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**The Development of the Wabash and Erie Canal (1832 - 1875)
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Wayne L. Bischoff

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**THE DEVELOPMENT OF THE WABASH AND ERIE CANAL (1832-
1875) IN CENTRAL INDIANA AND ITS AFFECT ON EVOLVING
WABASH VALLEY SETTLEMENT**

VOLUME I

By

Wayne L. Bischoff

A DISSERTATION

**Submitted to
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Department of Anthropology

2000

ABSTRACT

THE DEVELOPMENT OF THE WABASH AND ERIE CANAL (1832-1875) IN CENTRAL INDIANA AND ITS AFFECT ON EVOLVING WABASH VALLEY SETTLEMENT

By

Wayne L. Bischoff

The development of the Wabash and Erie Canal (1832-1875) in Central Indiana led to significant changes in the settlement pattern of the Wabash Valley, especially due to the introduction of the railroad in the late 19th Century. The project area chosen represented a maturing frontier situation, with an evolving local and regional transportation system. This study, by merging qualitative and quantitative approaches to settlement pattern formation, causality, and timing, uses two geographic concepts – Central Place Theory and the Kite Framework – to examine the historical and archaeological case study of settlement within the Wabash Valley. The approach used in this project solved the problems inherent in exclusively quantitative or qualitative approaches, by explaining the form of settlement at static time periods with Central Place Theory, and by explaining the causality and timing of settlement changes with intuitive inquiry utilizing the Kite Framework organizing tool.

As a result of this project, several new insights into the use and modification of classic Central Place Theory are presented, and many new uses and conclusions about the value and limitations of the Kite Framework are presented. Significant insights into the role of archaeology and the application of micro-environmental analysis to regional and

national problems are also given. Overall, this approach has profound implications for settlement study analysis in geography, history, and archaeological research, and can act as a guiding and comparative case study for projects dealing with regional settlement within a market economy.

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**This dissertation is dedicated to my wife, Michelle M. Marushia,
without whom this work would not be completed.**

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LIST OF ABBREVIATIONS

- (S. Doc) refers to a United States Senate Document
(H. Doc) refers to a United States House of Representatives Document
(Pub. Land) refers to a United States Document Dealing with Public Lands Owned by the Federal Government
(Misc.) refers to Miscellaneous United States Federal Documents Housed at the National Archives
(TCHA) refers to the Tippecanoe County Historical Association
(TCHA/L) refers to the Tippecanoe County Historical Association Library.
(TCHA/A) refers to the Tippecanoe County Historical Association/Archives Room.
(TCHA/A/O) refers to the Tippecanoe County Historical Association/Archives Room/Oversize Item Storage.
(IHSL/A) refers to the Indiana Historical Society/Archives
(ISL/A) refers to the Indiana State Library/Archives
(ISL/A/WA) refers to the Indiana State Library/Archives/Wabash and Erie Canal Collection
(ISL/MA) refers to the Indiana State Library/Map Archives
(ISL/IN) refers to the Indiana State Library/Indiana State Documents and Indiana-Related Materials Room.
(CCMA) refers to the Carroll County Museum Archives.
(CCMA/GAF) refers to Carroll County Museum Archives/General Archive Folders.
(CCPL) refers to the Carroll County Public Library.
(SIA) refers to the Shook Insurance Agency.
(DHHPA) refers to the Indiana Division of Historic Preservation and Archaeology.
(INDNR) refers to the Indiana Department of Natural Resources.
(CCWECA) refers to the Carroll County Wabash and Erie Canal Association.

Introduction

Settlement development and interaction within a market economy has long been a focus of interest for geographers, and more recently, to archaeologists. Central place theory, first developed by Walter Christaller in the 1930s, has been one of the more successful geographic models for explaining how central market communities interact within a region. Central place theory has been tested by geographers in a number of 20th Century regional case studies from around the world. Geographers have applied Central **place** theory to historical case studies a number of times, and historical archaeologists **since** the 1960s have been applying the theory to earlier historic and prehistoric situations.

The Kite Framework, an organizing system from geography with a political **ecology** theoretical background, will also be used in this study. The Kite Framework **organizes** data groups and applies hierarchies of importance to data elements. It is then **used** to generate logical qualitative interpretations of the data group. It is most useful for **organizing** data that involves events and decision-making within complex social and **environmental** systems. One of the major weaknesses of central place theory is its lack of **explaining** the timing of complex settlement emergence, and its inability to identify the **causal** ity behind settlement development. The Kite Framework will be used to examine **both causality** and timing within the project area. The combination of the two will, **therefore**, lead to analysis of the data from the study area both quantitatively and **qualitatively**.

This study applies central place theory and the Kite Framework to a 19th Century **central** Indiana situation, that of the interaction of farmsteads and higher order

communities along the Wabash and Erie Canal. The Wabash and Erie Canal was a 19th Century water-based transportation system, which linked Lake Erie with the Ohio River. The canal was constructed from Toledo, Ohio to Evansville, Indiana, with the most prosperous section being located within the Indiana Wabash River Valley. Settlement within this area developed in a transportation-poor region prior to the introduction of the canal from 1832 to 1843, with most communities having New Orleans via a long river route or Cincinnati by wagon as their only access to the larger United States economic system.

The Wabash and Erie Canal provided Wabash Valley communities with an access to East Coast markets in 1843, and facilitated local transportation for the ten years before *that* date. This shift from river to canal transportation led to a regional population and economic boom, which stimulated the exploitation of regional agricultural resources and the construction of many commercial industries. Later railroad and plank road development utilized the canal and road network previously created by merchants and farmers who used the canal. The 19th Century central Indiana economic landscape was, therefore, almost totally developed by the influence of the Wabash and Erie Canal.

Railroads became significant competition for canal transportation in 1856, when the Wabash Railroad was opened on a route parallel to most of the Wabash and Erie Canal. For the next ten years, both transportation routes competed for bulk goods, passengers, and general merchandise, with the canal finally losing the battle. Ironically, outside of the larger Indiana towns, the railroad did not develop infrastructure along its route until the mid-1870s, when smaller stations or agricultural processing stations emerged. This lag-time between transportation introduction and economic infrastructure

development allowed the older canal system to survive successfully through the 1860s.

The canal finally was closed in 1875, as bad weather, a lack of money, and the maturation of the railroad-based local transportation system led to the canal no longer being economically viable.

This project will attempt to determine if central place theory can be applied to the 19th Century Wabash Valley region. Before central place theory is applied to the project area, brief description of classic Central place theory and its modern variations, critiques, and test cases, will also be presented. Central place theory is best applied to case studies that involve large geographic regions because such an area is necessary to identify settlement hierarchies and interactions. Because central Indiana was a large enough region to study settlement interactions, was settled under the influence of a market economy, and since the region historically had a number of hierarchical central locations, central place theory structuring should be evident within the project area. Of primary interest also is whether the change in transportation, from canals to railroads, changed settlement within the project area in any way.

This study will, therefore, examine a three county area in central Indiana to test whether central place theory is applicable to historic settlement in the region. The three Indiana counties of Fountain, Tippecanoe, and Carroll were chosen because they were relatively unpopulated prior to 1840 when the Wabash and Erie Canal was introduced into the area. Settlement in the study area developed with the canal as the only single major transport system for almost two decades. Because of the dominance of the canal, several variations of central place theory can also be examined to determine if any one variation was dominant in the project area. These three variations, as described by Christaller, are:

general settlement within a market economy, settlement in a market economy with a single major transport source, and settlement within a market economy where the administration of lesser order centers by higher order centers is a primary goal.

Both historic and archaeological data will be used to first test whether settlement in the project area followed predicted central place theory patterns, or whether random spacing of settlements occurred. This project will then test whether settlement was oriented toward canal engineering features, or whether settlement occurred independent of canal feature location. The same hypotheses will be used for river and railroad transportation systems; then a comparison of the three will be done for the two time periods in question. A number of statistical tools will be used for this part of the study, including descriptive statistics, chi-square, K-S Test analyses, and regression analyses. Complete definitions, uses, and critiques of each statistical test will also be given within the *Theoretical Analysis* section of this work.

The second major part of this project will be to examine market complexity within the **three** Indiana counties during the 1860s. It will be determined whether retail and manufacturing buildings were more likely to be located in larger settlements (as predicted by **central** place theory) or whether there was no relationship between settlement size and **retail\manufacturing** placement. Again, a number of statistical tools will be used.

The final part of this project will involve using the Kite Framework to determine why settlement patterns developed within the project area at certain times. This is the first time that the Kite Framework, which has been applied to a number of modern case studies throughout the world, has been applied to a historical situation. The hypotheses tested above which deal with central place theory concepts provide a quantitative analysis

of the study area, but do not provide a qualitative analysis. Explaining why central place markets develop or change over time, and why change happened at certain times. Using the Kite Framework is an attempt to compensate for this central place theory weakness.

The Kite Framework is applied to historical data dealing with various Wabash and Erie Canal time periods into four major categories; political, social, economic, and environmental. Three major scales of interaction are also used to divide data. These scales are: local, regional (state-level), and national (or international). The data is then examined to produce qualitative conclusions about the relationship of the variables and scales of interaction.

The use of the Kite Framework can also give insights into which historic variables **were** important for changing settlement in the project area, and why the Wabash and Erie Canal eventually did fail as a transportation system. This is accomplished by assigning **power** to one of the four variable categories or to various scales of interaction. This **process** is designed to demonstrate the historical importance of one scale or variable at a **certain** time period.

For this study, the Kite Framework will be used to create intuitive conclusions for a **number** of specific time periods in the history of the Wabash and Erie Canal. To this **historic** data will then be added archaeological data, where applicable, with the Kite Framework being again used to create intuitive conclusions. Comparisons will then be **made to** determine the affect of archaeological data on the final Kite Framework **interpretation**.

The introduction of Archaeological data will be shown to be of great importance **in refining** the Kite Framework when dealing with an historic case study such as

settlement along the Wabash and Erie Canal. Including archaeological data can also better define which variables are given importance when the Kite Framework is applied in the future to historic studies involving linear transportation systems or developing frontier situations.

This project, then, uses a distinct multi-disciplinary approach to the study of settlement along the Wabash and Erie Canal. Theories and data frameworks from geography are applied to a historical situation that involves documentary evidence and archaeological data. The result is a multi-field study of the change in settlement within a *historical* context; a process that can be applied to modern situations as well as additional *historical* case studies.

Chapter 1

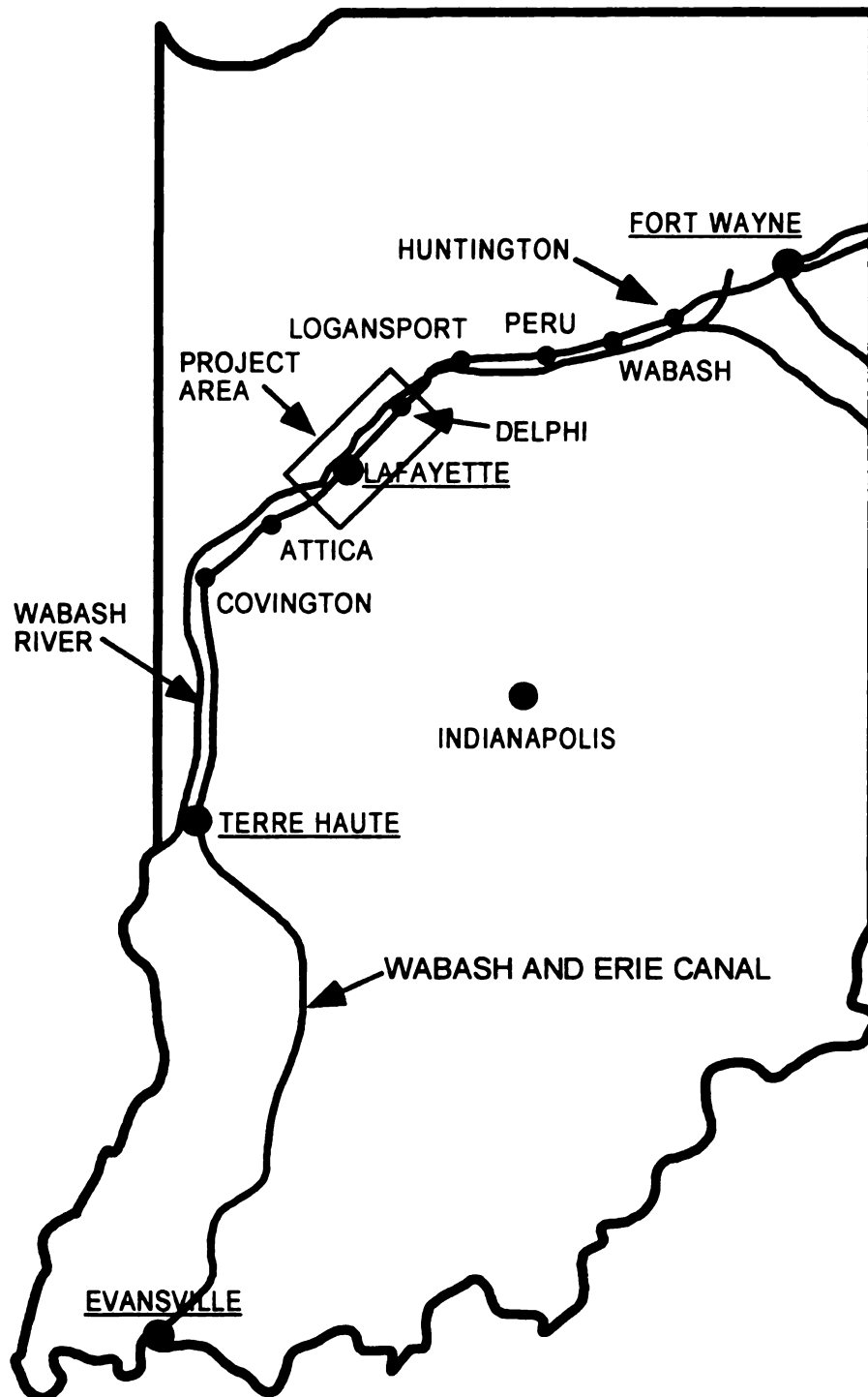
A History of the Wabash and Erie Canal, Including a Brief History of Tippecanoe and Carroll Counties in the 19th Century.

The Wabash and Erie Canal was the longest canal excavated in the United States, the second longest in the world, with over 468 miles of canal being constructed within the states of Ohio and Indiana (see Figure 1). The canal was begun in 1832 in Fort Wayne, Indiana, with individual sections being completed in different years. The final section of canal, from Terre Haute to Evansville, was open for navigation in 1853.

The financial mismanagement of the canal by the State of Indiana almost led to bankruptcy for the state between 1841 and 1846. Restructuring in 1847 placed the canal in the hands of a canal trustee board that answered to foreign and East Coast bondholders. Railroad competition began to seriously affect the profits of the canal two years later. Increased railroad competition, decreased tolls, and expensive maintenance eventually destroyed the economic usefulness of the Wabash and Erie. The entire canal was auctioned off in 1876.

The Wabash and Erie Canal has been labeled as the State of Indiana's "great white elephant," since it cost over \$8,200,000.00 to construct and made only half that money back in tolls and other rents. However, the secondary growth caused by the canal, especially in Central Indiana, was tremendous. Many of Indiana's most populous cities had humble origins as canal towns.

Figure 1: A Map of Indiana Showing the Wabash and Erie Canal and Major Canal Towns.



Wabash and Erie Canal, though not the most prosperous in American History, had at least a moderately successful history. Any examination of settlement along the canal is aided by a wealth of documentation, maps, and newspaper accounts that deal with the Wabash and Erie canal, canal economics, and settlement of commercial buildings, industries, and residences along the canal. To begin this project, a brief history of the Wabash and Erie Canal, based on these documents, is necessary.

The Origins of the Indiana Canal Project.

The end of the War of 1812 began one of the most speculative periods of economic growth in United States history. The vast Western territories that the U.S. government obtained after the ending of hostilities with Great Britain became the focus of intense debate, both at the state and at the national level. The new-formed states west of the Appalachian Mountains, and the more established states of New York and Pennsylvania argued over how best to utilize the seemingly endless tracts of land that were now opened for migration.

In the new race for westward exploitation, it was the State of New York that took the biggest risks, and reaped the largest rewards. After a long and futile struggle to obtain federal help in constructing the Erie Canal, the State of New York decided to undertake the project alone. In making this decision, the New York had several advantages over other states that bordered the vast western wilderness. New York had a determined and well-organized state administration that successfully completed the canal. New York also had a long-established financial infrastructure in place, a well-developed local infrastructure, and a population base that could be drawn on for necessary labor.

Finally, New York was an older state that had experience running large projects, organizing, and administering funds. New York accumulated a large state debt during the construction of the Erie Canal (begun in 1816), but the profits from the canal were such that this debt was easily paid off and profits, larger than originally expected, were soon being generated (Goodrich 1961, and Shaw 1966).

Many other western states tried to match the success of New York. What followed was an internal improvement “fever,” where states were in competition with each other to be the first to complete a canal or railroad between major bodies of water or other transportation systems. By the 1820s, every state west of the Appalachians and north of the Ohio was planning or constructing internal improvement projects on a scale equal to or greater to the Erie Canal (Esarey 1918). Indiana was no exception.

Indiana in the early 1800s was mostly an unpopulated wilderness. Most of Indiana was not opened for settlement until after the War of 1812, with the exception of the southern part of the state along the Ohio River (Fatout 1972). The ending of the war did open one of the larger natural transportation routes – that of the Wabash River/Maumee River system – for settlement. This transportation system had long been used by traders and travelers in the Indiana Territory, but only a few under-populated river settlements existed when Indiana became a state in 1816. The only market open to the State of Indiana until the 1830s was New Orleans. Agricultural goods would be shipped on flatboats to that city, either from ports on the Ohio or the Wabash River. The interior portion of the state was mostly cut off from the New Orleans market, as wagon hauling was too expensive (Duden 1909: 161, and Benton 1903: 105).

Thoughts of connecting the Wabash River and the Maumee River with a canal began as early as 1819, when a number of speculators and surveyors identified historically only as the “Ephraim Overman and others” petitioned the new State of Indiana for the rights to survey the area for a canal route. This plan was rejected by the state as being too premature (*House Journal* 1820:55). At this point in time, the new government of Indiana was not interested in backing a large transportation project by a private company in a mostly unpopulated section of the state, especially since the project would not have opened up new areas for settlement, nor connected existing populous regions (Cottman 1907: 118, and Poinsett 1969: 31).

The government of the State of Indiana would not view Northern Indiana as being worthy of much state investment until after 1825. At that date, the state capitol was officially moved to Indianapolis from Corydon, a move that shifted the focus from the Ohio River to the central part of the state. Slowly, an infrastructure of roads linking small settlements moved north, connecting the Indianapolis region and the Quaker settlement at Richmond on the east-central border of the state with the Ohio River settlements (Fatout 1972). Demand for canal transportation, therefore, increased over time as the population of Indiana shifted from the south to the central part of the state.

Indiana was also affected at this time by a shift in national political ideology. The mood of the country began to change through the 1820s, as the ideas of Andrew Jackson became more influential. The era of Jacksonian Democracy placed a large emphasis on the idea of public property and the suspicion of private monopolies. Politicians of the time believed in a paternalistic role for the state in the lives of its citizens, where state governments had a duty to aid in the prosperity of the people (Comstock 1909: 123).

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State-sponsored internal improvement projects fit in well with this idea of the government taking a role in the well-being of its citizens (Blank 1916: 132). The ideology of public works stated that the benefits of public enterprise must be equal for all citizens; every region had equal rights to the benefits put forth by the state. Internal improvements, therefore, were expected to expand equality and democracy at the same time that they supported economic expansion and development (Scheiber 1969: 89).

The realities of the time influenced state involvement in internal improvements as well. Private enterprise did not have enough capital to create the transportation systems needed by the growing western states. As George Cottman (1907: 118) stated, “such aid as the general government rendered was insignificant compared with the growing needs of the country; private enterprise likewise failed to keep pace with those needs, and the idea of State paternalism naturally grew up as the most promising means to the desired end.”

Because of the agricultural political base of the western states, the needs of farmers were high on the priority list of the state legislature. As farmers exploited new areas south of Indianapolis, a transportation problem developed. As has already been stated, wagon hauling in the 1800s was extremely expensive. The farther from the Ohio and Whitewater Rivers, the more costly agriculture became. A bushel of corn at Indianapolis was worth 12 to 20 cents. On the Ohio, it was worth 50 cents (Esarey 1918). The cost of shipping from the central counties of Indiana was about \$25.00 a ton, with the same rate being charged on goods entering the county (*Senate Journal* 1834: 74). This led to an overall loss to the farmers of Indiana in the hundreds of thousands of dollars. Another problem with wagon hauling was the time needed in transportation. Any

disruption in the road system, either from storms or from flooding, could mean a crop rotting before the river market of Cincinnati could even be reached (Fatout 1972).

As long as the Ohio River was the focal point of the inland transportation system, agriculture would remain a costly business (Esarey 1918). As Governor Ray (*Documentary Journal*¹ 1827:12) stated, “Whatever will carry the flour, pork, beef, potatoes and productions of our soil to a good market, with the most expedition and the smallest expense, as well as most safely and securely; and return those articles of merchandise which the people must and will have, in the same manner, is what is wanted.”

Indiana citizens began agitating for transportation improvement in the early 1820s, but a serious depression existed at the time and no investors could be found. Sectional interests also divided the state government on the direction of internal improvements. The overall lack of investment funding and the poverty of the new state led to a general disinterest in large improvement projects within the state government (Cottman 1907: 118). An overall upswing in the world economy in the late 1820s, and the interest generated from the successful construction of the Erie Canal began to spark new interest in Indiana for transportation projects (Fatout 1972).

Throughout the 1820s, several other states – chiefly Ohio and Pennsylvania – began large canal projects, creating an atmosphere of unease in the Indiana government.

¹ The *Documentary Journal* used here and throughout this Dissertation refers to the yearly publication of the State of Indiana of all official reports, addresses, and all official governmental statements to the public. Historically, the *Documentary Journal* included both the official publications of the Senate of the State of Indiana and the House of Representatives, with other inclusions as necessary. Most of the *Documentary Journals* of the State of Indiana can be found in the Indiana State Library in Indianapolis, Indiana.

The Erie Canal had not yet been proven a success at this time, but the interest it was generating in other western states caused the government of Indiana to question whether it too should invest in internal improvement projects so as to not get left behind in the coming transportation boom (Fatout 1972). As one newspaper of the time put it, “should the people of the growing state look silently on, while her sister states are increasing in wealth and population?” (*Indiana Register*, Jan 8th 1825).

Public opinion quickly shifted toward supporting state-constructed internal improvement projects. The Lawrenceberg *Palladium* (July 22nd 1825) put forth the plan for a statewide canal system, “the connection of the upper part of the Wabash River and the Lake, through the Maumee with the Ohio River... Let us then have the credit of making the first effort, in so noble and laudable an undertaking.” Several Indiana papers of the time called out for the government of the State of Indiana to act in the interest of its citizens. Most called for canals to link the distant Indiana towns and to provide for a cheaper route for bringing agricultural products to market (Fatout 1972, and Comstock 1907: 3).

Indiana Petitions the Federal Government for a Land Grant.

Late in 1825, the Erie Canal opened in New York, with 362 miles of canal connecting New York City with Buffalo on Lake Erie. New York’s triumph would over the years allow the state to surpass competitive commercial centers, such as Boston and Philadelphia, as the Erie Canal became the favored east-west route for immigrants, manufactured goods, and agricultural products. The completion of the canal added to the

almost desperate rush the other western states made to complete their own canals (Duden 1909: 163).

By the mid-1820s, several legislators again examined the feasibility of a canal to connect the Maumee with the Wabash River. Especially interested were the citizens of the small frontier town of Fort Wayne, who had the most to gain from such a project (Poinsatte 1969: 28). This plan grew from a twenty-five mile canal linking the two rivers, to a proposed canal to link Fort Wayne with Lake Erie (Cottman 1907: 119).

To fund such an ambitious project, the State of Indiana sought a Federal land grant of alternating sections along the path of the canal that the state could sell to pay for canal construction. This plan for Federal aid was submitted to the United States legislature in 1823 by Jonathan Jennings, one of Indiana's three representatives in Congress (Poinsatte 1969: 31). From 1824 to 1827, the United States Congress deliberated on the petition from the State of Indiana for a grant of Federal lands for the completion of a canal from the Wabash River to Lake Erie (S. Doc 47 (19-1) 126, S. Doc 29 (19-2) 145, H. Doc. 78 (18-2) 122).

The arguments presented by the State of Indiana for such a transportation system were that it would be an excellent military route for the United States if war with England and Canada ever broke out (Cottman 1907). This argument paralleled earlier congressional opinions that recommended Federally-supported canals and roads to aid the country in wartime (Misc. 462 (15-2) ASP038). In addition to canals as an aid in national defense, it was assumed that the economic gains to be made from such projects would benefit the entire country.

The United States Congress authorized the survey a canal route through Federal lands on May 25th, 1824 as a prelude to a final congressional decision on the Indiana land grant issue (Pub. Land 1203 (23-1) ASP033). Federal surveyors arrived in Indiana early in 1826 to determine the feasibility of several proposed Indiana canal routes. Over the next year, the surveyors examined the proposed pathways of several Indiana canals and determined which parts of the canal would be located within the State of Ohio (Comstock 1911:3, DeLong 1970: 1). In this endeavor, the surveyors were constantly manipulated by state officials and local officials, as special interests and individual communities sought to influence which routes would be surveyed. As Paul Fatout (1972: 35) stated, "The adventures of the engineering corps, moved around like chessmen by politicians, reveled that the clash of interests, private, political, and sectional, boded no good to concerted action by the state."

One environmental note made by the Federal engineers was a concern that the summer months would be too dry to water a canal. It was therefore suggested that additional feeders should be made to allow several creeks along the route to be tapped as water sources (*House Journal* 1827). This recommendation would later have expensive consequences for the State of Indiana.

It would not be until early in 1827 that the United States Congress was ready to decide on Indiana's internal improvement project. One of the side effects of the government of Indiana's quest for a federal land grant was the removal of the Potawatomis from their central Indiana reservation. This reservation was located on the northern side of the Wabash River directly in the middle of the state, and was a hindrance

to obtaining the Federal land grant. The United States congress needed proof that the reservation would not be a problem for Indiana's proposed canal. After several months of negotiation, the Potawatomis transferred ownership of their reservation to the State of Indiana in October of 1826 (Reid 1913).

With the Potawatomi question settled, the government of Indiana was ready to put forth its great internal improvement program. The governor summed up the feelings of most of Indiana's citizens at the time in his 1826 Message to the People of Indiana,

“On the construction of roads and canals... we must rely, as the safest and most certain state policy, to... place us amongst the first in the Union... The rough appearances of nature, must be overcome, and made to yield to human enterprise. Our waters must be imprisoned in new channels, and made to subserve the essential purposes of commerce”
(*House Journal* 1826).

Wild speculation began as soon as the Potawatomi Reserve was obtained by the State of Indiana. Land speculators descended upon the proposed Wabash and Erie Canal route, claiming lands at important points. Settlers started migrating to the upper Wabash, passing through Indianapolis as they hoped to arrive before the canal boom brought in greater numbers of immigrants. Excitement rose as newspapers painted pictures of an Indiana criss-crossed with internal improvements, linking every town with a canal, road, or railway (Poinsatte 1969: 12-14, and Reid 1913). It was at this time (1828) that the town of Logansport was platted (Holliday 1961: 103). Logansport was placed directly on the route of the proposed Wabash and Erie Canal, and is an example of the growth influenced by the canal even before it existed as a transportation system.

The Federal Land Grant and Deciding upon a Transportation System.

Indiana's request for a land grant was finally passed in the United States Congress on March 2nd, 1827 (Peters 1850: 236). The final version granted to the State of Indiana "for the purpose of aiding the said state in opening a canal to unite at navigable points the waters of the Wabash River with those of Lake Erie, a quantity of land equal to one half of five sections in width, on each side of said canal, and reserving each alternate section to the United States..." (Peters 1850: 236). This grant had several stated provisions, that the canal would be free to Federal purposes, and that the canal "shall be commenced within five years and completed in twenty years, or the state shall be bound to pay to the United States the amount of a any lands previously sold..." (Peters 1850: 236).

This original 1827 internal improvement grant funded a canal 213 miles long, which would link several of Indiana's major river systems. The total acres granted by this bill was 3200 per mile of canal, which the State could sell for the sole purpose of canal construction (DeLong 1970: 3). The United States Government hoped that the improvements completed by the State of Indiana would increase the overall value of the alternating sections which the government would retain, thus eventually paying off the grant through increased land values (Poinsatte 1969: 33-34).

Other land followed the 1827 Federal land grant, especially as the scope of the Wabash and Erie Canal project extended farther south. Eventually, the United States government granted 1,695,376.74 acres to the State of Indiana for the completion of the Wabash and Erie Canal. The dates of the separate land grants are as follows: March 2nd, 1827 -- 527,271.24 acres, May 9th, 1830 -- 29,552.50 acres, February 27th, 1841 -- 766,630.19 acres, August 29th, 1842 -- 766,630.19 acres, May 9th, 1848 -- 113,348.33

acres (Albjerg 1932, see also S. Doc 78 (28-1) 432, S. Doc 62 (23-2) 268, Pub.Land 1203 (23-1) ASP033, and H. Doc 83 (28-2) 465).

The government of Indiana, led by Governor Hendricks, accepted the conditions of the original land grant and began discussion of how the project would commence after 1827. The Indiana state government authorized the construction of the canal in 1828 (*Laws of Indiana*:1828 10). Eventually, this project grew to become the Wabash and Erie Canal; a proposed canal to link Lake Erie, near present-day's Toledo, with Evansville, Indiana, on the Ohio River.

Excitement mounted within the Indiana government over how best to use the generous Federal land grant. Governor Ray estimated the land given as being worth about \$1,250,000.00. How this figure was obtained was not noted, but the immense apparent value of the gift (especially to a mostly impoverished state) was expected to be able to fund a massive internal improvements campaign (Cottman 1907: 121). As Paul Fatout (1972: 40) has stated, "The concept of a 'grand system,' proposed for the first time, was good practical politics, for it seemed the only way to harmonize conflicting interests, particularly to satisfy Wabash canal opponents who regarded it as unlikely to benefit their section or the state as a whole." These opponents were from different geographical regions of Indiana, mainly the eastern section along Ohio, and the southern area.

To counter arguments that a Wabash River transportation system would cost more than the land grant, Governor Ray (*House Journal* 1827) stated that internal improvements should not be measured "by a too penurious calculation of dollars and cents." His conclusion was that, if the canal could not be paid for out of the land grant, then additional borrowing would not damage the credit of the State of Indiana while canal

tolls were gathered to make interest payments. His implication was that canal profits would be more than sufficient to pay off any loans taken out to complete a Wabash River transportation system (*House Journal* 1827).

At this point, Governor Ray was one of several politicians who favored railroads over canals. This classic debate of the early 1800s was played out in a number of western states as the form state internal improvements would take was decided. In all cases except Michigan, canals were chosen over railroads. Railroads were still in their experimental stage. Railroad technology was not yet developed to the point of being cost-effective, safe, or reliable, whereas canals were a proven means of transportation (Blank 1926: 127). The success of the Erie Canal also influenced this debate (Shaw 1990, and Calkins 1929).

A State Senate committee tasked with examining the issue of railroads versus canals concluded that “every consideration of usefulness, practicability, durability, and economy, point to canals, and render it obviously inexpedient to waste time upon the subject of railways” (*Senate Journal* 1828). A later study by the commissioners of the Wabash and Erie Canal concluded that, “From experiments made where canals and railroads have been used and fairly tested, the relative comparison between the two modes of conveyance, when passing at a rate not exceeding from two and a half to three and a half miles per hour, is much in favor of canals (ISL/A/WA: *Report by the Commissioners of the Wabash and Erie Canal*, December 17th, 1831).

Eventually, the canal-backers won. The Government of the State of Indiana formally accepted the Federal land grant on January 5th, 1828, and soon after passed an act to authorize the construction of a canal to connect the Wabash River with the

Maumee. On January 14th, 1828, the state legislature elected three canal commissioners to oversee the project, with funding of \$2500.00 to complete this task (*Laws of Indiana* 1828: 10). The purpose of this commission was to select land, hire surveyors, locate the canal, make estimates, lay off town sites, and finance the undertaking of the canal (*Documentary Journal* 1827). It was the task of these three politicians to perform an additional survey of the proposed Wabash and Erie Canal route from Fort Wayne to the mouth of the Tippecanoe River, using the Federal surveys as a base of reference. The canal commissioners also would make the final decision on the exact route the canal would follow (Poinsatte 1969: 34).

Another role played by the commissioners was that of political mediators between regions. The three commissioners spent much time their first year haggling and negotiating with other regional groups to gather support for the Wabash and Erie Canal project on a larger scale, and to decide the final route of the canal (DeLong 1970: 3). The heavily populated Whitewater Valley area, which stretched from near Cincinnati to Richmond, Indiana, demanded a canal of their own as compensation for their support. Eventually, the Whitewater Canal became another project accepted by the State of Indiana. Other regions put forth their own improvements ideas, most of which would later be incorporated into the Mammoth Internal Improvement Act (Fatout 1972).

Announcement of the plan to build the Wabash and Erie Canal gave hope to many central Indiana communities for finally gaining a cost-effective transportation route to more distant markets. A stormy political battle began in the early 1800s between the small settlements of the Indiana interior over the eventual route of the canal. Businessmen of Lafayette and Delphi petitioned the commissioners to have the canal

reach their towns (Stuart 1924: 39). Direct access to the Wabash and Erie Canal meant economic prosperity, whereas being by-passed would result in dependence on rival towns for access to the canal. The fight between rival communities over canal construction, pathway choice, and the eventual filling of the canal with water produced a number of political confrontations with the canal commission. The towns of Delphi, Lafayette, and Logansport were at the forefront of the political maneuvering for positions on the canal in the central Wabash Valley. Eventually, each town won its bid to become a canal town, though when the canal would be built through the area was undetermined in the late 1820s (Mayhill 1953: 33).

The Problem of Funding a Canal Project.

Taxes gathered by the State of Indiana in 1827 amounted to \$33,000.00 a year, hardly enough to keep the government in operation, let alone start the proposed statewide canal project. It is in this matter that more established states had an advantage over the newly formed western states (Esarey 1918). The State of New York had an existing financial system and could fund the Erie Canal. Pennsylvania, though land grants were also a necessary part of its canal plans, had enough money to start projects before loans were established (Shaw 1966). In 1828, Indiana could do little more than fund fact-finding missions, route selection plans, and cost estimates for the legislature. It would take much more financial maneuvering before the first spade of earth could be moved (Fatout 1972).

Political deadlock ensued after 1828. Confusion about where funds would come from, even with the land grant, caused delay on decision-making on the subject of canals.

Fact-finding reports were submitted by the canal commission, with estimates and route suggestions, but no loan bill could be agreed upon. Many legislators were wary of the complete lack of knowledge upon which they were being asked to make decisions (Esarey 1918). Others supported the canal based on idealistic notions of future canal profits or land sale returns. Debate also centered on how the public lands would be sold which had been granted by the Federal government. Would speculators take the forefront, or would land be set aside for individual owners? (*House Journal* 1829). Regional differences also entered the fray, with supporters of an Ohio River improvement, the Whitewater Canal Project, the Wabash canal backers, and opponents of any project because of the financial risk all in contest with one another. The result of all this lively debate was that construction of the Wabash and Erie Canal was delayed for many years while a direction of action was decided upon (Esarey 1918).

The Erie Canal at this time was producing a yearly income close to one million dollars, and was pointed to as one of the wonders of the modern world. Ohio's canals were also generating profit at a healthy rate. Canal proponents in Indiana expected any such system to result in as great a success, with the notion being often presented in political debates that any Indiana canal constructed would pay itself off within three years of completion (Cottman 1907: 121, and Duden 1909: 163). As Indiana politicians debated, other states were beginning canal systems which would link the most of the western rivers and lakes with eastern ports, creating a transportation system of hundreds of miles (Shaw 1966, and Scheiber 1987).

Another delay in the construction of the Wabash and Erie Canal was the debate with Ohio over construction of the canal from Fort Wayne to Lake Erie and the

distribution of the land grant within the border of the State of Ohio. Eventually it was agreed by the two states that Ohio would construct part of the Wabash and Erie Canal, from the state line to Lake Erie, and would receive the land grant within that state. This work would be completed within fifteen years of 1829. The Indiana legislature debated the agreement with Ohio through 1830 until it was finally passed (*Laws of Indiana* 1828-29: 147).

1830 also marked the decision by the Indiana government to hire Samuel Lewis as a canal commissioner, and to hire Joseph Ridgway, an Ohio engineer, to prepare plans and specifications for a canal from the state line to the Tippecanoe River. After again surveying the proposed route, Ridgway eventually estimated that \$1,081,970.00 would be needed to complete such a project (Fatout 1972, and Comstock 1911: 3).

Again, nothing came of these new Indiana canal actions. Ohio also did not ratify the canal construction agreement with Indiana, both of which delayed any canal decision for yet another year. Howard Stansbury, a United States engineer, performed yet another survey of the proposed Wabash canal route, as well as a route from the Wabash to Lake Michigan. His estimates were markedly higher than Ridgway's (Fatout 1972).

The canal lands granted by the Federal government were finally put up for auction in 1830, with disappointing results. Land was sold at an average price of \$1.70 per acres, which was far below their estimate of \$2.50 per acre (Esarey 1915). Eventually, the state government halted land sales until the price was more beneficial to the state (*Laws of Indiana* 1830: 124). The land grant, it seemed, would not produce the money the State of Indiana initially expected. After the land sale, the idea was put forth that an actual

starting of canal construction would stimulate prices and draw interest to future land sales (Poinsatte 1969: 36, and Esarey 1918).

Indiana at the end of 1830 was in risk of losing its Federal land grant. Land sales had not generated enough money to start the canal project that the grant was designed to support (DeLong 1970: 3). The State of Ohio had not agreed to provide a link to Lake Erie, which was a primary goal of constructing the transportation system in the first place (Fatout 1972). Political debate and sectionalism had slowed down decision-making on the canal project within the State of Indiana government so that few actual decisions were being made (Stuart 1924: 40). Another irritation to the canal backers in the Indiana legislature was a resurgence in the pro- railroad group, which brought up renewed debate over the nature of the transportation system to be created. This group, led by David Hoover of Wayne County, was strong enough to block the legislature for a whole session (Esarey 1918).

The canal commissioners submitted a report to the Indiana legislature in 1831 stating that the cost of a canal along the Wabash River would be less than \$9,000.00 per mile, which would be less than railroads (*House Journal* 1831). Part of the canal proponents argument was that the canal system, “with the exception of decay incident to Locks, Aqueducts *and other mechanical structures, must become more permanent by time thereafter*” (*House Journal* 1832). The canal backers, therefore, expected that the canal would be cheaper than railroads and cost little to maintain once the system was put into place.

The ending date for the Federal land grant was March 2nd, 1832, and with the government of Indiana facing the embarrassing situation of giving the land back, a

desperate need to come to some conclusion overcame the state legislature and the citizens of Indiana (Fatout 1972). In the end, the canal proponents won out over railroad backers. Part of why they won was that waterways were still seen as superior to railroads, and partly because most legislatures were determined, that something should be done so that the Federal land was not lost and the state embarrassed.

The internal improvement act of January 9th, 1832, set up a board of canal fund commissioners, empowered to borrow \$200,000.00 for the construction of a canal along the Wabash River (*Laws of Indiana* 1833: 3). Money would also come from land sales to be added to this sum. Canal commissioners were thereafter authorized to let contracts for canal construction, which would not exceed the funds accumulated from loans and land sales. The internal improvement legislation also classified the Federal land grant lands into three grades priced at \$3.50, \$2.50, and \$1.50 per acre. It also authorized a new round of public sales, and allowed for private sales thereafter (*House Journal* 1832, and *Laws of Indiana* 1831-32, ch 1: 3-9).

Most of the money needed to construct state roads within Indiana came from the “3 per cent fund,” which was set up by the federal government when it officially organized Indiana as a state on April 19th, 1816. This congressional enabling act set aside five percent of federal land sale revenues within the state for the construction of public roads and canals; three percent of which was controlled by the state legislature (Howe 1890: 190). Money was taken out of the “3 per cent fund” by the state government as early as 1824 for the improvement of Wabash River navigation (*Laws of Indiana* 1824: 82), and for road construction within the state in 1830 (*Laws of Indiana* 1830: 60). It is

unknown if some, or any, of this fund was incorporated into the later construction of the Wabash and Erie Canal.

The decision of January 9th to construct the Wabash and Erie Canal caused much celebration along the proposed canal route. River towns which once existed in obscurity were expected to become the new Cincinnati of the West. Economic prosperity was seen as being just around the corner. One part of the canal act, however, went mostly unnoticed as the interior parts of Indiana caught the wave of “canal fever.” Along with the construction of the Wabash and Erie Canal, the canal also allowed for the chartering of eight railroad companies, five of which were to be between Indianapolis and the Ohio River. These charters would eventually become the economic bane of the canal, as railroads eclipsed then dominated transportation in Indiana (*House Journal* 1832).

Ground-Breaking and Canal Financing.

Ground was broken for the Wabash and Erie Canal at Fort Wayne on February 22nd, 1832. This date was chosen to avoid the March 2nd deadline put forth in the original Federal land grant act. Fort Wayne at this time was a small frontier community of slightly over three hundred people. Much celebrating accompanied the ground-breaking as the citizens of Fort Wayne expected their community to soon become a great canal town (Poinsatte 1969: 37).

Five years had passed since Indiana had been given its first grant of Wabash and Erie Canal lands, and the state had little to show for the national government’s generous gift. Even though the ground-breaking ceremony was sufficient to retain the land grant,

not a single contract had been made by that date, nor was any work on the canal expected for several months (Fatout 1972).

President Andrew Jackson's fight with the United States Bank, despite the general world economic boom of the 1830s, was enough to make Indiana politicians wary of large-scale loans. Though no decisions were made by the time of the ground-breaking ceremony on the funding of the canal, several advertisements for loan investors were put forth in newspapers of New York and other eastern cities. Over the next year, canal fund commissioners debated the loan prospects received by Indiana and canal commissioners supervised the collection and investment of the returns from the original land sales, which amounted to about \$28,000 by 1832 (Fatout 1972). At this time, the canal board hired Jesse L. Williams, a veteran engineer of Ohio's internal improvements, to act as supervising engineer of construction. Williams, as Chief Engineer, was required to make yearly reports to the state legislature on the condition and progress of the Wabash and Erie Canal (*Laws of Indiana* 1839: 3).

Indiana Begins Construction of the Wabash and Erie Canal.

The canal board of the State of Indiana began letting contracts on March 1st, 1832, with the canal south of Fort Wayne being sectioned into one-half mile divisions. Each division had specifications that the engineers had previously put forth. The contracts were let to the lowest bidder, with some contractors taking several sections. During the first year of Wabash and Erie Canal construction, thirty-eight sections were contracted for a total of twenty miles. These contracts amounted to \$117,000.00 due in payment (Esarey 1918, and Poinsett 1969: 40-41).

Though contracts were made, work did not begin immediately. Contractors had no workers for canal construction; northern Indiana did not have a population base that could supply the number of workers needed, agriculture was in direct competition for labor and paid better at this time, and internal improvement projects in other western states had already monopolized the excess labor to be found west of the Appalachians. Blackhawk's War in the Illinois country and rumored outbreaks of cholera also dissuaded workers from northern Indiana (Poinsatte 1969: 38, and David Burr to John Tipton, August 7th, 1832, Robertson and Riker, 1842: 676). The scarcity of good materials for locks and other canal features also hindered the progress of construction (Duden 1909: 162).

While Indiana began its disorganized start on the Wabash and Erie Canal, several canal fund commissioners were traveling to New York City to organize loans for the project. The fund raisers arrived in New York to find out that no one had heard of the Indiana canal project, despite their advertising (ISL/A/WA: Fund Commissioners' Letterbook: 16). Finally, in August the fund commissioners negotiated a loan of \$100,000.00 at 6 percent Interest with J. D. Beers & Company. Part of the loan set up specific interest paying dates (*House Journal* 1832: 73). In exchange for the loan, the fund commissioners handed over \$100,000.00 worth of state improvement bonds to J. D. Beers & Company, half of which were offered on credit only (*Documentary Journal* 1835). This policy of delivering bonds for promises of future loan payments would get the fund commissioners, and the State of Indiana into much trouble as the years passed.

Another dubious practice of the fund commissioners was loaning money to friends out of the internal improvement funds. It was not illegal at this time for personal

loans to be made out of the accumulated loan money. In one way, the practice made interest money on the loan money while it was not being used by the State of Indiana to pay contractors. In another, it was also a way for the canal fund commissioners to help friends and politicians who needed large sums of money. The canal fund commissioners eventually loaned out to friends over \$25,000.00 of state money (*House Journal* 1832: 190). No one questioned these private loans at the time, and the practice began a tradition of unregulated use of canal monies.

The State of Indiana, after all the dealings of the canal commissioners, in late 1832 had \$104,573.23 on hand to pay for the initial construction of the Wabash and Erie Canal (*House Journal* 1832: 190). But several other conditions were needed before construction could begin.

The year of 1832 was important for two other canal-related events. The first was the final migration of the Potawatomi from their central Indiana reservation to new lands in the West. The second was the completion of negotiations with the State of Ohio on the construction of the Wabash and Erie Canal in that State. The resolution with Ohio assured the canal that it would eventually reach Lake Erie, though the time of completion to that lake was still left up to the State of Ohio (Fatout 1972).

Early in 1833, Chief Canal Engineer Williams noted that the drain on canal funds was at an alarming rate of \$13,200.00 a month, with little of the canal being actually completed. Contractors were operating at a leisurely pace (probably because the state had set no contract time limits). Speculators and citizens along the canal were becoming anxious at the lack of effort on the part of the State of Indiana in providing them with the promised canal. At the same time, interest payments were being made; the payment of

such coming directly out of the same canal fund set up by the loans in the first place (Fatout 1972: 58).

Engineer Williams soon found himself engaged in jobs other than canal construction. Notices began to appear throughout the newspapers of the western states, such as the following Indianapolis *Indiana Journal* add from August 4th, 1832:

“Cash for Canal Hands.

We wish to employ laborers on the Wabash and Erie Canal, 12 miles west of Fort Wayne.

The situation is healthy and dry. We will pay \$10 per month for sober and industrious men.

Murray & Vermilya.”

Labor problems were such that Williams had to go on a labor recruiting tour of the western states, enticing a number of German and Irish laborers to migrate to Indiana to work on the Wabash and Erie Canal (*Cass County Times*, August 25th, 1832. Thus began the intimate relationship with the Irish canal laborer who would become such a colorful part of Indiana canal construction history.

A Note on the Construction of the Wabash and Erie Canal.

At this point, a brief account of canal construction needs to be given. The construction of canals in all the western states during the early 1800s was mostly the same, with regional variations only modifying the basic form. Construction of a section of the Wabash and Erie Canal began with a sixty-foot wide swath being cleared of trees and brush along the proposed canal route. A channel was then excavated so that the cross

section was forty feet wide at the top, twenty-six feet wide at the bottom, and four feet deep sides (*House Journal* 1834: 16).

The back berm and the towpath were kept at least two feet above the water line, which was to be maintained at forty feet wide and four feet deep. The canal towpath top was 10 ft. wide and flattened for mule traffic, with the back-berm being 6 ft. wide and rounded. In some cases, the towpath was reinforced and rose to an additional height. In this way, the embankment could act as a reinforced flood wall or dam. This process was especially used in areas where several natural water sources came together or intersected the canal, or where run-off from steep cliffs threatened the earthworks. Within the towpath and back berm were sometimes placed stone rubble known as “rip-rap.” The purpose of this stone rubble was to reinforce the embankments. A water-tight clay “puddle” was then put down in the canal channel and sides (*House Journal* 1834: 16).

Drains of stone or rubble were placed along the back of both embankments to lead water away from the towpath or back-berm. Canal banks were cleared of trees out to twenty feet to prevent limbs falling into the canal. Spoil banks, made from the excavated dirt, were constructed behind the towpath or back-berm in some places to buffer against flooding or to facilitate drainage of excess water (*General Rules and Specifications, Engineer's Office* 1847: ISL/A/WA).

Captain John T. Campbell, who once was a child laborer on the Wabash and Erie Canal, gave an account of canal construction in Indiana:

“All the dirt was moved in carts and wheelbarrows. Each teamster led two horses, one at a time, from the shovel pit to the dump, or tow path, where a dump boss directed to “haw gee and back.” That was the command whether the turn to be made was haw or gee. The boss would

throw his weight on the back end of the cartbed when it would tip down and shoot the dirt out backward and down the embankment, or on the level ground, or in a hole or sink according to the progress of the embankment. Then drives would lead the horse and cart back to the shovel pit and turn and back the cart to the pit and lead the other horse and cart to the bank. While one horse was being led to the bank or towpath, six to eight shovelers would be filling the other cart” (Indianapolis *Star*, July 26th, 1907.

Though Chief Engineer Williams (*House Journal* 1834: 16) stated the ideal form that the Wabash and Erie Canal would take in his statement to the Indiana legislature in 1834, he was quite aware that local conditions would change, sometimes dramatically, the shape of the canal. Special engineering features were sometimes needed, and the local environment determined changes in the width or prism of the canal. The most common engineering feature on the Wabash and Erie Canal was a wooden box-shaped culvert which was located beneath the canal, and which was designed so that water from a local natural source could flow beneath the canal. This structure was necessary to prevent flooding which occurred in normally dry streambeds to bypass the canal, thus eliminating the risk to the canal from floodwater. Culverts were used when the stream or creek could not be used as a water source, since the normal flow of water was so small.

Other engineering features included locks for raising or lowering boats from one elevation to another (usually four to ten feet), aqueducts, which passed boats and the canal over gorges or steep-sided streams, and bridges, which allowed road traffic to cross the canal or for towpath mules to pass from one side of the canal to the other. Other, less common features were constructed for the Wabash and Erie Canal.

The purpose of a canal is to create a stable, non-directional and controllable body of water for transporting large cargo barges of a standard length, width and height.

Usually two mules in tandem were used on the Wabash and Erie Canal, walking along a towpath constructed on the embankment of one canal side. These mules pulled barges at up to four miles-per-hour along the canal channel.

Two major types of boat traveled on the Wabash and Erie Canal. Cargo barges were the work-horse of the waterways; hauling raw goods and merchandise between port cities on the canal. Passenger boats carried passengers between the major canal towns, and transported immigrants and migrants west. Benjamin Stuart (1924) briefly describes these two types of boat that would frequent the Wabash and Erie Canal:

"Boats were about one hundred feet in length, or a little longer, and built for the kind of traffic which they were to haul. Freight boats were generally pulled by three mules hitched single file, tandem style, to a tow line two hundred and fifty feet long. The driver rode the hindmost mule and when a hard pull on a sand bar or entering a lock, bags of sand would be put on the lead mule to hold them to the ground. Three miles an hour was a very good rate of speed.

"A packet was a passenger boat... It was generally pulled by three horses and made schedule time in relays. A team with fresh driver would be ready at the post, the change made, and away they would go at seven miles per hour..."

"The canal was also used to raft saw logs to an eastern or western market. Rafts would be built in sections – sometimes three hundred feet in length. Once through the lock the sections would be tied together and towed to the next lock."

Passenger boats were divided into two classes. Line boats carried passengers who did not care about the speed of the voyage – usually immigrant or migrant families and tourists. Packet boats were faster, and were used by passengers who needed to reach their destination with greater speed (DeLong 1970: 6-7).

Another type of boat was briefly tried out on the Wabash and Erie Canal in 1862. In the summer of that year, a steam canal boat was tried out on the Wabash and Erie

Canal. Built at Lafayette, it made the trip to Toledo in record time, but the wash it created so damaged the banks that it was never allowed to use the canal again (Reser 1934: 316).

In addition to these major types, many smaller boats would frequent the canal channel; either for local cargo hauls, or for pleasure outings. An account of this type of boat comes from J. Wesley Whicker, who reminisced about his uncle building a scow to be used on the Wabash and Erie Canal (1916: 80). These smaller boats were used by individual farmers for short hauls or for personal travel. An even cheaper form of canal transportation utilized by farmers were rafts, which were made of many logs fastened together (Whicker 1916: 82).

The First Completed Five Miles of Wabash and Erie Canal.

The Report of the Chief Engineer of 1833 noted that five miles of canal were completed west of Fort Wayne, and some thirty-five miles were in various stages of completion (*Documentary Journal* 1833). No water had yet entered the canal, though almost a full year of excavating had taken place. It was the opinion of the state canal board at this time that canal contracts should be let for the next thirty-five miles west, with an estimated cost of \$350,000. It was assumed by the board that the remaining canal lands from the Federal land grant were worth \$826,664.84, and therefore recommended that the canal loan limit be extended by \$400,000.00 (*House Journal* 1834). This suggestion eventually became law by 1834 as long as the loan was at 6 percent Interest (Comstock 1911). The same legislation that passed the \$400,000.00 loan limit extension also passed a measure that did not link future loans with estimated land sales; the ceiling

on possible canal loans, therefore, was removed. Without restrictions, loans could thereafter be authorized based solely on expected future toll earnings (Fatout 1972: 59).

The 1833 Indiana legislature also expanded the number of state-backed public works. The Whitewater Canal was surveyed down the Whitewater River Valley, five railroad companies were chartered (mentioned previously), and additional canal routes were planned that passed through previously neglected parts of the State (*House Journal* 1834: 1-8). The canal commissioners were also rearranged, with new officers being elected to the three-member commission. The new commissioners, realizing the generous nature of the state legislature at the time, increased previous estimates of the construction of the Wabash and Erie Canal to include more surveying equipment, more engineers, more laborers, and more general expenses.

Sixty additional miles were put under contract for the year of 1834, though available funds amounted to about \$45,000.00 (*House Journal* 1834: 1-8). The commissioners must have expected more loans to be made available under the \$400,000.00 loan limit increase. Lafayette was also chosen by the 1834 legislature to be the southern terminus of the Wabash and Erie Canal, with an expected cost of \$100,000.00 to be raised by the state for that purpose (*Documentary Journal* 1834).

In order to further pursued Ohio to complete its portion of the Wabash and Erie Canal, the Indiana state legislature passed in February of 1834 an act which gave up Indiana's claims to the Federal land grant within Ohio only if that state completed its portion of the Wabash and Erie Canal by March 2nd, 1837 (*Laws of Indiana* 1833-34, ch. 152: 359-360). The state of Ohio was in no way pleased to take on another internal improvement project. Several canals had already been started or completed between

Lake Erie and the Ohio River, with many unprofitable side cuts being added which linked additional regions to these main branches. Only reluctantly did the Ohio legislature accept the proposal of Indiana to complete the Wabash and Erie Canal, with contractors being hired in 1836 (Comstock 1911: 4, and *Documentary Journal* 1837: 2).

Ohio was also involved with a land dispute with the State of Michigan which centered on the ownership of Toledo (Poinsatte 1969: 68). Chief Engineer Williams notes this delay on the part of Ohio in the 1836:

“The construction of the Ohio part of the Wabash and Erie canal has evidently been delayed in consequence of the conflicting interests of Ohio and Michigan in regard to the disputed territory bordering the mouth of the Maumee river; and as that question will be probably settled by Congress during its present session on the admission of Michigan into the union, it is to be hoped that after the decision of this question the state of Ohio will speedily complete this work and open the canal to the lake” (*Documentary Journal* 1836: 11).

A difficulty arose for the Indiana legislature in 1834 of keeping labor crews working on the Wabash and Erie Canal while loans were being made in the East. With the available cash reserve so low, contractors had to wait for long periods without pay for themselves or their workers. Contractor payment would be a problem dealt with throughout the canal era. A variety of payment systems, using paper currency, canal bonds, and land from the Federal land grant, would eventually be used by the canal commissioners as hard currency became less available to the state in later years.

At the same time that cash problems were hindering the progress of the Wabash and Erie west of Fort Wayne, several regional groups were pushing forth with new internal improvement projects. Terre Haute citizens petitioned to extend the Wabash and

Erie Canal to that town, which at the time was the farthest north port on the Wabash for easy flatboat navigation down to New Orleans. Railroad-backers also were pushing for more state involvement in various railroad projects. Road and plank road enthusiasts were trying receive state backing on their projects. Overall, few cautious words can be found in the literature of the early 1830s. A rare exception was the editor of the *Indianapolis Palladium* (January 25th 1834) who stated that, "Indiana is yet too young, and altogether too weak in her resources, to compete with New York in the way of improvements."

The Governor Marcy of New York, surprisingly, also became an advocate for the expansion of western state's improvement projects. In his 1834 message to the New York legislature, he stated that western states should go forth with internal improvement projects; that a state could easily assume a debt of over ten million dollars, and recover the sum over time with canal profits (speech reprinted in the *Indianapolis Democrat*, February 8th, 1834). This claim may have been true for the Erie Canal, which was earning over a 1.5 million dollars a year, but the Governor neglected to mention that several other state projects were operating at a loss (Shaw 1966).

The records of other states were less encouraging. Pennsylvania canals in 1834 were operating at a loss, forcing the state legislature to pass a tax levy to cover interest payments on the state's internal improvements debt. Ohio was not collecting profits from its canal systems to pay for its yearly loan interest payment (Goodrich 1961). Indiana politicians chose not to heed any of these warnings, and instead went forward with their planned internal improvement system. Further loans of \$100,000.00 and \$500,000.00 were negotiated in New York City in the summer of 1834, with the money being returned

to Indiana in time to make delayed payments for the work on the Wabash and Erie Canal completed that summer. After the securing of the 1834 loans, it was still generally accepted by public and politicians alike that profit from the internal improvements would pay for the interest and eventually pay for the principal (Fatout 1972:61).

The only problem was that the canal was only slowly being constructed, and no tolls had been collected as of the end of 1834. Work on the Wabash and Erie Canal was hindered by the unpredictable nature of Indiana weather – storms delayed construction for weeks – and false reports of epidemics, which would clear the line for days (Fatout 1972: 62.)

In the southeast, surveyors hired by the State of Indiana and accompanied by Chief Engineer Williams began surveying the Whitewater Canal, which would run from Near Richmond, Indiana, to Lawrenceburg on the Ohio River. The conclusion of the surveyors was that Indiana's second canal would cost \$1,142,126.15 and it would be of great benefit to the state (*Senate Journal* 1835). Again, citizens and local politicians enthusiastically supported such a project, and expected that tolls from transported agricultural goods would easily pay for the construction of such a transportation system. Supporting facts and figures were also presented to back such an opinion, as was the case for the Wabash and Erie Canal. Any politicians who did not support canals at this time were easily defeated in the next election (Brookeville, *Indiana American*, August 8th, 1834). Popular opinion soon overwhelmed reason, and Indiana was on its way to creating the Mammoth Internal Improvement Bill.

Water was finally let into the Wabash and Erie Canal in November of 1834 at Fort Wayne, with much fanfare and celebration. At this time, the first canal boat was

launched to float upon the then nine-mile long canal (Fatout 1972: 63). Fort Wayne at this time was a small frontier town of about one thousand residents. Few roads entered the city, and little commerce existed within the town or the surrounding region.

The Wabash and Erie Canal in 1835.

The State of Indiana, which had an annual revenue from taxes of \$35,000 in 1834, was suddenly in the position of handling several hundred thousands of dollars, most in bullion, which it had gathered in loans for canal construction (*Documentary Journal* 1835). The construction of the Wabash and Erie Canal and the loans negotiated for its completion, however, did not satisfy completely the citizens of the state nor their political representatives. Governor Noble (Riker 1958: 319-320) stated in his address to the State of Indiana that “no good reason can be assigned why we should longer hesitate to follow the successful examples of other states... To borrow money at a fair rate of interest, and expend it upon some well selected objects of paramount public utility, will not embarrass the Government or impoverish the people, but on the contrary, will enrich both.”

The Indiana legislature followed suite, making plans to borrow even more money and pass more internal improvement projects. They were inundated by sectional requests for a multiple number of projects, including canals, roads, railroads, and turnpikes. The 1835 session approved a further canal loan of \$227,000.00 to meet the needs of canal contractors, and petitioned the United States Congress for an additional donation of Federal land to complete the Wabash and Erie Canal to Terre Haute. The summer of that year saw state surveyors, led by Colonel Howard Stansbury, a United States engineer,

surveying the canal line from Lafayette to Terre Haute, and a dozen of the other proposed internal improvement routes (Fatout 1972: 67).

Construction of the Wabash and Erie Canal proceeded at a rate twice that of the year before, with \$300,000.00 being spent through 1835 (*Documentary Journal* 1836: 12). At this time, the combative nature of the Irish and the rough lifestyle of canal construction was starting to be noticed by the canal commission, the state legislature, and especially the small communities through which the canal was constructed. Construction on the Wabash and Erie Canal would be halted mid-summer by the largest canal labor riot in the history of Indiana canal construction.

Irish Canal Workers

As stated above, in 1832 Chief Engineer Williams was recruiting Irish immigrants for canal work in Indiana. The Irish were originally brought in large numbers to the United States to work on the Erie Canal since New York encountered the same labor difficulties which would later affect Indiana. These Irish canal laborers later moved west to work on the Ohio canals. Some eventually made their way to the Wabash and Erie Canal (Fatout 1972: 58).

Wabash and Erie Canal contractors originally expected to employ their laborers from the areas the canal was constructed through; farmers, tradesman and skilled workers who would be willing to work on the canal a few months, then return to the local workforce. The reality was that competition between improvement projects throughout the western states, and the disagreeable nature of canal work, led to a severe labor shortage in Indiana during the early 1800s. The State of Indiana made up this labor

shortage by enticing hundreds of Irish immigrants and their families westward to work on the Wabash and Erie Canal (*Documentary Journal* 1836). Chief Engineer Williams mentions in 1837 that, "If by the ensuing spring proper efforts shall be made to introduce labor into the state, and prices should settle down upon a salutary basis, the Public Works can then be greatly extended, and their prosecution pushed with alacrity and expedition" (*Documentary Journal* 1837).

Mention of labor problems in Carroll County appeared in the *Documentary Journal* as early as 1836 (*Documentary Journal* 1836: 10). A rare mention of exact labor numbers is found in the 1837 *Documentary Journal*, "Laborers have been scarce on this line during most of the past season. The effective force, including teams, and reducing their performance to manual labor, has been equal to 1105 men, including the whole from Huntington to Lafayette, and averaging the whole business season" (*Documentary Journal* 1837).

The 1842 *Documentary Journal* also mentions the total labor numbers for 1841. In that year, the labor force was even larger than in 1837, "There has been, during the last season, an effective force, consisting of teams of oxen and horses, and men, equal to about 2,000 men. There were at the time the last estimate was taken, something rising 1,000 men at work on the line. As the contractors will prosecute their work with vigor during the winter, it is probable this force will be increased rather than diminished" (*Documentary Journal* 1842).

Scarce labor was not the only problem faced by the administrators of the Wabash and Erie Canal. It was common on all mid 19th Century internal improvement projects that shelter, food, and clothing were provided to the canal laborers by the state. Common

provisions at a work camp included flour, beef, bacon, potatoes, and beans, with wild game being supplemented where available (Way 1993: 112). In addition to these staples, workers on the Wabash and Erie were provided bedding, pots, pans, knives and plates (ISL/A/WA: J.L. Williams to Thomas Dowling, December 9th, 1850). Competition among public works projects throughout the western states led to higher overall labor costs and increased prices for provisions (*Documentary Journal* 1837). In addition to wages, the State of Indiana had to provide the canal workers with food and drink; whiskey being the most important beverage on the canal line (Poinsatte 1969: 61). Labor and provision costs eventually reached 50% more than expected when the canal was first budgeted (*Documentary Journal* 1839).

An additional cost from using Irish immigrants to make up the labor shortage in Indiana was the need to build construction camps along the canal. The construction of shanties for the laborers is mentioned by the canal commissioners in 1839, "The letting on this division embraces heavy work, which necessarily requires a very considerable outlay in the purchase of horses, carts, tools, and the building of some fifty shantees (camp buildings), in order to enable the contractors to commence operations..." (*Documentary Journal* 1840: 63).

Canal worker shanty towns were usually made up of two types of structures; multi-male bunkhouses and single dwellings for married families. In the bunk houses, men slept in bunks tiered along each wall, had a communal hearth, and had their cooking and cleaning performed for them. The number of men per bunkhouse varied widely, ranging from fifteen or twenty per building to upwards of one hundred. Single dwellings had related family members, including children, and sometimes had a number of boarders

(Way 1993: 146). John Campbell (*Indianapolis Star*, July 26th, 1907), who worked on the Wabash and Erie Canal as a child, stated that, "An Irishman and I slept in the lower bunk next to the horses, and the hired girl and two children in the bunk above us. Burns and his wife slept in a bunk at the south side."

A rare description of an Irish work camp on the Wabash and Erie Canal comes from the *Maumee Express*, an Ohio newspaper, whose editor visited the construction line of the canal in 1838. He described the scene as being, "Little villages of shantees, filled with laborers and their families nestle in the edge of the woods, while scores of half naked, tow headed urchins play all sorts of antics by the way-side" (August 25th, 1838).

Provisions and food costs were not the only problems faced by Wabash and Erie Canal contractors. Another problem to be dealt with was that of alcoholic spirits. Jesse Williams, the Chief Engineer for the State of Indiana, complained in his 1836 yearly report:

"...as soon as our public works are under successful progress, numerous establishments will be opened for the sale of ardent spirits in their vicinity, where they are most to be dreaded, and that will be, where the greatest number of laborers are employed... (I)f permitted along our public works, it is believed they will be a source of endless quarrels and riots..." (*Documentary Journal* 1836: 11).

A dry canal construction line was the goal of religious leaders along the Wabash and Erie Canal route, as well as the local populations who feared drunken Irish more than bears or wolves. Williams attempted to force prohibition upon the canal workers in 1832. The canal commission attempted to enforce this decision throughout the line (ISL/A/WA: Report of the Commissioners of the Wabash and Erie Canal 1833, and Poinsett 1969: 61).

The curtailing of alcohol use by the laborers was hindered by its believed benefits as a medicine against diseases such as malaria, fever, and cholera. Epidemics were common along the canal line, as construction was hard work and frequently involved working in swamps, marshes, and stagnant pools. The contractors of the construction of the Wabash and Erie Canal even incorporated this medicinal use of alcohol into daily work life. "Jigger-bosses" would circulate throughout the day giving a ration of alcohol to the canal workers. These rations were known as "jiggers" (Poinsatte 1969: 61-62, and Fatout 1972: 58 and 197)

Finding an ample supply of cheap labor in the form of the Irish did not mean an end to labor problems for the superintendents of the Wabash and Erie Canal. The Irish immigrants working on the canal were evenly divided among Catholics and Protestants; both groups having a long history of violence and mutual animosity in their home country. These two groups, the Corkers (from Cork) and the Fardowners (from Ulster) created a state of continuous tension up and down the path of the canal. "Each side was so terrorized by the other, that on the least provocation, they would leave their work and take to the woods or march, armed, to any supposed point of danger" (Hockett 1928: 298).

The violence among the Irish workers reached a peak in the summer of 1835 near Peru, Indiana. Canal work was frequently interrupted by rumors of one party or the other marching to attack the other. At night, families left their huts to sleep in the woods without a fire out of fear of being murdered during a night attack by the opposing group (ISL/A: David Burr to Governor Noble, December 30th, 1835, Riker 1958: 419-23). On July 10th, 1835, more than six hundred Irishmen were determined to end the religious

feuding once and for all in a violent clash, with the unfortunate village of Peru in the middle (Poinsatte 1969: 63).

The citizens of Peru were in constant fear of the Irish, who were more numerous than they and had on many occasions threatened to rise up and sack the village (Cox 1860). The riot of 1835 seemed to prove their threats had meaning. As several hundred Corkers and Fardowners marched upon each other, desperate calls went out to the militias of Logansport, Huntington and Fort Wayne. These troops were able to stop the fighting and persuade the Irish canal workers to go back to their camps (Hockett 1928: 298). Arrest and jailing of the ring leaders on both sides was left to sheriff Elias Murray, who was paid for his troubles (inadequately in his view) by the State of Indiana (*Laws of Indiana*, February 5 1836).

Fighting on the Indiana frontier was not limited to just the Irish. Many of the small towns along the path of the Wabash and Erie Canal were highly competitive for any economic advantage over the others. The more common of these inter-town rivalries centered on which settlement would become the terminus of the canal. Over this subject, many fist-fights and acts of vandalism were conducted (Nebeker 1913, and Fatout 1972). But sometimes, any excuse could turn a pleasant summer day into a rambunctious frontier brawl, as Sanford Cox found out in 1835 while visiting Peru, Indiana:

"...just as I was stepping upon the plank that led on to the boat, a fight or two commenced between a party that came up from Logansport and some Peruvians, which blocked up the gangway so that I could not get on the boat. The excitement ran high throughout the large crowd, and the battle waxed warmer and bloodier. I stood and looked on for several minutes, and was of the opinion that there were at least eight or ten fights all progressing at the same time. The Logansport party was about to prove too hard for their antagonists, who began to sing out for help. There were several hundred Irishmen near at hand, working on the Wabash and Erie

Canal, who, observing the foray, and considering it a free fight, could no longer resist the temptation to pitch in; and gathering their picks and spades, they rushed in platoons upon the belligerents, and soon vanquished the party who had proved strongest in the melee... On looking up and down the line of the canal for a mile and a half in either direction, Irish recruits were seen pressing for the scene of action, with picks in their hands, and wrath on their foreheads" (Cox 1860).

Later that day, Cox found out why the Irish were quick to enter any fray that summer. He states in his Recollections:

"I soon learned the cause of the hostility of the Irishmen, and quaked at the thought of the narrow escape I had made. On the Sabbath before my arrival, one Hoosier and two Irishmen were said to have been killed, and several Irishmen wounded, in a fracas which took place a few miles above Peru; and but a few weeks before the Governor of the State ordered General Tipton to call out the militia to suppress the riots that ever and anon disturbed the quiet of the laborers on the line of the canal" (Cox 1860).

Impressions of the Irish as brawling, hard-drinking canal laborers are what most 19th Century authors wrote about; but the Irish who came to Indiana spent most of their time working peaceably on the canal and socializing in construction camp communities. In reality, the uneventful rhythm of daily life was the norm and the exciting riots and fist-fights the exception. J. Wesley Whicker gives a rare glimpse into life in the shanty camps of Irish laborers which sprung up along the path of the Wabash and Erie Canal:

"The canal was finished to Attica in 1848. In the spring of that year, Asiatic cholera appeared among the laborers and they died like flies in a trap. These laborers lived in camps along the waterway. There was a large camp at old Fulton, where Flint now is. Among those Irishmen there was a sturdy young blacksmith, named Hugh Martin, who sharpened the plows and shod the horses for the contractors. A Mrs. Donnelly had the contract for cooking for all the camps from the county line to Attica... The

camp below Fulton was Maysville and Ann Crouch did the cooking for her countrymen in the camp at Maysville. Their tools were taken up the river to Hugh Martin's forge to be sharpened...

"There was another camp very near where the Fix schoolhouse now stands. There were about six hundred men, women, and children in this camp, about four hundred of whom died of cholera. About two hundred of them were buried in the old graveyard at Attica, and then a long trench was dug in a marl bed near the camp and the rest were thrown into this trench as they died and covered with a soft lime or marl" (Whicker 1916: 77).

Attica is a small town located in Fountain County, Indiana, which is the second county south along the Wabash and Erie Canal from Delphi. What is important about Whicker's account is that he clearly states that women and children were part of the large construction camps constructed along the canal. If one of the three major camps working on the Attica section of the canal housed about six hundred inhabitants, and if the work force employed by the State of Indiana averaged over one thousand men, then the total Irish (including men, women and children) temporarily housed along the route of the canal must have been near fifteen hundred to two thousand. Because the Deer Creek dam area was noted in several *Documentary Journals* (1837, 1839, 1846, and 1848 for example) as being a very difficult and complicated undertaking, it is safe to assume that the camp set up to service its construction would have included at least as many inhabitants as those located around Attica.

Many Irish immigrants working on the canal eventually decided to stay in the small Indiana villages and towns their work brought them through. Several accounts mention whole families involved in canal construction; the women and children being paid by the state to cover camp duties, such as cooking, cleaning and preparing food. In many Indiana canal towns, small immigrant families or larger groups would settle down;

some creating barrios or ghetto area of ethnic Irish (DeLong 1970). The naturalization papers of a young Irishman, Peter Moran (on file in the Tippecanoe County Court House) describes this process at work:

"...that he was born in the county of West Meath in Ireland that he is about the age of 28 years that he is a subject of William the fourth King of Great Britain and Ireland that he landed in Sacketto harbor in the state of New York in the month of June A.D. 1830 that he has since continually resided in the United States that his employment is as laborer in public works is now occupied as such in the Wabash and Erie Canal and intends making the state of Indiana his place of settlement..." (Tippecanoe County Court House Archives, and DeLong 1970: 2).

Construction on the Wabash and Erie Canal after the 1835 Riot.

The canal commissioners immediately after the Irish labor riot of 1835 issued a decree that any laborers involved in fighting on the line would be promptly fired. This order and the rounding up of the Irish labor leaders made life on the Wabash and Erie construction line more peaceable, though violence and religious feuding in no way ended. Survey crews on the Wabash and Erie Canal line south of Terre Haute made it to Evansville that summer, though the canal would not actually be built to that city for another eighteen years. The canal itself was completed to thirty-two miles west of Fort Wayne by the Forth of July of that year (*Documentary Journal* 1836: 12). Much celebration followed, with three boats carrying passengers from Huntington to Fort Wayne and over 500 marches parading at the docks. Success at Fort Wayne and Evansville added to the overall interest in improvements throughout the state (Comstock 1911:5).

Throughout 1835, it became more and more a matter of political survival that politicians had to back regional internal improvements (Cottman 1907: 119). As Paul Fatout (1972: 71) put it, “Public opinion was so determined that a candidate stood little chance of election unless he climbed aboard the improvements system bandwagon”. Expectations of prosperity were found in most of the publications of the time, and speculators descended upon newly surveyed areas, staking claims on the better areas which were expected to be along the future canal. As George Cottman (1909: 121) stated, “Those who owned one farm bought others, and those who owned none went into debt and purchased one.”

At this time, David Burr, a political backer of canals, published a pamphlet in Indianapolis which countered those who disagreed with the policy of the State going into debt to pay for improvements. Burr (1835) stated in his *An Address to the People of Indiana on the Subject of Internal Improvements*, the State of Indiana could not only survive a heavy debt from internal improvements, but also profit by it. He proposed several canal, railroad, and turnpike projects, which together cost over \$11,000,000.00. Speculative mathematics were again used to prove that the public works would gain over \$800,000.00 in the next twenty years, which would pay of interest on the debt and reduce the principle significantly (Burr 1835). But when it became public knowledge that the Erie Canal in the mid-1830s was bringing in over \$200,000.00 per year and had added over \$50,000,000.00 to the value of lands along its channel, Burr’s speculations appeared to be genuine (Esarey 1916: 96).

During the summer of 1835, the canal fund commissioners had negotiated a further loan of \$600,000.00 with J.J. Cohens and Brothers of Baltimore, increasing the

total canal debt to \$705,257.00 (*Documentary Journal* 1837). Governor Noble (Riker 1958) in his message to the State of Indiana in January of 1836 dismissed the threat of such a large loan to the financial security of the state, and called for an additional loan of at least ten million for further work on Indiana improvements. That same month, Robert Evans submitted a much more ambitious internal improvement bill to the state legislature. Those regions that were included in the bill, supported it, those that were not, opposed it's passing. Attempts to diminish the scope of the bill by eliminating some of the improvement projects were defeated, with the result being that the entire bill was passed in both the House and Senate (Comstock 1911: 5). Governor Noble signed the bill on January 27th 1836, thus making law what would later be termed Indiana's Mammoth Internal Improvement Project (*Laws of Indiana* 1835, ch. 2.).

Indiana's 1836 internal improvement project included construction of the Whitewater Canal from the National Road to the Ohio River, the Central Canal from the Wabash River near Logansport to Indianapolis and then to Evansville, the Wabash and Erie Canal from the Tippecanoe River to Terre Haute, a railroad from New Albany to Vincennes, and a survey of a railroad or turnpike from Jeffersonville to Greencastle, a canal or railroad from Fort Wayne to Michigan City, and the removal of obstructions in the Wabash River. To complete these projects, the fund commissioners were allowed to borrow an additional \$10,000,000.00 at 5 percent Interest, with all canal, railroad, or turnpike property, tolls, rents, or profits being offered as security (*Laws of Indiana* 1835, ch. 2).

This law also specified that the accounts of the Wabash and Erie Canal would be held separately, and that an additional loan of \$5,000,000.00 could be negotiated for its

completion to Terre Haute. A six-man board of internal improvements would oversee all the above projects, except for the Wabash and Erie Canal. All this was expected to be accomplished without the levying of any taxes (*Laws of Indiana* 1835, ch. 2).

Little criticism of the Mammoth Internal Improvement Project law was voiced in 1836. Most newspapers of the time heralded the plan as the opening of a new age in Indiana. The Indianapolis *Press* called the plan, “The dawning of a new era in the history of our legislation ... highly credible to the character of Indiana” (January 21st, 1836). The Indianapolis *Palladium* (January 23rd, 1836) stated that, “Indiana has taken a noble stand, in the cause of Improvements ... these days must be portentous of great results, which ere long will place Indiana among the brightest stars in the firmament of our widely extended and happy republic.” Celebration occurred throughout the state as each community waited expectantly for the start of *their* improvement project. Politicians were congratulated, newspapers wrote of great things to come and exuberant expectation among the populous, speculators ran amok along the proposed new transportation lines, and community leaders fired cannons to herald in a new era of internal improvements (Esarey 1915: 103). All were to be disappointed.

Enacting the Mammoth Internal Improvement Project.

Paul Fatout wrote that, “The Mammoth Hoosier system of internal improvements was conceived in madness and nourished by delusion” (1972: 76). The delusion he referred to was the near mythical financial analysis, which backed the Internal Improvement Law and provided its political backers with evidence and rationalizations. The madness, he states, was the belief in internal improvements for the sole fact that half

the other states in the Union were undertaking them (Fatout 1972: 76). The only state-owned transportation system that had been an actual success in 1836 was the Erie Canal in New York. All the other state projects except for this single canal were financial failures or were barely meeting interest payments. One state, Pennsylvania, was near bankrupt from its massive internal improvements. The “successful example” of other states which Governor Noble referred to as justification for Indiana’s internal improvement plan did not exist (Riker 1958).

Indiana was not the only state to be afflicted with the internal improvement “madness” after 1836. Illinois began the Illinois and Michigan Canal and thirteen hundred miles of railroads, placating those towns not on a transportation line with grants of \$200,000.00. Michigan, barely a state, began several canals and three railroads soon after Indiana’s mammoth project was announced (Esarey 1915: 97).

Why, then did United States citizens and their political legislatures succumb to the internal improvements “fever” when all evidence pointed to failure instead of success? Part of the answer lies with shortsighted reasoning. Politicians of the time were greatly disassociated from the projects they were voting for. Canals were not created over night, but the time of construction while interest payments became due and no profits were being accumulated was not factored into the financial equation. The environment was also ignored. Politicians, even those who did not back canal projects, were totally unaware of the interaction *between* canals and the landscape. For politicians, this was a problem for engineers – and if engineers could not solve it, then more loans would provide a solution (Fatout 1972: 77).

The ideology of internal improvements being linked with social democracy and equality also factored into Indiana's internal improvement law. In order to be equal to all citizens and regions, many separate projects needed to be constructed at the same time (Scheiber 1969: 90). As Harry Scheiber (1969: 92) put it, "a course of partial legislation, that aided some but not all, was intolerable."

Construction timing, therefore, was ignored. Several states, including Indiana, began a number of massive improvement projects *at the same time*. This practice led to massive confusion, labor shortages, and money problems as several projects competed for the same general pool of money (Comstock 1911: 6). Construction costs were also not factored correctly. Presented cost figures were taken from the lower range of estimates, with higher cost expectations being not presented to the public. No unexpected costs were factored in. An overall lack of quality administration, a pervasive atmosphere of corruption, graft, and overcharging, and a total lack of experience with large scale projects led to a large gap between improvement estimates, legislation, and decision-making, and the actual construction, administration, and maintenance of Indiana's improvement projects (Cottman 1909: 123).

A good example of the low level of administration of these early internal improvement projects was the surveying of the Erie and Michigan Canal, which was to link the Wabash and Erie Canal with Lake Michigan. Work never actually began on the Erie and Michigan, but surveying and administration costs eventually reached \$160,708.87 (*Documentary Journal* 1852). The *Documentary Journal* of 1852 states that "There have been no receipts (for this project)."

Another problem was the political nature of the improvements board. Most of the board members were from southern Indiana counties, and most were from the Whig political party. Political goals soon dominated the board and its hired internal improvement engineers and administrators. Since all projects were equally important politically, the suggestion that the most economically feasible should be completed first was rejected. Soon, every internal improvement listed by the State of Indiana in the Internal Improvement Law had some part under contract, each of which needed their own engineers and administrative staff (*Documentary Journal* 1837: 3). The yearly salaries of all these above administrators, surveyors, commissioners, engineers, and their aids was \$54,271.00, which was more than the cost of running the state government (*The Democratic Sentinel*, January 7th, 1842). This body of internal improvements administrators became known as the “Eating Brigade” (ISL/A/WA: John Dumont to James Hervey Stewart 1837, from Mayhill 1953: 37).

A few voices called for prudence in constructing Indiana’s internal improvement projects. Several newspapers and politicians suggested completing one or two of the more beneficial projects first before others were started. One of the most vocal opponents of the Mammoth Internal Improvement Bill was Samuel Milroy of Carroll, County, who termed the entire plan the “Internal Improvements Folly.” He also predicted that the improvement plan would end in disaster (Mayhill 1953: 36).

Work began on the new projects in the summer, with each of the nine supervisors working independently of each other (*Documentary Journal* 1837: 9). Competition soon arose between the various projects for the loan money; spending became a race, with the canal fund being depleted at a frenzied rate (Eseray 1915: 105). The many administrators

of the many improvement projects had already been put on the payroll, so the only thing lacking were professional engineers and laborers. Chief Engineer Jesse Williams and another project administrator were sent east in 1836 in search of more engineers to meet the needs of the many projects that were to be constructed (*Documentary Journal* 1837: 6).

While Williams searched for more engineers, the canal fund commissioners were in New York trying to negotiate for more money. Money, however was harder to find than in previous years as problems in the financial market, which would lead to the Panic of 1837, were starting to be felt (*Documentary Journal* 1837: 13). Dr. Issac Coe was the only loan negotiator left in New York by late summer of 1836. At that time, he successfully negotiated a \$500,000.00 loan with J.J. Cohens and Brothers, and \$1,029,000.00 with Thomas Biddle and Company of Philadelphia and the Morris Canal and Banking Company of Jersey City (*Vincennes Western Sun*, August 20th, 1839).

Unknown to the other canal fund commissioners, Dr. Coe had brokered a separate deal with each financial company for his own personal profit. Usually, the financial institution that loaned money to the State of Indiana would in turn sell the loan bonds to other speculators. In the case of Indiana internal improvements, many of these bonds were bought by investors in England. By agreeing to large loans on credit, Dr. Coe would split the commission received by the primary loan company when it sold the bonds to other investors. The fraud, mismanagement, and graft undertaken by Dr. Coe would not come to light for several years, since the government of Indiana had not set up any internal checks on corruption and had only a haphazard system of financial recording (Fatout 1972: 80-81).

What allowed Dr. Coe to operate so long without being caught was the practice on the part of the canal commissioners to keep poor loan records, if any at all. The state government also did not demonstrate any interest in their activities, only taking notice of their dealings when money became scarce in the early 1840s (Esarey 1815: 117). As Logan Esarey (1915: 117) put it, "It seems that bonds were signed and delivered to the several members of the board to sell as best each could."

Activities such as performed by Dr. Coe occurred at all levels of canal construction. Many state records demonstrate the yearly payment for damages to local property owners (many of which were fraudulent). Graft and corruption became as common as alcohol on the Wabash and Erie Canal construction line.

By the end of 1836, the Wabash and Erie Canal had reached the town of Wabash, Indiana, and work had begun on many of the other state improvement projects (*Documentary Journal* 1837: 2). Speculators descended upon the new improvement projects as they had done earlier on the Wabash and Erie Canal; land was purchased at key points, towns were platted, and advertisements went out all over the country to attract settlers, businesses, and investors (Fatout 1972: 82).

Eighty-five miles of Wabash and Erie Canal were completed by the end of 1836, with another thirteen miles under construction. Chief Engineer Williams notes no labor problems for that year, but warned against labor shortages for construction in the future (*Documentary Journal* 1837: 10). Williams also notes that no damages to the completed works worth mentioning had been done by the weather during 1836 (*ibid*: 2).

At this time, most of the expenses generated by canal construction were paid for in currency, which in 1836 was backed by specie deposited in the State Bank of Indiana.

Andrew Jackson in July of 1836 ordered public lands to only be purchased with specie. Major banks, concerned by the Federal shift from paper currency to specie, began suspending transactions in currency. The speculation in paper currency, which had been one of the key reasons why loans in previous years were more accessible, slowed the overall national economy. Workers started refusing to accept wages in currency as confidence in paper money diminished (Fatout 1972: 83).

Governor Noble (Governor's Message to the State of Indiana, December 1836, *Documentary Journal* 1837) continued the sentiment that nothing was wrong with the internal improvements in his 1836 address to the people of Indiana by saying, "nothing has been witnessed of a character to discourage the progress, or the ultimate success of the system (of public improvements)." Governor Noble pointed to the success of fund commissioners (Dr. Coe) in raising funds as an indication of overall success and confidence in Indiana's improvement projects. He also brought forth the novel idea that the construction of improvements was actually increasing the overall tax base of the state of Indiana, therefore providing for the cost of internal improvements indirectly (*Documentary Journal* 1837).

By the end of 1836, the State of Indiana had spent \$2,475,524.05 on its internal improvement projects (*Documentary Journal* 1837: 5). Indicators of financial doom were being experienced at all levels of canal operation, but the Indiana board of improvements created just as bright a financial picture as ever before. The board speculated that the Wabash and Erie Canal would start yielding a rate of return of \$95,000.00 in 1841, with twenty-five percent increases per year thereafter. It was assumed that interest payments could be met by 1845 (*House Journal* 1837).

Instead of becoming concerned with the slowing of the instability of world finances, the Indiana legislature instead introduced thirty-nine resolutions and bills to extend Indiana's internal improvement system. More survey crews were sent out (all of which were paid out of the improvements fund) as new sections of the mammoth internal improvement projects were examined. Late in 1836, Dr. Coe arranged a further loan of \$2,000,000.00 with the Morris Canal Company, with himself gaining almost \$100,000.00 in profit from the resale of Indiana bonds from this loan and the others he negotiated (Fatout 1972: 84).

The scarcity of labor and the competitive nature of Indiana improvements soon created a severe labor shortage. Contractors of different Indiana projects began bidding against each other for labor or stole the labor of other projects with extra inducements (Vincennes *Western Sun*, June 10th, 1837). The canal commissioners complained to the state legislature about the "high price of labor" in 1837, and noted in their 1838 report,

"If by the ensuing spring proper efforts shall be made to introduce labor into the state, and prices should settle down upon a salutary basis, the Public Works can then be greatly extended... At the late and present prices for labor the domestic supply might be deemed sufficient for that object, even though... they are exorbitant, and far above what other states have given for similar services..." (*Documentary Journal* 1838: 3).

Other states got into the labor-stealing business as well, with Illinois and Michigan enticing many of Indiana's canal laborers away to those states. To ensure an active labor force, which at times reached over five thousand men at work on all the state projects, the improvements board had to pay top dollar for the labor it could keep (Fatout

1972: 85). Along with increased labor prices, heavy demand led to an overall increase in the costs of provisions, materials, and tools (Cottman 1909: 123).

The Wabash and Erie Canal in 1837.

In the early spring of 1837, with financial storm clouds on the horizon and huge debts amassing for the state, water was finally let into the Wabash and Erie Canal down to Wabash, Indiana – again to much celebration (*Documentary Journal* 1838). Over eighty-two miles of canal were now open to the public, with boats making regular trips between Wabash and Fort Wayne, though the crucial linking of the canal with Lake Erie was still a distant event.

The Wabash and Erie Canal to 1837 had cost the State of Indiana \$1,178,391.79, with land sales amounting to \$564,804, thus pointing out the error in the original assumption that land sales could pay for the project. Further troubles occurred as the Panic of 1837 began. Paper currency continuously devalued over the course of the year as confidence fell. Coin specie was hoarded by bank and citizen alike, and prices declined overall. A general depression descended upon the United States financial world (Fatout 1972: 86-87). One early victim of the Panic was the firm of J.J. Cohens and Brothers, which dissolved in the spring of 1837 owing Indiana \$298,000.00 (*Documentary Journal* 1838, and ISL/A/WA: Fund commissioner's Record Book: 54).

Politicians and newspapers of the time began to demand a prioritization of Indiana's improvement projects (an idea which had been soundly defeated in the

legislation of the year before). Supporters of the “all at once” theory of improvement construction were again strong enough to defeat any reorganization bills sent to the state legislature (Esarey 1915: 106).

Instead of dealing with the existing financial problems of 1837, the board of internal improvements went on a “spending spree” (Fatout 1972: 89). Contracts were made on the Erie-Michigan Canal for the first time, and the overall number of improvement projects jumped from eleven to eighteen, with 1837 expenses reaching \$5,627,000.00. Most of this expansion came from the state policy of having the administrators of each project in competition with each other, with no administrator in charge above each project administrator who could make state-wide policy decisions. Each project administrator, therefore, was as much influenced by public policy within his district as they were influenced by state government (Comstock 1911: 6).

Another financial problem faced by the state was the high cost in administration of the various internal improvement projects being constructed at the same time; each needed its own administrators, staff, engineers, and assistants. The *Documentary Journal* (1838:5) gives a statement showing all the administrators, surveyors, engineers, and their attendants at work for the State of Indiana in 1837, along with the overall cost to the state by their employment:

“1	Principal Engineer	\$4,000	\$4,000
1	Secretary	\$1,000	\$1,000
12	Resident Engineers	\$1,500	\$18,000
7	Senior Assistant Engineers	\$920	\$6,440
12	Assistant Engineers	\$696	\$8,352
12	Junior Engineers	\$556	\$6,116
21	Rodmen	\$400	\$9,600
20	Axemen	\$300	\$6,000

9	Members of the Board	\$1,277.50	<u>11,490.50</u>
		Total	\$71,005.50."

While the state dealt with its own internal financial problems, Dr. Coe continued to gather dubious loan money from a variety of sources in the East -- \$100,000.00 from the Staten Island Whaling Company, \$300,000.00 from the Bank of Western New York, \$100,000.00 from the Bank of Erie County, New York, \$1,200,000.00 again from the Morris Canal Company, and \$100,000.00 from the Detroit and Pontiac Railroad (*Documentary Journal* 1839). Loans at this time were being made through state bonds, with purchase of the bonds being made with credit. The bonds would then be sold by the company at a profit to other companies; with a profit always going to Dr. Coe. Most of these ventures disintegrated in the wake of the Panic of 1837, leaving millions in Indiana state bonds in the hands of creditors who were owed money by the bankrupt groups. The State of Indiana, because so many of the loans were on credit, rarely received the money due. Indiana was, therefore, amassing millions of dollars worth of state bond debt, but receiving little of the promised money in return (Esarey 1912: 125).

For all the financial turmoil experienced at the state capital, the Wabash and Erie Canal slowly crept southward. The canal reached Logansport in the summer of 1837, with packet boats shipping out to Fort Wayne (*Documentary Journal* 1839: 112). Difficulties in operation were starting to be noticed by the canal engineers. Water leaked out of the canal where puddling was inadequate, grass in the channel needed periodic attention, sudden floods swept away the aqueduct over the St. Mary's River near Fort Wayne, and breaks in the banks hindered traffic and increased maintenance costs (*Documentary Journal* 1838: 2).

At this time, the State of Indiana made public its intention of constructing a dam across the Wabash River near Delphi, Indiana. The towns of Delphi and Lafayette had vigorously petitioned the state government through the 1830s to take the Wabash and Erie Canal across the Wabash River north of Delphi. This plan would change the canal from the north bank of the Wabash to the southern bank from Carrollton to Terra Haute (Stuart 1924, and Mayhill 1953). The State Dam, which was located next to Pittsburg, Indiana, provided water for the canal system south of Delphi, and gave the state much needed revenue from water power rents.

Local citizens from north of Carrollton were originally against the State Dam project because they feared that the dam would stop steamboat operation north to Logansport. The populous of Logansport, farther north up the Wabash River, was especially opposed to the dam, believing that it would sever their chances at becoming the head of steamboat trade on the Wabash (once the state removed obstacles, presumably). The compromise decided upon between the State of Indiana and the citizens of the Logansport area was a steamboat lock next to the State Dam and a towpath drawbridge that could allow steamboats to pass upstream. This steamboat lock was constructed by Reed Case of Delphi, Indiana, who was also involved in most of the canal construction from Miami County to the mouth of the Tippecanoe River, including the section which would pass near Delphi (Mayhill 1953, and 1882, Carroll County atlas).

The Wabash and Erie Canal in 1838.

Less cheerful improvement speeches were now heard in the state capitol. Governor Wallace's (Riker 1963: 154) 1838 message to the people of Indiana presented a

more accurate view of Indiana's financial situation than did his predecessors, "The truth is – and it would be folly to conceal it – we have our hands full... to preserve the credit and character of the state unimpaired." Borrowing had accumulated over seven million in debt, income from land sales was significantly lacking, and little cash was available to the state for continued improvement construction. Still, Governor Wallace (Riker 1963: 154) stated that he expected much improvement in the future, especially with new land grants from the Federal government, the increase in taxes from the newly opened areas along the Wabash and Erie Canal, and with a Federal surplus gift of almost \$300,000.00. In actuality, the state of Indiana was on its way toward bankruptcy.

Modest attempts were made by the state legislature to address the problem of administering Indiana's improvement projects. Finally, a sort of hierarchy based on usefulness was enacted. The new canal board (the old board of six men had been replaced by three) continued on with the existing five canals being constructed in Indiana – the Wabash and Erie, the Whitewater, the Central, the Erie-Michigan, and the Cross Cut canals. The existing canal fund board was also dissolved, to be replaced by a two-man board that was politically appointed (*Documentary Journal* 1839).

The Wabash and Erie Canal in 1838 was ninety miles long and was earning tolls which amounted to about \$3,000.00. Chief Engineer Williams stated that he expected the canal to be completed by 1839 from Lafayette to the state line. Ohio had suspended construction of its portion of the canal in 1837 as that state struggled to deal with its own internal improvement debt (Way 1993: 208). At this point, Williams noted that honoring the original Federal land grant stipulations was necessary, which obligated Indiana to

completing the Wabash and Erie Canal no matter what happened to Indiana's other internal improvement projects (*Documentary Journal* 1839).

Funding the Mammoth Internal Improvements Project in 1839.

As the Wabash and Erie Canal was constructed westward, the two new canal fund commissioners, Lucius H. Scott and Milton Stapp, headed to New York to continue the hunt for internal improvement money (*Documentary Journal* 1839). New commissioners, however, did not mean better loan negotiation practices. Indiana canal bonds were again sold on credit, most of which went to barely legal and risky financial firms. Scott negotiated a loan of \$600,000.00 with an unknown firm. Samuel Merrill, the president of the Indiana state bank, with Dr. Coe's help, negotiated a \$1,000,000.00 loan with the Morris Company. Stapp negotiated an additional \$400,000.00 with the Morris Company, and sold a further \$400,000.00 in bonds to the firm of Danforth and Cole, the Bank of Binghamton, the Bank of Commerce of Buffalo, the North American Trust and Banking Company, the Merchants Exchange Bank of Buffalo, the Bank of Newburyport, the Bank of Circleville, Ohio, and two individual investors, Hiram Pratt and Reuben Dodge. Stapp's worst transaction was with the Erie County Bank, where he handed over \$410,000.00 in Indiana canal bonds without a contract, down payment, or written agreement (Noah Noble Collection, Noble to A.H. Davidson, May 9th, 1841).

In January of 1839, the Indiana public debt had risen to \$10,064,000.00. The annual interest on the improvement loans was \$479,000.00. Various sources of revenue associated with the improvements could pay about \$100,000.00 of this interest debt. Indiana was fast becoming insolvent (*Documentary Journal* 1841: 58-59).

Rothschilds of London threatened to auction off its Indiana securities if the January interest payment was not made. The improvements fund commissioners negotiated a loan from the Indiana State Bank to make the January payment. To meet this need, the state bank liquidated most of the hard currency on hand in its branch banks and main bank in Indianapolis. This solution to the interest problem was only a temporary solution. Past mistakes came back to haunt the fund commission in August when the Morris Company declared insolvency, owing the State of Indiana \$2,536,611.00 for previously delivered state bonds. One by one, all the bad improvement deals became public through the latter half of 1839 (Riker 1963: 260).

Several other clients of Dr. Coe followed suit that fall: the Detroit and Pontiac Railroad Company and the Bank of Western New York went under, owing the State of Indiana \$330,000.00. The president of the Erie County Bank sold off Stapp's bonds, then fled to Texas, owing Indiana \$587,000.00. The Bank of Binghamton, the Bank of Commerce, and the North American Trust Company all went under, owing Indiana about \$200,000.00. Many other financial companies defaulted on their improvement bond promises. In total, over \$4,000,000.00 in debts on state securities were lost (*Documentary Journal* 1841, pt. I, no. 6). In the wake of these disasters, Indiana's Mammoth Internal Improvement Project collapsed.

Another victim of the Panic of 1837 was the Bank of Indiana. The Bank of Indiana and Indiana's internal improvements had been closely linked from the beginning of the state's public improvement history. The improvement loan funds were often kept in the Bank before being used for construction, administration, and maintenance purposes, but it was common for the canal commissioners and project supervisors to

overdraw their funds. When the state failed to make contractor payments in 1839, the bank was overdrawn by \$650,000.00 to meet improvement demands, which eventually almost bankrupt the Bank of Indiana (Barnhart and Carmony 1854: 328).

The board of internal improvements halted construction on all Indiana public works in late summer of 1839. The only exception was the Wabash and Erie Canal, which continued operation on a few unfinished structures. The canal commissioners had pointed out to the state legislature that closing construction on the Wabash and Erie would eventually cost the state more than it saved, as several projects on that canal were only half completed (*Documentary Journal* 1840: 64).

Governor Wallace (*Documentary Journal* 1840) summed up the situation in his December 1839 annual message to the Indiana legislature, “The failure to procure funds, as we had a right to expect from extensive sale of state bonds effected in the early part of the season, has lead to great and unusual embarrassments, not only among the contractors and laborers but also among the people”. Governor Wallace called for work to continue on the Wabash and Erie Canal, but even work on the Wabash and Erie ended in 1840, resulting in no improvement project work being completed in that year (Way 1993: 209, and Poinsett 1969: 70).

It took time for the citizens of Indiana to realize the extent of the disaster. When the populous became aware of the full extent of the financial problem, the newspapers vilified Dr. Coe, Ex-Governor Noble, and the other members of the fund commission. Indiana bonds dropped to 50 Percent of their value, contractors were owed over \$700,000.00 by the state, and the political future of many improvements-backers in the state legislature were seriously threatened (Fatout 1972: 100).

Indiana was not isolated in its improvements disaster. Michigan, Illinois, Pennsylvania, and Ohio were all victims of the Panic of 1837 and the financial industry collapse that followed. The worse news was that the State of Ohio, which was never very interested in completing their portion of the Wabash and Erie Canal, now appeared to be on the verge of abandoning the entire project (Scheiber 1969: 143-145).

Indiana's legislature floundered as it attempted to deal with the financial crisis. As the *Indianapolis Journal* (February 28th 1840) stated, "This body, after a... useless session... has at last adjourned, and may heaven for all time save us from such another." The assembly decided to meet payments owed contractors with an issue of \$1,500,000.00 in Indiana treasury notes, with an interest accumulation of 6 percent (*Laws of Indiana* 1839). This decision did not cover Wabash and Erie Canal contractors, who were told to wait for the next land sale when payments would be made by the state. Many contractors went bankrupt and thousands of laborers went without pay for the work they had done (Cottman 1909: 122).

Jesse Williams went one step better for the contractors in October of 1839 by issuing canal notes backed by the public land holdings and other canal securities. William's notes later became known as "white dogs," after the white paper used in their printed. The notes were grudgingly accepted by contractors as work on the Wabash and Erie Canal continued westward through 1839 (Way 1993: 210). The canal commissioners suggested in 1844 that the scrip notes be accepted as payment for tolls or water rents (*Documentary Journal* 1844: 21). Eventually, the legislature passed a bill allowing canal scrip to be used to pay for public lands and state taxes (*Laws of Indiana*:

199-200). These scrip notes rarely held their actual value, fluctuating between 10 percent and 60 percent devaluation during their use by the State of Indiana (Way 1993: 210).

Financial Problems, 1840 to 1842.

Governor Bigger, elected in 1840, faced an internal improvement system in chaos. His first act was to create a hierarchy of all Indiana's many projects, with more effort going to those at the top of the list. The other projects would be completed when Indiana had recovered from the Panic of 1837 (*Indianapolis Journal*, February 19th, 1841). The Indiana legislature also attempted to restructure the administration of Indiana's internal improvement projects (*Laws of Indiana* 1842: 3, and *Documentary Journal* 1844: 37). By this time, however, reclassification and restructuring were mute points; no money was available for work on any of the transportation systems.

Interest payments on the existing loans also became a problem for the 1840 legislative session. Indiana by this time owed \$13,667,433.00. Canal boats were running from Lafayette to the state line, but tolls for the year only amounted to about \$3000.00 (*Documentary Journal* 1841: 26). Because of the poor overall financial situation, many purchasers of canal lands were defaulting on their interest payments to the state, reducing even that source of income (*Documentary Journal* 1844: 24). The legislature attempted to raise funds by issuing 7 percent bonds and by passing a tax increase, but these measures resulted in yet more paper scrip for the state and no hard currency, which was the only form of payment loaning agencies were accepting at the time (*Laws of Indiana* 1840-41: 199-200). Indiana, therefore, was forced to default on the July 1841 interest payment. Indiana would not be able to make another interest payment until 1846.

At the same time, the Federal government gave Indiana another land grant, for completion of the Wabash and Erie Canal to Terre Haute. Again, this land was expected to pay for the completion of the canal to that town by those who backed the canal, and seen as inadequate by those who did not want Indiana to take on yet another costly project. Ironically, canal backers were right about the land sale, which produced sales that were actually slightly better than expected (*Documentary Journal* 1846: 137). The only problem was that state lands were allowed to be sold on credit, and selling land on credit brought in little hard currency for the state (*Documentary Journal* 1844: 24).

Maintenance of the Wabash and Erie Canal had not been a major factor in yearly expenses through 1841, though problems with the weather were noted in many of the state documents up to that year. The problem with constructing a canal next to Indiana's major flood plain and natural water system began to show. Flooding, breaching, ice floes, and muskrats all worked to wear the Wabash and Erie down.

Soon after the interest default, angry and threatening letters from around the globe began to pile up in Indiana's legislative halls. Newspapers, voicing the financial bondholders' anger, echoed the angry sentiment. The London *Morning Herald* denounced Indiana politicians as a bunch of "plundering vagabonds," and went on to say, "Indiana mocks all the obligations of good faith and common honesty, and yet invites immigration... Let the ignominious fact be advertised with all other congenial roguery in the *Hue and Cry* and published in the *Gazette* of every country that Indiana is the general receiving hulks, the land of promise for all the knavery and thievery of the known world" (reprinted in *Indianapolis Sentinel*, April 19th, 1842). And the New York *Express* declared, "the very whiskey drunk in Indiana and Illinois is drunk in quantities sufficient

to meet the interest on their debt! Let us hear no more now of this inability of Indiana and Illinois to pay up, by and by, if not just now. “To suspend” is one thing: to declare and act of Bankruptcy, another thing” (reprinted in the Logansport *Telegraph*, April 16th, 1842).

Several letters from England to Governor Bigger pointed out Indiana’s growing reputation as being little better than thieves and rascals, and noted that the states good name would be destroyed by its actions (Thornbrough: 439-44). With the State of Indiana’s yearly tax revenue at \$56,000.00 in 1841, and the interest payments amounting to \$615,000.00 yearly, there was little the state government could do to fix its financial problem (Fatout 1972: 106).

The Indiana state legislature did what it did best in the face of this crisis, it created a bipartisan committee to look into how the mess had been created in the first place. After questioning all former canal commissioners and past legislatures, and after 875 pages of testimony, the government reprimanded four canal administrators and fined fund commissioner Milton Stapp \$27,175.00. Dr. Coe was charged with fraud and illegal conduct, but was later acquitted (Fatout 1972: 108).

During the 1841 session, the State government called for a formal assessment of the public debt. The agents in charge of this concluded that the state government had issued bonds amounting to \$15,000,000.00. From these, the state had received \$8,593,000.00 in cash, and the rest in worthless securities from companies who bought on credit, then later went bankrupt. In addition to this loss, roughly \$2,000,000.00 had been embezzled by various state officers and agents (*Documentary Journal* 1841).

While this action was going on, financial questions of how to fund the completion of the Wabash and Erie Canal to Terre Haute emerged. The solution to this new financial problem was an issuing of more state bonds, this time with blue ink on white paper, which were commonly known as Indiana “blue dogs.” This new scrip was good enough to keep contractors working, and was accepted by the state for land payments and taxes. (Poinsatte 1969: 72, and *Laws of Indiana* 1841-42: 24-25). The Chief Engineer noted that repairs on the canal were paid for by using “white dog” scrip, which was greatly devalued by contractors (*Documentary Journal* 1844: 20).

The Wabash and Erie Canal in 1841 and 1842.

The Wabash and Erie Canal was opened at Lafayette late in 1841 to much fanfare and celebration. This achievement stimulated commerce along the entire canal line, especially at Fort Wayne. The Fort Wayne *Sentinel* (November 6th, 1841) noted that, “Canal boats now run heavily laden with merchandize from the east and for this and other places down the canal. The stir and bustle of our wharves makes Fort Wayne appear like quite a seaport town.” Passenger service also began between the two towns. Another bonus of reaching Lafayette was that the New Orleans trade route was not open to Fort Wayne, with a tentative link being formed by water from Lake Erie to the Gulf of Mexico. The only drawback to this renewed canal excitement was that Ohio had not yet completed its section, thus denying Indiana crucial access to Lake Erie (Poinsatte 1969: 73-74).

1841 also marked the first instance of disastrous weather on the canal line. At the end of that year, the tolls taken on the canal were enough only to pay for repairs, which

amounted to \$94,466.00. Most of this amount came from a single flood that damaged aqueducts, embankments, and canal structures (Esarey 1918: 437).

Ohio Completes its Part of the Wabash and Erie Canal.

As work on the Wabash and Erie Canal west of Lafayette slowly extended the canal toward Terre Haute, the State of Ohio was completing its portion of the canal toward Toledo. The linking of Indiana's existing system with Terre Haute was hoped to create a massive increase in canal use and financial returns (Scheiber 1969: 220). Ohio finished the canal within that state in May of 1843, and boats were making the trip from Lafayette to Toledo by the middle of the month. At this time, 175 miles of canal was opened to the public (*Documentary Journal* 1844: 20).

Opening the canal to Lake Erie did produce a large increase in Wabash and Erie Canal receipts (compared to earlier years), but the tremendous profits originally envisioned by Indiana politicians never became a reality. The Wabash and Erie produced \$45,620.98 in tolls in 1843, which was well above the cost of repairs and administration of the canal. The State of Indiana was given hope that the canal would at least produce enough revenue to eventually pay for yearly interest rates on the improvement loans (*Documentary Journal* 1844: 20).

The canal trustees were quite hopeful for the future. As the canal trustees (*Documentary Journal* 1844: 20) stated, "(the) beneficial influence (of the canal) has been widely felt, not only in enhancing the price and furnishing a ready cash market for every species of the surplus products of the soil, but in enabling the consumers of salt, merchandise, etc., to obtain those articles at greatly reduced prices. The advantages

resulting from the use of the canal to that portion of the state through which it passes, has at least equalled former expectations.”

More Financial Problems, 1843 to 1845.

The opening of the Wabash and Erie Canal from Lafayette to Lake Erie should have been a highpoint of Indiana’s internal improvement history, but even this news could not counter the financial gloom felt in the Indiana legislature. Governor Whitcomb, elected in 1843, confronted the state’s financial mess by doing nothing. His opinion was that the state was not morally responsible for the suspended debt of approximately \$4,000,000.00. Following the governor’s lead, the state legislature refused to deal with the internal improvement debt issue through the session of 1843-44 and through the next (Fatout 1972: 111-112).

Letters from British investors kept arriving at the Indiana legislature. State politicians began referring to the loans that were due as being unjust debts, with the State of Indiana being a victim in the whole mess. This explanation did have historic merit, based on the dubious dealings of Dr. Coe and the other canal commissioners, but the argument had more value as a way out of the debt crisis Indiana was mired within (Fatout 1972: 112). All legislation that attempted to remove the principal owed on internal improvements by raising taxes and issuing new state bonds failed (Fatout 1972: 112 and 113).

Governor Whitcomb finally issued a statement on the financial crisis in 1845, “The opinion has hitherto been nearly, if not quite, universally held among our citizens... that it is beyond the power of our State, at present to fully meet our obligations... No plan

that has been mooted for a resumption of payment, even the most stringent, has contemplated a full and immediate payment” (*House Journal* 1845: 19). Indiana, therefore, was refusing to pay.

Whitcomb’s announcement caused outrage on the East Coast and in London. The *New York Tribune* (January 3rd, 1845) condemned the governor, saying that “the widows and orphans who have been plundered of their all by trusting to... lying promises may beg or starve, as they can!... The annals of the civilized world have furnished few parallels to the cold blooded rascality of this declaration.” Other newspapers were not so kind. Some of the harshest criticism came from Indiana papers, such as the *Brookville Indiana American* (January 3rd, 1845) which stated, “We are willful defaulters, repudiators and swindlers. We have borrowed money – squandered it – and now make no effort to pay... Like a cowering criminal [the governor] shrinks from the responsibility.”

By refusing to deal with the internal improvements financial problem, the Indiana government could not make it go away. Representatives of the bondholders of New York and London finally sent representatives to the state in 1845. The head of this delegation was Charles Butler, a New York lawyer, who was hired to persuade Indiana to act upon his clients’ claims. Butler’s primary goal was to get at least partial payment from the Indiana government (Esarey 1918: 431).

Butler arrived in May of 1845 and began a long series of negotiations with state representatives through the end of that year. Resistance to dealing with the state debt was a common theme he encountered, with law makers absolutely refusing to issue a tax to make interest payments. Finally, he persuaded the state legislature to issue a plan to deal

with the debt in January of 1846. His most difficult job was to get the Indiana government to honor the bonds given to loan companies that had never given the state the promised loan money (Esarey 1918: 532, and Comstock 1911: 12).

Finally, on January 19th, 1846, Butler's hard work paid off. The Indiana legislature passed the "Butler Bill" which provided for refunding the entire bonded debt. The law also gave provisions on how the debt would be paid: half from taxes and half from profits from the Wabash and Erie Canal would be used to reduce the debt. As Butler put it, "Pay us by your State tax and otherwise a portion of the interest on your public debt, and we shall be willing to look to the revenues of the (Wabash and Erie) canal for the balance" (Benton 1903: 65). As part of the agreement, the creditors who had hired Butler to act as their representative were required to contribute \$2,225,000.00 in loans to the state in order that the Wabash and Erie Canal could be completed to the Ohio (*Documentary Journal* 1846, and *Laws of Indiana* 1846: 3).

The Wabash and Erie Canal in 1845.

As bondholder representatives negotiated Indiana's financial obligations in Indianapolis, plans for extending the Wabash and Erie Canal west of Terre Haute were underway. Governor Whitcomb ordered a survey of the line from Terre Haute to Evansville in 1845 (*Documentary Journal* 1845). The estimated cost of this extension was \$2,502,813.00, mostly because the path of the canal crossed the watershed of the region, meaning that many more culverts, aqueducts, and improved towpaths had to be constructed. Drops in elevation of up to fifty feet, and problems obtaining enough water increased the overall number of locks and feeder canals that needed to be constructed.

Eventually, large reservoirs also had to be built to meet the water needs of the canal south of Terre Haute (*Documentary Journal* 1847).

Tolls on the Wabash and Erie Canal in 1844 amounted to \$67,957.00 (*Documentary Journal* 1845). Water problems were encountered that year throughout the line, and the Northport feeder was ordered constructed at Rome City, Indiana, to partially solve the problem (Esarey 1918: 437).

Water was entered into the canal below Lafayette in 1846. The canal had physically been constructed as far south as Covington, but boats could only travel as far south as Attica. South of that town, water drained out of porous soils not properly sealed during construction. The citizens of Covington, contemplating a canal without water month after month, decided to take matters into their own hands on one day in the summer of 1846. As Paul Fatout (1972: 122) stated, “Still getting no water, [the people of Covington] concluded that selfish persons at the Attica lock were deliberately shutting off the flow. Then Covington went on the warpath.”

The result was the “Attica War,” an armed conflict between about three hundred persons from Covington --armed with rifles, shotguns, pistols, and an old cannon – and several hundred Attica natives determined to protect their lock. What followed was a general free-for-all battle, interrupted only by canal boaters who joined the fray with enthusiasm. The attackers succeeded in opening the lock gates, which threatened to strand thirty heavily laden canal boats in port, but the flow was stopped by bales of straw thrown in by the Attica side. The water that was released into the canal was not enough to make the Covington section more than a damp marsh. The end result was that neither town had water for the canal. Thwarted in their plans, the Covington people retired. No

more fights broke out that year, and eventually water was let into the Covington section (DeLong 1970: 10-13, and Nebecker 1913: 20-23).

Financial Problems in 1846.

In London, the bondholders who had chosen Butler as their representative balked at the conditions of the Butler Bill. They refused to give up their bonds for the interest settlement concluded by Butler, and declined to loan out the \$2,225,000.00 to complete the Wabash and Erie Canal. Butler was forced to return to Indianapolis to try to pass more amendments to the bill. The new demands were that Indiana deed over the Wabash and Erie Canal to the bondholders as half the payment, and issue state securities to make up the other half. For this change, Indiana would be loaned \$800,000.00 for completing the canal (*Documentary Journal* 1846). Furious debate occurred in the Indiana legislature through the 1846, but the Butler Amendments were passed in January of 1847 (*Laws of Indiana* 1847: 3).

The gamble on the part of bondholders with the Butler Bill and its amendments was whether the Wabash and Erie Canal would generate enough money to make the interest payments on the canal bonds. If it did not make money, then the bondholders would have no way of getting payment for half of the bonds owed by the state. The bondholders were willing to take this gamble, while receiving at least half of their bonds from the state government, because the securities they held would otherwise be worthless. If a deal had not been made, the bondholders probably would have lost their entire investment (Esarey 1918: 435). Gambling on the Wabash and Erie Canal in 1847

also appeared to be a better bet than it would in later years. It was still believed by investors and state officials alike that the canal would eventually make money.

The amended Butler Bill was approved by Rothschild and Baring, other foreign creditors, and American bondholders, and newly issued State of Indiana stock and Wabash and Erie Canal stock were exchanged for the original canal bonds negotiated so long ago by Dr. Coe and company (Fatout 1972: 124). An example of one of the Indiana canal bonds exists in the Smithsonian American History Museum. The bond is referred to as “State of Indiana/Wabash and Erie Canal/Five per cent Preferred Special Canal Stock,” is valued for \$300.00, and has payment contingent upon the tolls and rents of the canal. The bond also specifically mentions the necessity of the completion of the canal to Evansville before payment with interest would be paid. The maturation date for the bond was January, 1853 (Canals Box 1, Warshaw Collection #60, Archives Center, American History Museum, Smithsonian Institution).

As per the agreement, Governor Whitcomb formally turned over control of the Wabash and Erie Canal to the canal trustees on July 31st, 1847 (*Documentary Journal* 1847, part 2). The Wabash and Erie Canal would officially remain in trust with the bondholders until the bonds had been paid off (Comstock 1911: 13). The trustees of the canal included Charles Butler of New York, Thomas Blake of Terre Haute, and Nathan Palmer of Indianapolis. Part of the amended Butler Bill stated that these trustees would report to the general assembly of the State of Indiana each year (*Laws of Indiana* 1846).

Jesse Williams was retained as chief engineer by the trustees, and the entire canal was reorganized into three divisions. Other administrative changes were made to eliminate waste and increase efficiency (Barnhart and Carmony 1954: 335). An official

Orders, Rules, Regulations, and Rates of Toll pamphlet was printed specifying all aspects of administration on the Wabash and Erie Canal (1847).

The new trustees ran the canal like a well-organized business venture, and not like a political project. Record keeping was excellent, with detailed accounts being kept. For the first time in the history of the Wabash and Erie Canal, the books balanced at the end of the year. Butler was constantly kept informed of the condition of the canal.

Some problems, however, could not be solved by a change in administration. Unreasonable damage claims, long a thorn in the side of the state canal commissioners, were a particular nuisance for the new canal trustees. Farmers were under the impression that the canal had been sold to English creditors, and were expecting that the foreign bondholders would be more likely to pay for damages (*Documentary Journal* 1948: 74). Maintenance was another problem. Breaches, floods, and droughts had to be dealt with for proper navigation on the canal.

Regionalism was another problem faced by the trustees. Under the assumption that raising the Deer Creek Dam by several feet was a plot by Lafayette mill owners downstream from the Delphi area, angry Delphinians vandalized the new dam works. South of Lafayette, the people of Covington feuded with Lafayette to the north and blocked up the canal to the south with a sunken barge to deprive southern towns of the canal's use. Covington citizens also helped the townsmen of Perrysville in demolishing a dam at that city and to open the nearby lock gates, thus stranding a number of barges. When farmers did not get the damage compensation from the bondholders that they wanted, they often damaged the canal banks, letting out water and stopping commerce, thus adding to the general mayhem (Fatout 1972: 126).

Despite all these regional problems, the Wabash and Erie Canal managed to make a healthy profit in 1847. \$122,922.00 was taken in for that year, setting a new record for the canal. This figure made such a good impression that the canal trustees let contracts for the section between Coal Creek and Terre Haute. By the end of the year, 277 miles of navigable canal existed from Covington to Lake Erie (*Documentary Journal* 1848: 73-76 and 334-335).

Regional Growth along the Wabash and Erie Canal.

The financial disaster the Wabash and Erie Canal had become for the State of Indiana was countered by the boom it brought to farmers and towns along the canal line. Economic expansion occurred everywhere along the canal pathway, with former frontier towns of a few hundred people becoming cities of up to six thousand citizens by the 1850s (Figure 2). As Stephen Visher (1955: 341-342) put it in his article *The Location of Indiana Towns and Cities*, “On the upper Wabash, Lafayette, Logansport, Peru, Wabash, and Huntington became sizable during the late 1830’s and the 1840’s, when the Wabash and Erie Canal was being constructed. Lafayette, at the head of steamboat navigation on the Wabash, was the state’s fourth (in size) city in 1850.”

One of the original hopes for the canal was that it would attract emigrants from the east who would settle in Indiana’s unpopulated interior (Odell 1816: 103). This expectation, at least, came true. The population of Lafayette, as an example, rose from about 600 before the canal to nearly 6000 in the 1850s.

A detailed historical map of Indiana, titled "A NEW MAP OF THE STATE OF INDIANA". The map shows the state's boundaries, major cities, towns, and a dense network of roads and railroads. A rectangular box is drawn around the central part of the state, highlighting a specific region. The map includes a legend on the left side with various symbols and a scale bar at the bottom. The title "INDIANA" is prominently displayed in the center, with "A NEW MAP" above it and "PUBLISHED BY THOMAS COWPERTHWAIT & CO. 1122 Market Street Philadelphia" below it.

Lafayette was exporting more than forty thousand barrels of flour and pork, one million bushels of corn, four million pounds of bacon and lard, and great amounts of wheat, oats, butter, soap, cheese, potash, hides, and tanbark each year, and all on the canal (Fatout 1972: 130). Other canal towns saw equally impressive increases in their agricultural and processed goods output. The town of Fort Wayne grew from 1,500 citizens in 1840 to 4,282 in 1850. By 1853, the population was 6,500 (*Compendium of the Seventh Census* 1850). This growth was directly linked to the successful completion of the canal to Lake Erie in 1843 and its operation thereafter. Property values also doubled between 1842 and 1850 (Fort Wayne *Daily Sentinel*, July 10th, 1874).

The Wabash and Erie was also the main route taken by immigrants into Indiana. Germans and Irish were the primary immigrants of the mid-1800s. The census atlas of 1970 showed foreign born populations making up between 1 to 4 persons per square mile throughout the United States, but this figure rose to between 8 and 10 per square mile along the Wabash and Erie Canal (Benton 1903: 97). Allen County, with Fort Wayne in the center, had in 1850 a foreign population of 3,753 out of a total population of 16,919, or twenty-two percent of the population (*Compendium of the Seventh Census* 1850).

Warehouses, shops, boat builders, hotels, grain elevators, service yards, and mills were all located along the Wabash and Erie to take advantage of either the transportation of the canal or the water power it could also provide (Cottman 1907. A writer for the *Wabash Gazette* (June 10th, 1850) stated about the canal that, “all the advantages to make her such, and we can in truth say to those who look to the Wabash and Erie Canal for a market for their pork, and surplus produce, that at no other town on the Wabash, can they find a more reliable and better market.” The Wabash and Erie Canal brought economic

growth to Fort Wayne, stimulated mills and other industries that existed on water power, increased overall land values, and added much money to the area from canal construction and administration. Construction of buildings directly designed to exploit the canal for transportation and passenger service actually preceded construction in Fort Wayne, as it did in many towns along the canal (Poinsatte 1969: 221).

At the Wabash and Erie Canal's height, about five hundred boats of various sizes navigated the waters between Terre Haute and Lake Erie (Fatout 1972: 135). Travel by canal barge was much more pleasurable than by coach and horse in the 1840s, despite the mosquitoes. Passengers traveled on the specialized passenger packets, or could join a slower moving cargo barge for a cheaper price. Charles Titus took a trip on a Wabash and Erie Canal barge in 1843, noting at the end of his trip, "We had now travelled on this canal 118 miles & my expenses had been only two dollars & seventy five cents. Cheap travelling surely!" (From Clark 1989: 223).

To service this fleet of barges and passenger packets, a thriving boat-building industry grew up within the major canal towns. In Lafayette, the state business gazette notes a boatyard located at the foot of Water Street. This was the Shriner Boatyard, owned by Daniel Shriner. Some boats were even designed to make the long trip to the East Coast via the Erie Canal. These boats were dismantled in sections, then floated by lake steamer to Buffalo where they were reassembled (Fatout 1972: 139).

Agricultural goods were always the primary economic items shipped on the Wabash and Erie Canal. Canal transportation created a reason for farmers to produce surplus crops. Prior to the canal's construction, farmers along the canal corridor produced only enough for self-sufficiency. The markets that would take surplus

agricultural products were too distant to make over-production a useful venture. The canal changed all that, making cash-cropping in Central Indiana a viable occupation (Poinsatte 1969: 221).

George Cottman describes the influence of the Wabash and Erie Canal on life in central Indiana:

“The abundant agricultural wealth of the Wabash country now found comparatively cheap and easy transportation directly to the East; the regions north and south for a distance of fifty to one hundred miles gravitated to this outlet... Westward, in turn, came the capacious freight boats laden with merchandise of all kinds, and the packets with emigrants who, now having access to this land of promise, came in an uninterrupted stream... Towns along the river which heretofore could have only a broken and restricted intercourse with each other, were now regularly connected, and traveling was made possible to the multitude.”

Charles Poinsatte (1969: 239) noted that, “The canal had opened up for the Fort Wayne market an agricultural hinterland which ranged from sixty miles north to Sturgis, Michigan, sixty miles northwest to Goshen, Indiana, fifty miles south to Muncie, Indiana, and some fifty-five miles southeast to St. Mary’s Ohio.” George Cottman (1907) also described the affects of canal transportation in the town of Toledo, “In 1844 there was shipped out of Toledo, coming from the Maumee and Wabash valleys, 5262 bushels of corn. Two years later this output increased a hundredfold, and in five years more it amounted to 2,775,149 bushels.”

Indianapolis was also affected by the Wabash and Erie Canal. The Indianapolis *State Sentinel* declared in 1843, “it is a fact that we are beginning to send produce west to the New York and Boston markets. Large quantities of Hemp and other articles are now being forwarded in wagons to Lafayette, some 65 miles north west, by our enterprising

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citizens, to be sent on the Wabash and Erie Canal to Boston and New York markets” (from VanBolt 1951: 346). Leola Hockett describes the influence of the canal on economics in Wabash, Indiana, “Prices paid in Wabash for grain were higher than elsewhere and it was brought there from Delaware, Madison, Howard, Kosciuski, Whitley, Fulton and Blackford counties. It is said that from 500,000 to 1,000,000 bushels were shipped each season from the town of Wabash. There were several pork packing establishments in Wabash and in LaGro and pork was shipped from these towns to New York” (Hockett 1928: 302).

Another account comes from J. Wesley Whicker (1816: 77), who lived in Attica when the canal was opened in that city in 1848, “boats began to ply upon (the canal) – packet boats, carrying passengers, gaudily decorated, and pulled by horses with some speed, also tug boats and heavy boats for mercantile purposes, pulled by mules and heavy horses. Soon this waterway was lined with hundreds of boats carrying all kinds of merchandise, freight and passengers. Warehouses, mills, packing houses and many other houses of commerce were built along its banks” (Whicker 1816: 77). But the most convincing statement on the positive affects of the canal on regional economic development comes from Charles Titus, a young Methodist schoolteacher who in 1843 traveled through Indiana. Part of his journey was by canal boat, which prompted him to state in his diary,

“The Wabash and Erie canal affords the greatest facilities of transportation to the farmer & merchant of the Maumee & Wabash vallies – two of the most fertile regions in the whole world. By means of this canal, the farmer in the upper Wabash – which is the most fertile part of that valley – finds a ready market for all his surplus produce, at a good price. I could but notice the difference of the price of grain on the canal,

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and in the southern part of the State. Soon after leaving Madison, I saw corn selling for ten cents a bushel, and a drug at that: on the canal it went quick, without parleying, for 37 ½ a bushel” (From Clark 1989: 234).

Another affect of the canal was the development of secondary transportation infrastructure along the route of the canal. Roads were created to link local agricultural regions to the canal, ferries were located so as the opposite banks of the Wabash River could use the canal, and bridges were constructed to facilitate the shipping of agricultural goods to canal ports (Poinsatte 1969: 239).

The Southern Division, 1848 to 1853.

In the year 1848, the Wabash and Erie Canal had 189 miles of canal open for navigation. Ninety-six miles were being constructed on the Southern Division, and 1,780 men were at work. Receipts from the Wabash and Erie Canal in 1848 were \$146,148.90; a remarkable feat for a canal with such a stormy beginning. Another positive note was that expenses were only \$35,000.00; much less than in previous years (*Documentary Journal* 1847). The next year’s receipts were less, mostly due to a cholera outbreak that halted navigation for several weeks. The epidemic affected Toledo and Lafayette particularly hard, both of which were key revenue-making towns. Tolls for 1849 were only \$135,000.00 (Esarey 1918: 439). One of the victims of the epidemic was the canal trustee Thomas Blake, who died at Cincinnati as he was returning to Indianapolis (*Documentary Journal* 1849).

On October 25th, 1849, two boats entered Terre Haute for the first time, again to much fanfare. Commerce with this southern port was quite slow at first, with 1849 receipts being \$2,228.38, and never would reach the levels of the northern division.

Damage claims in the south also reached unparalleled heights (*Documentary Journal* 1850: 273). Whereas normal damage claims on the Northern Division had been about \$2500.00 a year, those on the Southern Division averaged \$5000.00 per year (Fatout 1972: 142). Overall, the canal south of Covington became a liability for the canal trustees, never making enough to even pay for the yearly maintenance.

Funded by the \$800,000.00 given to the State of Indiana by the stockholders, the Wabash and Erie Canal was slowly constructed south of Terre Haute. Delays occurred in 1851 as cholera killed hundreds of workers on the line (Esarey 1918: 440). Floods also damaged aqueducts, court cases delayed construction through various parts of southern Indiana, and embankments crumbled as water was let into them. The floods alone closed the canal for a full month (*Documentary Journal* 1851).

Another problem was an overall lack of water south of Terre Haute, leading to the construction of huge reservoirs so that boats would not be stranded in the summer. The most important of these reservoirs was Birch Creek Reservoir in Clay County (Holliday 1929: 93). Chief Engineer Williams reported in 1852 about this reservoir, "I cannot too strongly recommend the immediate construction of this work, as without it, the Division south of Terre Haute must be comparatively valueless during the dry season. The cost of the reservoir and feeder is estimated at \$24,358.00 exclusive of damages for land occupied, and making provision for clearing off 250 acres of the timber" (*Documentary Journal* 1852).

Finally, on July 29th, 1853, the first canal boat arrived in Evansville to an unusual silence for such an event (*Documentary Journal* 1854: 842). The citizens of southern Indiana, long waiting as their promised canal inched southward, had had enough.

Support for the waterway was almost non-existent as people in the south instead turned toward railroads for their transportation needs. Canal economic infrastructure, as was seen in the north, did not materialize. Few warehouses, basins, or mills were ever constructed along the canal (Fatout 1972: 147). But for a short time at least, 468 miles of Wabash and Erie Canal were open for business.

A general mood of disinterest surrounded the canal during its brief life south of Terre Haute. It was usual practice on the Southern Division, because of the light traffic on the canal, for boatmen to lock themselves through lock gates when traveling from one elevation to another. This saved the state the cost of permanent lock-keepers, but led to negligence on the part of uncaring boatmen who would leave the locks open, thus draining a level of water. Local citizens also used the canal as a dumping place for logs and stumps, which became a nuisance to navigation (Fatout 1972: 157).

Mismanagement and an overall fatalistic attitude among the canal trustees about the Southern Division led to late maintenance and a lack of work crews, engineers, and canal administrators south of Terre Haute. The major problem that led to excessive damage to the canal was the design of the canal channel itself. Being at right angles to the White River drainage meant that any increase in water flow eroded at the banks and undermined engineering structures at a faster rate than in the north (Fatout 1972: 157).

Torrential rains created a flood in the spring of 1854 which wrecked the Sugar Creek aqueduct, damaged another at Raccoon Creek, and stopped navigation for almost four months on the Southern Division. Repairs cost \$11,000.00, but their completion and the reopening of business still resulted in only \$2351.12 in tolls at Evansville for that year (Fatout 1972: 158).

The Reservoir War on the Southern Division

The Southern Division was unique in Indiana canal history in that it was submitted to a sporadic and often violent guerrilla war against its features and embankments. The cause of this war was the general belief that stagnant driftwood in the canal was unhealthy and a threat to the local inhabitants. Fear especially concentrated on the canals reservoirs. As has been previously stated, the lack of good water sources in the south made numerous reservoirs necessary for navigation (Esarey 1918: 442).

The citizens of Gibson County, Indiana, alarmed over the threat of disease in their area, applied for a court injunction against the construction of a reservoir in their county, but were unsuccessful (Fatout 1972: 142). Clay County residents also protested the construction of the Birch Creek reservoir, threatening that they would destroy the reservoir if it was ever constructed (Holliday 1929: 93). Jonathan T. Grimes (Terre Haute, *Wabash Express*, August 18th, 1852), one of the most outspoken opponents to the canal trustee's Clay County reservoir plan, said in 1852 "in view of the known danger of these works (reservoirs), we have heard with much regret... that the Trustees contemplate the construction of a further Reservoir in the Valley of Birch Creek, in the immediate vicinity of our houses, covering a dense forest of many hundred acres, the timber of which is contemplated to be left standing to die and decay."

Legal action was taken by representatives of Clay County against the reservoir plan, but the courts refused to stop the reservoir's construction. By 1853, the Birch Creek reservoir was completed and filled with water. Though official medical inquiries ordered by Governor Wright proved both the Gibson County and Clay County reservoirs to be harmless, local citizens were not easy to convince (*Documentary Journal* 1855: 912). An

editorial in the *Eel River Propeller* (September 21st, 1853) spoke out against the reservoir, “The land covered by water is not the only loss to the county, but thousands of acres adjacent thereto remain uncultivated, and men are forced to abandon their farms in order to save their lives.”

After failing in their legal attempt to stop construction of the reservoir, the citizens of Clay County took matters into their own hands. A meeting of concerned Clay County citizens met for the first time on February 23rd, 1854, to decide what to do about the perceived reservoir problem. Further legal avenues were suggested, but several citizens chose a more permanent solution. On June 22nd, 1854, the Clay County “Regulators”, as they were called in the popular press of the time, cut a hundred foot gap in the Birch Creek embankment, releasing the water and drying up the canal for miles. Commerce was paralyzed between Terre Haute and Evansville (Holliday 1929: 96).

The trustees attempted to negotiate with the Clay County group, promising to clear out the timber if no further vandalism took place. During the summer of 1854, all the remaining timber in the Birch Creek reservoir was removed by the trustees, at the cost of \$1000.00 (*Documentary Journal* 1855: 912). This action, however, appears not to have been satisfactory to all the citizens of Clay County as the Eel River feeder dam was burned two months later (Holliday 1929: 97). The resident engineer estimated the cost of repairs at \$20,000.00 (*Documentary Journal* 1855).

Repairs were completed on the Eel River feeder dam, and the canal was again opened for commerce in the spring of 1855. But on May 8th, a force of about one hundred and fifty men returned to the Birch Creek reservoir and broke open the embankments. The canal once again was left dry as navigation became impossible. It

appears that this second attempt to destroy the reservoir involved claims for money more than the fear of health problems (Holliday 1929: 97). A statement by local citizens afterward said that they had, "repeatedly informed the Trustees that it [the reservoir] could not stand unless they were paid a reasonable price for their land or the timber was taken off... and other reasonable steps taken to preserve the health" (Clay County *Advocate*, May 16th, 1855).

The Regulators twice set fire to the Birch Creek reservoir waste weir, and tried to burn the Eel River dam, which prompted the canal trustees to turn to the governor for help. The state issued a \$5000.00 reward was issued for arrest of the instigators, to no effect (Fatout 1972: 158, and *Documentary Journal* 1855: 912). In May of 1855, the Clay County Regulators marched on the Birch Creek reservoir with the purpose of demolishing the structure for good. One hundred armed vigilantes cut the reservoir banks, wrecked the aqueduct, and burned all the support buildings at the location. This action drove the canal workers away and made further repair work on the reservoir impossible (Holliday 1929: 98).

Governor Wright sent out a company of state militia, led by General Dodd, who was reinforced by sixty armed volunteers from Evansville (*Wabash Courier*, June 16th, 1855). The guerillas disappeared into the surrounding country, leaving the militia to guard repair crews as the reservoir was restored. Canal trustees again agreed to clear more timber out of the reservoir, and the area remained quiet for a few weeks. As soon as the work was completed and the troops left for home, the Clay County Regulators returned to Birch Creek. As the Chief Engineer reported in 1856, "No sooner were these troops withdrawn, however, than the same band, on the night of the 29th of June, again

made an aperture in the embankment, and permitted the water to escape from the Reservoir, thus hazarding, for many months, the safety of navigation (*Documentary Journal* 1856: 121).

Several more attempts were made to damage the reservoir over the next two years, but the water was never successfully let out. The Birch Creek aqueduct was destroyed in August of 1857, and the Birch Creek reservoir was again drained in 1860, but by this time, the Regulators had nothing to fight. The Wabash and Erie Canal in the south was no longer being used (Holliday 1929: 98).

The Prosperity of the Northern Division.

While the Southern Division faced guerilla wars, regional conflicts, environmental disasters, and an overall lack of public support, the Northern Division of the Wabash and Erie Canal was having its heyday. Tolls from the entire canal in the early 1850s were increasing by about \$20,000.00 each year. Repairs were also manageable. The total cost in repairs for the year 1850 was \$58,549.00, with an additional \$65,000.00 being expended to replace most of the road bridges along the line that were reaching the end of their use life (*Documentary Journal* 1851). This bridge activity was the result of a number of court cases where individuals were suing the state for damages from rotten bridges (*Laws of Indiana* 1851 and 1852).

Water was entered into the Maysville division in June of 1852, with the entire line being navigable for 392 miles (*Documentary Journal* 1852). Tolls on the canal were lowered by forty per cent in 1852, but even with this reduction, overall receipts rose to \$193,400.00 (*Documentary Journal* 1853). Poor crops in 1853 reduced canal revenues to

\$181,207.00 (*Documentary Journal* 1854). These results led bondholders to think that their gamble on the revenues of the Wabash and Erie Canal appear to have been a safe bet. The canal was making a profit each year, and even if the amount was much less than originally expected, interest payments were being met, and it was hopeful that future years would see even greater results.

The Decline of the Southern Division.

The actions of the Clay County Regulators were successful in stopping most navigation on the Southern Division during the years of 1854 and 1855 (*Documentary Journal* 1855: 912). When the Birch Creek reservoir was out of operation, the canal relied on rainwater to fulfill its water needs. Too much water fell in some places, and not enough in others. At Feassel's ferry along the White River, flooding caused fourteen thousand cubic yards of canal embankment to fall into the White River. Repairs were made, the water was again released into the canal, and abruptly ten thousand more cubic yards of the repair work ended up in the White River. The Southern Division was cursed with a blue clay soil layer that gave no solid foundation for embankments, and that allowed sections of earth above it to slip when water pressure was applied (*Documentary Journal* 1856: 125-126). The situation was exasperating for the trustees. Thomas Dowling wrote to Butler in April 14th, 1854, that "We have had several heavy breaks on the Southern Division... and it looks as tho' it would never stand" (ISL/A/WA: Wabash and Erie Canal Letterbook 1851-1863).

The next year, 1856, produced a long dry spell that dried up the canal and turned the canal channel into a swampy marsh. Economic use of the Wabash and Erie Canal in

the south came to a stand still (*Documentary Journal* 1857: 275). As the *Evansville Journal* (May 19th, 1856) noted, “Freight is accumulating at several ports. At Smyrna, a Dutchman has been waiting several days with a half barrel of krout... The wharf at Petersburg is crowded with 1 peck of potatoes, 2 doz. Onions, ½ peck shorts, 1 passenger (who wants to work his passage), and 1 paper of tacks.” Late fall rains eventually watered the canal, but an unusually early freeze made travel again impossible (Fatout 1972: 161).

The canal trustees had to deal with more than bad weather and reservoir guerillas, they also had to deal with regional conflicts. The citizens of Williamsport, a town located just off the main line of the Wabash and Erie near Attica, tried to convince the state to build a side cut canal to their town, much as Delphi had created in the north. When rebuked, the town took matters into their own hands, formed the Williamsport Canal Lock Company, and proceeded to dig their own canal branch to the Wabash and Erie. Breaching the main canal at Attica, the Williamsport side cut was a failure as it drained so much water from the main line to make both unusable (*Documentary Journal* 1854: 920).

State Finances in the Early 1850s.

1850 was an important year for the canal history of the State of Indiana as it marked the sale of the aborted Central Canal, located at Indianapolis. This canal, which cost the state over \$880,000.00 to survey and partially construct, was sold for \$2845.00 (Fatout 1972:143). Over the next twenty-five years, Indiana’s other canal ventures would be sold off for similar losses.

Governor Wright in 1850 also gave the general assemble an update on the state debt, reporting that “with no other resource but taxation, we have liquidated, of our domestic debt, in principal and interest... \$2,529,156, and have paid of interest on our foreign debt... \$739,269; making a total of \$3,268,425” (*Documentary Journal* 1851: 102). Indiana, therefore, was well on its way to paying off its half of the state debt in 1850. The Wabash and Erie Canal, however, was a different story.

Business revived on the Wabash and Erie Canal in 1850, with receipts adding to \$157,158.38. In 1851, they totaled \$179,282.26. Unfortunately, these figures, though impressive when compared with earlier years, were only enough to meet the interest payments on the \$800,000.00 given by the stockholders to complete the canal. The receipts were also not enough, after administration and maintenance fees (nearly \$60,000.00) were taken out, to pay for the interest on the originally debt, let alone the principle (ISL/A/WA: Ledger A, Wabash and Erie Canal Trustees Cash Book). In 1853, the Wabash and Erie Canal hit its peak in toll revenues, earning \$193,400.00. Thereafter, the canal would lose money, even as yearly maintenance costs would continue to climb.

At this period in the history of the Wabash and Erie, maintenance was becoming an increasing burden on the yearly tolls collected on the canal. The 9 aqueducts, 37 locks, 5 dams, 71 road bridges, and 139 culverts of the transportation system were reaching their useful life span. Wooden abutments, locks, and structural supports were rotting, and the harsh Indiana winters and summer flooding were taking their toll. Banks would wash away, and breaches would form. All of the above would keep a large repair crew hired by the canal trustees constantly working (Fatout 1972: 143).

The canal trustees were supplemented by healthy land sales from the federal grant, which added over \$80,000.00 a year to the general fund (*Documentary Journal* 1853: 352). Indiana made good on its half of the internal improvement debt, mostly by reducing government spending by \$20,000.00 annually. Taxes were also raised to meet the remainder needed each year to pay off the interest. As Indiana finances became better after the Butler Bill, enough revenue could be put together to finally buy back all the “white dog” and “blue dog” scrip still in circulation (Fatout 1972: 142).

Another event of the early 1850s that would have profound effects for the financial future of the canal was the surveying of the Wabash and St. Louis Railroad. This railroad paralleled the Wabash and Erie Canal at a distance of about one mile. Indianapolis already had four railroads entering that city, none of which paralleled the canal at this time (Benton 1903: 80). Canal trustees realized this new danger to canal profits, noting that once railroads were constructed in canal districts it, “will probably call for such revision in tolls... as will protect its business and revenue against competing routes” (*Documentary Journal* 1852: 242). In 1852, canal trustees entered a formal protest to the state for chartering railroads through canal territories (Fatout 1972:146).

Canal support was far from dead in the 1850s. Many newspapers openly stated their support of the waterways. The editor of the *Evansville Journal* (May 29th, 1851) noted that the Wabash and Erie Canal would “do more business than probably half a dozen railroad tracks could running between the same points.” A new project to construct a ship canal around the Ohio Falls near Jeffersonville, Indiana, was also begun (Fatout 1972: 146).

The Wabash and Erie Canal, 1853 and 1854.

Total tolls on the Wabash and Erie for 1853 were \$181,206.68, with \$78,947.98 in costs (*Documentary Journal* 1854, see Tabular Statements section). Even though this figure was down from 1852 (\$187,392.15), it should be noted that the trustees reduced toll charges on the canal by 40 percent, which took place in 1853. The volume of traffic, then, was significantly higher. As Chief Engineer Williams notes, "The collector's books, at the Fort Wayne office, show the number of boats navigating the eastern section of the Canal during the whole, or part of the season, to have been 299, being an increase of 50 boats over the number reported for the previous year" (*Documentary Journal* 1854: 841). The trustees also note that a small amount of merchandise trade was shifted to railroads (*Documentary Journal* 1854: 831).

The larger than average repair costs were attributed to a major replacement of older wooden canal features. No major weather disasters were noted on the Northern Division by the Chief Engineer for 1853, though the Southern Division was impacted by a disastrous flood which swept away an aqueduct and a large culvert near Newberry, and another aqueduct was damaged on the White River. Repairs in the south were almost \$25,000.00 (*Documentary Journal* 1854: 840).

The Wabash and Erie Canal had \$180,535.33 collected in tolls on traffic utilizing the canal in 1854, which was roughly the same as the year before (*Documentary Journal* 1855: 911). Only 10 percent of this figure came from southern ports. The combined total for ports south of Covington were \$13,656.78, which was not enough to pay for yearly repairs on that section of canal. The difference had to be made up from tolls from the more successful northern ports (*Documentary Journal* 1855: 945). A poor wheat crop

was made up by larger shipments of corn, iron, lumber, and other bulk goods. Imports of finished merchandise goods were down for the year, with the beginning competition of railroads being blamed for the decline. As the trustees pointed out, "The latter class of freights (merchandise goods), paying the highest toll, has been to some extent diverted into railroad channels, induced by a saving of time. It is in the diversion of this class of business that the revenues are likely to be impaired by the railroad system"

(Documentary Journal 1855: 911).

The trustees realized that railroads would take away some of the canal business, but they had no idea in 1855 of the extent of the eventual shift from canal transportation to railroad transportation. The nature of the compromise between bondholders and the State of Indiana, which formed the administration of the canal trustees, determined to a large degree that railroad competition would eventually wreck the canal financially. Because the State of Indiana no longer had any obligation to the success of the Wabash and Erie Canal, state legislatures could issue charters for railroads that would eventually bleed the canal of its business. At this point, a brief history of railroads in Indiana is necessary to understand how the two transportation systems became adversaries in the mid-1850s.

Railroads in Indiana.

Railroads had a long history in Indiana. The first railroad to be constructed was an experimental section built by John Walker in 1832 near Lawrenceburg, Indiana. This railroad was given a charter by the state in the same year, and was given assistance under the 1836 Internal Improvement Act. The railroad later was purchased by George H.

Dunn in 1848, who revived construction as the line crept toward Greensburg with the goal of Indianapolis as its terminus (*Laws of Indiana* 1848). In 1853, Indiana's first railroad was finally completed. It had taken twenty years of intermittent construction and an unknown amount of money (Esarey 1918: 718-719). The history of the Lawrenceburg Railroad shows that early railroads had about as much success as the canals of the same era.

Originally, railroad lines were intended to supplement existing water routes, including the Wabash and Erie Canal (Bogle 1962: 215). By the 1850s, railroads were chartered to directly compete with Indiana's water transportation systems. The first railroad to be constructed in Fort Wayne, the *Ohio and Indiana*, linked that town with Pittsburgh, Pennsylvania on November 1st, 1854 (Benton 1903: 76). Passenger travel shifted almost exclusively to the new rail line by the end of 1855, and total tolls on the canal decreased by almost half (Poinsatte 1969: 255).

In the year of 1855, Indiana had thirteen hundred miles of operating railroad, sixteen hundred miles under construction, and seven hundred miles in the planning stage (Fatout 1972: 159). Advances in railroad technology had eliminated most of the original problems faced by railroad investors in the first half of the century. Iron technology had improved, greatly reducing the overall price of construction of a railway, and steam engines were made faster and more reliable (Bogle 1962: 229).

Railroad owners, knowing that the Wabash and Erie Canal was their major competitor, cut rates and campaigned hard to take shipping away from the canal. Before 1855, railroads in the state were only located on perpendicular lines, so that the canal faced no direct competition. In 1856, the Wabash Valley line was opened, which ran

between Toledo and Logansport, thus paralleling the canal through its most profitable region (Benton 1903: 80). Line boats after this date hauled mostly bulk and agricultural goods from the interior to Toledo, returning empty where before they carried passengers and finished goods (Poinsatte 1969: 256).

Canal transport could not match the service of the railroads in the 1850s.

Railroads were not affected by the winter season as much as canals. A good year for the Wabash and Erie Canal would see the transportation line opened for navigation in April and closed in November. Boats would be stored during the winter months, with merchants stocking up on items beforehand (Hockett 1928: 301). The railroad could run throughout the winter when the canal could not. Railroads were also not dependent upon a large water system for transportation. One of the major causes of the decline of the Wabash and Erie was high maintenance as wooden structures deteriorated, embankments were breached, and sudden floods swept away towpath bridges and abutments. Railroads were not dependent on water sources, and therefore were not as susceptible to harsh weather, especially early freezes, floods, and droughts. (Fort Wayne *Sentinel*, June 17th, 1843 and January 16th, 1847).

Another factor in the favor of railroads was speed. Canals were designed for barge travel at three or four miles per hour, with passenger packets moving at eight miles per hour. Anything faster would cause the deterioration of the towpath. Railroads boasted of speeds between twenty and thirty miles per hour, and faster. Canals could not keep up with this speed of shipment. When it came to construction speed, railroads also fared better. Railroads needed a smooth bed for steam engines, but did not need the deep forty-foot wide channel that canals required. Technological differences in construction

meant that railroads were cheaper to build, took less time, and showed results faster than canals (Comstock 1911: 14).

The canal trustees noted the impact of railroad competition in their 1858 report to the Indiana legislature. Tolls were down that year from \$113,423.00 to \$60,165.00, which the trustees attributed to railroad competition (*Documentary Journal* 1858: 174). Similar drops in yearly toll revenues were experienced from 1856 through the 1870s. Railroad competition first impacted profits from the transportation of manufactured goods. The canal trustees noted this loss of manufactured good traffic in their 1858 report, “The opening of the transverse railroads... diverted a portion of these goods, but this diversion would have been partly compensated by the increased trade of the intermediate districts not transversed by railroads” (*Documentary Journal* 1859: 4). The canal trustees note later in the same report that merchandize goods incoming on the canal fell from \$65,000.00 in 1853 to \$15,000.00 in 1857 (*Documentary Journal* 1859: 4). This loss in goods prompted the canal trustees to complain to the state legislation and criticize the chartering of competitive railroad lines.

Passenger service quickly shifted to the faster and more reliable railroad lines, leaving the canal only competitive in the hauling of low-payment bulk goods, such as corn, oar, wheat, and coal. Another bulk item hauled on the canal were boulders from Attica brought to Lafayette and crushed to pave the city streets (Whicker 1916: 82). Ironically, the rails needed to construct the *Indianapolis & Lafayette Railroad* fell into this category. The massive iron rails were brought to Lafayette on canal boats in the 1850s. By the 1870s, even these bulk goods were shifted to railroads, leaving the canal with no major economic use.

The *I & L Railroad* was first chartered in January of 1846, The *Indianapolis & Lafayette Railroad* would not be completed to Indianapolis until 1852, demonstrating that even the early railroads took time to construct. Even though the *I & L* railroad some business away from the Wabash and Erie Canal, it was the railroad extension north of Lafayette to Logansport, completed in 1856, that did real damage. The Logansport extension of the *I & L* railroad paralleled the canal for forty miles, placing the canal in direct competition with railroad transportation for the first time (Ewbank 1939). By the end of 1856, the *I & L* and the *Wabash Valley* lines formed an unbroken railroad between Toledo and Indianapolis, with stops at all the major canal towns.

Along with railroad lines, economic infrastructure focused on certain railroads slowly developed throughout Indiana. Speculators laid out towns, warehouses were constructed, and land at key railroad junctions was developed to service passengers, freight, locomotives, and rail cars (Fatout 1972: 159). As Stephen Visser (1955: 344) stated, "Indiana railways were deflected to intersect existing towns, but new towns grew up where roads or several railways converged.

All of the railroads that operated in Indiana in the 1850s were privately funded; backers of the *Wabash Valley* line were able to raise \$4,000,000.00 for its construction (Esarey 1918: 730). The vast expense necessary to start such a transportation project was not available in the early 1800s, but by the middle of the century the economic infrastructure of the United States could support large-scale projects (Poinsatte 1969: 260). An advantage to the State of Indiana was that it had no direct investment in the railroads, thus was insulated when one went bankrupt or could not make payments. Taxes were, however, taken for the railroad charters through the state. The disadvantage

for Indiana was that the state held no control over the administration of the rail lines, and the state did not reap the vast profits that the railroads eventually generated.

The Wabash and Erie Canal in 1855 to 1857.

The year of 1855 was a bad year for the Wabash and Erie Canal. Crops failed throughout Central Indiana, and bad weather interrupted navigation on a number of occasions. Railroad competition for the first time was diverting business away from the canal (*Documentary Journal* 1856: 127). As the trustees noted in their annual report:

“The effect of this competition (with railroads) upon the Canal has been more strikingly exhibited during the past year than ever before. A reference to the returns from the Ft. Wayne and Lafayette Offices affords evidence of this. The receipts of the latter Office alone show a deficiency of \$19,621.68, as compared with the previous year, while that of the former shows a deficiency of \$16,965.96... This deficiency at the Fort Wayne Office is in merchandise, which, since the opening of lines of railways, connecting many of the principal towns of the interior, which were formerly dependent upon the Canal for their supplies directly with Lake Erie and the eastern cities, has been steadily falling off, and the shipments of merchandise this year by the Canal are less by more than fifty per cent than they were in the year 1853” (*Documentary Journal* 1856: 127).

The year 1856 was a disaster for the Wabash and Erie Canal. Only two hundred boats, half that of the year before, cleared at Evansville. Overall maintenance of the canal rose to \$70,000.00, but total receipts fell by \$29,000.00 to \$113,423.00 (*Documentary Journal* 1856: 276 and 289). Bad weather was accountable for the unusually high maintenance costs. A severe winter reduced the overall time period of navigation. Ice, drought, freezing and thawing, floods, and breeches all damaged the canal and its structures (*Documentary Journal* 1857: 262). In the south, The Clay County

Regulators cut the bank at the Eel River, and maintenance costs on the Southern Division siphoned off most of the profit generated by the Northern Division. The Southern Division accounted for \$8000.00 in tolls and \$40,000.00 in repairs (*Documentary Journal* 1857: 275 and 297-307).

The trustees put the blame for falling tolls directly on railroad competition. As their annual report stated, “there was a diminution of tolls and revenue from the Canal in that year (1856) of more than forty thousand dollars from the receipts of the previous year, which was attributable, mainly, to the effect of railroad competition” (*Documentary Journal* 1857: 275). To counter this competition, the trustees reduced tolls for 1856 from the state line to Evansville. Local canal advocates attempted to counter railroad competition as well, by expanding warehouse services and raising financial support for using the canal (Hockett 1928: 302). These actions, however, did not stop the shifting of transportation use from canal to railroads. The trustees concluded, “But the result of the year’s business shows too plainly that the Canal cannot successfully compete with railways, for that class of traffic, which, from its greater value in small bulk and weight, can afford to pay the greater charge for transportation” (*Documentary Journal* 1857: 276).

Tolls for 1857 were \$60,165.00, with repair expenses totaling \$58,405.00. Most of this expense was from repairs on the St. Joseph feeder dam, which broke during a flood (*Documentary Journal* 1857). It became more and more clear that the canal was not going to be able to meet the interest obligations to the bondholders, and most likely would never reduce the principle by any amount. Fortunately for the trustees 1857 was a good year for weather. Other than the St. Joseph feeder, little damage occurred along the

canal line (*Documentary Journal* 1858, see Chief Engineer's Report). For the first time, expenses on the Wabash and Erie Canal were larger than earned income.

Rumors began to circulate that the bondholders would make the State of Indiana again responsible for the original half of the state debt that was to be covered by the operation of the Wabash and Erie Canal. Dowling countered these speculations by stating that they were, "false in every particular... no bondholder, no Trustee, and no agent of either, will apply to, or ask, the Legislature or the Governor to 'throw back upon the State the Wabash and Erie Canal'" (*Terre Haute Express*, August 16th, 1856).

Bondholders in 1857, led by the Rothschilds and Barings firm of London and New York, sent a statement to Indianapolis complaining about the legislative practice of granting railroad charters that were in direct competition with the Wabash and Erie Canal. They argued that the compromise of 1847 protected the canal against such action. They asked for Indiana to once again accept the debt covered by the Wabash and Erie, which the state was legally and morally obliged to pay for; it appeared that the rumors were correct (*Documentary Journal* 1858: 288-289).

The state government and the citizens of Indiana were reluctant to again take on the internal improvement debt, especially since it was thought settled long ago. The Indiana legislature passed a resolution clearly stating that the State of Indiana no longer had any obligations to the debt, it did not own the Wabash and Erie, nor was it responsible for the canal any longer. The canal trustees and the bondholders were, therefore, left alone in determining the fate of the Wabash and Erie Canal (Fatout 1972: 162).

The Wabash and Erie Canal in 1858 to 1860.

The year of 1858 proved to be a worse year for the canal trustees than the last. Flooding on the upper Wabash River destroyed the Wild Cat dam, swept away the Wea and Shawnee Creek aqueducts, and caused a dozen breaches along the line . The worst hit section was between Attica and Delphi, where many extensive gaps had formed in the embankments of the canal (Reser 1934: 316). From June 10th to August 26th, no traffic moved between Delphi and Terre Haute. The annual report of the canal Trustees stated:

“The Trustees have to report a series of disasters to the Canal in the month of June last, caused by the excessive floods beginning on the 8th of that month, by which great damage was done to the structures and embankments between Delphi and Terre Haute. The rains which fell during the entire month of May, and which proved so disastrous to agricultural industry, came in full force on the 8th and 9th of June, raising the river and creeks in the Wabash valley higher than they had been since 1828, and at most points higher even than in that disastrous year”
(*Documentary Journal* 1859: 279).

Total expenses for the canal in 1858 were \$181,000.00, which exceeded tolls and combined by \$60,000 (*Documentary Journal* 1859). Lafayette, the largest exporting town on the canal, had been cut off for almost a year (Reser 1934: 317). At this time, the Clay County Regulators were demolishing the Birch Creek aqueduct in the south, and repair crews were being sent all over the Northern Division in a desperate attempt to keep the canal open for traffic (Fatout 1972: 162). The Wabash and Erie Canal was in trouble.

Agents of the bondholders returned to Indianapolis in 1859 with yet another petition. Their argument, that the state’s granting of railroad charters parallel to the canal nullified the Butler agreement, made the state once again liable for the remaining half of the canal loans due. Other parts of the petition called for the closing of the Southern

Division below Terre haute, and ordered the trustees to suspend navigation on any sections of the canal that were not producing revenues enough to match expenses (*Documentary Journal* 1859).

The petition also ordered for future sales of government land south of Terre Haute to be applied to the \$800,000.00 loan given to construct the canal in that area. Land sales south of Terre Haute had returned over \$2,000,000.00 to the trustees, but most of this had been used for construction of the canal, repairs and maintenance (Fatout 1972: 163). To prevent this loss of land revenues in the future, part of the bondholder's petition stipulated that future repair funds would come exclusively from receipts (*Documentary Journal* 1859).

To meet this bondholder demand, the trustees formally closed the Southern Division in 1859, fired workers and toll collectors, and cut salaries by 20 percent . Local citizens responded with alarm. Meetings were organized from Fort Wayne to Evansville to find some way to keep the Wabash and Erie Canal open. The general consensus in each canal town was that the Wabash and Erie should remain open (Fatout 1972: 163).

The state government, in the 1858-59 session, firmly refused to take over the failing canal. The Wabash Valley Railroad was allowed to continue construction, and no special benefits were granted the trustees of the Wabash and Erie Canal. The state did allow the trustees to lease out various sections of the canal to responsible individuals; a suggestion which the trustees hoped would make up some of their cash problems (Fatout 1972: 164). At this time, the Wabash and Erie was divided up into three sections – Fort Wayne to Terre Haute, Terre Haute to Newberry, and Newberry to Evansville. Terms of the two or four year leases were that the trustees retained ownership and control, but that

the lessees were to repair and rebuild the canal physical structures. The Chief Engineer would have final say on what work was necessary to keep the canal navigable. The last stipulation was that tolls would be retained by the trustees; the total sum being handed over to the lessees at the end of their current lease (*Documentary Journal* 1860: 299-300).

The change in management was celebrated up and down the Wabash and Erie Canal. Since the state had given control of the Wabash and Erie over to the canal trustees, the trustees had long been the scapegoats of the canal's ills. Now, the citizens looked forward to a new era of prosperity (Fatout 1972: 164).

In Evansville, it did not take long for the new administrators of the Southern Division to encounter the same problems the canal trustees had faced. In 1859, a severe lack of funds developed as few canal stockholders paid the new administrators what they were due for the issued bonds. Repairs and general maintenance added up fast, and the canal was breached by vandals near Independence, Indiana (*Documentary Journal* 1861: 285).

On the whole line, receipts for 1859 amounted to \$48,278.10 for the year, with expenses and maintenance totaling \$67,995.00 (*Documentary Journal* 1860: 320). The new administrators were clearly having just as hard a time keeping the canal viable as had the trustees.

The Wabash and Erie Canal, 1860 to 1865.

The year of 1860 marked the end of the Southern Division. The new administration on the section south of Terre Haute had brought in \$3433.00 in tolls for

the year before, which was hardly enough to meet repairs and maintenance. The abandonment of the Terre Haute-Newberry section created a fifty-seven mile gap in navigation and prevented boats from traveling from the Evansville section to Lake Erie (*Documentary Journal* 1861: 273).

The ninety-five miles of the Evansville section lasted a little longer. The lessees of the southern section could not generate enough interest in the canal within the local counties, nor in Evansville, for keeping the Wabash and Erie Canal open for navigation. Eventually, expenses were kept low by totally abandoning repair work on the canal. The total tolls for this section were \$4000.00 for 1859, and a similar amount in 1860, but the canal could not stay open forever without maintenance (*Documentary Journal* 1861: 285).

The year of 1859 was peculiar in canal history in that the weather was mild and no great natural disasters struck the canal line. The next year, 1860, saw tornadoes damage trees along the canal, breaking banks, and stopping traffic for a month. Vandals cut the embankment of the Prairie Creek aqueduct, and the Clay County Regulators returned to Birch Creek, draining the canal (*Documentary Journal* 1861: 285). The cost of keeping the canal maintained proved to be too much for the lessees, who formally petitioned the canal trustees for release from their agreements.

With the closing of the Newberry section, the line from Newberry to Evansville was used less and less. The town authorities of Evansville finally petitioned the canal trustees to convert the canal channel within their town into an enclosed sewer, thus saving them the cost of bridge maintenance (*Documentary Journal* 1861: 286). At the end of 1860, the Southern Indiana Canal Company had only \$1,385.91 in funds to

complete the year's maintenance on the ninety-five miles of canal north of Evansville. It was not enough. By the end of 1862, the remaining section of canal north of Evansville had become what the Clay County Regulators feared, a stagnant morass, good only for breeding disease and mosquitoes (*Documentary Journal* 1862: 386-387). The town of Evansville was also filling in the canal channel within the city limits by this time (Fatout 1972: 167).

In the end, the Southern Division of the Wabash and Erie Canal left a deficit of almost \$1,000,000.00. A sad tribute for the longest canal in the United States (Fatout 1972: 168). The worst legacy of the Southern Division was its constant drain on the resources of the Northern Division. For most of the years between the construction of the Southern Division and its leasing out to private parties, maintenance was paid for by using profits from the Northern Division. If this money had been spent on the Northern Division, and not sunk into the endless quagmire of guerilla wars, porous soil, and dry summers of the South, the Wabash and Erie Canal may have had a different ending.

North of Attica, the canal fared better in the early 1860s as the state experienced several years of good weather. Violent weather, however, struck the Wabash Valley again in 1863, doing much damage. Storms, floods, and frost heavily damaged crops and canal features, all of which caused a decrease in canal tolls for that year. General maintenance was also expensive, as many features were replaced. Tolls amounted to \$50,966.87 and repairs were \$66,282.54 for 1863. Canal tolls were below repair costs for the first time since 1859. Canal land receipts, which usually produced a surplus for the trustees at the end of each year, were barely enough to meet the extra repair needs (*Documentary Journal* 1864: 476 and 481-482).

The year of 1864 produced a better situation for the canal trustees. Tolls increased from \$50,956.87 for 1863 to \$51,921.32 for 1864, with expenses decreasing by roughly \$23,000.00 (*Documentary Journal* 1865: 186). Even if the canal was not making profits at the level of the decade before, at least it was holding its own and still providing a valuable transportation service to the people of the Wabash Valley.

The Wabash and Erie Canal North of Terre Haute.

While the Southern Division was dying a slow death through the early 1860s, the section of canal immediately north of Terre Haute was surviving and still making a profit, though barely. Receipts for 1860 were \$65,000.00, half as much as in 1859, with expenses for the canal amounting to \$40,000 (*Documentary Journal* 1861: 277). By this time, the Wabash Valley line was in full competition with the Wabash and Erie Canal, paralleling the canal from Toledo to Attica.

Overall economic and agricultural expansion in Central Indiana through the early 1860s led to an increase in canal business. With canal profits increasing, the railroads began a rate war to drive away canal business. Thereafter, regardless of canal trustee efforts to stop it, a war of cutthroat competition began between the two transportation routes. At the same time, regional economic infrastructure slowly moved from the canal to the railroad (Fatout 1972: 169). As the trustees stated in their annual report to the Indiana legislature:

“The direct competition of the Wabash Valley Railroad with the business of the Canal has been more active during the last two years than in previous years, for the obvious reason that the managers have been encouraged to expect that by such means parties would be discouraged

from building freight boats to be used on the Canal, and consequently all reliance upon it as a means of transportation would be destroyed. Acting on this theory, they have refused to entertain proposals from the contractors to establish, for mutual interest and support of Canal and Railway, a remunerating tariff of freights on produce shipped for Toledo from common points on the Canal... and in 1860 they seem to have adopted and put in operation a systematic plan for destroying the Canal” (*Documentary Journal* 1862: 379).

In spite of this new competition, the Wabash Canal Company, the group of business investors that had leased the Northern Division from the trustees, managed to last out its first contract. At the end of their four-year lease in 1863, the company was only down \$3,500.00. Hoping for better receipts in the future, the company signed up for a further three year lease, which lasted from 1863 to 1866 (*Documentary Journal* 1863: 458). Enough support of the canal remained that over \$158,525.00 in Wabash and Erie Canal Company stock was bought during those years, prompting the company to agree to another three year lease in 1866 (*Documentary Journal* 1869: 13). Stockholders in the Wabash and Erie Canal Company expected that an investment in repairs would make the canal a successful competitor once again. Enough sentimental support existed in canal towns that the Wabash and Erie was still able to entice local support to its cause. As Paul Fatout put it, “In canal towns the Wabash and Erie was no longer the center of life, but neither was it entirely paralyzed, and it put up a stiff fight for survival” (1972: 170).

The early 1860s showed a slight rebound for canal transportation. Tolls increased, and the weather stayed mild for the most part, which gave the canal trustees a break from major repair costs. Chief Engineer Williams (*Documentary Journal* 1862: 383) stated, “No unusual flood in the streams has occurred during the year. Indeed, since

the damaging flood of June, 1858, there has been a remarkable exemption from great rises in the Wabash and its tributaries, and this favorable turn in the seasons has produced a marked influence upon the amount of expenditure for annual repairs” (*Documentary Journal* 1862: 383).

Overall abundance in agricultural produce and economic expansion along the canal line created more demand for transportation than the railroads could absorb. Business, therefore, shifted somewhat back to canals. As the Chief Engineer (*Documentary Journal* 1863: 465) said in his annual report, “The season has been more promising as respects the trade of the canal than either of the three years immediately preceding... As freights have been more abundant, so has the railroad competition been less sharp. A disposition to build canal boats has been manifested.”

With the closing of the Southern Division, traffic into Terre Haute diminished. Another problem for this canal town was the abandonment of the Eel River and Sugar Creek feeders and reservoirs, which made it necessary to fill the canal from the State Dam near Delphi. Water was difficult to get down to the Terre Haute end of the line from so far away. The purchase of a steam dredge was hoped to alleviate some of the problems by clearing out sandbars and blocks along the entire line (*Documentary Journal* 1865: 192).

By the mid-1860s, though, the Wabash and Erie Canal was facing harsher weather and diminishing business. By 1865, the raised stock money was not enough to cover yearly maintenance. In 1863, a sudden freshet demolished the Shawnee dam, and the Raccoon Creek aqueduct gave way in 1864. 1865 was a mild year, mostly because a general drought reduced the damage of flooding (*Documentary Journal* 1865: 190).

Nature struck the canal a devastating blow when the State Dam at Pittsburg was demolished by an ice freshet on February 26th, 1866. One hundred twenty-five feet of the dam was swept away, and with it, most of the tolls of that year. Desperate repairs were made, but permanent rebuilding of the dam could not be finished until the next winter. The cost of the breach to the trustees was \$25,767.00. Flooding damaged a number of other canal features in 1867, and general maintenance was also undertaken (*Documentary Journal* 1869: 14).

Canal trustees continued to complain to the state legislature about parallel rail lines, to no avail. The state was thoroughly determined to free itself of the canal burden forever. The only dealings the Indiana government had with the bondholders after 1860 was when the state defaulted on its July, 1863 interest payment. Governor Morton soon addressed this issue, paying the next installment and all the back monies due (Fatout 1972: 169).

By the 1860s, railroads were viewed as the vehicles of progress. Most legislatures supported railroad expansion, especially since Indianapolis was becoming one of the great railroad hubs of the Midwest. Governor Morton was one of the strongest supporters of the new transportation technology (Fatout 1972: 169). No wonder the state government had little sympathy for the ancient and slow Wabash and Erie Canal.

The Last Years of the Wabash and Erie Canal.

A Tremendous flood in 1867 swept away 125 feet of the Deer Creek dam, stopping navigation on the canal for almost a year. Other canal features desperately needed repair as they were reaching their natural replacement time. The Wild Cat dam

needed repair work, aqueducts on the St. Mary's River and the Wea, Flint, Otter, and Sugar Creeks needed replacing. Lock gates needed mending (*Documentary Journal* 1868: 13). In 1866, damage to feeders was such that navigation could only reach Armiesburg, twenty-two miles above Terre Haute. The list of Wabash and Erie Canal features needing work through the mid-1860s was always longer than those that did not.

General maintenance problems finally became too great for the Wabash and Erie Canal Company to deal with by the end of the 1860s. Tolls were only averaging about \$45,000.00 a year, all of which was needed for maintenance. Maintenance also used up the stockholders' contribution of \$158,525.00 (Fatout 1972: 170). Railroad competition had drastically reduced the annual tolls collected by the canal. In 1869, the canal trustees again criticized the state legislature for allowing railroads to be constructed parallel to the canal, saying "With the railroad competition along the most productive portions of the canal, invited or permitted by State legislation, it is impossible to say what amount of revenues will accrue from it during the coming year" (*Documentary Journal* 1870: 11).

Even with inadequate maintenance and repair, the Wabash and Erie Canal retained surprising vitality through the 1860s. Fort Wayne businessmen in 1866 were still constructing canal boats to navigate the Wabash and Erie (Fort Wayne *Gazette*, December 27th, 1866). The Wabash *Plain Dealer* (May 9th, 1867) noted that, "Merchants [regarded the canal as] a very essential means of preventing those exorbitant rates... which railroads without competition are so prone to charge."

The canal towns of Lafayette and Fort Wayne were still utilizing the canal to a great degree, shipping out goods bound for Toledo and eastern ports. The Lafayette,

Journal (May 15th, 1870) stated that the canal was “in better repair and... doing a larger business than at any previous time for the last fifteen years.”

The canal trustees also still believed in the canal, as they stated in 1865, “The Canal, as a channel of transportation for the counties bordering on it... possesses elements of great strength and future prosperity” (*Documentary Journal* 1865). Although receipts were barely keeping up with the minimal maintenance being conducted through the 1860s, the regions through which the canal was constructed still benefited economically from its existence.

A Few Final Financial Dealings.

In 1870, the canal bondholders again petitioned the Indiana government, claiming that the Butler agreement had been violated and the state was now responsible for the other half of the original improvement debt. The unpaid canal debt in that year, with increases from interest, was valued at about \$16,000,000.00. Governor Baker (Fatout 1972: 172-173) again stated that the canal was a completed issue that the state would not reopen for negotiation. The Indiana legislature went further in 1871 by passing a constitutional amendment that made it illegal for the state legislature to pass any law compromising the 1847 Butler Bill (*Laws of Indiana* 1873). This amendment stated that, “No law shall authorize any debt to be contracted, on behalf of the state, except in the following cases: to meet casual deficits in the revenue; to pay interest on the State debt; to repel invasion, suppress insurrection, or, if hostilities threaten, provide for the public defense” (*Constitution of the State of Indiana*, and *Documentary Journal* 1874: 42).

A final remaining financial problem for the State of Indiana was about \$191,000.00 worth of canal bonds which were not handed over by bondholders after the 1847 compromise. John W. Garrett, president of the Baltimore and Ohio Railroad, represented these bondholders when he sued the State of Indiana in a United States circuit court. The judge in this case ruled that Garrett and those he represented were entitled to a part of the value of the Wabash and Erie Canal prior to the administration of the canal trustees (*Documentary Journal* 1873: 4-6).

To prevent this ruling from being attached to the greater disagreement over canal debt, the State of Indiana chose in 1872 to raise money to pay off John W. Garrett and the hold-out bondholders. This move allowed Indiana to permanently escape the repayment of the outstanding internal improvement debt, and kept the Wabash and Erie Canal from the action block (*Documentary Journal* 1873: 5-6).

The End of the Wabash and Erie Canal.

After 1870, the Wabash Canal Company operating the Northern Division of the Wabash and Erie experienced increasing maintenance difficulties. To keep the canal opened to Toledo, the company appealed to eight counties along the line, raising \$40,216.85 in contributions (*Documentary Journal* 1874: 10). The money from the county gifts was made available for repair work along the canal. The contractor in charge of maintenance between Terre Haute and Armiesburg could not keep the section open, mostly because of earlier damage to the Sugar Creek feeder dam, the repair of which the trustees could not afford (*Documentary Journal* 1871: 6).

Income from tolls and water rents for 1869 were \$43,626.03, and \$52,403.44 for 1870 (*Documentary Journal* 1871: 6). The Chief Engineer (*Documentary Journal* 1871: 13-14). noted that a large number of expenses were expected in the next few years as older canal structures gave out. His estimates placed the total needed at \$73,680.00 for the next three years.”

At this time, railroads began to disregard the less used sections of the canal as rail lines crossed its channel. The Chief Engineer notes that, “The Chicago, Danville and Vincennes Railroad Company, in the construction of their work across the canal at a point a short distance south of Clinton, have filled the canal with earth for several hundred feet” (*Documentary Journal* 1871: 10). Though the railroad president pledged to remove the soil, the flagrant disregarding of the canal must have been embarrassing for the trustees.

The Chief Engineer (*Documentary Journal* 1872: 13) noted in 1871 that canal boats were not traveling south of Armiesburg, but that the condition of the navigable canal was quite good. Good crops in the area along the canal apparently stimulated a small revival of tolls. The use of a steam dredge for the first time also apparently aided navigation by removing sand bars and obstacles. One problem encountered in the 1870s was the *lack* of boats on the canal. Few merchants and boat builders were willing to invest in canal boat construction in the 1870s, so there were not enough barges to carry the grain of the Wabash Valley region. Shippers of grain who could not find shipping were compelled to take their grain to railroads (*Documentary Journal* 1872: 15 and 29).

Tolls and water rents for 1871 amounted to \$48,846.03, with expenses for repairs being \$39,880.67. The difference went to the bondholders, instead of to additional repairs as the Chief Engineer had suggested (*Documentary Journal* 1872: 14).

The *Documentary Journal* of 1872 demonstrated the importance of water rents to the trustees as toll revenue declined. A detailed analysis of mills on the canal was ordered for that year, with reassessments of charges being made (*Documentary Journal* 1872: 6 and 18-27).

The county gifts kept the Wabash and Erie Canal adequately repaired through 1873, but failed to pay for that year's maintenance by \$18,000.00 (Fatout 1972: 174). A token gesture from the State of Indiana was the passing of a law allowing county commissioners to keep local sections of the canal in repair, but this did little to improve navigation (*Documentary Journal* 1874).

The canal was only partially maintained by the lessees in 1873, and only because of the county grants given to them for repairs. Maintenance amounted to \$58,755.52, with tolls and revenues coming to \$17,086.52. Chief Engineer Williams (*Documentary Journal* 1974: 3) noted that considerable damage was done to the canal during 1873 by floods around Lafayette and in Cass County (*Documentary Journal* 1874: 6). The Wabash and Erie Canal Company petitioned the trustees to give up their lease, which was good through 1878. The trustees resisted, but there was little they could do in the face of the canal's financial failure and high maintenance costs.

The Wabash Canal Company could operate the canal no longer. In 1873, the company petitioned the trustees to give up their lease for providing maintenance on the Wabash and Erie Canal north of Terre Haute (*Documentary Journal* 1874: 3). On

January 1st, 1874, the company formally gave up its lease on the Wabash and Erie Canal. Over the last eight years of their management of the canal, the company had spent \$435,345.52 on repairs and maintenance, which was \$122,000 more than the money gathered from tolls, water rents, stockholder bonds, and county contributions. After January 1st, the canal had no administration, though the trustees continued to keep records of receipts, debts, and land sales (*Documentary Journal* 1875: 91-92). At the end of 1874, the total receipts amounted to \$28,654.42, with most of this coming from land sales. No tolls were collected and no repairs were made (*Documentary Journal* 1875).

A tremendous flood in August of 1875 damaged the canal beyond repair. Many boats were stranded far from the canal, thrown up onto surrounding fields by the force of the flood (*Lafayette Daily Journal*, August 3rd and 4th, 1875). The Wabash and Erie Canal, with no money available for repairs, could no longer operate normal boat traffic.

The trustees, with no canal to administer, gave up their posts in 1875. The last report was given to the legislature of the State of Indiana in December of 1875. This report listed the receipts and costs of the Wabash and Erie Canal for 1875. By this time, no tolls were being collected, with most of the yearly income coming from the sale of the last of the federal land grant (*Documentary Journal* 1876). A complete account of tolls taken and costs put out for the Wabash and Erie Canal is located in Table 1.

Table 1: Summary of Wabash and Erie Canal Receipts and Expenditures²

Year	Receipts	Expenditures
1838	Not Given	Not Given
1839	\$4,248	Not Given
1840	\$3,000	Not Given
1841	\$5,300	Not Given
1842	Not Given	Not Given
1843	\$45,620	\$14,979
1844	\$67,597	Not Given
1845	\$95,473	\$76,496
1846	\$102,424	\$27,330
1847	\$125,982	\$27,330
1848	\$146,148	\$48,025
1849	\$134,659	\$63,414
1850	\$157,158	\$54,845
1851	\$179,282	\$58,549
1852 ³	\$193,400	\$73,421
1853	\$181,206	\$71,572
1854 ⁴	\$190,535	\$66,977
1855	\$140,252	\$64,987
1856	\$113,252	\$70,109
1857	\$60,165	\$58,405
1858	\$63,995	\$78,594
1859	\$48,278	\$68,015
1860	\$70,041	\$30,638
1861	\$58,069	\$41,488
1862	\$71,403	\$57,752
1863	\$50,966	\$66,282
1864	\$51,921	\$43,095
1865	Not Available	Not Available
1866	\$57,668	\$131,347
1867	\$37,160	Not Available
1868	\$47,529	\$63,344
1869	\$45,006	\$53,758
1870	\$50,806	\$45,841
1871	\$48,846	\$39,880
1872	Not Available	Not Available
1873	\$17,086	\$58,755
1874	\$0	\$6,678
1875	\$0	\$36,137 ⁵

² Receipts include tolls and water rents. Expenditures include repairs, general replacement of old structures, expenses, and salaries of canal employees. Expenditures does not include the costs of canal construction, route surveying, or the administration of such.

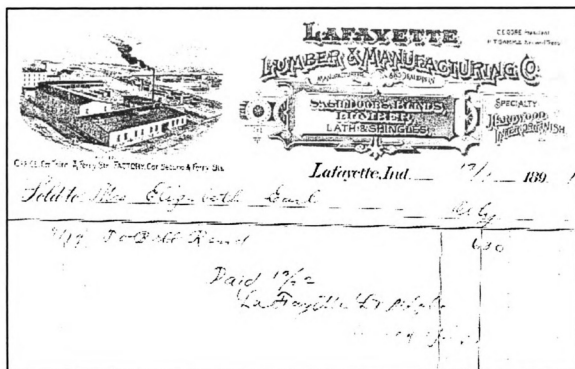
³ Railroad competition on perpendicular routes begins at this time, with railways intersecting Fort Wayne and Lafayette. Passenger and merchandise transportation were drawn away from the canal.

⁴ Railroad competition on perpendicular routes begins at this time, with railways intersecting Fort Wayne and Lafayette. Passenger and merchandise transportation were drawn away from the canal.

⁵ Most of the cost noted for the last year of trustee management of the Wabash and Erie Canal came from paying off contracted officials, and not maintenance of the canal. A complete list of final debits can be found in the *Documentary Journal* of 1876.

The Wabash and Erie Canal was auctioned off, piece by piece on February 12th, 1876, raising a final \$96,260.00 for the bondholders (Esarey 1918: 445). Boats continued to use the canal, especially for short hauls between canal towns. The last trip from Lodi to Lafayette occurred in late 1875. The last boat to travel from Attica to Lafayette did so in 1883 (Fatout 1972: 174). A single business letterhead (Figure 3) from the Tippecanoe County Historical Association archives shows a canal boat on the canal behind a lumberyard in 1891 (TCHA/A: Business Letterhead Box). Whether this lithograph depicted a modern scene of local commerce still operating on the canal, or whether it is a fanciful image of days-gone-by is unknown.

Figure 3: 1885 to 1891 Lumberyard Letterhead Showing Canal.



Local Wabash and Erie Canal History.

The general history presented above is important for this study because it deals mostly with issues at the regional, state, and national/international levels. Local history, however, is also important and will provide key information for a number of the analytical studies found in later chapters. The geographic region dealt with statistically in the analysis section is a one to two mile wide corridor of land south of the Wabash River from where the Wabash and Erie Canal historically crossed the Wabash River in Carroll County, through all of Tippecanoe County, and for a mile into Fountain County.

The dominant towns along the canal in this area during Indiana's canal-era were Delphi in Carroll County, Attica in Fountain County, and Lafayette in Tippecanoe County. Lafayette also served as a regional canal administration center for the section of canal between Fort Wayne and Terre Haute. A number of smaller towns and settlements were also located within the project area. Both Delphi and Lafayette were county seats, as well as being the dominant economic center of each county during the 19th Century. Fountain County was economically dominated by the town of Attica, but had the county seat at the town of Covington, which was also on the Wabash and Erie Canal.

Delphi, Attica, and Lafayette all played the role of being a local entrepot into the canal system; collecting agricultural goods from the surrounding county for warehousing, packing, then shipping out on canal barges. Each of these towns also had a number of industries which exploited local resources; such as paper making and flour milling that used canal water power, lime production, brewing, and animal processing for food and leather. Merchandising was also undertaken on a limited scale. Because only one small section of Fountain County was included

as part of this project, a local history and the history of the Wabash and Erie Canal in that county will not be presented.

Lafayette became a much more important regional center -- partly because it housed the administrative offices for the canal -- and collected agricultural goods and livestock from a much larger area than the other two canal towns. Lafayette also produced a much wider range of manufactured goods, including some manufactured products. Finished merchandise shipped into the area on the canal also arrived at Lafayette for distribution elsewhere within the region.

A number of smaller towns and hamlets were also located within the project area. These smaller communities centered on local collection and storage of agricultural products for later transfer to a larger canal city for bulking, for local mill operation, or for local livestock processing. Import merchandising was not a part of these smaller communities, but some redistribution of goods brought in to the major canal centers did occur.

Lafayette was chosen as the focus of this project because of its dominance of a large section of Wabash and Erie Canal from 1840 to the demise of the canal in the mid 1870s. Lafayette's influence as a major canal town led to increased economic activity throughout the region, with settlements, businesses, and agricultural centers becoming part of a complex trade network centering on the canal.

Another benefit to choosing Lafayette as the center point of this study is the difference in canal construction and use to the north and south of the city. The section of canal between Lafayette and Fort Wayne, Indiana, was also one of the most used and longest lasting sections of the Wabash and Erie Canal. The northern link (the Ohio border to Lafayette) was completed to Lafayette in 1840 and was the most successful and longest used part of the Wabash and Erie Canal. The central and southern links (from Lafayette to Evansville on the Ohio River) were

not completed until 1852, and never came close to the use levels of the northern link. The southern and central links were mostly closed by the late 1860s, whereas the northern link stayed open with limited barge traffic into the late 1870s. This overall importance of the Lafayette area means that if settlement patterns within the region are influenced by the canal, they should be well-defined by the historical and archaeological data. What will be presented next is documentary information from Tippecanoe and Carroll counties, and from the two major canal towns in the project area, Lafayette and Delphi.

The City of Lafayette Before the Canal.

Lafayette began in 1824 as a small river town on the banks of the Wabash River. Like many towns on the American frontier of the early 1800s, Lafayette was barely more than a dozen log cabins and rough frame houses. Lafayette's founder was a veteran of the War of 1812, William Digby, who later made the mistake of selling off his entire interest in the city; living mostly in poverty as he watched the city he founded prosper around him (Hayman 1976, and Kreibel 1988).

The city's namesake, the Marquis de Lafayette, made a popular tour through the United States in 1825, visiting Indiana in May of that year. Digby probably adopted Lafayette's famous name in hopes of attracting people and businesses to the town. Developers in small numbers were attracted to Lafayette, mostly because of its location at the last navigable stretch of the Wabash River (Hayman 1976, and Kreibel 1988).

The earliest description of Lafayette comes from Sanford Cox's book, *Pioneer's of Tippecanoe County*. Cox's account paints a picture of Lafayette from between 1826 and

1833, describing the town as if you were stepping off a Wabash river boat, then walking east toward the Public Square:

"At the boat landing at the foot of Main Street, a ferry...; three or four rude cabins on the bank near by, comprising Wm. Smith's store, Digby's grocery, Kelsey and Bishop's justice office and Richard M. Johnson's hotel, a little further off, Solomon Hammer's 'grocery' which was a liquor store..."

"There were also Benbridges and Foster's store at the foot of Main Street; John McCormick's little one-story frame on the corner of Main and Wabash (2nd) streets, where the old veteran and his two sons Perry and James sold goods. Joseph S. Hanna's new two-story frame house across the street south of McCormick's -- it was of fine appearance for that day having a front painted white with perpendicular green steps and facing up Main Street."

"Taylor and Linton's store on the south side of Main Street, east of McCormick's; on the north side of Main was Ayre's grocery in a small log cabin; Wm. Heaton's store, a small frame; Seneca and Cyrus Ball's store in a small frame on the corner of main and Ohio (3rd) Streets; Hill and Halloway's little store."

"On the corner opposite the Balls was the story and a half log tavern of Robert Johnson, from Crawfordsville, who surveyed the original plat of La Fayette... Daniel Burgher's residence and office was a hewed log house on the corner of Columbia and Wabash (2nd) streets. John McCormick had a small neat residence at the foot of Columbia street. Mariam ("Granny") Neff occupied a log cabin on a partially opened street leading south-easterly toward Sample's tan yard ... Samuel Hoover had a one story frame dwelling on Main street north of the center of the public square, where he afterwards erected his two story brick block..."

The 1862 *Lafayette City Directory* (TCHA/A:12) has an account of early

Lafayette which noted:

"The earliest improvements were made along the river between Columbia and Ferry streets, and Ferry was the principal business street from the fact that the City Hotel was built on it, and also Digby's ferry, with Digby's and Hamer's groceries at the foot of it. The post office was between Main and Columbia on the River bank."

Early Lafayette was a rough river town of dubious moral character, but its location hinted at great things to come. Lafayette was located at the center of vast stretches of rich flood plains and white oak forests. Agriculture was inevitable. Its location at the head of steamboat traffic, and its central location for exploiting the Wabash Valley and Tippecanoe River regions agriculturally gave Lafayette at least the chance at commercial greatness. In 1826, Lafayette was made the county seat of the new Tippecanoe County, Indiana; thus adding to its local importance (Hayman 1976, and Kreibel 1988).

Meat-packing and tanning were the first businesses in town that involved state-level interaction. Hogs and cattle were slaughtered, then sent south by flatboats to New Orleans. Increased exploitation of suitable agricultural lands around the city eventually made investment in Lafayette an attractive undertaking. Two of the most successful of these early investors were John Purdue and Moses Fowler who started a dry goods operation in 1839, both of whom later went on to dabble in almost every aspect of Lafayette commercial growth. Fowler concentrated on the grocery trade, steamboats, and banking. Purdue continued importing dry goods, led the construction of Lafayette's first toll bridge, and later entered into cemetery speculation as well as founding Purdue University (Hayman 1976, and Kreibel 1988).

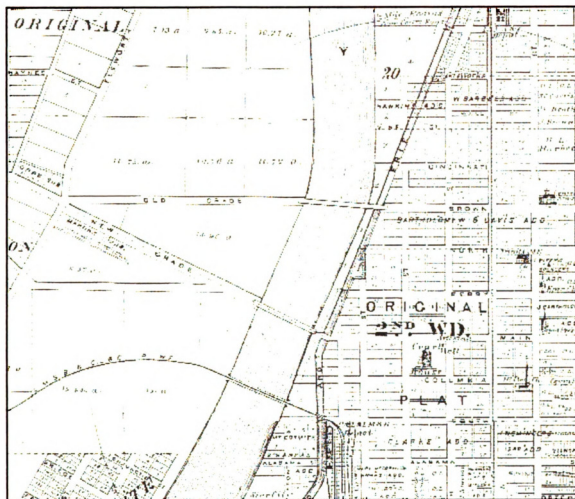
Lafayette's strategic location, with access to Illinois, Michigan, southern Indiana, and places south via the Wabash River system, gave these early investors a sound base of operation for financial investment throughout the new Midwest states. Steamboats acted as the conduits of this initial surge of commerce and commodity flow. By the 1830s, hundreds of boats traveled between Lafayette and other population centers along North

America's large interior river system. But it was access to the vital Great Lakes transportation routes and the East Coast port cities that the citizens and business owners of Lafayette truly desired. The Wabash and Erie Canal, was seen in 1834 as the means to gain this access to the East (Hayman 1976, and Kreibel 1988).

The Wabash and Erie Canal opened at Lafayette for boat traffic late in 1841, to much fanfare and celebration (Figure 4). The location of Lafayette, at the head of steamboat traffic on the Wabash River and the temporary terminus of the canal, soon allowed the town to become a major agricultural center, exporting corn, hogs, and cattle to markets throughout the Midwest and east coast states. Processing mills, packing houses, and tanneries quickly sprung up throughout Tippecanoe County. Though the heyday of the canal was brief, roughly 1850 to 1860, the stimulus to manufacturing, agriculture, and commerce it generated gave Lafayette a distinct advantage over other central Indiana communities at a time when economic dominance among towns in the region was uncertain. Several other towns which hoped to become economically important in the region were soon overtaken by Lafayette, which to this day is still one of Indiana's most prosperous cities (Kreibel 1988 and 1990).

Between 1852 and 1855, five rail lines began operating out of Lafayette, competing directly with the Wabash and Erie Canal for transporting cargo (TCHA/A: 1996 *Lafayette Commerce Book*). During the revival of canal traffic in the 1860s, the waterway from Lafayette south was intensively dredged for the last time. The Wabash and Erie Canal remained active in Lafayette until 1875, when an extremely bad flood damaged the canal beyond repair.

Figure 4: 1878 Kingman Bros. Map of Lafayette, Showing Wabash and Erie Canal and the City at the End of the Canal Era.



By the late 1800s, the primary value of the canal changed from a means of transportation to one as a garbage dump for businesses along the Wabash River (Bischoff 1994:119). Industrial, commercial, and residential waste was deposited into the canal channel. The stagnant, trash-filled canal over time became a health-hazard, leading in 1895 to the city of Lafayette directing the canal within the city to be filled (TCHA/L: Lafayette City Documents Binder, Sept 23rd, 1895).

There is circumstantial evidence for the canal being used locally well into the 1890s. Fatout (1972) notes sporadic traffic from Attica to Lafayette up to 1883. A Lafayette business letterhead dated Dec. 1st, 1891 clearly shows a packet boat on the canal next to a large lumber mill built between 1885 and 1892 (TCHA/A: Business Letterhead Box and TCHA/A: Sanborn Maps 1885 and 1892). Whether this is artistic license or actually use of the canal for local purposes is unknown. A family of boat builders also has their business listed in the local directories and were presumably repairing and constructing boats well into the 1870s (TCHA/A: *Lafayette City Directories* 1870-1880). The Wabash and Erie Canal is recorded being used as water power for a number of Lafayette area mills up through the late 1880s (Reser 1933). The canal had been used as a source of water power for local businesses, and as a source of revenue from water right charges for the State of Indiana (ISL/A/WA: Dec. 9th, 1850).

The water power consumers who had businesses located on the canal had to maintain the section from the Wildcat Creek feeder north of Lafayette to the Wea Creek south of the city. These canal-based businesses had to pay a yearly water fee to the local owner of the remnant section of the canal which ran through Lafayette, as well as take care of the feeder dam and channel through the city (Reser 1933: 322). It is unknown

whether this upkeep would have kept the canal channel wide enough to service boats of packet boat size.

Lafayette also had a canal boat-building industry. Daniel Shriner was listed as a boat builder in the first, *1858-1859 Lafayette City Directory* (TCHA/A) and in other directories up through the early 1870s. He then becomes listed as a carpenter after the decline of the Wabash and Erie Canal. His residence and boat yard are listed as being off White Street, south of Lafayette. The 1861 Burke Bros. Map shows Shriner and family owning lots 15, 16, and 19 below along the northern side of White Street south of Lafayette. A mention of Shriner's business comes from the 1927 *Journal and Courier*:

"In the days of the old Wabash and Erie Canal, a man named Shriner maintained a boatyard where the Lafayette Union stockyards are now located. Water would be run into the yards through gates from the canal so the boats could be floated in. Dry docks were constructed on piles and when the boats were piloted over the dock the water would be run out through a sewer into the river. Boats were then repaired and caulked and painted ready for shipping."

"Daniel M. Shriner built the "H.T. Sample" and the "O.W. Peirce."
Lafayette Daily Courier, Mrch, 1871" (*Lafayette Journal and Courier*,
April 14th, 1927).

A number of canal features were located within Lafayette. A wooden bridge at Main Street spanned the canal, independent of another bridge, which crossed over the Wabash River. A swing bridge spanning the canal existed at Ferry Street, and a later covered bridge at Brown Street spanned both the Wabash River and the canal (TCHA/A: D.A. Sanborn 1875). The swing bridge acted as a moveable foot or single wagon bridge, designed to be operated by one person, which could be swung out of the path of canal traffic (ISL/A/WA: Nov 30th, 1849). An unloading dock existed in a large basin between

Ferry and North Streets and acted as a coaling platform (TCHA/A: D.A. Sanborn 1875). Other basins north and south of the city facilitated unloading, turning around, and the holding of packet boats until they were ready to dock or continue along the canal once traffic had cleared. Large winter holding pens and dry-docks were located north of the city along a large basin titled the "Wide Water," and several bridges and culverts were located at the outskirts of the City of Lafayette (*Documentary Journal* 1847).

The yearly reports of the State of Indiana Chief Engineer do not include information on any of the canal construction or structural features within Lafayette (*Documentary Journal* 1839, 1840, 1841, 1842). The detailed listing of Wabash and Erie canal structures and their condition in the 1847 Report of the Chief Engineer stops at the canal wagon bridge just north of Lafayette used to cross-over the towpath, and except for briefly mentioning two bridges over the canal in Lafayette, resumes with the Durkee's Run culvert and Wea Bluffs lock and aqueduct complex south of the city. This may indicate that the State of Indiana assumed upkeep and modification of the canal within each major city to be undertaken by that city. Poor records of canal construction through Lafayette and afterward leaves this issue unanswered.

The State of Indiana was responsible for the upkeep of several bridges over the canal in Lafayette, and several records of their repair and construction remain (ISL/A/WA: 17th May 1852 and Dec 5th 1848). Bridges were probably constructed over the Wabash and Erie Canal as the canal was dug through the City of Lafayette, but no record remains of these earliest structures. A July of 1850 state contract to John Thompson (ISL/A/WA) accounts for the "Rebuilding of our canal bridge, 75 ft. long, known as Hull & Spencer's bridge, in Lafayette." Hull and Spencer owned a flouring

mill on the river side of the canal at the foot of Union Street and across from the Thieme and Wagner brewery. The canal bridge mentioned here was at Salem Street (Reser 1934).

State contracts also note the construction of a double track bridge at South Street across the canal in 1852 (ISL/A/WA:17th May 1852). An 1853 contract notes the removing and rebuilding of one single track canal bridge at Ferry and one at Columbia, both inspected by the Chief Engineer, Jesse L. Williams. A pivot bridge at Ferry Street may have been locally constructed, the pivot style being used because closeness to the river there would not allow abutments (ISL/A/WA: Nov 30th, 1849). The 1847 Report of the Chief Engineer (*Documentary Journal*) notes for the City of Lafayette:

"Road-bridge No. 51, used also for crossing the towing-path from the south to the north side, must be re-built in 1848.

"In the town of Lafayette, are several street bridges, on two of which, State or county roads are said to cross, these bridges, Nos. 52 and 53 should be re-built during the coming year."

The Brown Street covered bridge was constructed in 1847 by the Lafayette Bridge Company, which included as stock holders Isaac Spencer, R.H. Eldridge, R. Stockwell, R. Heath, and H.T. Sample (TCHA/A: *Lafayette City Directory 1858-59*, and Gould 1976). The Brown Street bridge consisted of six spans wholly or in part over water, with a short span over the Wabash and Erie Canal, with a total of 583 feet in length. The bridge was operated as a toll bridge for half of its life, bought by the city in the mid 1870s and made free to city traffic, and finally destroyed by fire in October 6, 1901. Before the completion of this bridge, ferry boats were the only source of transportation across the Wabash River. Hiram L. Kilborn, who built the Brown Street bridge, also built the iron

Main Street bridge in 1865 (Gould 1976, and Kriebel 1990). Construction of an iron replacement bridge for the Brown Street wooden bridge destroyed by fire was begun in 1902. Several replacement bridges were also constructed at Main Street from the late 1880s to present day (Kriebel 1988 and 1990).

A grubbing and clearing order in 1850 notes that there were two canal guard gates somewhere in Lafayette near the Brown Street Bridge, which were to be the starting point of this cleaning process (ISL/A/WA: 17th Jan. 1850). Where these guard gates were precisely and how they were built is unknown, but similar gates at the time were constructed to simulate lock gates, though they were placed in the canal wall instead of across the channel and acted to release excess water during storms and floods. Guard gates were also used as reserve locks, closing off a section of the canal to prevent the loss of water from an entire section resulting from a wall breach.

Photographic and Lithographic evidence indicates an extensive timber wharfing built along the canal through cities and along major industries, such as mills, packing houses, and goods stores to facilitate loading and unloading (TCHA photographic archives and Burke and Bros. Map 1861). There is a report for state-sponsored construction of a timber dock along a large turn-around basin south of Lafayette to the specifications identified by archaeological survey of the downtown Lafayette wharfing, but whether all wharfing found along the canal has a state, local, or mixed financing and construction is unknown (ISL/A/WA: No Date). Because of very poor records, especially during the first two decades of Wabash and Erie Canal history -- a factor which later led to the management crisis of the late 1850s -- it is unknown what role the canal officials in charge of the various sections played in the construction and

modification of canal wharfing features. It is hard to imagine local industries building wharfing along the canal without at least their permission, if not their overseeing the wharfing construction.

The Wabash and Erie Canal existed as a ditch in Lafayette long after its usefulness as a means of water transport. Finally, in 1895, the City of Lafayette had had enough and ordered the canal to be filled. The fill-in order of Sept 23rd, 1895 notes that the water had become "so stagnant and noxious as to be, in their opinion, a nuisance, and injurious to the health and comfort of the city, and especially of that part of said City lying along and near said old canal ditch... and that said nuisance should be abated by filling up said old canal ditch as above described..." (TCHA/L: Lafayette City Documents 1895).

The Wabash and Erie Canal intersected Lafayette in roughly the middle of Tippecanoe County. The canal also passed through four Tippecanoe County townships; two north of Lafayette (Washington and Fairfield), and two south of the town (Wayne and Union). Each township has its own history and information found within the documents record. The individual history of each Tippecanoe County canal township is next presented below.

Fairfield Township History.

Fairfield Township is located north and west of the city of Lafayette (see Appendix III). This township saw early growth as Lafayette expanded as a city. After the canal reached Lafayette in 1841, residential and commercial areas of the city

expanded northward along the canal, and westward away from the Wabash River. Less expansion occurred toward the southern part of Fairfield Township, mainly because the canal in that direction was not opened for use until 1846.

Construction of the Wabash and Erie Canal south of the Tippecanoe River began in 1839. The section of canal through Fairfield Township was heavily used, and, as numerous repair contracts demonstrate, was unfortunately subject to frequent flood damage (ISL/A/WA: var. docs.). The 1847 Report of the Chief Engineer (*Documentary Journal*) describes in detail the canal structures found through Fairfield Township:

"Culvert No. 119, 2 spans, 10 feet by 18 inches -- submerged.

"Flood gates near Wild Cat, abutments of wood, not in good order, may last two years.

"Wild Cat dam, erected for the purpose of a feeder, and also to raise a pool, in which the canal crosses this stream, 221 feet long and 13 feet high from low water. The dam is formed by means of cribs filled with stone, resting on foundation of brush and trees. The bed of the creek is formed of sand and gravel. This dam is in good and safe condition; abutments of wood, and will require rebuilding, one in 1849 and one in 1850.

"On each side of Wild Cat, a guard lock is constructed to protect the canal from the floods, built of wood upon the common crib plan. The guard lock on the north side of the creek, is too low, the walls at the upper gates must be raised four feet during the present summer. One pair of the gates to be renewed this season, the other pair will last three years. On the lower end of this lock, is a small bridge on which the towing-path is crossed -- will last three years. The walls of the guard lock will need renewing within three years.

"Guard lock on south side of creek, constructed in the same manner as the other, was injured by the high floods of last winter, but since repaired -- may last two years. Upper gates will last four years, lower gates will last two years.

"Adjoining this guard lock, a set of culverts are placed under the guard bank with sliding gates at the upper end, through which the feeder is passed, the culverts are submerged, the whole structure recently re-built, having been washed out by the great flood of last winter.

"Towing path, and road bridge across the Wild Cat, this structure was washed away by the floods of last winter. In May last, a contract was made, by the State officers for building a new bridge upon "Long's patent," of 160 feet clear span, resting on permanent stone abutments. The

total cost will be about \$6,500, and must be paid for in the expenditures of 1847-8.

"Culvert No. 120, of wood, 10 feet by 18 inches -- submerged"
(*Documentary Journal* 1847: 232).

The Wildcat Creek area was important to the operation of the Wabash and Erie Canal. The creek itself was used as a feeder water source for the canal, with a dam and improved embankments being constructed to create a pool for the crossing of canal barges. Guard locks on either side of a towpath bridge protected the canal from flooding. The towpath bridge, located at the junction of the Wildcat and the Wabash and Erie Canal, was first constructed in 1839 (Gould 1976). The location of the towpath bridge had a transportation history that lasted long after the end of Indiana's canal era. Gould notes that local citizens were petitioning by 1845 for a widening of the "towing path bridge across the Wildcat at the canal so as to permit the passage of wagons" (1976). By 1847, a standard-width 160 foot Longtruss wooden canal bridge was built on the same location (Allen 1970, and Gould 1976). After the canal closed, three covered bridges took advantage of the stone abutments initially built for the canal towpath bridge. Gould (1976:2) describes the covered bridge history over Wildcat Creek as:

"The three Springvale covered bridges were located in section 10 at the northeast edge of Lafayette where Wildcat creek emptied into the Wabash and Erie canal. This spot was on the Delphi and the Linnwood & Wildcat gravel roads and was some 1000 feet south of the present concrete structure on State Road 25...

"The 1858 flood destroyed the Wildcat dam on the canal and carried away the (first) covered bridge. For the next two years travelers and the tow animals had to be ferried over the open water...

"1860, 85 local citizens, including John Purdue, Moses Fowler, Israel Spencer, L.B. Stockton, William K. Rochester and H.T. Sample, petitioned the county government to aid the canal trustees in rebuilding one abutment and replacing the superstructure."

This new bridge had abutments 220 feet apart, and was probably built by Hiram L. Kilborn, who constructed several other major bridges in the county (Gould 1976).

In 1880, the county obtained ownership of the covered bridge, abutments, and central piers. At this time, the third covered bridge was constructed by Smith Bridge Company. This new bridge was 242 feet long. A completely new iron piling central pier was constructed in 1888. This third Springvale bridge existed from 1880 to 1921, with only minor repairs and replacements. The east abutment was replaced by concrete in 1906, though the west remained of cut stone (Gould 1976)

The Wildcat bridge and dam were rebuilt a number of times through the history of the Wabash and Erie Canal. Flooding damaged both on several occasions. A letter from May 14th, 1848, gives great detail on the construction of the towpath bridge abutments with well-cut stone (ISL/A/WA: J.L. Williams to J.H. Blake). A construction contract from October 14th, 1850 (ISLA/A/WA)(describes repairs at the Wildcat dam and the guard locks protecting the structure and towpath bridge against flooding. Cribbing made up the major structural support of the dam, with guard gates built on the lock gate design.

Other repair contracts describe (ISL/A: Wabash and Erie Canal Archives):

1847 -- Repairs to Wild Cat Creek towpath bridge and towpath bridge abutment.

1849 -- Wild Cat lower guard lock repair

1850 -- Rebuilding the south abutment of the Wild Cat dam.

1850 -- Rebuilding the north guard lock of the Wild Cat.

1851 -- Rebuilding the south guard lock of the Wild Cat.

1851 -- Rebuilding the south abutment of the Wild Cat Dam.

1852 -- Rebuilding of one canal bridge above Lafayette (usually called a change bridge). Charles E. Kilborn, contractor. This contract probably refers to the 9th Street bridge which was found farther down the canal from Wildcat Creek.

1854 -- Rebuilding the gates to both of the Wild Cat locks.

Immediately north of the Wildcat Creek area was located the Wildcat Reservoir, a large holding pond that was used to release water into the canal during dry conditions.

The reservoir itself was not mentioned in the 1847 report of the Chief Engineer, but was constructed to act as a controlled source of water for the canal in later years. The reservoir is found on the 1866 Titus Map.

Southwest of the Wildcat area, at the Southeast margin of the main basin north of Lafayette, known as the Widewater, were the ice houses of the Northern Lake Ice Co. A huge eight story warehouse between the canal and the railroad was the center piece of these buildings, as depicted in an 1890 lithograph. The Northern Lake Ice Co. harvested the iced-over Wabash and Erie Canal in the winter, both at the Widewater and at several other canal basins throughout the county. Ice was later packed for shipment with sawdust and straw. This larger building lasted through the late 19th Century (TCHA/A: *Lafayette Commerce Book 1890*). A rail bridge over the Widewater dates back to at least the 1866 Titus map, though it may date back to the late 1850s when rail lines first were completed through Lafayette.

North of Wildcat Creek was located the Birmingham Bluff, an area of steep cliffs along the Wabash River located in Section 2 of Fairfield Township and Section 35 of Washington Township. These steep ridges caused the engineers of the Wabash and Erie Canal numerous problems from the time the canal was constructed beneath them. The Report of the Chief Engineer in 1840 noted:

"In filling the canal for the first time below the mouth of Tippecanoe, considerable difficulty has been experienced at the Birmingham bluff. At this point the towing path is formed in the river for a distance of one and a fourth miles, for which no material could be obtained better than the very light sand of which the hill is chiefly composed. This sand on the first introduction of the water is very liable to yield and slide off in the form of a semi-fluid. Several breaches have occurred at this point during the season, which were promptly repaired. The embankment will become more compact by the natural action of the water upon it, and when the outside shall have received its covering of stone, according to the original design, there will be no great difficulty in maintaining the navigation along this narrow pass (*Documentary Journal* 1840: 24)."

By 1841, the Birmingham Bluff was covered with stone as planned. The stone, however, was not adequate enough to prevent further breaches in the bluffs during later years.

A number of farmsteads were located in Fairfield Township along the path of the Wabash and Erie Canal. The most important for this project are listed next. The 1866 Titus map indicates a farmhouse, ca. 1850-1860 at the southern end of the Wildcat reservoir, as well as two other period structures across a small road from it. A number of other structures are located within 1500 feet of the Wildcat towpath bridge. The 1878 Kingman Bros. Tippecanoe Co. atlas shows an additional building on a rise south of the canal which is identified as being owned by G. Girara. An inn also supposedly was located near the north side of the Wildcat Towpath bridge; an area with a long history for stills, mills, party halls, and inns, lasting up to the 1960s (Reser 1945).

Washington Township History.

Washington Township is located between Fairfield Township and the Carroll County border (see Appendix III). This Township includes the rest of the Wabash and

Erie Canal located north of Lafayette. Washington Township was very prosperous during the canal-era, with a number of mills, hamlets, and farms utilizing the canal as a means of transportation. This section will start with the 1847 Report of the Chief Engineer, which described in detail the canal structures found through Washington Township:

"Culvert No. 111, over Shaker run (Bridge Creek), of wood -- two spans, each 12 feet by three feet -- submerged"

"Guard lock at Kites, designed to guard against extreme floods in the Wabash when the river is admitted to flow in -- built of wood; the cribs will last perhaps four years, gates two years. To pass the enlarged quantity of water some additional sliding gates must be placed in the main gates during the ensuing winter.

"Culvert No. 112, of wood, 9 feet by 18 inches -- submerged.

"Culvert No. 113, of wood, 6 feet by 28 inches -- submerged.

"Culvert No. 114, of wood, 9 feet by 18 inches -- submerged.

"Culvert No. 115, of wood, 9 feet by 18 inches -- submerged.

"Each of the last named four culverts is banded with iron, as security against the upward pressure in time of high floods, when the river is higher than the canal.

"Road Bridge, No. 50, at Americus, will last one year.

"Culvert No. 116, of wood, 6 feet by 18 inches -- submerged.

"The next structure is Sugar creek Culvert, No. 117, a large wooden arch of 24 feet chord; the arch springing from the slate rock, in good condition -- will last five years, when it must be rebuilt of cut stone. Head walls may need some repairs within two or three years.

"Just above Sugar creek a small wooden culvert was constructed for the passage of a mill-race. The mill having been abandoned, the culvert may be dispensed with. It is therefore not numbered.

"Culvert No. 118, over Buck Creek, of timber, 4 spans, 12 feet by 3 feet, in good order -- submerged. (*Documentary Journal* 1847: 231).

As previously mentioned, a number of mills and industries were located in Washington Township. The 1878 atlas of Tippecanoe County mentions a number of these:

"Prominent among the early improvements in the township was the saw-mill erected by Philip Stair, in 1831, near the Sugar Creek culvert..."

"The first tannery was built in 1832, near the grist-mill now owned by Bates, and operated by John D. Miller (the tannery was operated by Miller also)" (Kingman Bros. 1878, no page numbers given).

The 1866 Titus map shows the Hinkel-Talbot mill to be located in section 21, and consisting of three buildings, with a further building across the creek (probably the tannery mentioned in other sources). Another important mill in the area was the Obenchain Mill, located on Sugar Creek. Reser (1945:91) describes the history of the Obenchain-Dinkle-Bates mill in his book, *Grist Mills of Tippecanoe County*:

"In April, 1838, John Obenchain, Sr., purchased land on Sugar Creek about a mile south of Americus. ON this site his two sons, Simon and John, built a grist mill in 1840 on the south side of the creek about a mile upstream from where Sugar Creek crossed the Lafayette-Americus road before entering the Wabash River. The mill was about 40 feet x 40 feet in dimensions and consisted of two and one-half or three stories plus a basement built of boulders. The frame was of hewed timbers and the weatherboarding of lap-siding. A ten-foot high "rock and brush" dam created a mill pond three or four acres in extent. Power was generated by a wooden overshot wheel which operated two sets of buhrs, one for corn and one for wheat. Both custom and commercial grinding was done, and much of the commercial flour was hauled to Americus and shipped to market on the Wabash and Erie Canal.

"In 1860 or 1861 the Obenchain flouring mill was sold to William Dinkle who operated the mill until its sale in 1873 for \$1,700 to Simon Bates, a horseman. Nearby Bates soon built a well-equipped barn in which he kept his eight stallions, when they were not on the racing circuit. In 1879 Bates sold the property to Lew Baker. Within a year Baker died, and shortly after the mill was destroyed by fire. Since the mill had recently had a hard time financially it was not rebuilt."

Obenchain (McCay)'s farmstead is in the same area to the south. The dam was supposedly blown up by local farmers after the mill's closing to stop the upstream fields from being flooded during heavy rains (Reser 1934).

The most prominent community located in Washington Township during the canal-era was Americus (Figure 5). At one time Americus was to be the southern terminus of the Wabash and Erie Canal. Speculation ran rampant, as the citizens of Americus speculated on their town eclipsing Lafayette and becoming the next Cincinnati of the west. They were to be soon disappointed as the canal was constructed past their town and on south toward Lafayette.

A brief historical account does exist of this town:

"AMERICUS: This town was laid out in the year 1832 by Wm. Digby, who also ceded the land for the original plat of La Fayette. At this time, Americus was the terminus of the Wabash and Erie Canal, and gave promise of becoming the foremost town in the county; indeed, the project of locating the county seat at this point was seriously considered.

"Real estate reached a fictitious value, and merchants conducted a lively traffic; but the subsequent extension of the canal, via La Fayette, diverted the channel of trade, and Americus relapsed into comparative insignificance" (TCHA/A, *Washington Township History*, author unknown).

Another early account of Americus describes the town by stating, "It (Americus) was a port of entry upon the Wabash and Erie canal and had a number of stores, warehouses, steam mills and lumber yards – all doing a large business" (Turpie 1903, no page #). Few historical canal documents mention the Americus area. An 1856 contract (ISL/A/WA) report notes the need to rebuild part of the Americus bridge. The 1866 Titus map, in an individual town insert, shows a canal basin at Americus between Lafayette and Basin streets, and between the canal and Main. This basin does not appear on the 1878 Kingman Bros. Map.

Northeast of Americus was a location known as "Kite's Ford." Kite's Ford was a shallow part of the Wabash River where wagons could cross during the low water months. The ford location had a bridge over the canal, and a number of canal features. In the summer of 1985, the curator of the Tippecanoe County Historical Association inspected and photographed several large oak timbers uncovered by construction and flood activity along a guard levee near Bridge Creek. The beams uncovered were from 22 feet to 11 feet in length and from 15 to 24 inches wide. There were 15 of the shorter beams visible and 16 of the larger. The beams continued into the earth that was not eroded by the excavation and water damage.

The total surface area of the beams was 33 feet north to south in length to an undetermined length from east to west, or along the canal. The cross-canal length was determined at 13 ft. plus. These beams were located about 10-12 feet beneath the field surface, and today exist partially under a levee, which was later constructed over the site. It also appeared that puddling was present in the layer just over the canal boards. At the time, the curator surmised that the structure was part of the Wabash and Erie Canal; perhaps a lock or aqueduct foundation (TCHA/A: TCHA report 1985).

Kites Ford itself was only roughly described in historical documents and it does not exist on any 20th Century maps. A guard lock for the Wabash and Erie Canal was located near the Kite's Ford area, which would act to control flooding during heavy rains and floods. A rebuilding order existed that ordered the construction of a new lock, two gates, and a feeder culvert and race around the lock (Indiana State Library Archives , 1st of Dec. 1851). The contract did not mention cribbing, instead indicating frame walls,

with timber tie backs, much like the wharfing found in downtown Lafayette. The guard gates would have been at the center of this construction. This guard lock was probably somewhere near the center point on the line dividing Section 11 in Washington Township with Section 2 of the same township.

Contract Reports (ISL/A: Wabash and Erie Canal Archives):

1837 -- Rebuilding Kites lock and rebuilding the gates for the lock and building a feeder culvert and race around the lock.

Fords were not the only means of crossing the Wabash River. A ferry was stationed at the most western corner of Washington Township. This ferry was owned by Dr. L. Jewett, a local doctor who speculated in the Wabash and Erie Canal. A road led from the ferry to the canal, and where the two met, Dr. Jewett built a small settlement. Jewettsville, as the hamlet was historically known, was a failed venture by Dr. Jewett to plat a town along the canal between Lafayette and Americus. The major draw to this location was the ferry that linked mills and farmsteads on the opposite side of the Wabash River with the canal. Dr. Jewett constructed several buildings and planned to sell a number of lots, but his speculative venture died with the canal.

The 1866 Titus map shows four buildings owned by Dr. Jewett south of the canal in section 25. A further building exists above on the ridge next to the state road. The only descriptive account of Jewettsville comes from the *Lafayette Daily Courier*:

“Title -- Jewett City

"On a recent trip up the canal we were surprised to find that a new town had been laid out by our worthy and enterprising friend Doctor Jewett, and we were still more astonished to see that he had erected and was building a large and splendid ware-house, a tasteful and strong bridge across the canal, a hotel, and smaller buildings for the residences of the future citizens of this embryo town. The new town is about seven miles distant from Lafayette, on the west side of the canal, and the plat is laid

out upon a lovely plain, fronting and in view of the River and the beautiful "Pretty Prairie" on the opposite side of the 'abash, and at the base of an elegant bluff, which rises abruptly about one hundred and fifty feet to the upland above, and which is skirted and covered with splendid foliage, shrubbery, and fine forest trees. From this bluff a hundred charming springs of cool soft water gush out in never ending quantity, which is calculated will be sufficient to water a town equal to that of this place. The site of the city is favorable for ammanding the trade of large and valuable section of country to which there will ever be access by FREE roads, which have already been laid out in many directions. It is destined to be a valuable point and will do a fine business. We hope that Dr. Jewett's enterprize and liberality will meet with an abundant reward" (August 22nd, 1850).

Dr. Jewett also had a building of unknown size near the Wabash River ferry, both of which are identified on the 1878 Kingman Bros. map. The ferry would transport people and goods across the river to Jewett's Port, found on the Battle Ground side of the Wabash. The building located at the ferry may have been for the use of a ferryman.

A number of farmsteads were located in Washington Township along the Wabash and Erie Canal that are important for this project. These farmsteads will next be described.

The 1866 Titus map shows G.W. Stair owning a house on the plateau above the Milton-Leigh mill. George Trida later owns this area on the 1878 Kingman Bros. map. The 1866 Titus map also shows two buildings on the Cunningham Property (Section 10), the building next to the canal probably being a hotel reported to be in the general location. The next building up the canal (Section 11) is part of Kite's farm (1878 Kingman Bros. Map, J.R. Hussey), with the next (Section 11) being owned by H. Dryar (1878 Kingman Bros. map, Elizabeth Tea).

The 1866 Titus map shows a house owned by David Mount along the canal in Section 1 of Washington Township, later owned by Elizabeth Trobough on the 1878 Kingman Bros. Map. This house is identified in the Tippecanoe County Historical Association archives as being built between 1840 and 1850, and originally known as the Lehnert Farm (Harris and Hilt 1974). An older structure found behind the current building, possibly built by David Mount the original land owner, dates back to the 1820s-1830s. Harris and Hilt describe the newer house as, "The farm house is a frame structure with a gable in the center of the front line and would appear to have been built perhaps in the decade prior to the Civil War, or possibly earlier" (Hilt and Harris 1974: 1).

The 1866 Titus map shows a farmstead in the southwest corner of Section 21 of Washington Township, 1000 feet from both the south and west sides of this section. The map shows the house owned by a J. Obenchain. The race horse barn mentioned by Reser (1945) would have been built nearby. The 1878 Tippecanoe County atlas map shows the house owned by Jane McKay.

The 1878 Kingman Bros. atlas shows two lithographs dealing with Cunningham properties in Washington Township, Section 10. The property along the state road shows in the lithograph a Victorian house built in 1856, with four barns and five supporting houses and buildings. The property along the canal shows in the lithograph a house built in the early 1830s, with a log cabin and one small frame support building. The 1856 house is still standing and easily visible from the road. The Cunningham cemetery in the lithograph is near the house and also still exists, and can be found on several local maps and the USGS map for the region. Also present in the lithograph is a canal bridge, with

one brick or stone abutment and a span built high enough to allow barges to pass beneath.

Two log cabins are shown existing between the two buildings on the field margins.

Harris and Hilt also describe the Americus Inn, which was the original Cunningham family farmhouse:

"The Inn was originally his (John Cunningham's) homestead and is pictured on page 102 of the 1878 Kingman Bros. Atlas. The springhouse, etc., were built at the time the house was converted into an inn. It is made of brick, two stories tall, and measures approximately 40 by 80 feet. There is a small addition to the rear of the Inn which extends back another 15 to 20 feet and is only one story tall. The Inn is in very bad condition with most of the glass broken out of the windows and holes or openings in the walls at various places. At one point you may observe the second floor of the Inn sagging considerably, thus making the safety of entering the buildings quite doubtful. In the main entrance hall you can see what is left of a circular stairway leading from the hall to the second story. The bannister has been removed, but the stubs of the railings are visible. Down the slope beyond the Inn to the southwest is a dam and springhouse. I have never seen bricks quite this shade of red and would guess that they were brought in on the canal, from some distant location. Next to the springhouse is a large concrete dam which apparently fed water into the springhouse trough. The dam has since been demolished to the extent that water now flows through quite easily, but one can see the remains of either end of the structure. Lyda Hilt said that a road led back to the Inn and proceeded on to the springhouse where it went under an overhanging porch and stopped" (Harris and Hilt 1974: 4).

In the decade after Harris and Hilt's visit, the Americus Inn was finally torn down by the current land owner. As it was deteriorating rapidly in 1974, and the focus of trespassers in its abandoned state, this was not wholly unexpected. It is not sure when the inn was established in the Cunningham's first house, but it must have been sometime after 1856 when the second house was built.

Union Township History

Union Township is located south of Lafayette along the Wabash River (see Appendix III). This township historically had little population outside of the sections nearest the town of Lafayette. Mills were located along Wea Creek, but the unpredictability of this water source made milling precarious. Some large farmsteads were established during the canal-era, especially in the central part of the Township along county roads.

Plans for the extending the Wabash and Erie Canal south of Lafayette to Terre Haute began in 1842, but construction did not begin until 1845 (*Documentary Journal* 1842, and Fatout 1972). The canal was opened to Attica in October of 1849, resulting in the entire canal within Tippecanoe County being filled with water. A complete contract report for the Tippecanoe County sections of canal was found in the Indiana State Library Archives, with construction orders for each section of canal from Lafayette to Terre Haute (ISL/A: Wabash and Erie Canal Archives).

The 1847 Report of the Chief Engineer of Indiana describes in detail the canal structures found within Washington Township:

"Culvert No. 121, below the paper mill, of wood, 2 spans, 8 feet by 18 inches, not submerged, to place the timber permanently under water will cost \$20.

"Culvert No. 122, near large pork-house, 6 feet by 12 inches, not submerged -- an expense of ten dollars will place it under water.

"Guard lock for the protection of the Wea Bluffs, the necessity for this lock will not much longer exist, and therefore it will not require renewal. (Used while construction and excavation went on for the canal south of Lafayette).

"Culvert No. 123, for Durkees Run, of wood, 3 spans, 11 feet by 3 feet, not fully submerged -- an expenditure of \$15.00 required for this purpose.

"Aqueduct No. 7, over Wea creek, 3 spans 32 feet each, abutments and piers as well as the trunk, constructed of timber. The foundation was undermined by the great flood of last winter, and the piers were settled as much as two feet. The trunk has been raised to the proper level and the foundation secured with brush and stone. Whether the work still stand in this condition, it is impossible to say, the timber will last six or seven years, when the trunk must be renewed upon the present plan and the abutments and piers re-built of stone.

"Lock No. 34, 10 feet lift, is located just south of the Wea aqueduct. It is built of timber upon the frame plan, the workmanship very imperfect and wholly unsuitable for canal structures. Owing to the imperfect manner of its construction, this lock with its gates, will probably last but three or four years.

"Just below the lock a feeder is introduced from the Wea, it is 25 chains long, constructed with 15 feet width at bottom, the banks of this feeder should be raised one foot throughout to keep out the floods.

"Wea feeder dam is built upon a temporary plan, being formed wholly of brush and gravel, and will require a small annual expenditure to keep it at proper height, it is about 200 feet long and raised 4 1/2 feet above low water.

"To pass through the long level from Wea to Attica, the large quantity of water required below, the upper end of this level must be kept at the height of five feet above the bottom. To meet this requirement, one foot in height must be added to the Wea dam, and this expense, together with the raising of the feeder banks, must be incurred in 1848.

"Culvert No. 124, of wood, 11 feet by 2 1/4 feet -- submerged.

"Road bridge No. 54, at Granville, will last seven years.

"Road bridge No. 55, two miles below Granville. Of this bridge the embankments only are completed, the wood work under contract at \$250, which will be paid in the expenditures of 1848.

"Culvert No. 125, of wood, 2 spans, 10 feet by 2 feet -- submerged" (*Documentary Journal* 1847: 232).

The most important Wabash and Erie Canal feature found in Union Township, and one of the most extensive in the entire county, was Lock #34 on the Wea Creek and its surrounding engineering structures. Construction here involved much more than just the lock; a series of dams, holding basins, and feeders were built, as well as Aqueduct #7 over the Wea. Lock #34 was planned to be constructed on the composite frame following a crib lock plan with a 10 foot lift (*Documentary Journal* 1842).

The original construction order for the canal section including Lock #34 on Wea Creek, built on the frame lock plan, and the Wea Creek aqueduct describes the work needed as:

"Section, Number One Hundred and Seven (107)

The work on this section (No. 107) is to be done at ten percent less than the following rates, to wit:

Grubbing and clearing -- ten dollars per chain.

Excavation -- nine cents per cubic yard.

Excavation for aqueduct above low water -- fifteen cents per cubic yard.

Excavations for aqueduct below low water -- seventy five cents per cubic yard.

Tow path embankment -- twelve cents per cubic yard.

Full embankment -- fifteen cents per cubic yard.

Masonry in aqueduct -- eight dollars per cubic yard.

Puddle -- forty cents per cubic yard.

Foundation timber -- nine cents per cubic foot.

Stone protection -- one dollar per cubic yard.

Aqueduct trunk -- fifty dollars per lineal foot.

2 inch oak plank -- four cents per square foot" (ISL/A: Wabash and Erie Canal Archives).

A composite frame lock was made exclusively wooden planks and beams. Crib locks were mostly made of wood, with stone rubble placed within wooden box-like cribs. This type of lock was a compromise between weak all-wood composite locks and locks made entirely of stone, which was very hard to obtain when the canal was being constructed. In 1852, repairs were started to convert Lock #34 into a crib lock (ISL/A/WA: May 28th, 1852).

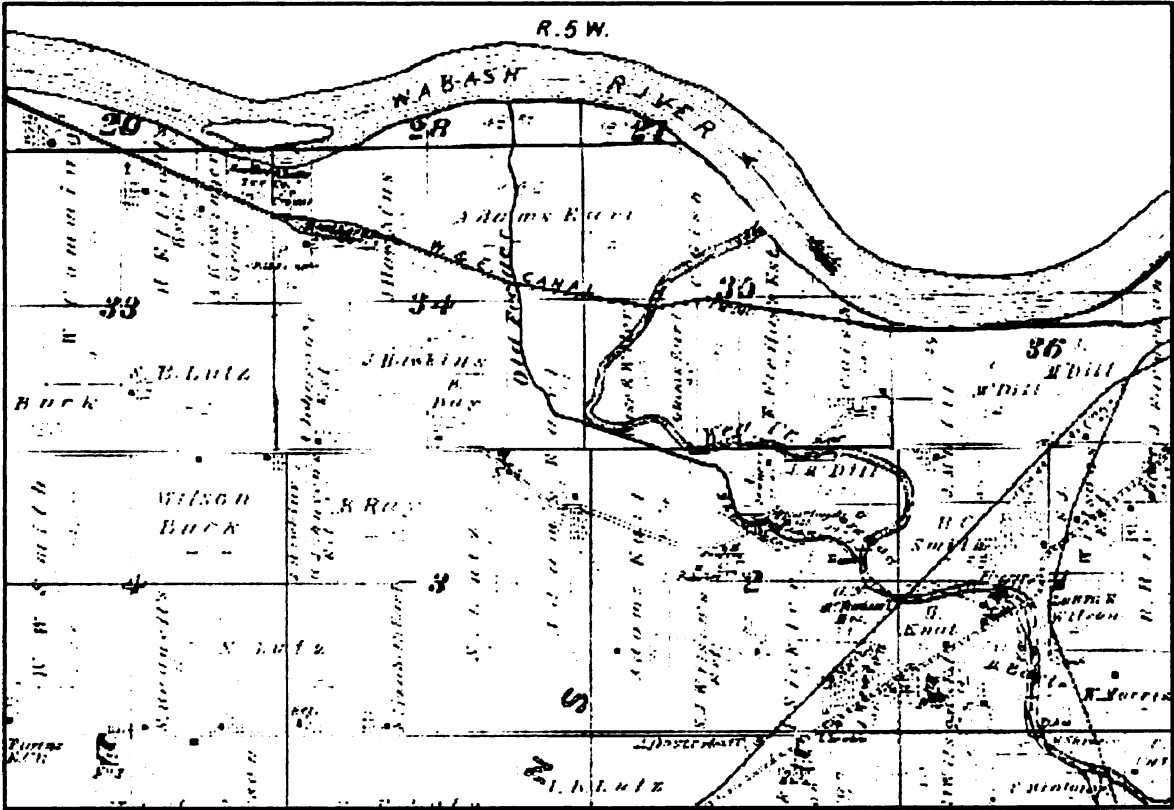
Aqueduct #7 over Wea Creek was 96 feet long, with three spans of 32 feet each. It was made with timber abutments and piers, and had an open wooden trunk line. No contract can be found which indicates a conversion of the aqueduct abutments from wood to stone, as proposed by the Chief of Engineers in 1847. In May of 1852, the Chief

Engineer decided to construct a house on the walls of lock #34 to be used by the lock tender, 14 ft. by 22 ft. and 10 ft. high (ISL/A/WA).

The Chief of Engineers Report of 1842 mentions the use of wood instead of stone for the aqueduct embankments because of the lack of good stone in the area. The 1847 contracts for the construction of Lock #34 and the Wea Creek aqueduct do not include stone or masonry work (ISL/A: Wabash and Erie Canal Archives). As this report was in August of that year, and the above work order was in June, the later contract may be a revised construction plan.

A 1993 contract archaeology project in downtown Lafayette located a number of blocks of pristine canal wharfing, filled with later rubble, trash, and earth. Michigan State University was involved in preliminary monitoring of this site, which allowed some detailed notes and photographs to be created on this rare archaeological feature. No state-sponsored contracts could be found which describe the construction or repair of the Lafayette canal wharf detail. However, there was found a contract report for the state-sponsored construction of a timber wharf along a large turn-around basin south of Lafayette in Union Township (ISL/A/WA: 1848). This basin was known historically as the "Shadeland Basin," and was used to load and unload agricultural products from the Union Township area. The 1878 Kingman Bros. map shows the Shadeland Basin owned by the Northern Lake Ice Co (Figure 6).

Figure 6: 1878 Kingman Bros. Map, Showing Shadeland Basin and Wea Creek.



A number of farmsteads were also identified as being along the canal in a Union Township within the project area. One farmstead of note was a late canal-era farmstead was located on the 1878 Kingman Bros. map south of the Shadeland Basin, but not on the earlier 1866 Titus map. The house was once part of a large farmstead owned by Adams Earl. The house and farmstead, then, date to between 1866 and 1878.

The earliest mill constructed in Tippecanoe County was located in Union Township and utilized the Wea Creek for water power. This mill was built by Joseph Hawkins in 1827. A brief note from the 1878 atlas describes this mill, "(In 1827), Joseph Hawkins erected a grist-mill on Wea Creek..." (*Historical Atlas of Tippecanoe County* 1878, Kingman Bros., no page #).

Wayne Township History

Wayne Township contained several miles of Wabash and Erie Canal, but the lateness of its construction in that Township led to little secondary infrastructure such as that found north of Lafayette (see Appendix III). A single canal town was located near the center of the southern Tippecanoe County canal section. This town was named Granville, and was platted in 1834 (Figure 7). The 1866 Titus map had an excellent insert map of Granville, as did the 1878 atlas map.

[illegible]

Granville was never very successful; before the canal, Granville businesses included two general stores and a hotel. When the Wabash and Erie Canal was extended south from Lafayette in the mid-1840s, it was constructed through the town of Granville. Local citizens soon envisioned a vast city where their dozen or so rough frame houses stood. Agricultural products were shipped out of Granville along the canal, with three elevators being located in the town next to the canal to facilitate storage and transport.

Benjamin Hall's Granville elevator was propelled by horse power and was located east of the road running to the bridge. Frederick Scott's elevator was also horse powered and located on lot number 27. A canal overhead bridge was located at the town which linked up to fords and a ferry located east of the canal bridge for traffic across the Wabash. A passenger station on lot 26 was later built to facilitate passengers boarding canal boats. Railroad transportation entered Wayne Township around the mid-1850s, but missed Granville. This and the decline of the Southern Division of the canal led to the abandoning of Granville by the 20th Century, though some buildings remained in use until the mid 1900s (Stover 1915).

The Wabash and Erie Canal in Carroll County.

Carroll County, along with information from Tippecanoe County, makes up most of the local documentary information used in this project (see Appendix III). The only part of Carroll County actually used in most of the statistical studies is the township of Deer Creek, which is located south of the Wabash River along the pathway of the Wabash and Erie Canal. Next, a brief history of Carroll County, the Town of Delphi, and

the Deer Creek Township area will be given, with several key industries being highlighted.

Carroll County, Indiana, was officially made a county in 1828, but the population did not increase significantly for several decades. Early pioneer reminiscences of Carroll County described a situation similar to that of Lafayette in its early days. Most accounts describe a wild, untamed wilderness, where Native American, wolf, and bear still roamed forest and marsh, and transportation followed Indian trails and natural waterways (see Odell 1916, various accounts). Dr. John M. Ewing, one of the earliest settlers in the region, recounts life in the early 1800s:

"In the year 1827, when I first landed on Deer Creek, there were but forty families living in what now forms Carroll, White and Cass Counties. Where the town of Delphi now stands was a hazel and blackberry thicket. Where the town of Logansport stands, everything was in a state of nature... What is now the city of La Fayette had then but six log cabins, and a one-story hewed-log house, occupied as a tavern.

"There were then no roads, except one that was opened by Father Robinson in December, 1824... Traveling had then to be done on Indian trails and deer paths. The face of the country was then covered with a growth of nettles, which were, in the upland, as thick as a crop of flax, and about as high, and on the river bottom, as high as a man's head, on horseback.

"There were then no rabbits, no partridges, larks, thrushes, or other variety of birds that followed civilization. Frogs were abundant. I have traveled for days without ever getting out of hearing of their croaking music. Snakes were also plenty, especially the large rattlesnakes... Wolves were also plenty -- the large gray wolf -- and, like the Indians, they surrendered their rights to the country with reluctance. I have seen them walk off with a snarl and a growl, looking at me as though they thought me an intruder on their domain" (1882 Carroll County atlas).

Most of the early settlement of Carroll County was along the Wabash River, where a number of small river towns sprung up to take advantage of the main

transportation route through the area. Trade with Indians was still a viable business, with a major trading post being found in nearby Logansport in the 1820s (1882 Carroll County atlas). Immigrants into the area who built homes and cleared forests for agriculture were discouraged by the dense wilderness between them and markets in more settled places. Trade with the eastern states and the rest of the world was nearly impossible (Mayhill 1853). The town of Delphi, one of the first settlements in Carroll County, was described by Dorra Mayhill as being:

"...a mere village of a few log and frame houses and one or two of brick. It had been little more than ten years since the trees had been cleared from the public square. While the town had been incorporated in 1835, the streets were still not more than woods roads. In 1840, according to city records, stones and stumps were just being cleared from Main Street" (1953).

In the year 1837, the Wabash and Erie Canal finally reached the town of Delphi, which has a prominent place in this report. Even though construction in Carroll County was begun in 1837, political and economic circumstances linked to the Panic of 1837 would not bring water to the Delphi area for another two years. To the north of the city, the canal was dug through solid rock. A naturally wide ancient tributary of the Wabash River was followed, making the canal north of the town much wider than the official forty feet width. Between this wide area in the north and the Wabash River was a large swamp which proved to be a great difficulty in creating a stable bed for the canal (Mayhill 1953).

The 1847 Report of the Chief Engineer of the State of Indiana describes the canal in detail from the Wabash River crossing point at Carrollton in Carroll County to the Tippecanoe County border:

"The next structure is the Wabash guard lock, constructed at the entrance of the canal, where it leaves the slack-water. It is constructed of wood upon the crib plan...

"Just below the guard lock is Road bridge, No. 46, used also for changing the towing path from the north to the south side of the canal...

"Road bridge, No. 47, crossing the canal where it occupies the Delphi bayou. This bridge is three times the common length...

"Road bridge, No. 48, at Bowles and Colten's warehouse, double length, will last one year.

"Road bridge, No. 49, at Delphi, will need rebuilding in 1848.

"Lock, No. 33, five feet lift -- the walls of extra height to guard against the Wabash floods. Built of wood upon the crib plan...

"Wabash dam, No. 4, opposite Delphi, is 590 feet long and 12 feet high from low water. It is constructed by means of timber crimps -- slopes of three to one on the upper and lower sides -- filled with stone -- the whole resting on rock bottom. The abutments are of timber... This dam answers the double purpose of forming a pool in which the canal crosses from the north to the south side of the Wabash, and also of furnishing the chief supply of water from this point to Coal creek, a distance of over 70 miles. In order to pass forward so large a quantity of water, this dam will require raising permanently about one foot. The stone filling is washed out of a small portion of the crib on the lower side, and should be replaced.

"The next structure is Deer Creek dam, erected for the double purpose of a feeder and of forming a pool in which the canal crosses this stream; length 170 feet, height 10 feet from low water; formed of cribs filled with stone, resting on a foundation of brush and trees; abutments built of wood and will require renewal in 1849. The dam may be considered a safe and durable structure. The pool of this dam forms the upper end of the Lafayette level, and the plan proposed of passing through this level a greater quantity of water for the canal to Coal Creek, involves the necessity of adding 15 or 16 inches permanently to its height. Bed of the creek at the dam is sand.

"Towing path bridge across Deer Creek, a simple wooden structure about 10 feet wide, uncovered, and three timber bents -- the bridge is in good order, but the portion which is of timber will require rebuilding in five or six years.

"Deer Creek Guard Lock -- built of timber upon the wooden crib plan... (*Documentary Journal* 1847).

Lock #33, a crib lock with a five foot lift, was located at the northern end of the Deer Creek Reservoir. This location was about 600 feet south of the Delphi paper mills.

Because of the short lift involved, little additional construction (such as dams, basins, or feeders) were associated with the lock. The *Documentary Journal* for 1845 notes the construction of a tumble around this lock for the passage of water during the dry season. This water was necessary for the operation of the mills at Lafayette, which paid the state a set fee for yearly water rights to the canal. Somewhere near the lock was constructed a lock-keeper's house. The lock-keeper would open and shut the lock for the passage of boats, and would throw open the lock gates during periods of intense flooding.

A very important historical document notes that in 1851:A. Glover advertised that he was buying hay, oats, corn, potatoes, butter, and a wide variety of other meat and vegetable products, as well as feathers, rags, beeswax and tallow. The location for this purchasing was "at the Lock House on the canal a few rods below Rinehart and Bowen's new paper mill" (Mayhill 1953). This advertisement was originally found in the *Delphi Journal* and is important in that it specifically mentions a lock house being located along Lock #33 on the Wabash and Erie Canal.

Canal Construction and Repair Work around Deer Creek

The Deer Creek Dam was located south of Lock #33 and created a slack water for the passage of canal boats across Deer Creek. This slack water, identified as the Deer Creek Reservoir on a number of 19th Century maps, formed a large controlled water source for the entire canal system. The canal had an extensive towpath on the dam side, used to strengthen the surrounding banks, but had no back berm along the Deer Creek Reservoir until the canal neared the lock (*Documentary Journal* 1847).

The water from Deer Creek would be controlled in the slack water by a number of sluices and guard locks, which could release water into the Wabash River. Over this slack water, a towpath bridge was built. The Deer Creek towpath bridge was constructed of wood with cut stone abutments and allowed mule and horse teams to cross the reservoir. Associated with the dam was a guard lock on the south side of the slack water, where the waters of Deer Creek reformed with the canal proper. This lock was exclusively for flood control purposes (*Documentary Journal* 1847).

The *Documentary Journal* for 1855 has an additional note of interest on the operation of the canal around Deer Creek. The Chief Engineer of the State of Indiana stated that:

"The Wabash river, Deer creek and Wild Cat creek, as is known are each crossed in a pool of a dam. The sediment brought down in floods, and held in solution while in the strong current, tends to settle as it meets the more quiet water of the pool. At the entrance and outlet locks of these slack waters, deposits have been gradually forming since the construction of the canal. By partially removing the upper surface of these bars, any serious interruption has thus far been avoided, but a thorough removal is to be called for. As the pools cannot be drawn off, an under water dredge must be used.

"At the Deer creek pool, where, from its shape and position, the sand deposit has become extensive and formidable, it is proposed to build a culvert with gates, under the guard bank, placed (along) the Canal bottom, through which the sand may be wasted out, by draining through it the water of the Canal and of the creek at its low stage" (*Documentary Journal* 1855).

The *Documentary Journal* for 1836 also noted the presence of Lock #33, Deer Creek Dam and Deer Creek Reservoir, and the towing path bridge:

"But to avoid the necessity of closing the guard-lock (on the Wabash River) so frequently, which would cause some delay in

navigation, it is proposed to raise the first lift-lock (Lock #33), situated two miles below, to an extra height, so that it will answer also as a guard-lock in ordinary floods. Upon this plan which has been adopted, the floods, during all moderate rises will flow into the canal and rest against the lift-lock, and the gates of the guard lock need not be closed until the river rises to the height of four feet on the weir of the dam...

"The Board, in determining the plan of crossing the Wabash river, virtually settled the mode of crossing Deer creek also, inasmuch as the level of the Wabash Dam is too low to admit of any other structure for crossing Deer creek than a dam with a towing path bridge. That stream is therefore crossed in the pool of a dam to be located immediately at the mouth of the creek, and to be built about ten feet high, and 170 feet long. The great length of the dam being about twice the ordinary width of the channel, will prevent, in some degree, the fluctuations of the stream, and remove any serious difficulty in crossing during high water. *The situation is very unfavorable for building a dam, and great care will be required in its construction (italics added).*"

One of the major finds of the 1996 archaeological survey of canal park lands south of Delphi was *Sunset Point*, a canal construction camp site. This construction camp was once located between the Wabash River and the Wabash and Erie Canal, just north of Deer Creek. The camp occupation dated to 1839 -- a date supported by the artifacts recovered -- but evidence of a later 19th Century occupation was also found. This second occupation dated to between 1840 and 1860. Several major repairs and reconstructions of Deer Creek area canal features may be responsible for this second occupation. A complete list of all known repair and work contracts is provided below.

1837 -- Work begins on the Deer Creek Dam. A total of six feet of foundation on one abutment is completed before the Panic of 1837 halts all work on the canal

"The materials of the Deer Creek Dam are chiefly prepared, although but little has been done towards putting them to their place. One abutment has been commenced and raised six feet high." (*Documentary Journal* 1837).

- 1838 -- No work is accomplished on the Deer Creek Dam (*Documentary Journal* 1838).
Problems paying contractors and laborers (*Documentary Journal* 1839)
- 1839 -- Deer Creek Dam and towpath bridge are completed. The State of Indiana pays for the construction of 50 shanties through the Delphi-Fort Wayne canal section for laborers (*Documentary Journal* 1839).
- 1846 -- A new towpath bridge is built to replace one lost to floods in 1844 (*Documentary Journal* 1845).
- 1847 -- Rebuilding the gates of the Deer Creek guard locks (ISL/A: Wabash and Erie Canal Archives).
- 1848 -- Timber added to the top of the Deer Creek and Wabash River Dams to raise their heights by 10 inches (*Documentary Journal* 1848).
- 1848 -- Advertisement for timber for use on the Wabash and Deer Creek Dams (Mayhill, 1953).
- "Canal letting -- Sealed bids are to be received by C. Carter, canal superintendent at Logansport for Wabash and Deer Creek dams -- oak timber to cover said dams their entire length -- 7 feet long, 13 inches thick, sawed once through, by May" (*Delphi Oracle*, January 1848).
- 1850 -- Timber order for the Deer Creek Dam (ISL/A: Wabash and Erie Canal Archives).
- 1850 -- Deer Creek dam rebuilt (ISL/A: Wabash and Erie Canal Archives).
- 1851 -- Rebuilding the Deer Creek guard lock and south abutment of the Deer Creek Dam (ISL/A: Wabash and Erie Canal Archives).
- 1853 -- Rebuilding and hanging complete set of lock gates to the Delphi Lock (ISL/A: Wabash and Erie Canal Archives).
- 1853 -- Rebuilding towpath bridge across Deer Creek on the Truss plan, 256 feet long (*Documentary Journal* 1853).
- 1856 -- Deer Creek culvert built beneath the dam (*Documentary Journal* 1856).
- 1858 -- Lock #33, tumble rebuilt (*Documentary Journal* 1858).
- 1858 -- Deer Creek Dam abutment replaced (*Documentary Journal* 1858).
- 1863 -- Lock #33, work on wood in lock chamber and gate replacement (*Documentary Journal* 1863).

1864 -- Deer Creek Dam abutment replaced (*Documentary Journal* 1864).

1867 -- Renewal of the Deer Creek Dam lower slope and rebuilding of one dam abutment (*Documentary Journal* 1867).

The Delphi Side Cut Canal

The Wabash and Erie Canal was completed to Delphi in late 1840, but the final canal construction plan was less than ideal. Between Delphi and the Wabash River was a wide swampy area known as the "Delphi Bayou". The canal corridor passed through this area almost half a mile west of the town. The bayou would become almost impassable during parts of the year, creating great difficulties for Delphi merchants and farmers who wanted to use the canal (Mayhill 1853). Charles Titus, in his 1843 Journal, describes entering Delphi by canal boat and the bayou that greeted them: "Eighteen miles from our starting place, we came to a pleasant little village called Delphi. Here we tarried awhile... The land about the town is low and flat, with many puddles of stagnant water" (Clark 1989). Construction of a side slip, from the canal over to the high ground upon which the town was located, was necessary to solve the problem.

The State of Indiana agreed to Delphi's petition to construct a canal side slip, and stated the terms for such an undertaking in the Indiana state legislation of 1847. The act reads as follows:

"Section 1. *Be it enacted by the General Assembly of the State of Indiana*, That the citizens of Carroll county be and they are hereby authorized and empowered to construct a side cut canal, either around on the east side of said town or through the west part of the same; said side cut to commence at the most suitable point on the canal north of said town, and to run thence on the most suitable ground into the side cut heretofore made by the Delphi Forwarding and Storage Company, and into the canal above the lock opposite said town, or into Deer Creek above

the dam at a point where the same is navigable for boats; and said citizens shall have power to make the necessary tow-paths and bridges, so as to connect it with the main line of the canal, for the purposes of navigation; said side cut canal when made to be a part of the Wabash and Erie canal.

"Sec. 2. *Be it further enacted*, That Enoch Rinehart... contract for the making of the same, collect all such sums as have been or may hereafter be subscribed, to aid in its construction, by suit or otherwise.

"Sec. 3. So soon as a sufficient sum is subscribed to make said side cut on either of the proposed routes, the agent named in the second section of this act shall... without unnecessary delay, make a survey of the several proposed routes and an estimate of the cost of each, and shall locate said side cut on the most advantageous route for the interest of the State: *Provided*, That in case there is a sufficient amount subscribed to make the side cut on one of the proposed routes and not enough on the others, then he shall locate it on the route for which a sufficient amount is subscribed, and he shall make the necessary estimate of the depth and width of said side cut and lay the work off ready for contracting for the construction of the same..." (*Laws of Indiana*, January 23, 1847).

The canal side slip was eventually constructed by two local entrepreneurs, Reed Case and James Spears. Reed Case came to Carroll County in 1838, and became a contractor for the Wabash and Erie Canal, managing the construction of several local segments of canal. James Spears was from Lafayette, where he ran a successful merchandising operation. In 1838, both men formed the partnership of Spears & Case (later Spears, Case & Co.). This firm constructed the side cut from the canal to their warehouses at the foot of Main Street in Delphi (Odell 1916, and 1882 Carroll County atlas).

The Delphi side slip officially became part of the Wabash and Erie Canal in 1848, with the following Indiana state legislation:

"Section 1. Be it enacted by the General Assembly of the State of Indiana. That the said cut from the Wabash and Erie canal up to the west end of main street in Delphi, constructed by the Delphi Storage and

forwarding company be, and the same is hereby declared to be a part of the Wabash and Erie canal...

"Sec. 2. Nothing in this act shall be construed to make the State or the trustees liable for the construction of said side cut canal..." (*Laws of Indiana*, February 16, 1848).

Delphi merchants also saw the opportunity to improve local business by the construction of a millrace from the canal to the Wabash River. Their petition was acted upon by the State of Indiana Legislation in 1842, with the following act being passed:

"Sec. 1. *Be it enacted by the General Assembly of the State of Indiana*, That it shall be the duty of the engineer or other person having charge of the Wabash and Erie canal... to let by contract to the lowest bidder the clearing out and removing all obstructions from the bayou which extends from the canal, at the said town, to the Wabash river, for the purpose of creating water power upon the said canal at that place.

"Sec. 2. *Be it further enacted*, That... the said work shall be finished within six months from the time of the said letting.

"Sec. 3. *Be it further enacted*, That ... for the purpose of paying for the said work, the rents that may be received by the State for water power created by this act, shall be appropriated to that purpose... and the person or persons doing said work shall look to the said rents for their pay and to no other source whatever; and as fast as the said rents may be due and received, they shall be expended in paying for the said work until the whole amount is paid..." (*Laws of Indiana*, January 20 1842).

Following this legislation, canal commissioner S. Fisher advertised this work to be done in the *Delphi Oracle*, September of 1842:

"Sealed proposals will be received in Delphi, September 19, for leasing any amount of water power to be created by the construction of a race from the point near where Main Street intersects the Canal, to the Wabash River, not to exceed 30 power. No lease to be for less than 4 powers, to run for 30 years. The highest bidder will be entitled to choice of location" (Mayhill 1953).

Spears & Case apparently won the bid for construction of this mill race. The route chosen by them followed an old stream channel west of Delphi. The mill race upon completion was 20 feet wide and 12 feet deep, and was constructed from the Wabash and Erie Canal -- roughly where the side slip entered the channel -- to the Wabash River (Stuart 1924, and 1882 Carroll County atlas). The State of Indiana approved of their construction and decided upon payment with a legislative act in 1846:

"Section 1. *Be it enacted by the General Assembly of the State of Indiana*, That it shall be the duty of the officer having charge of the Wabash and Erie canal east of Tippecanoe, as soon as possible, to make a settlement with Spears and Case, for work done by them under an act entitled "An act relative to water power at the town of Delphi, Carroll county," approved January 20, 1842; and to give Spears and Case a certificate for the amount of work done by them under said act, which shall be paid out of the rents derived from the water power created by the side cut constructed by said Spears and Case near said town... until payment thereof shall be made" (*Laws of Indiana*, January 19 1846).

This mill race eventually provided two Delphi paper mills with their water power. Both the side slip and the mill race were privately financed by Case and Spears, and they were evidently paid back from water rents from the two paper mills (Mayhill 1953, Stuart 1924). This payment scheme answers why the two paper mills were never included on the Chief Engineer's yearly reports of water rents for mills located along the Wabash and Erie Canal (*Documentary Journal* 1846 and 1847).

The Delphi Paper Mills

George Robertson came to Delphi in 1845 and selected a site for a paper mill on the canal along the newly constructed millrace. Paper was being produced by 1846. This

first paper mill of George Robertson was destroyed by fire in 1849. Robertson, Enoch Rinehart, and C.A. Woods rebuilt the mill in 1850. Enoch Rinehart was engaged with George Robertson in the manufacture of paper for several years. The mill at its height would produce about two tons of rag paper a day, which was shipped as far away as Chicago, Indianapolis, and Cincinnati. Wagons would transport the paper to these distant places, then return with rags for the paper mill. Rinehart became sole owner of the paper mill in 1873 (Stuart 1924, and Mayhill 1953).

A second paper mill was erected in 1853 by George Robertson and George Armitage. It was also located on the mill race, slightly upstream of the Rinehart mill. John B. Caldwell and Robert Johnson were the millwrights. This second paper mill was solely owned in 1868 by A.H. Bowen, who operated it until it was destroyed by fire in 1877. The Rinehart mill continued to make paper until the dynamiting of the State Dam at Pittsburg in 1881, which destroyed the mill in the ensuing flood surge (Stuart 1924, and Mayhill 1953).

In 1871, William J. Ball produced a survey of mill power along the Wabash and Erie Canal. His report contains the only State of Indiana document describing the paper mills at Delphi:

"Whole fall, eleven feet. They use in each mill water-wheels forty-eight inches in diameter. Effective fall, ten feet. Full capacity of wheel, 1,964 cubic feet of water per minute, equal to 4.45 of one standard power. They were not running when I was there, but informed me that a two-thirds gate gave them *ample* power for their machinery. This would require 1,310 cubic feet of water per minute, or 2.97 standard powers. The wheels and forebays at these mills appeared to be in good order, the waste not being more than 250 cubic feet per minute, which would give a total consumption of water at this point to 2,870 cubic feet, but the whole of this is thrown into the river and wasted.

"Whilst at Delphi, I made an examination to ascertain the probable cost of cutting a tail from these mills down to a point just below Deer Creek lock. The length of this race would be seven hundred feet, and depth from nine to twelve feet, making it ten feet wide at the bottom, with slopes of one and three-quarters to one; the excavation would be 7,237 cubic yards, which, at 25 cents per yard, would amount to \$1,809. Upon the plan of returning the water used at these mills to the canal again, the fall would be reduced to about five feet; and to give them the same power that they have now, wheels of sixty-six inches in diameter, would be required, each wheel using about 3,000 cubic feet per minute. As the larger wheels would run much slower than those now in use, it would be necessary to change the gearing in the mills, at a cost of \$2,000, giving a probable cost of this improvement, of \$3,800" (*Documentary Journal* 1871).

The work suggested by William J. Ball was never completed; by 1871 the Wabash and Erie Canal was too unproductive for such an expensive undertaking as described above.

The Delphi Lime Kilns

One of the principle industries of 19th Century Delphi was the quarrying and processing of limestone. A series of lime kilns once faced the Wabash and Erie Canal north of Washington Street and east of the canal. At this location the canal widens into a larger turn basin. A number of other kilns were located throughout the county, but constructing kilns along the canal appears to have been the favored location. The 1868 map of Delphi and Pittsburg shows six kilns, oriented in a row along the canal, in the Washington Street area, and two kilns south along the canal near the paper mills. A much larger kiln is shown farther along Washington Street toward Delphi, but still in the vicinity of the canal. A number of these kilns are also shown on the 1874 Carroll County atlas map, the 1876 map of Delphi and Pittsburg, and the 1868 Birdseye view of Delphi.

The first lime kilns in Carroll County were operated in 1825 by David and Daniel Baum, with the lime being shipped down river on flat boats. When the Wabash and Erie Canal was constructed through Delphi, the canal became the principle transport route outside of the area (1863 atlas of Carroll County). The construction of the canal through Delphi allowed for the exploitation of the high quality limestone upon which the town rests. When the industry started on a small scale in 1840, a number of crude kilns were put into use. A number of other manufacturers operated lime kilns in the Delphi area; most of whom sold out to the firm of Hubbard and Company by 1857. Hubbard and Company was owned by E.W. Hubbard, D.R. Harley, and Robert Mitchell, with Lewis B. Sims, Daniel McCain, James McCain, and Hiram Sampson buying into the firm in 1871. This lime company was at the forefront of the Carroll County lime industry; an industry that would be known throughout the Indiana and Illinois as producing some of the best lime products available.

Carroll County limestone was for the most part processed into lime for wall plaster and white wash. Delphi lime was known for its superior quality and workability. The earliest detailed account of the Delphi lime industry comes from a "Professor" Cox, working for the State of Indiana in 1872:

"E.W. Hubbard & Co. mine their stone from the lower number of the Pentamerous limestone, at their location, about twenty feet thick. The strata dip in every direction, and, at one part of the mine, are nearly vertical. A band of porous stone is seen near the water level, containing petroleum, which oozes out on exposure to the warmth of an October sun. Hubbard & Co. have twenty common kilns and two "Monitor Perpetual Burners." Pelton's patent. The capacity of the common kilns amounts to 150,000 bushels (seventy pounds) per annum. The common kilns are now only occasionally at work. The capacity of the two "Monitor Kilns" is

estimated at 500 bushels a day, and intended to run nine months in a year. The greatest product in one year is reported at 150,000 bushels...

"The expense of mining is 35 cents per yard: of burning by common kiln, 16 cents per bushel, and by patent kiln, 10 cents per bushel of seventy pounds" (1882 Carroll County atlas).

Cox provides the kiln capacity of several other Delphi companies in his report; none coming close to the number of kilns operated by the Hubbard company. The authors of the 1882 atlas of Carroll County noted several changes since Cox wrote his report, mainly several new partners joining the Hubbard company, and the Harley brothers starting their own lime processing company known as "Harley & Brother".

By 1882, the older common kilns were all abandoned in favor of perpetually burning lime kilns. The 1882 atlas of Carroll County notes that "The Delphi Lime Company (formerly Hubbard & Co.) now run six perpetual burners, and Harley & Bro. four, the aggregate products of which are equal to nearly one million bushels per annum."

W.S. Blatchly gives an account of both types of lime kilns in his 1903 book on the Indiana lime industry:

"As the population increased (in Indiana), the demand for lime became greater, and in many places permanent kilns lined with fire brick were erected. These were the old fashioned stone "pot kilns" of a quarter of a century ago. On the inside they were usually circular in horizontal section, tapering slightly, by a curve both up and down from the circle of largest diameter, which was from four to six feet above the bottom. A kiln 10 to 11 feet in greatest diameter, was 25 to 28 feet high, five to six feet in diameter at the top and seven to eight feet at the bottom. There was an arched opening on one side at the bottom, five to six feet high, through which the wood was introduced and the burnt lime removed. A horizontal grating on which the fire was built was usually placed one or two feet above the bottom...

"As wood became scarcer and the demand for lime increased, these intermittent kilns gave way to continuous or perpetual burning kilns, usually made of stone, in which the lime was burned by coal without

intermission in the fires. In the first styles of these, some of which are still in use, the kiln was filled with alternate layers of coal and limestone and then fired from below with light wood. As the burning was completed in the lower portion of the kiln the finished lime was drawn out from time to time, usually twice each 24 hours, allowing the entire mass above to settle down. New layers of fuel and stone were then added at the top."

Archaeology during the summer of 1996 proved that the six lime kilns shown along the Wabash and Erie Canal north of Washington Street were of the "pot kiln" type (see results section). Blatchly notes that Hubbard & Co. used these types of kilns until 1870, and that they held 1000 to 1200 bushels of lime, were filled in one day, and took about three days to burn before being emptied in a day or two. He notes that about 20 of these kilns were once operated by the company until they were replaced by perpetual burners soon after the "Delphi Lime Company" was formed in 1870 (Blatchly 1903).

At some date after 1870, the railroad spur (known locally as the "Belt Railroad") was constructed across the canal, through the middle of the "pot kilns" along the canal towpath, and westward toward a number of Delphi industries, including an ice plant, a coalyard, and the Harley & Bros. quarry and kiln site (personal communication with Dan McCain). This quarry was used until 1917, and can still be seen today by following the railroad trail west from the Delphi Canal Park Annex.

Other Carroll County Industries Located on the Canal

The 1868 map of Delphi and Pittsburg has the most detailed account of the paper mill area; with eight separate structures, the mill race, and two large holding basins being identified as part of the paper mill complex. The paper mill building farthest to the west along Bicycle Bridge Road is identified as a "Ware House". This map also indicates a

residency to the north of Bicycle Bridge Road on the west side of the canal, and a warehouse-like structure and two lime kilns on the east side, just north of the road.

The 1874 map of Deer Creek Township shows four structures belonging to the paper mill complex, the warehouse northeast of the paper mills, and an additional warehouse-like structure across from the paper mills on the east side of the canal. These are associated with the "Bowen Mill".

North of where the canal crosses present day Bicycle Bridge Road, in the area of the canal's bend to the northeast, are a number of additional structures. The 1868 map of Delphi and Pittsburg shows a residency in section 7 of the addition made by Spears, Case and Dugan, as well as a short side slip from the canal. On the western bank of the canal in the same general area is shown a "slaughter house". Both structures do not appear on the 1868 birds-eye view of Delphi, but do appear on a photograph taken in 1874.

North of Washington Street, on the west side of the canal, was once a series of residencies, several with out-buildings which were located next to the canal channel (1868 map of Delphi and Pittsburg and 1868 birds-eye view of Delphi). Many of these residences can be seen today, though most of the out-buildings are gone. These structures, except for the out-buildings, faced Center Street to the west, and not the Wabash and Erie Canal. A brick kiln is shown being next to one of the residencies north of Washington Street Bridge and west of the canal. Near this location, the canal widens to form a turn-basin, probably used for docking purposes by the surrounding lime industry. A much larger brickyard is shown to be north of the brick kiln and the residencies.

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Chapter 2

The Results of Several Years of Archaeological Survey and Excavation within the Study Area.

The archaeological data used in this project primarily comes from four years of summer archaeology survey projects conducted by Michigan State University in Tippecanoe, Fountain, and Carroll Counties from 1993 through 1997. These survey projects concentrated on areas south of the Wabash River and along the Wabash and Erie Canal. The completed surveys examined 13 linear miles of Wabash and Erie Canal corridor, discovered 18 canal features, surveyed over 200 acres of land, and discovered 53 canal-era historic sites. Over 50 sites with prehistoric and 10 sites with 20th Century components were also found.

The purpose of these surveys was to identify historical cultural resources within the counties mentioned for the Indiana DNR/DHPA, and to clear trails for construction by the Carroll County Wabash and Erie Canal Association as part of their expanding trail system. The surveys primarily involved Phase I-level exploration, with some sites being more extensively surveyed as part of individual research goals of the CCWECA. The artifacts collected are stored in the CCWECA Case House Museum, and at the Tippecanoe County Historical Association.

A parallel goal of this survey research was to accumulate data for this project. This second goal directed the survey work in that more detail was given to identifying site function and date range. Documents research into discovered archaeological sites was also more extensive than usually found on survey projects.

Historical documents, especially county and township maps, were used to direct archaeological survey teams to known sites, and also aided in the interpretation of sites discovered by archaeologists. Many historic sites, however, were found within the project area that had no historic background information and that did not appear on 19th Century maps.

The archaeological survey of the Wabash and Erie Canal and settlement along the canal will be dealt with in this chapter in three sections. The first section deals with Tippecanoe County from the city of Lafayette north to the county border with Carroll County. This section includes survey work conducted within the city of Lafayette. The second section deals with Tippecanoe County and Fountain County from Lafayette south to Maysville in Fountain County. The third section deals with Carroll County exclusively, including the city of Delphi.

Tippecanoe County from Lafayette North to the County Line.

Fairfield Township

Documents research indicated that the Wildcat Creek area north of Lafayette had a long history of canal-era canal and related economic and construction activity, with the potential of locating a number of canal features and non-canal pioneer sites (see Appendix IV). A secondary goal for survey work in Fairfield Township was to explore farmsteads and buildings located on the 1866 and 1878 Kingman Bros. Tippecanoe County maps.

The Wabash and Erie Canal corridor in Fairfield Township was walked from the most northerly part of Section 10 to the bottom of the Widewater Basin in Lafayette. The canal channel and embankments in Section 10 east of Wildcat Creek no longer existed, though Barton Beach Road was built upon the canal back berm. The area had been graded for agriculture and for urban expansion. The from this point north to the Birmingham Bluff area along the Wabash River had been graded and filled for agricultural use.

The canal path was in better shape from Wildcat Creek to the Widewater Basin (12T866). This section had a very distinct bed and earthen embankments, with only a few breeches to allow for roads across the channel and embankments. At places the canal bed was plowed for agriculture. Two historic sites from the early 20th Century were located in this section (12T836 and 12T837). Site 12T836 consisted of a small scattering of lithic and historic materials, dating to the first quarter of the 20th Century. Site 12T837 consisted of a denser scattering of lithic and historic materials, with most artifacts being found closer to the canal, dating to the first quarter of the 20th Century. This site appears to be a refuse dump of limited duration. Neither site was important for this project.

The section of canal between the sites mentioned above and the Widewater heavily forested and well preserved. The canal bed had been made into a trail, which will some day be part of a larger county park.

The Widewater Basin (12T866) was once a large turn-around and storage area for canal boats located just north of Lafayette. Most of the site still existed at time of survey and covered an estimated 29 acres along Canal Road north of the city, located in mixed

forest and marsh. The northern two thirds of the Widewater were also in good shape, with very distinct embankments. The lower third was quite marshy, with standing water year round. A large, square wooden structure of posts driven into the ground was visible within the waters with no apparent use interpretation. The lower margins of the Widewater, and the land once owned by the Northern Lake Ice Co. were built over by a modern scrap yard, a rail yard, and other Lafayette industries. The canal disappeared south past this point, being filled in 1895, or by later urban expansion.

The Wildcat dam (12T860), with a construction date of 1839, was still visible at low water, though it was mostly rubble at time of surveying. The original dam was 221 feet long and 13 feet high, and made up of stone rubble filled cribs, all resting on a foundation of brush and trees. Visual survey could make out where the dam was located at high water by stone rubble on the Wildcat Creek banks, but whether any of the extensive cribbing remains was unknown. The entire site exists mostly within Wildcat Creek, with the dimensions of about 220 feet by 60 feet.

The long history of towpath and covered bridges over the Wildcat Creek had left behind a visible record of their existence. A well-constructed cut stone bridge abutment on the west side of the Wildcat, a concrete abutment on the east, and a rubble pier between the two, were still visible; all that remained of the long history of bridges, covered and uncovered, in this area . All three features were included into one site (12T859). The cut stone abutment probably dated to the early 1860s, when the entire bridge was replaced after severe flooding destroyed the towpath bridge and Wildcat dam. Its dimensions above ground were 6.5 meters east to west, 9.7 meters north to south or

across the face of the structure, and 3 meters in height. The blocks were one foot high to a variable length. The entire structure was located amongst trees and bushes near the creek bank. The concrete abutment probably dated to 1906, when further bridge constructions were undertaken. It measured about 9 meters in width, three meters in height, and only about 1 meters in depth, though more may exist beneath the topsoil of the surrounding urban lawns. The central pier probably dated to the late 1880s and was nothing more than a jumble of rocks and concrete pieces of non-uniform size. The entire site was roughly 35 meters by 130 meters in size.

The Wildcat Reservoir (12T873) was located in the same area as all the above mentioned features. The reservoir once covered a large area to the east of the canal in Section 11 of Fairfield Township, with a total acreage of about 13 acres. The lowlands today, which once made up the reservoir, were visible from Barton Beach Road; the area beyond the houses lining the road appeared to be marshy and thick with tall grasses. Interstate 65 cut the reservoir in half with its construction, filling up most of what once was the reservoir. Barton Beach Road was constructed over what would have been the western margin of the reservoir, where any canal features would have been located. At some point along the canal, a feeder gate or sluice would have been erected to allow water into the canal system. Earthen embankments and possible cribbing would also have been constructed. None of these were evident at time of survey, but partial remains may be located underground.

A farmstead ruin (12T868), dating to at least the late 1800s, was located just off the canal when it makes its turn north from Wildcat Creek. The landowner mentioned that the house was destroyed by arson sometime in the last decade, and once was his

parent's house. Construction materials found at the site included square machine-cut nails and lath for the walling. A structure in the exact spot was found on the 1866 Titus and 1878 Kingman Bros. maps. The 1866 Titus map showed other buildings being present across the road immediately south of the building, but no other foundations were visible. It was not known whether the house ruins was the structure that was found on the two older maps. The entire area of the farmstead would have been about two and one third acres.

The 1878 Kingman Bros. Map, but not the 1866 Titus Map, showed a farmhouse on a rise just south of the canal in Section 10 within the Longlois Reserve. A Victorian frame house was visible at time of survey on this location. The farmstead (12T880) probably dates to that time period, and was originally owned by a G. Girara.

Washington Township

Documents research indicated that the Sugar Creek area north of Lafayette was a good study area, with the potential of locating a number of canal features and non-canal canal-era historic sites (see Appendix IV). Another survey goal for this township was Jewett's Port, a well known, but unlocated, town near the Wabash River that was linked to the canal economic system and was located somewhere along Stair Road north of Lafayette. Of secondary interest in Washington Township were a number of farmsteads near the canal located on the 1866 Titus and 1878 Kingman Bros. Tippecanoe County maps. This report section starts in the most northeasterly part of the township explored, and follows the canal to the southwest.

Following State Road 25 from Delphi toward Lafayette, the first county road located in Tippecanoe County led to a house that existed during the time of the canal.

The Wabash and Erie Canal itself was located along the Wabash River just behind this house. The house probably dated from the 1850s, with an even older frame structure being located between the house and a later-period barn found about 200 feet to the southwest. This farmstead (12T865), originally founded by David Mount, was on the same location as indicated on the 1866 Titus and 1878 Kingman Bros. maps, and dated back to the 1820s or 30s, making it one of the older sites in the township (Kingman County atlas 1878, and Harris and Hilt 1974). The entire site covers roughly 3.5 acres.

The canal prism was visually observed through most of section 1, 2 and 11 in Washington Township to assess the condition of the canal and to look for structural features. Most of the towpath was made up of quarried natural gray shale from the southern cliff; the cliff acting as the berm bank. The towpath was raised higher above the water line than usual, about 10-ft in height, to withstand the waters of the Wabash River, which was immediately to the north. Springs filled the canal with several feet of water in some places. The towpath in some spots also had a rock rip-rap added to give additional strength, and the towpath soil was mixed with shale from the excavated areas, which also gave it a shale gravel surface. About four breeches in the towpath existed, which were probably caused by past flooding. Because of this rock-base, this section of canal could easily be patched to float canal boats once again.

The towpath changed at Bridge Creek in Section 11, where the creek had been diverted into the canal bed for about 1200 feet. The canal south of the levee that diverted Bridge Creek was obliterated, being graded flat for agriculture. It only became visible again in Section 10, when the tree line was used for ditching purposes.

A modern cabin was constructed just above the Wabash and Erie Canal on a small clearing surrounded by forest halfway up the ridge. This cabin was located at the extreme southern end of the canal in section 1, and had a limited foundation of four concrete corner slabs. During the construction and in later years, the landowner discovered a number of historic artifacts. The artifacts found in the landowner's collection are similar to those our crew found through shovel testing; blue and green shell-impressed scalloped-edged whiteware, one pearlware sherd, a wide color range of transfer-printed whiteware sherds, and a number of polychrome and blue hand-painted whiteware. Our crew conducted 16 shovel tests at five-meter intervals, locating a small early historic site near the cabin and a natural spring (12T845). The collection owned by the landowner was noted as being found within this area, as well as around the modern cabin location. Ceramic and glass analysis from the shovel tests revealed an artifact dating range for this site as being between 1820 and 1840. The landowner's collection had a similar artifact date range. This artifact assemblage was similar to that found at the 1838 canal construction camp near Delphi, meaning it may have a similar use-history.

The forest and plowed field margins above the canal in most of Section 1 were walked with good visibility and limited groundcover. A number of canal-era historic sites (12T840, 12T842, and 12T843) were identified, which may be linked with either the cabin site or with the Mount Farmstead. Site 12T840 was a historic and lithic scatter, which was located in an area, which has long been plowed. Ceramic and glass analysis on the small amount of material recovered indicated the artifact range for this site as 1830 to 1860.

Site 12T842 was a historic and lithic scatter. Ceramic and glass analysis on the small amount of material recovered indicated the artifact range for this site as 1810 to 1860. Diagnostic lithic material indicated an Early Archaic occupation. Site 12T843 was predominately a lithic scatter, but three historic artifacts were also found. The historic artifacts date to between an undetermined date to the 1880s.

This cluster of early historic sites may have more significance to the history of the Wabash and Erie Canal than was immediately apparent. Because of the nature of the canal construction through this section, large amounts of shale and rock had to be moved from the surrounding cliffs and out into the Wabash River. This activity would have taken a considerable amount of work, with the need of labor camps being constructed somewhere within walking distance. Because of its location in the center of the shale bluffs, site 12T845, and possibly the other sites with historic components (12T840, 12T842, and 12T881), may have been part of just such a construction camp.

The Kite Guard Lock (12T863) was located by talking with the land owner and consulting maps and Mr. Stringfellow's 1985 report on file at the Tippecanoe County Historical Association. Using this information, the site was mapped, with the location of this canal feature being placed as best possible. The guard lock was located just under the western most part of a levee that diverts Bridge Creek, and extended back up the canal for about 10 meters. Several oak timbers were taken out by the landowner with a backhoe from the structure mentioned in Dick Stringfellow's report and deposited nearby. We measured them to be 3 feet by 3 feet square. The remainder of the uncovered timbers

were reburied where they set and at the time of survey were located roughly ten feet beneath the base of the levee.

The Tea Cemetery (12T864) was also located in Section 11, and consisted of about 20-30 stone markers dating back to the late 1700s and featuring names of some of the earliest settlers in Tippecanoe County. It was badly overgrown and forested and difficult to find in the dense vegetation. The Kites Ford roadbed was still visible, with trees and a fence on either side lining it. This road once extended from Kites Ford to State Road 25 to the south. A gated path from this road to the Tea Cemetery once existed as well. The entire area between Bridge Creek, the canal, and the old Kites Ford road was also walked over.

The plowed field which the levee enclosed in Section 10 was walked in the attempt of finding two farmsteads which once were located in the area along the canal, as well as to see if the canal could still be identified. The Wabash and Erie Canal was identifiable in this area because the blue-gray clay puddling had mixed with the soil, forming a grayer soil line along its original path. Two major historic sites were located while walking the plowed field; one along the canal heading south (12T839), and the other in the middle of the cultivated land between the diverted Bridge Creek in the canal and the Wabash River (12T838).

The site 12T839 was originally a farmstead on the canal owned by R. Kite in 1866, and later by J.R. Hussey in 1878. The site consisted of a consistent scattering of historic material, with a smaller lithic component. A large number of historic artifacts were recovered which indicated a dating range of between 1820 and 1920, with an

emphasis on 1830-1900, for this site. Occupation was most likely consistent, then, from the earliest settlement of Tippecanoe County to the turn of the century.

The site 12T838 was originally a farmstead owned by H. Dryar in 1866, and later by Elizabeth Tea. The site consisted of a consistent scattering of historic material, with a smaller lithic component. The site follows the canal line from this point, with a length of 265 meters and an average width of 50 meters. A large number of artifacts were recovered, with a datable range of between 1820 and 1920, with an emphasis on 1830-1900, for this site. Occupation of this farmstead was probably from the earliest settlement of the region up through the turn of the century.

Sections 10 and 15 of Washington Township contained the sites of two farmsteads owned by the Cunningham family, described in detail in the 1878 Kingman Bros. atlas. The house in Section 15 (12T878), as depicted in the 1878 lithograph, still stood at time of survey and was in good shape. This house was built in 1856, and originally had a number of supporting structures.

The first Cunningham house, later sold and renamed as the Americus Inn (12T877), was located along the Wabash and Erie Canal, and was noted by Hilt and Harris as being in poor condition in 1974 when they toured the site (report on file with the Tippecanoe County Historical Association). This building was no longer standing, as it was demolished sometime in the decade after Harris and Hilt's visit because of its rapid deterioration and dangerous condition. The former location of the site was still identifiable, as was a springhouse and pool.

The Wabash and Erie Canal was still visible in parts of Americus, especially on the town margins, but silting and urban grating make it little more than a two foot deep

indentation in the ground. The canal to the south of Americus was walked, but the thick undergrowth and forest conditions made visibility difficult. The visible outline of the canal bed and towpath improved somewhat to the south of the city, but past flooding still has left several feet of river silt over the entire area. The canal bed was walked to the edge of Section 16.

The forested Sugar Creek mouth area was also walked, and found to be in a similar condition. River silting, as shown by limited shovel testing in the canal bed and on the margins of the towpath, was up to three feet deep, making any site identification unlikely without major disturbance of the ground. Canal definition was poor because of the silting, and reduced to barely a foot elevation change once it entered the plowed fields south of Sugar Creek. The margins of Stair Road, which was built upon the canal back berm, were also surveyed from Sugar Creek to its intersection with State Road 225.

Half way through Section 19, Stair Road changed over from the back berm side of the canal to the towpath side, and the canal bed entered the numerous private lots found to the south of the road. Several lots showed a slight indentation from the canal bed, but for the most part, urban grating has eliminated any sign of the Wabash and Erie Canal. One historic site (12T823) and one lithic site (12T824) were located in a plowed field along Stair Road. The historic site 12T823 consisted of a scatter of historic materials, with artifacts recovered date from between 1830 and 1900. Site 12T824 was a lithic scatter, with diagnostic artifacts indicating a Late Archaic occupation.

The Sugar Creek culvert (12T851) was once made of wood, with stone abutments. The 1847 Report of the Chief Engineer indicated the size of this site as being 24 feet by

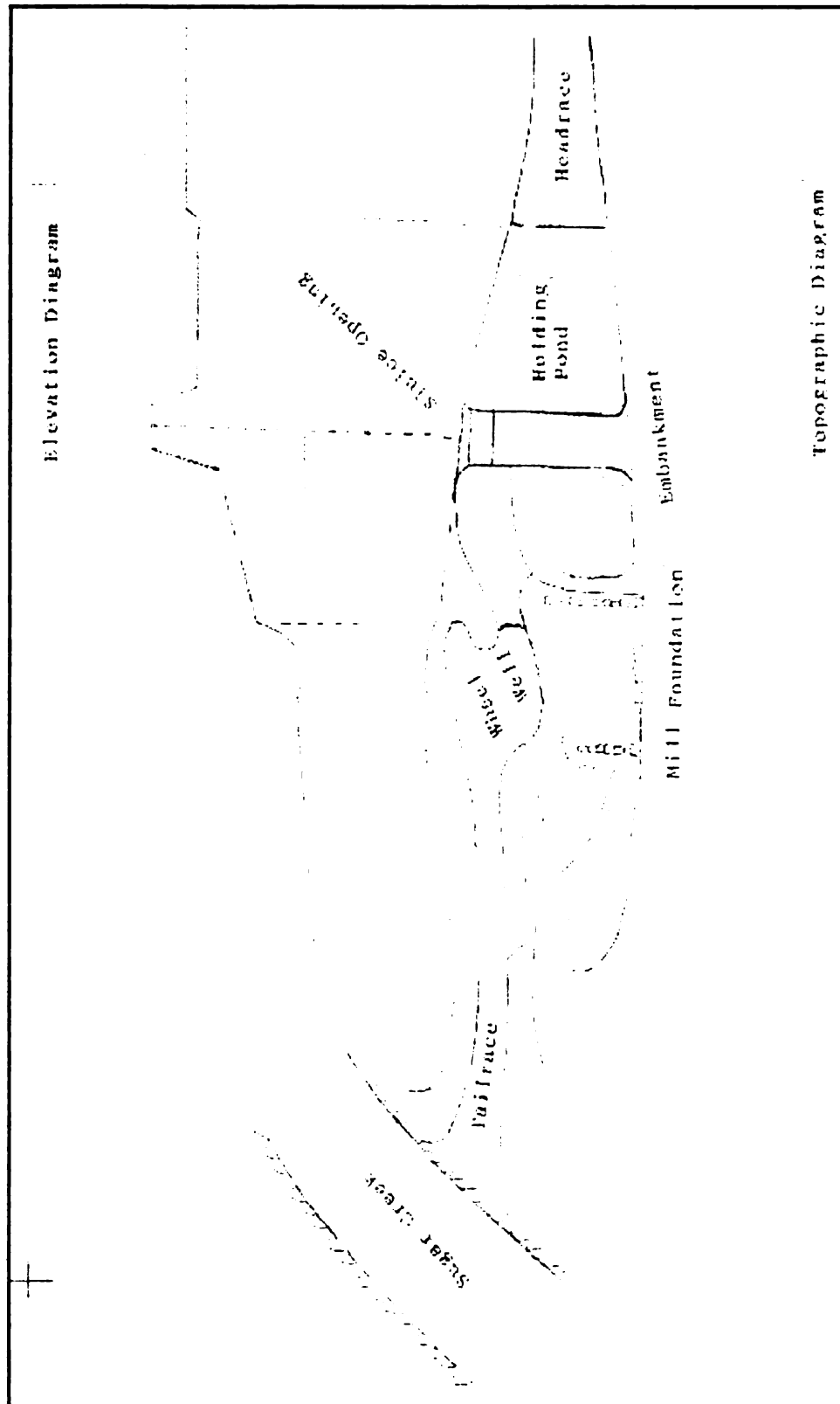
40 feet in dimension, making it in actuality a small aqueduct. These stone abutments still exist, though all of the wood sections of the feature have disintegrated.

Constructed just upriver near where the back berm of the Wabash and Erie Canal would have been at its crossing of Sugar Creek were the two cut stone culvert abutments. Cut stone abutments with slabs of finished stone on the top still exist on both sides of Sugar Creek and have resisted flooding for a number of years. The abutment face for each side had a 17 feet six inch width and a 5 feet 4 inch height. Each abutment extends back away from the creek to between 7 and 11 feet. Large cut limestone blocks with rough stone masonry made up most of the abutments. Each abutment was also topped by cut rectangular limestone slabs of non-uniform size. These abutments may have been incorporated into later county bridges that crossed Sugar Creek.

Sugar Creek had a long history of mill operation on its several turns and forks (Reser 1934). Farmsteads and a tannery, all linked economically to the canal, were also noted as being within the Sugar Creek drainage basin. The Obenchain-Dinckle-Bates Mill (12T852) was located at a sharp bend in Sugar Creek, found by survey in the most west-central part of Section 21. This mill was found to have an extensive race, holding basin, and dam system, which covered almost 20 acres (Figure 8).

Survey of this area involved a complete walk over of the entire area. Still identifiable were the path of the mill head race and tail race, the mill foundation and wheel basin, a holding basin and sluice for the head waters, a partial stone foundation which would have been part of the mill proper, and the probable mill dam on Sugar Creek.

Figure 8: Map of the Obenchain-Dinkle-Bates Mill Site.



A stone foundation (12T849) near the summit of the area was probably a support building for the mill. Shovel tests were done in two transects off the stone foundation (12T849) located 60 meters south of the mill site, revealing an age range of artifacts found as between 1870 and 1910. This date would have been later than the historically documented age of the mill, indicating that the structure may have been reused for another purpose after the abandonment of the mill.

The Obenchain-Dinkle-Bates mill was located half way up the west edge of Section 21 on the south side of Sugar Creek between where two creek bends make a horseshoe-shaped curve. The tailrace once brought water from a dammed pool on the east side of the horseshoe brought water across land to a holding basin just west of the mill. This holding basin was measured at 1 meter below the surrounding ground level. Water was let into the wheel well by opening a sluice, which was clearly located at the northern most point of the embankment that held water in the basin and away from the mill. The holding basin embankment was 3 meters wide. The water fell 8 meters from the embankment top (or 7 meters from the sluice opening) to reach the tailrace at the bottom of the mill. Water was then allowed to re-enter Sugar Creek on the western side of the creek's horseshoe bend via a tailrace. The stone mill foundation measured 8 meters east-west along the wheel well location, and 5 meters on the west side and 7 meters on the east northward from each corner. No northern side to the foundation was visible.

The ridge line was walked from the mill site to the Obenchain Farmstead (12T869), located on the 1866 Titus and 1878 Kingman Bros. maps. The property owner stated that the existing building, in a deteriorating state, was built upon the older foundation of the first building built on this site. The first building probably dated back

to the early to mid 1800s, and the second building to the late 1800s. A barn, in better shape, was also present and probably dates to the turn of the century. The entire area of the farmstead site was about two acres.

In addition to the Obenchain sites, the landowner had a number of Native American points from a variety of cultural time periods, including a Clovis point. While looking for the mill, a plowed field near the Obenchain farmstead was surveyed identifying three lithic sites in the southwest corner of Section 21 (12T846, 12T847, and 12T848). All were lithic scatters with Early or Late Archaic diagnostic dates. No historic sites were located.

The 1866 map showed G.W. Stair, one of the earliest settlers in Washington Township, owning a house on the plateau above the probable site of the Milton-Leigh mill. George Trida later owned this property on the 1878 Kingman Bros. map. To locate this site, surveying of the Sugar Creek plateau was undertaken. Several lithic sites were discovered on the plateau (12T833, 12T834, and 12T835), with diagnostic artifacts indicating Middle Woodland or Late Woodland occupation.

The G.W. Stair farmstead (12T832) was located halfway between the center of Section 20 and the center point of the eastern side of that section. The entire site covered roughly four acres, both within the woods and extending out into the surrounding plowed field. The G.W. Stair farmhouse was located at the center of a small amount of woods surrounded on three sides by the plowed field. The farmhouse was constructed using square machine-cut nails and lath walling. The house itself was mostly fallen into the basement, and was in an advanced state of deterioration. Behind the house was a small

frame shed (still standing), a well, and a large amount of rusting farm machinery. A mid 20th Century dump was located behind the abandoned farm equipment.

Surrounding the woods was an area of dense artifact along the margins of the plowed field. Analysis of the ceramics and glass from this site gave a probable artifact age range of between 1830 and 1950, with a concentration in the 1850s to 1930s range. Because of the large amount of artifacts and the extent of the features located around the dwelling structure, occupation was probably extensive from the mid-1800s to around 1950.

The Wabash River on the north side of State Road 225 was walked to look for evidence of Dr. Jewett's ferry and the building identified on the 1878 Kingman Bros. Map as being associated with the ferry. No sites were found. The canal hamlet of Jewettsville (12T850) was located on both the 1866 Titus and 1878 Kingman Bros. maps, but was difficult to locate on modern maps because of changes in the path of State Road 225. Jewettsville was finally located at the bend in State Road 225, spreading back south and toward the ridge line below State Road 25. The landowner reported uncovering with his backhoe a brick foundation and several timbers in a number of places, buried several feet beneath his lawn. Flooring timbers were also present in his duck pond. More construction materials were found when he built a pool foundation closer to the road.

Two test units were placed at this site between the canal and the modern house. Both recovered square nails but little else. It later became evident that we were digging within the canal bed itself, and that the canal had been filled with rubble from Jewettsville buildings. A trench located more rubble farther east toward the modern house.

Investigations at the duck pond located a number of submerged boards at about a 1 meter depth along the west side of the pond. These boards run roughly east-west in alignment, with no nails visible. There is evidence upon them of sawing, with the average dimensions being 8 inches by 1.5 inches, by approximately 4 feet in length. A number of springs, mentioned in the 1850 account were also visible along the ridge line nearby (*Lafayette Daily Courier*, Aug. 22nd, 1850).

The Wabash and Erie Canal in Lafayette

Archaeological work in the City of Lafayette involved monitoring a large, eight block, section of wooden canal wharf uncovered during that city's rail relocation project in 1993. While monitoring construction at the Rail Relocation site, the survey crew also made general observations about the canal wharfing already exposed. Everything observed indicated an extensive and complicated wharf construction pattern throughout the entire site (Bischoff 1994).

Engineering features south of Main Street indicated a canal construction with large supporting tie-back timbers placed backward from the canal wall, as well as four dovetailed white oak timbers placed on top of each other making up the wall sides. Wooden and ceramic gutters, which may have extended extensively back beyond the canal wall, were evident from a number of time periods. Planks were also found beneath the westward canal wall, extending backward to an unknown depth. None were found on the east wall, though suspected depth markers were periodically located along the wall in the form of short boards which taper upward into a rounded point (Bischoff 1994).

This complex construction followed closely wharfing construction identified in several period photos and lithographs dealing with other cities and businesses along the

canal, and matched closely the wharfing ordered at Shadeland Basin (mentioned above) and at several locks throughout the Wabash and Erie Canal system (Indiana State Library Archives). Wharfing such as what was found at Lafayette was used for mills, packing houses, loading docks, bridges, and goods stores to facilitate loading and unloading, and to create a permanent squared abutment for docking barges (TCHA photographic archives and Burke and Bros. 1861, and Indiana State Library Archives).

Surface collection recovered a large amount of early to mid 19th Century artifacts. The overall range in age for the canal material was between 1800 to the late 19th Century, with the period of 1830 to 1880 emphasized. The artifacts found displayed a high degree of preservation of organic materials, as did the canal walls and other wooden structures uncovered by excavation. Artifact preservation was especially good for metals, leather, and wooden artifacts.

Tippecanoe County and Fountain County, from Lafayette South to Maysville.

Union Township

Most of the Wabash and Erie Canal in Union Township passed through land now part of the Shadeland farms, which occupied much of the Wea floodplains and the higher plateau country above the Wea Bluffs (see Appendix IV). Agricultural activity in this area allowed for easy reconnaissance of the land to either side of the canal embankments, except for where the canal uses the steep cliffs of the Wea Bluffs as part of its back berm embankment. The canal bed was in good shape from the Wea Creek south to where it

had been cut to facilitate a drainage ditch. Canal embankments in this area were quite definable, as were those of the Wea feeder, lock, and basin.

The canal south of this section, which ran along steep bluffs, was in poorer condition, with years of ridge run-off filling in the channel. The large Shadeland Basin (12T862) was the exception to this. Because of its size and width, this feature did not totally fill with silt, and still had standing water in some places. The entire area was very overgrown, forested, and marshy with pools of stagnant water. Historic documents placed Lock #34, Aqueduct #7, and the Wea Creek dam and feeder in the general area where the canal crossed the Wea, but the documents did not describe the extension of the earthen embankments discovered by Michigan State University (*Documentary Journal* 1847).

The only canal lock found in Tippecanoe County was constructed immediately south of Wea Creek in Union Township. As has been mentioned above, this area also had an aqueduct, several dams and feeder channels, and a large turn basin. This cluster of complex features was the primary focus of archaeological survey in Union Township. A secondary goal for Union Township was to explore farmsteads and buildings located on the 1866 Titus and 1878 Kingman Bros. Tippecanoe County maps.

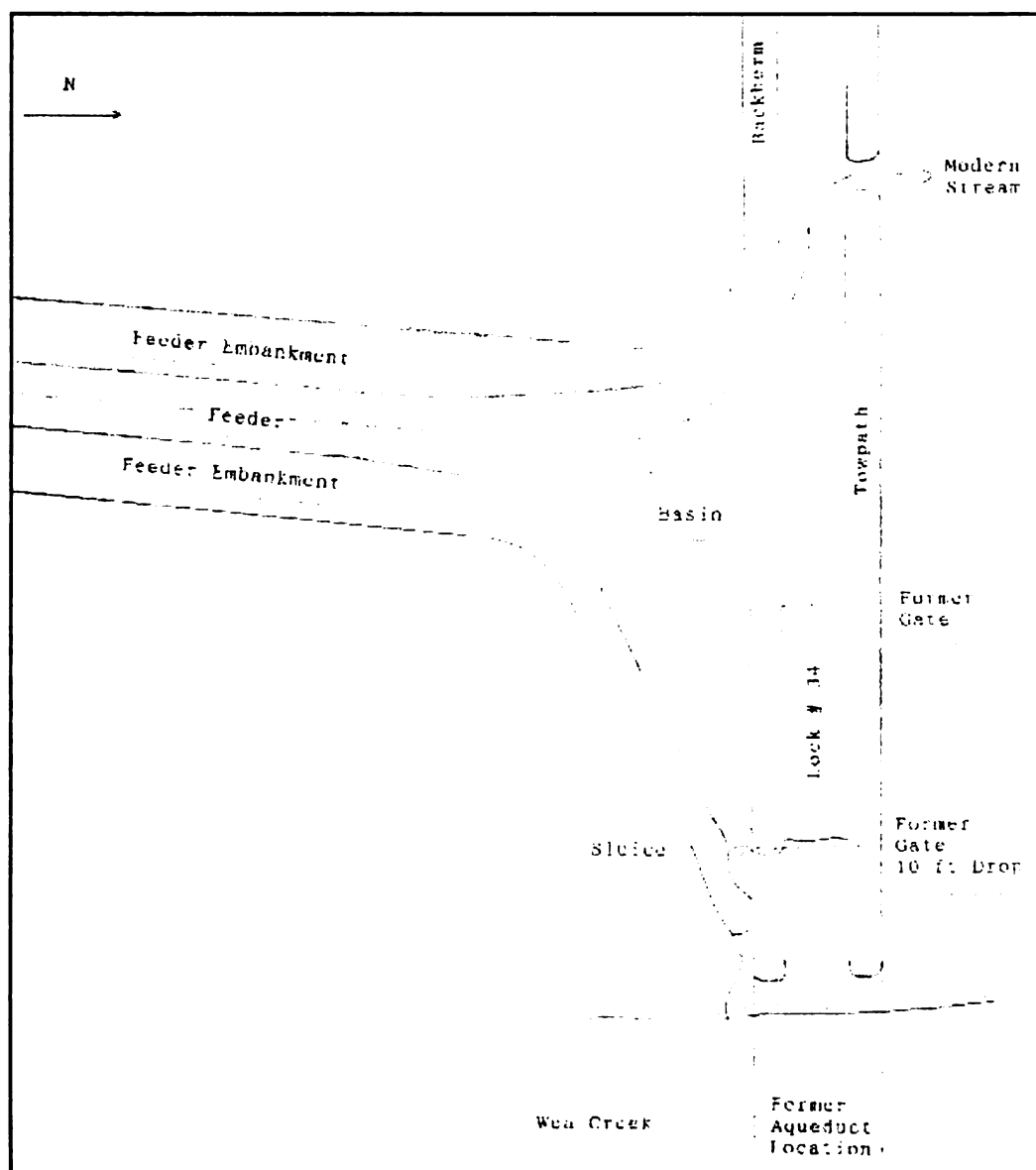
Getting to the lock area was very difficult, as it was far from any major road and located within dense forest. The area within the embankments was also very swampy, with a large amount of standing water and a multitude of mosquitoes. No remnants of the 96 ft long Wea Creek aqueduct could be found, except for a rounded opening just to the east of the lock where the stone aqueduct abutments once were. It was suspected that this feature was washed away, since the Wea Creek had a history of frequent and violent

flooding, as the Wabash and Erie Canal repair contracts show (Indiana State Library Archives).

The lock, Lock #34 (12T871), still existed within the forested area and appeared to be in good shape. The 10 foot drop mentioned in the 1847 Report of the Chief Engineer was very visible, located 27.7 meters from the Wea Creek where the aqueduct once was. The lock chamber, which would have been defined by two large double-doored wooden gates, was also very discernable. The gates were gone, but walling timbers and flooring timbers probably still exist. It was discovered during excavations at Lafayette and near Fort Wayne that the lower parts of wooden canal structures, especially if sealed by earth, can be quite well preserved, even after 150 years. No visible evidence for the lock-keeper's house mentioned in the 1852 contract could be found (Indiana State Library Archives).

Lock #34 was roughly 35 meters (110 feet) long, with a 15 meter (50 foot) width (Figure 9). Roughly 28 meters of canal existed at the top of its lift, as mentioned above, heading east to Wea Creek where the channel disappeared. The embankments were reinforced and existed at a high level toward the west for quite a ways past the lock, gradually reforming the usual canal embankment prism. A guard sluice once existed 5 meters south of the lock next to the upper gates, partially built into the same southern embankment. This structure probably allowed excess water into the holding basin without the need of opening the lock gates, similar in purpose to the tumble around Lock #33 near Delphi. The sluice was about 10 meters (30 feet) in width, and also had a 10 foot drop. A similar sluice may have existed within the southern embankment on the upper level of canal to let excess water into the Wea.

Figure 9: Map of Lock #34 and the Wea Aqueduct Sites.



The Wea embankments for the feeder and holding basin (12T861) were in equally good shape, forested, and quite visible on the USGS topo map. The embankments formed a holding basin of approximately 40 meters by 35 meters just downstream of the lock and widened to the south. This area would have allowed canal barges to wait to one side in a protected area while the lock was handling other ships. The canal channel remained wide for about 30 meters to the west. Sixty meters from the end of the lock along the canal's northern bank, a breach had been made either by water action or intentionally to allow the feeder water out during flooding.

Walking the feeder embankment south from the lock revealed it to be lightly forested and in excellent shape. The land was less swampy than the lowlands within the lock and not as over grown. A point roughly 60 meters south of the lock was chosen for cross-section measurements. The westward embankment of the feeder was about 9 meters in width, with a 10 meter wide channel. This embankment was paralleled by another embankment to the east, which was 9 meters in width.

The 1847 Report of the Chief Engineer described this feature as being:

"Just below the lock a feeder is introduced from the Wea, it is 25 chains long, constructed with 15 feet width at bottom, the banks of this feeder should be raised one foot throughout to keep out the floods.

"Wea feeder dam is built upon a temporary plan, being formed wholly of brush and gravel, and will require a small annual expenditure to keep it at proper height, it is about 200 feet long and raised 4 1/2 feet above low water (p. 233)."

With one chain equaling 66 feet, the reported feeder would have been 1650 feet in length. Survey placed the feeder embankments at roughly this length.

The feeder dam was harder to identify. Most dams from this period were frequently washed away by frequent summer flooding or by winter thaw. The Wea dam

mentioned in the 1837 Report of the Chief Engineer was probably located near the opening to the feeder, though there was no structures apparent on USGS topo maps or areal photos. The Wea has changed course a number of times since the dam was constructed. Because of the difficulty getting back to this feature, we were limited in the extensiveness of our exploration. Eventually, the lock, turn basin, canal bed, most of the feeder embankments, and the fields out to about 30 meters from the features were examined.

The north side of the canal was walked within a plowed field from the ditching located in Section 34, which cuts the canal about 640 meters west of the lock, to Wea Creek. One lithic site was discovered (12T825), as well as an isolated historic find (12T830), a solarized amethyst two-piece mold bottle neck and lip, which dated to between 1875 and 1890. Site 12T825 was situated along the canal, starting about 300 meters from Wea Creek, and had no identifiable concentrations. Diagnostic artifacts indicated a Late Woodland occupation. Site 12T825 also had a flow-blue whiteware sherd found with the lithic material.

The southern side of the canal was also walked within another plowed field to reach the embankments of the feeder. A lithic site was discovered here as well (12T826). Site 12T826 measures about 70 meters by 30 meters along the canal, directly across from the most western side of site 12T825. Both sites may at one time have been part of a single occupation. Diagnostic artifacts indicated a Late Woodland occupation for this site as well.

Westward along the canal from the lock area mentioned above was the Shadeland Basin, used originally to dock and store boats. The towpath and the cultivated land along the canal were surveyed. The basin was reported to have had a wharf, much like that found in Lafayette (Indiana State Library Archives). Historical accounts also placed nearby several structures belonging to the Northern Lake Ice Company (1878 Kingman Bros. map). The basin itself was still intact and in good shape, though the central channel was filling in with silt. The canal to the end of the Shadeland Basin was surveyed, but none of the wharfing mentioned in the Wabash and Erie Canal contract reports nor any evidence of other structures were found. The entire basin covered about 40 acres, was forested, and had large sections of marshy ground with standing pools of water.

Several lithic sites were found or re-examined in the plowed field along the canal section mentioned above. Most of these sites had a limited historic component (12T827, 12T828, 12T829, 12T831, 7556.07, and 12T529). 12T827 was a small lithic site situated along the canal, about 60 meters west from the Shadeland ditch which bisected the Wabash and Erie Canal. This site had a single stoneware fragment, dateable to the turn of the century. Site 12T828 was a lithic scatter situated along the canal, about 425 meters west from the Shadeland ditch. 12T829 was a lithic scatter also located along the canal, at about 915 meters west of the Shadeland ditch. Diagnostic artifacts revealed a Late Woodland occupation. This site also had three historic artifacts; a pane glass shard, a green glass bottle shard, and a lead musketball.

Site 12T831 was a small lithic and FCR scatter at the most western part of the Shadeland Basin. This site was located roughly 1555 meters from the Shadeland ditch. Site 12T529 was a resurvey of a site initially located by Rick Jones in 1983. This site

was situated along the canal at roughly 1130 meters from the Shadeland ditch.

Diagnostic artifacts indicated a Late Woodland occupation.

A late canal-era farmstead with a Victorian house (12T870) was located at the road entrance used to reach the above mentioned lithic sites and the complex structures around Lock #34. This house can be found on the 1878 Kingman Bros. map as being part of a large farmstead on that site owned by Adams Earl. The house and farmstead, then, date to between 1866 and 1878. The entire site area covers roughly 5.5 acres. An extremely old appearing barn (possibly mid 1800s or earlier) was located across South Road from this site and may later be included as an extension of 12T870.

Wayne Township

The canal-era town of Granville was a primary focus of archaeological survey in Wayne Township (see Appendix IV). The village of Granville was easily found, being located to the north of South Road and to the west of 700 West in Wayne Township, and had previously been given the site number of 12T225. About half of the Granville site was under cultivation at time of survey. The remainder was being used to grow trees, and a small part was set aside for residential use. The size of the entire site, from just south of South Road to the canal and from 700 West to the tree grove end, was about 84 acres.

The Granville Cemetery (12T882) still existed in 1993, though it was untended and greatly overgrown. A large number of headstones, some dating back to the late 1700s with a number of weeping willow patterns were clearly visible. An iron fence in a square set aside several headstones within the greater cemetery. The entire site covered roughly one to one and a half acres.

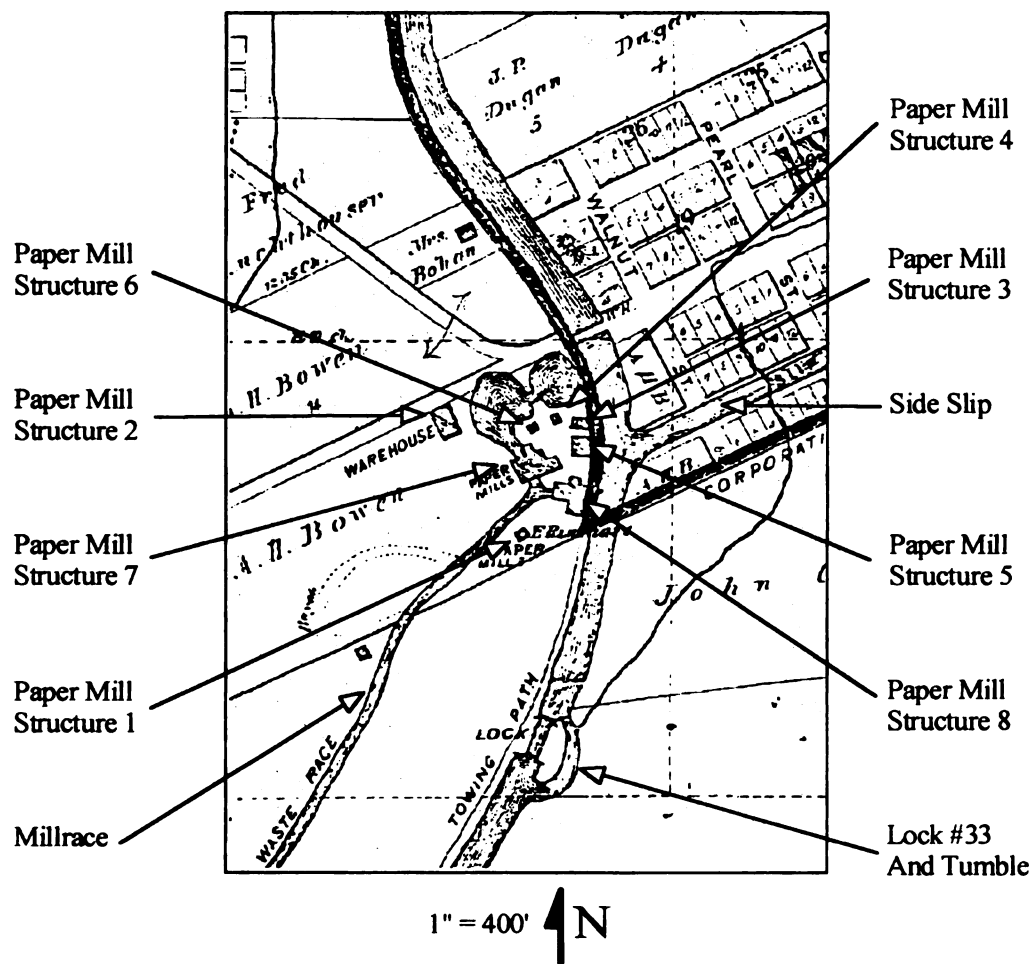
Carroll County Survey Results.

A number of historic and prehistoric archaeological sites were located on canal park lands by the 1995, 1996, and 1997 surveys conducted by Michigan State University (see Appendix IV). Several canal-era sites located dealt with the commercial use of the Wabash and Erie Canal, including the two Delphi paper mills, several associated mill structures, a lock keeper's house, the several warehouses, Lock #33, six lime kilns, a brickyard, and a slaughterhouse. In addition to these, a large pre-canal Irish construction camp was found, as were several post-canal dumping sites located along the path of the canal. Several important Native American sites were also found, but these will not be discussed in any detail (Bischoff 1996, 1997 and 1999).

The Delphi Paper Mill Complex

The 1868 map of Delphi and Pittsburg accurately identified the Delphi paper mill complex (see Figure 10). This map showed two main paper mills, two large holding basins, and at least five other lesser structures as all being part of the mills owned by Rinehart and Bowen, and by Robinson and Wood. The 1868 map appeared to be very detailed and accurate when compared to other nineteenth century documentary data and current maps of Delphi and Deer Creek Township. Because of this, the 1868 map was chosen as the primary reference for planning the survey of the paper mill complex area. English measurement was used so that points on the 1868 map could be fixed to modern reference points, and to survey surface collections, shovel tests, and test units. The 1995 survey eventually was able to examine seven of the eight paper mill complex structures, with several of these being surveyed extensively.

Figure 10: 1868 Map of Delphi, Showing Paper Mill Structures.



The 1868 Map of Delphi and Pittsburg is the most detailed document which shows all eight of the paper mill complex structures. The circular areas north of the buildings are two large holding ponds for controlling water. The side slip brought boats up to the foot of Main Street in Delphi, where cargo would be loaded and unloaded. North of the paper mills on the city side are a warehouse and two lime kilns. The tumble around the lock allowed water to flow when the lock was not in use, providing several Lafayette mills with a continuous supply of water power.

A map of the entire area was produced which used the southwest corner of the bridge over Bicycle Bridge Road as a fixed datum. In this way, all identified sites and all survey tests conducted could be linked back to this one fixed reference point.

The first paper mill structure to be investigated was Paper Mill Structure 1, which was easy to visually locate as a partial stone foundation still existed. The location of PM Structure 1 was comparable to the most southwest paper mill structure shown on the 1868 map of Delphi and Pittsburg. The stone foundation of this structure was of mortared and faced field stone, with an early form of concrete used in additional building areas. Dimensions for this structure are approximately 15 ft. x 25 ft., with an additional concrete slab of 5 ft. x 4 ft. existing on the surface along the north wall. Maximum foundation depth was between 4 and 5 feet, but a shovel test in the base identified at least 2 additional feet of fill. A fieldstone well, constructed without mortar, was located nearby, as is a concrete trough.

Surface collection recovered a number of 1875 to 1920s artifacts, with the most common being storage crockery and glass canning jars. A large number of construction materials were also found, including wire and cut nails, roofing tacks, brick, mortar, and pane glass. Shovel tests at this site found few canal-era artifacts. The shovel test within the foundation found a dense layer of ash and a number of melted late 1800s artifacts. The vast majority of artifacts dated to a post-paper mill use period, and consisted mostly of storage crockery and canning jars.

This structure was probably used for storage, both by the paper mills and after their abandonment. This building was identified on the 1868 map of Delphi and Pittsburg identified as being part of the Rinehart Paper Mill. It was probably modified

for agricultural use and storage after the destruction of the State Dam at Pittsburg in 1881. At some point in the late 1800s, the building was extensively rebuilt, with the addition of concrete corner supports, a concrete trough, a metal well cap, and new building construction, indicated by the large amount of wire nails recovered. Paper Mill Structure 1 burned down in the 1920s, as this was the cut-off date for most of the recovered artifacts, and most melted materials dated to that time period.

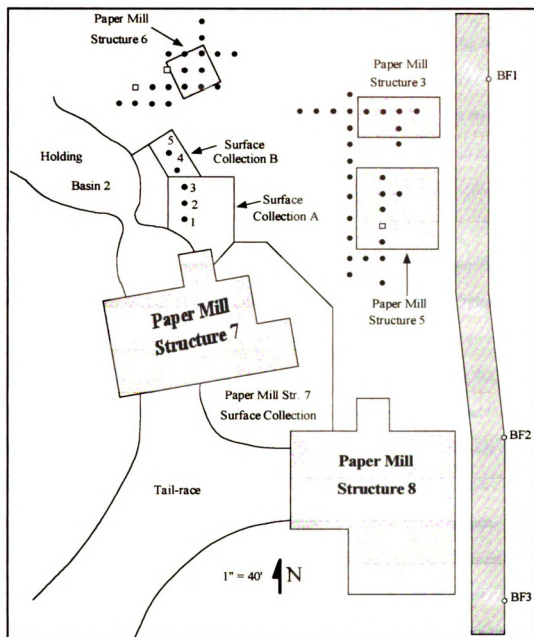
Paper Mill Structure 2 was a rectangular building foundation, in poor condition, located south of Bicycle Bridge Road and to the extreme west of the other paper mill complex buildings. This structure was identified on the 1868 map of Delphi and Pittsburg as being a warehouse for the Bowen's paper mill. An 1860s or 1870s photograph shows the building to be rectangular, two-stories, and of stone construction.

The remaining foundation consisted of stone rubble, without any identifiable mortaring. Agricultural use and the collapse of the building sometime in the last century resulted in its deteriorated condition. The area surrounding the foundation was plowed yearly, which decreases the chances for finding undisturbed features outside of the foundation perimeter. A number of artifacts were visible in the plow-zone around the structure remnants. These artifacts include nineteenth century ironstone and transfer-printed ceramics from the canal era and afterward. As this structure was not on Canal Park lands, it was not surveyed beyond a visual observation made from Bicycle Bridge Road. No artifacts were collected.

Paper Mill Structure 3 was once a frame structure linked with the paper mills, which faced the Wabash and Erie Canal (Figure 11). The 1868 map of Delphi and Pittsburg gave the original dimensions of this building as 50ft. x 25 ft., with the smaller side facing the canal. No original use for this structure could be found in the available documents, though some role in the paper-making industry was to be expected. This area was supposedly a garden sometime in the last 50 years, but a consistent artifact-sterile soil at 1.0 feet indicated the lack of extensive deep disturbance. The sterile layer was identified throughout the paper mill area by a distinct lightening of color and by a significant increase in soil compactness.

Three transects of shovel tests were placed where the 1868 map showed the building being located. One transect bisected the supposed building location in an east-west direction. The other two transects were placed along north-south lines; the first being across the building center, and the second paralleling the back of the building. Shovel test results did suggest that a structure was once in this area. Most shovel tests contained samples of brick, pane glass, cinder, coal and square cut-nails. A small midden was also located just behind where the building would have stood. The overall artifact date range for this structure was between 1870 and 1900. Plain ironstone was most numerous in the ceramic category, with one flow-blue fragment also being found. Glass was mostly colorless and amethyst, and wire nails were infrequently found. Square-cut nails appeared in almost every shovel test (Jones 1989, and White 1978).

Figure 11: Map of Paper Mill Structures Surveyed in 1995.



The general subsurface stratigraphy of Paper Mill Structure 3 is very similar to that of Paper Mill Structure 5, except for the area of high button and fastener concentration within the interior of that building. Because of this, a similar probable use-date of between 1860 and 1881 can be used for Paper Mill Structure 3. The lack of any depth of stratigraphy or artifact concentrations after 1881, and the presence of only two wire nails (common after 1880) for the entire site, can be attributed to this structure's probable destruction or abandonment resulting from the flood surge caused by the dynamiting of the dam at Pittsburg. This building most likely was a later-constructed office or storage facility for the paper mills.

Paper Mill Structure 4 was not tested. The 1868 map of Delphi and Pittsburg showed this building to originally have the dimensions of 25 ft. x 25 ft.. Ironstone sherds were observed on the margins of this site area, which dated to the mid to late 1800s.

Paper Mill Structure 5 was once a large frame structure linked with the paper mills, which faced the Wabash and Erie Canal. The 1868 map of Delphi and Pittsburg gave the original dimensions of this building as 50ft. x 50 ft., with the east side facing the canal. Again, no original use for this structure could be found in the available documents, though some role in the paper-making industry was to be expected. Survey at this location involved placing two shovel test transects going north-south across the site, with one being placed behind the suspected building location paralleling the back, and one immediately through the building center. A number of linking and opportunistic shovel tests were also conducted to test additional site areas. Two cinder and ash middens were located; one being just past the southwest corner of the building location, and

another being due south of where the building center would have been. Most shovel tests produced cinder and ash in uneven quantities.

Surface collection discovered Paper Mill Structure 5 had an unusually large number of mid-nineteenth century buttons, brass clasps, and brass fasteners. Items collected came in a wide variety of shapes, sizes, and manufacturing materials. The shovel tests within the original structure dimensions also produced a large number of buttons and decorative clasps, as well as an extensive ash-cinder-button feature in the southwest central part of the building location. This feature was further explored using a 3 ft. x 3 ft. test unit, which described a deep and stratigraphically complex subsurface midden. The total number of decorative buttons and clasps recovered by surface collection and subsurface testing was well over 1000.

One of the shovel tests discovered a brick fall on the western edge of the structure. This area may have once been a chimney. This shovel test may indicate a chimney-fall linked with the structure.

Artifacts recovered by the shovel tests had a date range of 1850 to 1900, with the span of 1870 to 1890 being most represented. This earlier date was represented by a sprigware ceramic fragment, a scroll flask shard, and several brass fasteners with earlier patent dates. Most artifacts, however, date to between 1870 and 1890. These included a number of yellowware fragments, colorless and amethyst glass shards, and a number of brass fasteners with patent dates of 1871 (Jones 1989, and Majewski and O'Brien 1987).

Glass shards were evenly distributed throughout the shovel tests, but the ceramics category was only represented by a few pieces. Construction materials were concentrated around the southwest corner of the suspected building foundation, with the highest

density of brick and stone appearing in Shovel Test 18. Cinder and coal fragments were mostly found behind the building foundation and in the external building midden areas mentioned above. Within the suspected building area were found almost exclusively the buttons, clasps, child's doll and tea set fragments, and decorative fasteners.

Patent dates of 1855 and 1871 on a number of brass fasteners were found in all the button-containing levels of Test Unit 1. It appeared, therefore, that the depositional time period for the site most likely post-dated 1871 (the latest patent date found at the lowest unit level). The artifacts present with earlier manufacture dates appeared to have been curated. It was unknown whether this structure was also impacted by the fire which destroyed the Bowen mill in 1877, if it was destroyed in the flood surge of 1881 which destroyed the Rinehart mill, or if it continued in a commercial capacity past when the State Dam at Pittsburg was destroyed in 1881. The lack of any depth of stratigraphy or post-1881 artifact concentrations, and the presence of only two wire nails (common after 1880) for the entire site, strongly suggested that this structure also was destroyed or damaged beyond repair in the flood surge caused by the destruction of the dam at Pittsburg.

The primary use of Paper Mill Structure 5, therefore, was probably as a processing building used between 1871 and 1881, where rags were stripped and cut into material for the rag-paper making process at the two paper mills. Most likely, this structure was abandoned after the latter date.

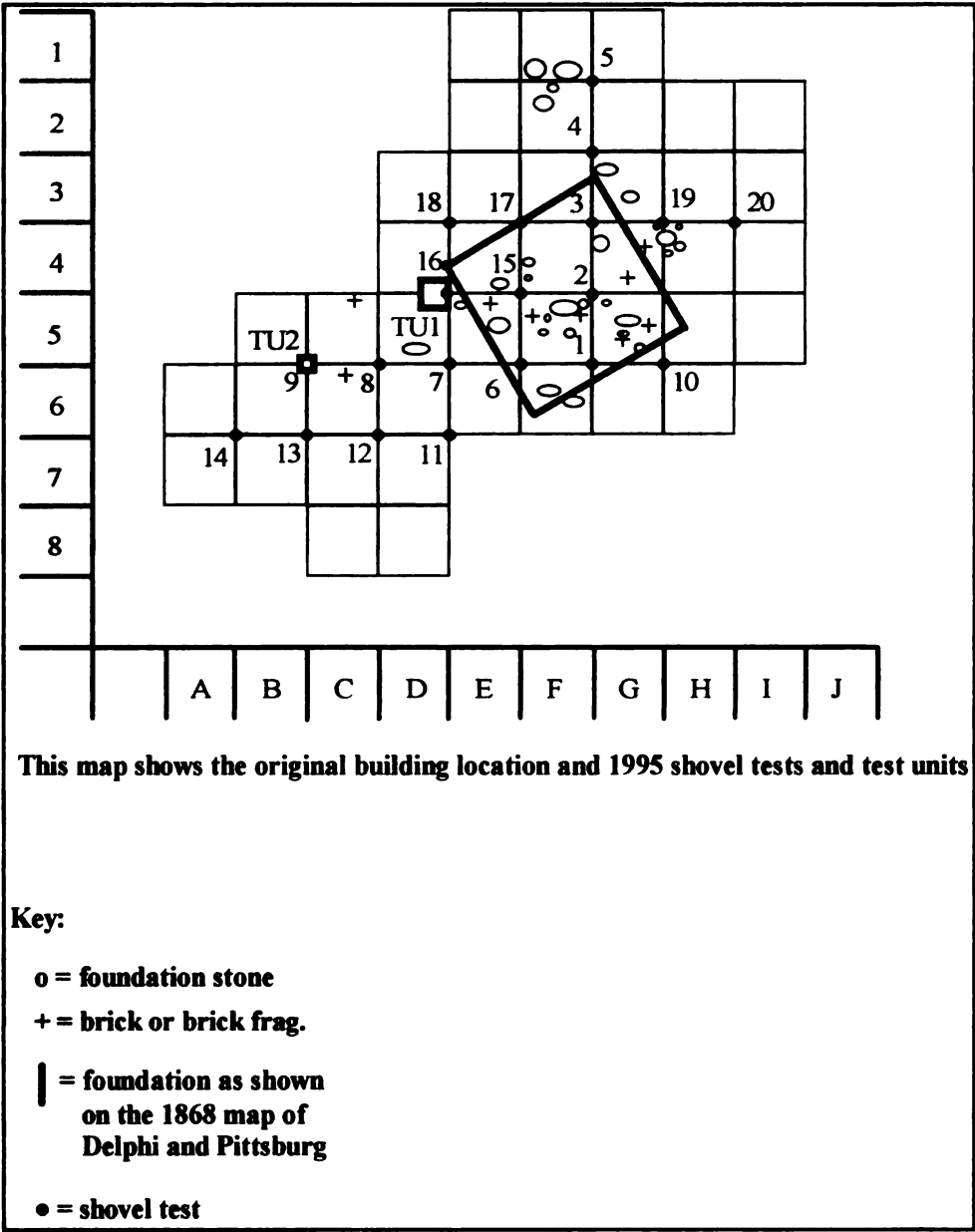
Paper Mill Structure 6 appeared to have been a permanent and long-lasting residence, probably for the mill-keeper of the Bowen paper mill (Figure 12). This mill was originally erected by George Robertson and George Armitage in 1853, with John B.

Caldwell and Robert Johnson as millwrights. Paper Mill Structure 6 may have been the residence of one of these gentlemen. The first mill, also built by George Robertson, was constructed in 1845 downstream from the second paper mill.

A large quantity of surface artifacts covered the Paper Mill Structure 6 site, leading to the use of a grid format for the procedure of surface recovery, with a 10 ft. square being the collection unit. Shovel tests were placed at each of the grid corners. In this way, most of the site was sampled by both surface and subsurface testing. Shovel testing identified a late 1800s midden on the western edge of the site, another on the eastern edge, and a complex earlier midden in the central site area. Surface collection and observation also revealed a good number of limestone cobbles, bricks, and larger flat limestone rocks, all of which may be the remains of the structure identified on the 1868 map of Delphi and Pittsburg.

A test unit of 4 ft. x 4 ft. dimensions was placed in the central area where a large stone was uncovered by a single shovel test. This stone was probably part of a later building renovation or construction in the late 1800s as a builder's pit was present which was excavated down into an earlier midden. The early midden dated from the 1840s, which started a continuous occupation stratigraphy up to the date of renovation, and thereafter to about 1900. Many artifacts from this later date were found just beneath the large stone at a level contiguous with the 1840s material from the earlier midden. Older material, scattered on the surface around the test unit area, probably came from this or similar later excavation.

Figure 12: Paper Mill Structure 6, Survey Map.



It was the surface collection that first indicated the presence of a historical site in this area, probably associated with the structure shown on the 1868 map. Construction material concentrated in the center of this site, forming a loose rectangle, tilted to face the mill proper. The 1868 map also showed a similar arrangement for the 25 ft. x 25 ft. paper mill structure identified as being in this location. Surface collection artifacts are also concentrated in the central site area, though slightly more to the southwest. Earlier diagnostic materials also concentrated in the site center, though low numbers of elements make this study less reliable for pattern interpretation.

The shovel tests conducted at this site revealed a different depositional pattern. A dense late 1800s midden was located along the western margin of this site, where the ground slopes steeply down into the second holding basin. This midden had many wire nails, colorless glass shards, and plain ironstone fragments (Majewski and O'Brien 1987, and Lofstrom et al 1982). Another late 1800s midden was at the extreme eastern margin of this site.

The centralized concentration of artifacts identified by the surface collection was also indicated by the shovel tests, but was less distinct. The shovel tests did indicate that most of the pre-1860 artifacts uncovered concentrate in the middle of the site, supporting those patterns suggested by the surface collection. Shovel tests that demonstrated wall plaster were concentrated in the central site area, and in the extreme western midden. The western midden also had the highest concentrations of both wire and square nail types. Sterile soil for the entire site was consistently located at 1.0 feet in depth.

Artifact distribution and stratigraphy within Test Unit 1 identified a number of distinctly different occupational time periods for Paper Mill Structure 6. Layer 1, the

highest identifiable occupation layer, indicated a post-use period, perhaps involving salvage of the structure, collapse, transient habitation, dumping, or a combination of these factors. The abandonment of the structure as indicated by this layer probably took place between 1890 and 1900.

Layers 2 and 3 both appear to have been part of an extensive reconstruction phase, with a continuation of the structure's use as a permanent residence. This layer probably dates to between 1881, when the State dam was destroyed, and the early 1890s. Because the destructiveness of the flood which followed was so great as to damage beyond use the nearby Rinehart Mill (Mayhill 1953), it would be expected that major repairs would be necessary at this location as well, which was only a few feet above the mill in elevation.

The top levels of Layer 4 appeared to have been a transition zone between the mill time period and the late 19th Century residential use of the structure. Based on artifact analysis and comparisons with PM Structure 5, an estimated date range for this transitional zone of 1850 to 1881 could be established.

The remaining levels of Layer 4 were fairly uniform. Artifact date ranges remained consistent, and become slightly older in the lower levels. Overall, the use-range for these levels was between 1835 and 1850. Since documentation exists that George Robertson first developed the land the paper mill complex occupied in 1845, this date was the probable starting time for the midden, unless an unknown resident used the same location before this date. This would give an expected depositional time for the lower levels of Layer 4 as being between 1845 and 1850.

Comparing Paper Mill Structure 5 with Structure 6 revealed a number of insights into the paper mill complex as a whole. Documentary evidence did not indicate whether these structures, or any of the other lesser structures of the paper mill complex, existed before they are shown on the 1868 Map of Delphi and Pittsburg. Evidence for Paper Mill Structure 6 indicated that there was a small structure at this site from the earliest period of paper mill construction (1845). The lack of early materials at Paper Mill Structure 5 indicated a later construction date, probably between 1860 and 1868. Paper Mill Structure 6 appeared to have had a coal-burning furnace after the reconstruction phase of 1881, with PM Structure 5 having had one from the 1870s to its abandonment in the early 1880s. The flood surge of 1881 appears to have been a catastrophic event for the Delphi paper mill complex, with most of its buildings being destroyed or abandoned to account for the total of \$25,000 in damages historically documented (Mayhill 1953). Only Paper Mill Structures 6, 2, and 1 seem to have had a post deluge life, and only Structure 6 continued in its original role as a residency until the turn of the century.

Paper Mill Structure 7 involved a surface collection of the site area, as well as a limited number of shovel tests between it and Paper Mill Structure 6. The original outline of the mill could be seen, with a deep basin formed for the water wheel between the second holding pond and the mill tailrace. A narrow channel to the north of the building was still visible between the wheel well and the second holding pond. This channel would have contained a sluice for the introduction and control of water into the wheel well basin. Limestone cobbles were also lightly scattered across the site. Because of the mill's frame construction, as indicated by the 1868 birds-eye view of Delphi, these cobbles were probably part of support structures, and not part of a formal foundation.

The grist mill on Wildcat Creek in Tippecanoe County (see above) featured a partial foundation of stone which was still visible under similar environmental circumstances (Bischoff 1994). Overall, the date range for this site, based on diagnostic artifacts present, was between 1840 and 1900 with the last two decades of the 1800s being most represented.

Paper Mill Structure 8 was totally covered with modern concrete and gravel rubble. The channel that once flowed from the canal and into the Rinehart mill wheel well had been completely filled.

The Delphi Wabash and Erie Canal Side Cut

The side cut toward the foot of Main Street in Delphi, Indiana, was explored with a surface reconnaissance, as well as a limited number of shovel tests. The location of the Spears and Case Warehouse and its extensive basin and docking facilities had been completely impacted by the construction of a modern restaurant, and by the improvement of State Road 25 over the last half-century. Extensive damage farther west along the side slip had also been done by the construction of a second modern restaurant. The three shovel tests conducted in this area indicated that the slip has been negatively impacted by extensive grading and filling out into the original canal side cut pathway, and that the only deposits likely to be found would involve side slip use-related materials. This would involve a very low density of artifacts dropped over the side from passing boats, or thrown into the canal by pedestrians using the towpath. The available documents indicate that no canal or commercial constructions of significance ever existed in this area.

Side Slip Warehouse

A large warehouse associated with the paper mill complex (surveyed in 1995) once was located east of the Wabash and Erie Canal and south of Bicycle Bridge Road. The 1996 survey searched for remains of this structure, as well as attempted to find evidence of its purpose or use.

Two transects of shovel tests were placed in general north-south lines across where the structure was located historically. Surface observation identified three main concentrations of limestone rubble, as well as a general scattering of limestone cobbles and bricks over the entire area. Some of the limestone debris had been cut into smooth-sided blocks.

The shovel tests identified three disturbance episodes: impact from excavating and ground leveling from the construction of Bicycle Bridge Road; bulldozer grading from the construction of a nearby Pizza Hut; and demolition and clearing of the original warehouse at some point before the turn of the century. Shovel tests discovered large amounts of limestone rubble and building materials. Diagnostic material from the Side Slip Warehouse site included two ceramic sherds, square nails, and a single green glass bottle finish. These few artifacts indicated an 1850 to 1900 occupation range

VanScoy 2 -- The Lock-keeper's House

Surface collection of historic artifacts at VanScoy 2 formed a half-circle, centered somewhat to the north of the canal lock, and with the dimensions of 180 feet north-south by 70 feet east-west. The most northerly 30 feet of this site had a lower artifact density

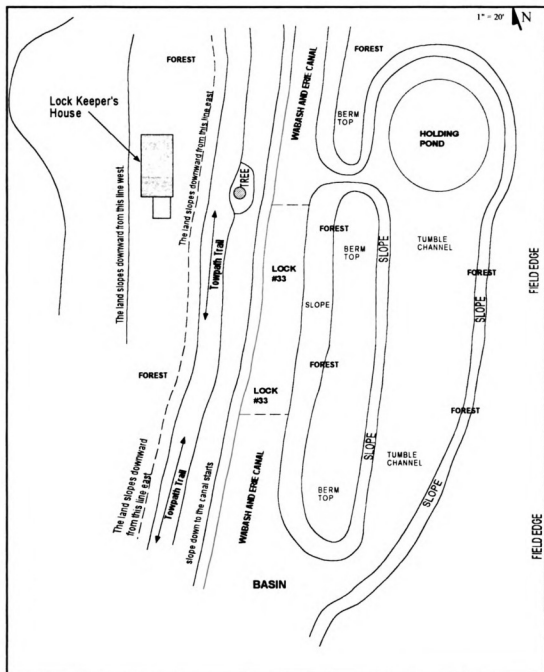
than the rest of the site. Small limestone slabs, uncut, were also found randomly in this area. Most of the artifacts recovered dated from roughly 1840 to 1860.

Between this site and the nearby Lock #33 was a narrow forested area, which was tested with two east-west transects of shovel tests (Figure 13). The intent of these transects was to locate any building features or evidence of construction material. Several additional shovel tests were placed along a rough north-south line in the center of the forest between the two transects. This line was less uniform than the east-west transects due to the dense vegetation, which tended to run north-south in complexity. Shovel tests identified a large midden within the area. Construction material, mostly consisting of soft brick fragments, hard paste brick, mortar, and pane glass were found.

A 3 ft. x 3 ft. test unit was located to better explore the midden stratigraphy, and to sample deeper than shovel testing permitted. This test unit, Test Unit 1, revealed a deep midden with complex stratigraphy..

A number of different construction materials were present in the test unit in small quantities, including brick, mortar, plaster, and pane glass. Salt-water oyster and fresh water mussel shell fragments were found, as were samples of rabbit, bear, and deer bones. A number of large (cow-size) animal bones are also present, with long bone and rib cuts being most common. Ceramic density for the test unit was highest in this layer for the test unit, with a date range of 1835 to 1860. A number of ash layers were also encountered. Cut nails were found in every layer of this test unit, but this layer was unique in that a number of hand-wrought nails were also recovered. Hand-wrought nails were historically used before cut-nails. Cut nails were introduced in the early 1800s, but would not dominate the nail market until the 1830s.

Figure 13: Lock #33 and the Lock Keeper's House.

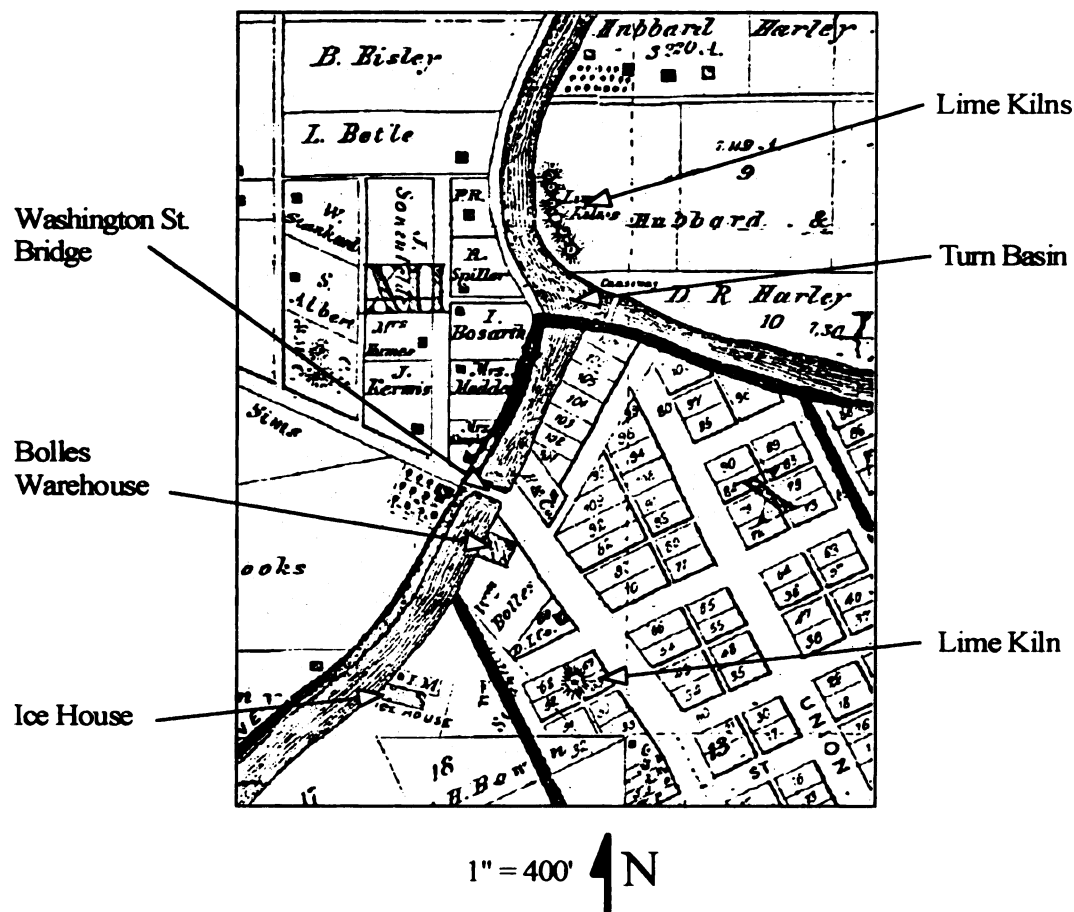


The results of these tests indicate that a building of unknown dimensions did occupy this area, with a long and active occupation dating from the earliest times of canal construction and operation (1838 to 1840) through the mid 1860s. The structure probably was located west of the canal next to the towpath. This building was probably abandoned sometime in the mid-1860s (toward the end of the canal-era) because it did not appear on the 1868 map of Delphi and Pittsburg, nor on the 1868 birds-eye view of Delphi.

Washington Street Commercial Area

The area south of where Washington Street crosses the canal in Delphi once had a number of commercial structures, residences, and a large lime kiln (Figure 14). All of these structures are no longer standing. One goal of the 1995 archaeological survey was to discover if any subsurface features could be located that would indicate buried structural foundations or remaining canal wharfing facilities in this area. Bolles Warehouse was the target of this goal, which was once located 75 feet south of the Washington Street canal bridge on the east side of the canal, with the rear part of the structure being constructed close to the canal edge. An early nineteenth century photo showed a standing section of the Bolles Warehouse stone foundation or wharf along the canal (Indiana State Library Archives). No other structural remnants appeared in the photo, which was taken from the center of the Washington Street canal bridge facing south

Figure 14: Washington Street Commercial Area.



The Washington Street area was quite active during the canal-era. Three large warehouses were located south of the canal bridge on the Delphi side of the Wabash and Erie Canal (two are shown on this map). A number of lime kilns also operated in this area. The turn basin to the north allowed cargo barges to dock for loads of lime. The residencies shown west of the canal faced center street, but had a number of out-buildings and one brick kiln which were located along the canal channel.

Survey efforts in this area included a 12 ft. trench, which was placed so as to bisect any below ground remnants of the Bolles' Warehouse foundation or wharf, and a 3 ft. x 3 ft. test unit placed at the most easterly end of the trench to test for any wider below surface artifacts concentrations or features. The trench did reveal a downward-sloping tumble of limestone rocks, with several retaining stone saw marks. The test unit revealed a continuation of the rock tumble to the east, but with a lesser concentration of rock debris. No additional features were uncovered, and no nineteenth century artifacts were recovered from the test unit or from the test trench.

The results of this study indicated that the wall was most likely pushed into the canal, probably sometime during the last 50 years as part of surface grading during the construction of a nearby playground and recreational area. Historical documents noted that a currently standing stone structure, near to where the warehouse once stood, was actually constructed from that building's materials in the late 1800s (Gerard and Griffey 1977).

The Wabash and Erie Canal North of Washington Street

The canal bed north of Washington Street in Delphi was scheduled for trail-construction and flooding impact sometime in the summer of 1996. Michigan State University conducted in the fall of 1995 an archaeological survey of the 900 ft. of canal channel targeted for impact. Survey work north of Washington Street consisted of a general surface collection of artifacts, as well as 40 shovel tests conducted at spaced

intervals throughout the canal bed, from the center point of the Washington Street Bridge to the railroad track crossing roughly 900 feet to the north.

Historical documents indicated that a small number of residential out-buildings were once located along the canal on the west bank, and that a large frame building, possibly a warehouse or barn, was once on the east side of the canal, closer to the loading basin for the lime kilns. This basin was noted on a number of historical maps, and its remnants were still visible as a shallow depression constructed outward from the main canal channel, starting about 450 feet from the Washington Street bridge, and extending north for a further 200 feet.

The 900 feet of Wabash and Erie Canal north of Washington Street surveyed had been heavily impacted by past destructive events. The Washington Street bridge had been replaced and repaired a number of times, disturbing the project area out to about 50 feet from the bridge. In 1976, the canal north and south of Washington Street bridge was dredged to improve scenic water flow for the nearby canal park. Rubble, trash, and fill from this dredging were placed along the canal bank to the east. Stone fill, possibly from the dismantling of the Bolles Warehouse in the late 1800s or from an earlier bridge replacement, was also found in piles along the canal sides near the Washington Street Bridge.

Silting caused by water flow from the surrounding agricultural fields and from the higher elevation woodlands had also accumulated in a number of areas. This accumulation was as extensive as three feet in depth. Construction and repair of the railroad trestle at the extreme northern end of the 900 foot section of canal impacted a large area of canal channel. Shovel testing also uncovered an iron pipe of unknown use

that ran across the central portion of the survey area. This pipe had a narrow builder's trench, which was filled with sand.

Because of past silting and construction, the exact basin perimeter was unknown. What was shown on the map was roughly where the modern basin perimeter was located. The canal-era basin probably extended much farther to the east where docks for the lime-kilns would have been located. The vast majority of artifacts recovered proved to be from a post-canal period, with the highest concentrations ranging from 1910 to 1930 in date. The most extensive early 1900s fill occurred along the western edge of the canal, where residencies not linked with the canal have existed since the mid 1800s. One shovel test located a mortar and ash deposit that may have been linked to the brick kiln shown on the 1862 map of Delphi. A single glazed brick fragment, as well as a number of soft-fire red brick fragments, were also recovered from this shovel test.

The only canal-era artifact concentration encountered was a small midden. This midden consisted of two white clay pipe fragments, two aqua bottle fragments, one plain ironstone base sherd, a leather ladies' shoe, two sawed cow bones, and a number of iron and wood fragments. Only three other shovel tests contained canal-era artifacts. The stratigraphy of this area was complex and difficult to follow. Most of the canal from the Wabash River to Deer Creek was constructed within an old river channel for the Wabash. A natural limestone bedrock could be found under parts of the canal, with ancient river silting and sanding making up a good portion of the stratigraphy beneath the canal-use layer. Because construction followed this ancient river channel, the canal in the project extension area is wider than usual. The basin mentioned above could be a natural depression associated with this ancient channel.

The *Documentary Journal* for 1855 describes the problem of silting in this region:

"The sediment brought down in floods, and held in solution while in the strong current, tends to settle as it meets the more quiet water of the pool. At the entrance and outlet locks of these slack waters, deposits have been gradually forming since the construction of the canal" (1855).

The same process most likely has affected the stratigraphy of the canal bed north of Washington Street Bridge. Flood waters and run-off entered the canal channel around the basin area, settled out in a random fashion in the currents of the canal, and flowed unevenly down-stream (toward Deer Creek). It is interesting to note that the section of canal from the Wabash River to Lafayette actually did have a current as water power was generated for a number of mills in Delphi and Lafayette. The tumble around Lock #33 was a result of this water power need (*Documentary Journal* for 1845).

The presence of the lime kilns around the basin area would have produced a great amount of limestone cobbles and sediments, which would also have flowed into the canal at this point. Part of the lime-manufacturing process, and that of brick manufacture, was the need for burning large amounts of wood. Ash, charcoal, mortar-like debris from the kilns, limestone fragments, and brick rubble, therefore, were present within the canal stratigraphy at this location. Shovel tests near the basin indicated a depth of silting at almost a foot in depth. The shovel tests within the basin area were even more complex, with evidence of sand bars, deep silting depressions, and additional layer sediment, such as one would find where two flows of water meet.

Between the south side and the north side of the smaller trench, there was a distinct change in stratigraphy. Shovel tests south of the lime kilns demonstrated complex sand and silt stratigraphy similar to the basin area, but shovel tests north of the

lime kilns had uniform stratigraphy, with organic loam over silty-clay, which was placed over silty clay puddling and solid clay from the ancient river bed at the lowest levels. All shovel tests from the north demonstrated this same stratigraphy.

The 1996 field season surveyed an additional 1200 feet of canal prism bottom north of Washington Street north of the abandoned "Belt Railroad" trestle. Canal-era layers within the canal bed were easily identified in the shovel test stratigraphy. Canal-era deposition was marked by small brick, coal, and lime or mortar fragments in a variety of soil contexts. Variation within canal stratigraphy, caused by current action within the canal, included silting, sandy inclusions, clay deposits, and a combination of all of the above. In all of the shovel tests, canal-era material ended with the silty-clay layer, which was probably the "puddle" used to make the canal water-tight. Canal-era material was sometimes found imbedded in the topmost part of this silty-clay layer, but did not appear within the rest of the layer.

VanScoy 10

VanScoy 10 was an early 1900s historic site was, located in the far northwest corner of the VanScoy field near the millrace. This site was first identified by a historic scatter within the plowed VanScoy field. This scatter included a number of early 1900s historic artifacts; mostly ceramic sherds and bottle glass fragments.

Several 20th Century features of VanScoy 10 were mapped during the survey of 1996, including a circular corn crib, a concrete well, and two earlier concrete foundations. The older foundations probably dated to the early 20th Century, based on

concrete type. The corn crib was of newer construction. None of these features were in use at the time of the survey.

Survey efforts in 1997 concentrated on the untested area of woods between the VanScoy field and the millrace. This area was surveyed using three transects of shovel tests; two east-west, and one north-south in orientation. Shovel tests to the east of the existing structures discovered an extensive disturbed area, probably impacted by grading and leveling. Shovel tests to the west and south of the existing structures found undisturbed areas. Both areas produced a small amount of Native American chert flakes and 20th Century historic materials.

Based on these shovel tests, VanScoy 10 appeared to have an undisturbed Native American occupation, especially along the millrace margin. Unfortunately, this occupation revealed few artifacts and no features. This low artifact density meant that additional exploration of VanScoy 10 would probably yield little additional data for interpreting the Native American occupation of the Deer Creek region.

This survey also concluded that the millrace, constructed so as to follow an ancient stream channel, was not excavated in the 19th Century to the extent originally thought. It appeared that, instead of major earth moving, the 1800s excavation of the millrace consisted of grubbing, clearing, straightening, and securing of the banks. This conclusion was based on the shovel tests done at VanScoy 10 in 1997, and those completed at VanScoy 5, 7, 8, and 9 in 1996. Stratigraphic evidence from all these shovel tests could find no evidence of major disturbances, fills, or soil changes, as would be expected with major earth moving (such as the canal construction).

Wabash and Erie Canal Park Area

The canal park area between Washington Street and a modern railroad trestle to the south was surveyed in the summer of 1996. This area had been extensively impacted by modern construction. A nearby furniture factory had graded and excavated to a significant depth the entire area which now makes up the Delphi Wabash and Erie Canal park. The only section not impacted by this grading and excavating was the towpath. Several years before this survey, members of the Carroll County Wabash and Erie Canal Association suspected hitting a buried feature while installing a utility line across the towpath. They suspected that it may have been a stone building or wharf remnant.

The towpath was therefore tested in 1996 to identify any buried features. Two Test Units were placed along the towpath margin nearest the canal. Both test units revealed complicated stratigraphy linked with continuous graveling of the towpath for its use as a road throughout the 20th Century. Stratigraphy included a number of layers of pea gravel, sand, cobbles, and crushed limestone. At least six separate applications of gravel could be identified. Beneath this was sterile soil to the bottom of the test units at 2.5 feet in depth.

Oheim Homestead

Immediately south of the Delphi Wabash and Erie Canal park was a rectangular section of land that has been occupied by a number of residential buildings. The earliest known residency located at this site was the Oheim Homestead, identified on the 1868 map of Delphi and Pittsburg. The latest residence was a mobile home that was being demolished as we were surveying the area in the summer of 1996. Immediately west of

the mobile home, a large surface scatter was observed with many early 20th Century artifacts. A ridge line with scrub vegetation followed the north property line and also contained early 20th Century artifacts. Both of these areas were surface collected. Materials from these locations indicated that they once belonged to an early 20th Century domestic context.

Also behind the trailer was found a concrete foundation remnant of roughly 8 feet in length. Other more modern residential features were also present; a power box, power poles, and a gravel drive. The mobile home itself was 56 feet x 12 feet, with a 12 foot x 28 foot addition built onto the front.

It was local knowledge that the original house for this site burnt down in the 20th Century. Because of the square-like shape of the early 20th Century midden behind the mobile home, this may have indicated that the house cellar or sub-basement was filled with what remained of the house and other trash materials after the fire. A shovel test placed in the middle of this area found early 20th Century material, then sterile fill at 1.4 feet in depth.

Shovel tests were placed behind and in front of the mobile home in east-west and north-south transects. No 19th Century artifacts were found behind the mobile home.

In front of the mobile home, shovel tests found limestone gravel fill, a limestone rubble pile, and a section of the original house brick front walk. To test the brick walk remnant, a test trench was placed north-south across the walk and a later concrete walk which was partially covering the brick walk. The bricks of the walk appear to have been recycled from other structures. One removed brick still had mortar on the bottom, and many of the other bricks were of odd sizes. A fence post had impacted the brick walk in

the western section of the test trench, causing the removal of several walk bricks and the torquing of others. The width of the brick walk could not be determined because of the overlaying concrete walk.

Several test units were placed at the western end of the buried concrete walkway. These test units located a pea gravel layer of coal, cinder and brick fragments, which was probably put down as a bed for the concrete walk. Sterile soil was found beneath this layer at 0.5 feet in depth. The concrete walk itself had been severely truncated at this point, with the rest of the walk to the west being removed (probably for construction of the mobile home foundation). West of the walk fill layer was found a limestone pea-gravel fill. This pea-gravel layer sloped downward under the concrete walk and its layer of brick, coal, and cinder bedding. This gravel may have been part of the original 19th Century construction, perhaps acting as a sill for the foundation or as general fill.

A single test unit was located at the eastern edge of the brick walk. This test unit succeeded in finding the end of both the brick and concrete walks, as well as in locating a large cut stone step associated with the earlier walkway. This large step appeared to have been pushed to one side, either from placement of the modern fence post, by the concrete walk construction, or by the growth of a large shrub.

The Oheim Homestead site had been greatly disturbed over the last 100 years. Archaeological work in 1996 identified a number of major demolitions and constructions: walkways had been built, abandoned, and torn up; houses had been built, demolished, graded, then built anew; and support features (such as fences and gravel drives) had been added to the grounds, removed, then added again. Of the original canal-era residence, only a few feet of walk and a cut stone step remained. The artifacts associated with the

Oheim Homestead mostly date to the 20th Century. A few square nails were recovered that hinted at an earlier 19th Century occupation, but by far the majority of materials consisted of aluminum pull-tabs, wire nails, plastic pieces, and canning jar fragments.

Most of the Oheim Homestead diagnostic materials dated to the 20th Century, with the early to mid 20th Century. The second most represented period was from roughly 1970 to the time of the survey. This later material was probably associated with the occupation of the mobile home. There appeared to be an absence of occupation in the 1940s and 50s. This absence may be linked with the original house burning down

South of the Oheim Homestead was a large plowed field, which was also surface surveyed. Within this field was located Canal Park 1, a prehistoric site of low artifact density. Canal Park 1 was a lithic scatter located within the plowed field, which produced a number of chert flakes and no diagnostic material.

South of the plowed field was a high-density 20th Century artifact scatter between the field and the railroad trestle. The Michigan State survey crew was later informed that this scatter was a secondary deposition resulting from a modern Delphi factory moving part of the early 20th Century Delphi city dump from their property to this location. Artifacts collected from this disturbed location included glass and ceramic samples from the late 19th and early 20th Century.

Canal Central-East

This section of canal involved a surface survey within the two large plowed fields east of the Wabash and Erie Canal and between Washington Street and Bicycle Bridge

Road. The residential area immediately south of Washington Street was not included in this survey.

Two historic sites were identified within the plowed fields. Just south of the trestle, a surface scatter of 19th Century materials was located. This site (East Canal 1) corresponded to a residence once located in the area, as shown on the 1868 map of Delphi and Pittsburg in the "J. P. Dugan #7" lot. A large pile of brick and limestone rubble dominated the center of the scatter. Artifacts were found outward from this circle for 30 to 40 feet. Undisturbed elements of this site may be found between the canal and the field margin. No tests of this undisturbed area were conducted. Artifacts for this site suggested a domestic residence and dated from the 1860s to 1910.

North of the railroad tracks was another historic scatter located along the canal. A high spot in the center of this area contained brick and limestone rubble. The canal back berm come very close to the plowed field in this area, meaning that it was unlikely that the site has undisturbed areas. This historic site (East Canal 2) included stoneware, ironstone, aqua bottle shards, a pontiled aqua bottle base, and six buttons. Dating this material gives a date for this site as between 1850 and 1920.

North of this second historic site was a brick scatter, dominating the northwest corner of the field north of the railroad trestle. No other artifacts were present with the bricks, and the bricks appeared not to be associated with the East Canal 2 site. These bricks were in the general location of what is called an "ice house" on the 1868 map of Delphi and Pittsburg.

The second historic site mentioned above corresponds to "R. Case #16" on the 1868 map. The 1862 map of Delphi shows the lot belonging to "Beck and Hubbard", but

shows no buildings. Our conclusion was that the documents and the archaeological record were too limited to create use-profiles for these two historic sites.

Canal Central-West and the Canal Slaughterhouse

The area of land west of the canal and between US 421 and the railroad trestle was shown on 19th Century maps to contain no structures except for a Civil War-era slaughterhouse. This slaughterhouse was located several hundred feet past the bend in the canal, and was positioned to be near the towpath. Locating evidence of the canal slaughterhouse became the primary focus of archaeological survey in this section of Canal Park land.

Surface observation noted that the canal had been severely impacted by modern road construction. The water course had been diverted for several hundred feet along US 421, then taken under the road via a culvert. The towpath had also been breached, exposing much rip-rap -- rock rubble used in the construction of the towpath. The railroad at the north end of this section of survey area had also impacted the canal by introducing a modern drainage ditch cut into the canal, and by the construction of a railroad embankment across the canal.

The Canal Slaughterhouse was identified by surface collection and by the shovel tests. A low density of bone was found in several shovel tests, with larger concentrations being found in two shovel tests. Low numbers of artifacts were also recovered by surface collection. The rest of the shovel tests in this survey area did not find any significant artifact densities, features, or diagnostic materials.

Two additional shovel tests were placed nearer the towpath in the artifact concentration area, which discovered high artifact densities as well. A shovel test in the middle of the towpath in this location also found artifacts from the slaughterhouse. Surface observation in the towpath area noted artifacts on the surface of the canal-side of the towpath as well, including brick, limestone cobbles, and ironstone fragments.

To further test the Canal Slaughterhouse site, a 3 ft x 3 ft test unit was placed in the center of the artifact concentration mentioned above. This test unit revealed a deep and dense deposit of slaughterhouse materials; including a wide variety of animal bones, nails, glass, and brick fragments. Artifacts were encountered in each level, down to an ending depth of 2.2 feet where sterile soil was encountered.

Building construction materials were found, included bricks, brick fragments, mortar, glazed brick, brick with mortar, pane glass, and nails. Square nails were dominant in this test unit, but wire nails were also present. Charcoal and mortar fragments were found in the soil matrix of each level down to sterile. Metal artifacts found were almost exclusively nails, with nondescript iron sheet fragments being second in number. Glassware consisted of aqua and colorless glass shards from a small number of vessels. A few ironstone and stoneware fragments were also found. No stratigraphy or differences in artifact category or type distribution could be identified across levels.

By far the most dominant artifact category for Test Unit 1, and for the entire slaughterhouse site, were animal bones. Several species could be identified, including cow, pig, deer, and bear. Cow and pig were the most frequently identified species, accounting for 99% of the entire identifiable remains. It appears from this data that the

slaughterhouse was concentrating on cow and pig processing, but also processing wild animals brought to the site.

The faunal assemblage from Test Unit 1 and from the shovel tests can give an idea of which parts of the animal were being processed at the slaughterhouse. Overall, the only whole bones came from the extremities of animals. For large animals (cow-sized), the highest number of identifiable bone elements came from the vertebral column, the ribs, and the extremities. Few cranial, shoulder, pelvis, or long bone fragments were present in the tested deposits. The slaughterhouse, therefore, was probably removing the feet of cows, then sectioning the animals into side and hind quarters for sale. This would result in many lower limb bones, vertebral fragments, and proximal rib fragments being thrown away. The question in this case is, where were the skulls going? Few large animal cranial fragments or teeth were located. Either the skulls were being deposited elsewhere, or the slaughterhouse had some saleable use for the cranial areas of cows.

Medium-sized animals (most likely pigs) were processed differently. Few pelvis, shoulder, or rib bones were recovered. For medium-sized animals, the highest number of deposited and identifiable bone elements came from the extremities and the lower jaw/mouth area. The slaughterhouse was probably removing the feet and head of the medium-sized animals, then selling the gutted carcass as a single unit. Again, the lack of cranial bones in larger numbers was puzzling. Deer bones recovered were too few to create processing profiles such as these.

The bones found in all the subsurface tests were not articulated. The operation of the canal before 1875 makes it unlikely that large quantities of freshly cut carcass parts would be deposited along and on the towpath of this State-run transportation system. It is

described elsewhere in this results section (see section on Canal North-West, for example) how the canal was used as a convenient dumping location for refuse after being closed to traffic in 1875. The slaughterhouse appears to have taken advantage of the Wabash and Erie Canal's defunct status and used it as a dumping place for animal bones, as well as other trash. The presence of colorless glass, plain ironstone, and wire nails in small amounts indicates that the dumping episode described by the shovel tests and Test Unit 1 probably took place from 1875 to 1890.

The disarticulated nature of the faunal remains indicate a secondary deposition status for the area surveyed. Carcass sections would be cut off (such as the legs) and deposited. At some point after the canal's demise, these primary deposits were collected, added to general slaughterhouse trash, then deposited along the canal towpath. The bones and some artifacts could, therefore, date to an earlier primary context.

Canal North-West

The 1868 Map of Delphi and Pittsburg placed a number of residencies, outbuildings, and industries on the west side of the Wabash and Erie Canal and north of Washington Street. Some of these residencies were still standing. The 1996 archaeological survey of Canal Park lands attempted to locate any remaining evidence of these structures within the towpath margin west of the canal.

Starting north from Washington Street, a standing canal-era residence was found roughly 40 feet west of the towpath. This residence was not tested except for the area immediately west of the towpath. In this area, a deep layer of driveway grading and graveling was encountered near the road. Elsewhere, no canal-era features or artifacts

were found, though a small early 20th Century dump was located by ST31. This dump consisted of wire nails, cinders, and stone rubble.

North of this residential property was another house, which was associated on the 1862 Map of Delphi with a brick kiln constructed along the canal, 200 feet north of Washington Street. Shovel tests were placed to explore the towpath margin in this area. The landowners noted that the canal-side portion of the property had been used as a stables and riding area in the mid-20th Century. Evidence of the brick kiln operation was found in most shovel tests in the form of soft-paste brick fragments, glazed brick fragments, and limestone cobbles. No other artifacts were located from the canal-era.

The woodlot north of this property was tested using shovel tests. Surface observation and collection located a dump of late 19th and early 20th Century artifacts along the towpath throughout this area. Surface artifacts included decal-decorated ironstone, gilded ironstone, porcelain, and many canning jar fragments. A single Amethyst bottle had a valve mark on the bottom. Shovel tests also recovered late 19th Century to early 20th Century material. Two shovel tests found large quantities of brick fragments, with another finding a wall plaster dump. It appears that, once the canal was abandoned, the towpath area became a convenient dumping ground for unwanted construction material and domestic trash.

The section of ground from the woodlot to the abandoned railroad trestle was also tested using shovel tests. It was found through these tests that the first 30 feet south of the railroad tracks had been disturbed by trestle construction. A number of canal-era residencies still existed in this area, though closer to the town road than to the canal. A barely visible foundation remnant was also observed. This foundation consisted of a

rectangular depression in the ground and was outside of our project area. No canal-era artifact concentrations, features, or diagnostic materials were discovered. The artifacts that were found by shovel testing into this fill area included undecorated ironstone, colorless glass, square and wire nail fragments, cinder and coal. The southeast corner of this fill area appears to have been used as a dumping area for domestic trash. Surface collection located ironstone fragments, brick, mortar, coal, colorless glass, square nail fragments, and limestone cobbles.

North of the abandoned "Belt Railroad" was a large industrial lot that faced the canal towpath on the east side. This area had a modern warehouse, and had been heavily impacted by 20th Century grading, graveling, and the operation of heavy machinery. The yard once was a parking facility for semi trailers. The northeast corner of the property has been excavated for fill and used as a dump location for modern machinery parts.

Land owned at the time of survey by Public Service Indiana was located north of this disturbed warehouse property. The PSI property was dominated by a large, modern power station. This property once had a large brickyard business, as shown on the 1868 map of Delphi and Pittsburg. The Canal Brickyard site was once located 1200 to 1300 feet north of Washington Street Bridge in the center of the property, roughly where the power station now stands.

Shovel tests were placed in the PSI lawn area and a small wooded area near the towpath. Several shovel tests in the middle of this area located many brick fragments, with a number of brick ash layers being found closer to the wooded area. Beneath the bricks, in some shovel tests, was a layer of limestone cobbles in a clay fill. At 1.6 feet in depth, sterile soil was reached.

A single shovel test was placed at the south center of a square depression found in the PSI property lawn. This depression was 65 feet x 65 feet in size, and started at 20 feet west of the canal edge. Trenching later indicated that the depression was of modern origin (perhaps to collect fill during the power station construction). Brick fragments were easily observable on the surface of the depression. This shovel test identified complex stratigraphy, going down to 2.25 feet in depth. A test trench of 1 ft x 3 ft was placed south from ST10 to cross the edge of the depression and to study the deeper stratigraphy of this feature. Test Trench 1 revealed the most complex brick dumping episode at the Brickyard Site. Layer "A" contained brick halves and larger brick fragments in a soil matrix. Layer "B" contained bricks and brick fragments in a silty-sandy matrix. Layer "C" was a layer of brick ash. Layer "D" was a layer of brick ash in a silty-sand matrix. Layer "E" contained brick ash, brick fragments, and limestone cobbles in a silty-sand matrix. Sterile soil could not be reached because of the number of limestone cobbles.

Within the forest, large piles of limestone rubble were visible on the surface. Edges of the large brick dump described above were encountered. It appears that, while the brickyard was operating, large areas along the canal (especially in the northeast half of the property) were used to dump broken bricks and brick debris. In some of these tested areas, brick debris could also have been piling up with normal yard use. Sometime after the site was abandoned, construction material from the demolition of the brickyard structures apparently was piled up in the forested northeast corner of the property.

The property north of the brickyard was totally disturbed up to the towpath by yearly plowing. Several brick fragments were also found close to the edge of the field

that bordered the brickyard. These were probably associated with the Brickyard Site. North of this property was an area that has been heavily impacted by the creation of a modern levee.

The Delphi Lime Kilns

Six lime kilns were shown on the 1868 and 1874 maps of Delphi and Pittsburg as being north of Washington Street and east of the Wabash and Erie Canal. A major task of Michigan State University's archaeological survey of Canal Park lands was to identify what remained of these kilns. The target area for these efforts was the Canal Park Annex area, which was located north of Washington Street and east of the canal and south of the abandoned "Belt Railroad". Another area for study was the forested area from the railroad to the next property north. It was speculated that if this railroad track followed historic property lines, as shown on the 1868 map of Delphi and Pittsburg, then it would have been constructed between the first and second of these Hubbard and Harley canal-side lime kilns. Archaeological efforts in this area suggested that this was what happened historically.

The canal had experienced major silting and runoff in the Canal Park Annex area, making the slope down toward the canal bed more shallow than it would have been during the canal-era. Forest lines the canal back berm for 75 feet south of the railroad tracks. A few scrub trees occupy the rest of the back berm slope. The canal bed in this area was greatly disturbed by two excavations in 1995, and by a large amount of grading and heavy machinery movement (Bischoff 1996).

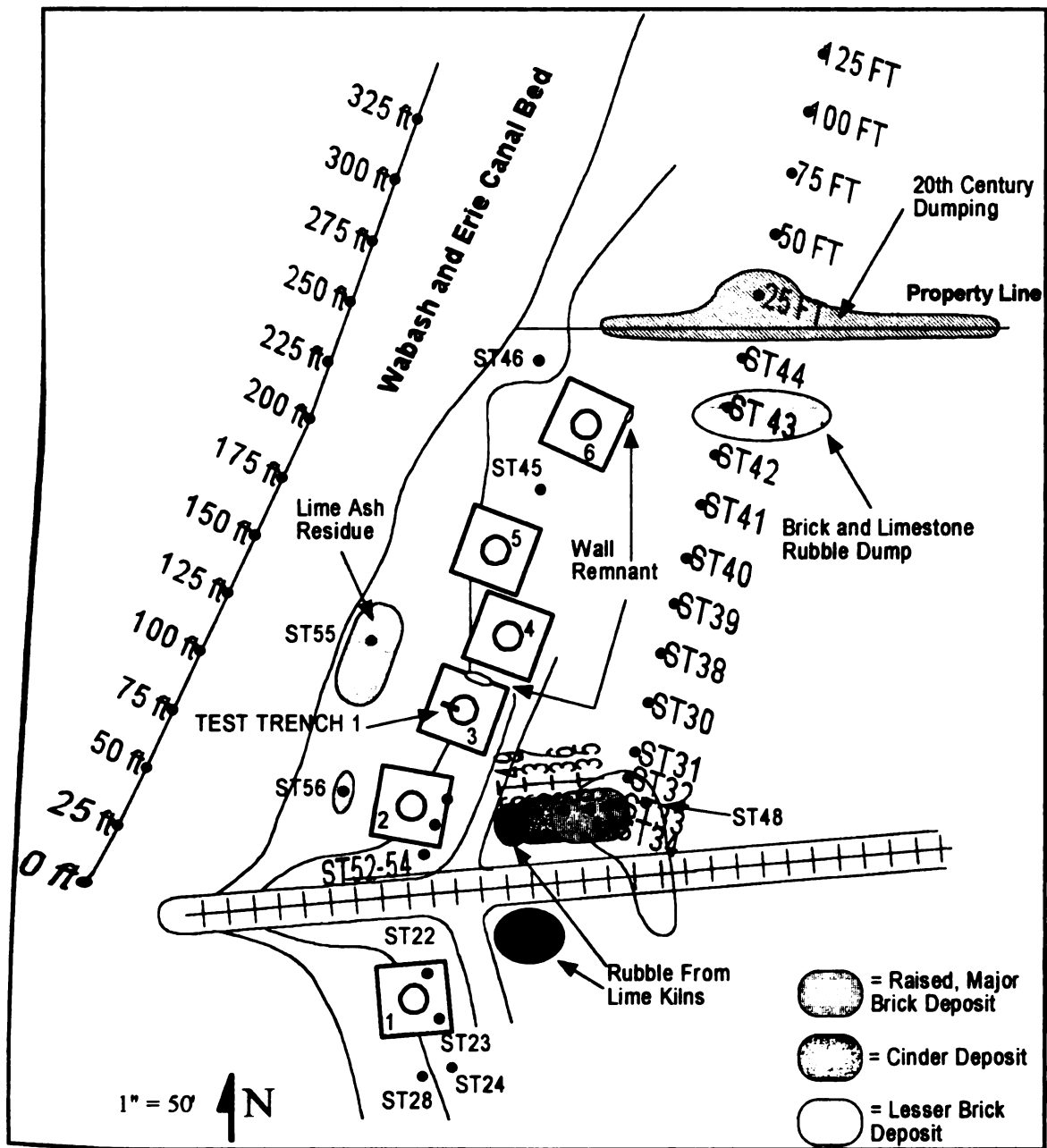
To test the Canal Park Annex, a transect of shovel tests was placed in a general north-south direction along the canal margin, roughly 20 to 30 feet east of the canal back berm slope (Figure 15). A modern gravel road was just to the east of this transect.

Sterile soil was reached in these shovel tests at an average of 0.5 feet in depth. Closer to the railroad tracks, cinder and coal fragments were found in the shovel tests. Several shovel tests located a cinder midden within a black soil matrix. Brick fragments and mortar were also found in a lighter soil matrix. One shovel test found sand with cobbles beneath the cinder layer.

No diagnostic canal-era artifacts were located by any of these shovel tests. The lower layers picked up by two shovel tests were very reminiscent of the stratigraphy encountered in the canal bed north of Washington Street. A logical interpretation for this line of shovel tests was that normal erosion and runoff processes created the silt and sand deposits in the lower depths of the most southern shovel tests, and that post-canal cinder and furnace residue was deposited above. This large amount of cinder may have been from the trains used on the nearby railroad track, or from several residences or structures that once were in the area.

Two other transects of shovel test were placed in the lawn area of the Canal Park Annex. Many of these shovel tests found small amounts of cinder or coal beneath the surface, but no middens, features, or canal-era artifacts.

Figure 15: Delphi Lime Kilns Identified in 1996.



Not finding any evidence of the lime kilns in the Canal Park Annex lawn, six additional shovel tests were placed along the wooded slope south of the railroad trestle. One of these shovel tests located two lime ash layers, consisting of lime ash with charcoal and brick in the matrix, with the second being made up of lime ash with limestone cobbles. Two other shovel tests located pure limestone ash and small cobbles, with some brick fragments. Another shovel test found brick rubble with some lime ash. In addition to the shovel tests in this wooded area, surface observation located a number of bricks and limestone cobbles on the ground. One brick recovered was melted on one side. It probably once was an interior-facing brick from the central wall of a lime kiln.

The lime kiln from this area (Lime Kiln 1) appeared to have been thoroughly demolished by the railroad trestle construction, with demolition rubble being spread along the ridgeline. The two shovel tests with extensive limestone cobbles may have located the interior portion between the inner brick wall and the outer limestone block wall. Studies of Lime Kiln 3 have shown that this area was filled with lime ash and limestone cobbles of the same type as found by these two shovel tests.

Lime Kiln 3 had the most intact structural features remaining of all the lime kilns. Five feet of outer wall still existed on the northern side of the kiln, and shallow clearing of the topsoil revealed an intact circular interior wall of fire bricks. These bricks had been heated to the point of fusing together, and had been coated on the interior side with a thick layer of emerald-green lime glaze.

Original dimensions for Lime Kiln 3 could be determined from these structural remnants. The exterior of the kiln was square and 27 feet across. The cut limestone wall which made up the outside of the kiln was two feet thick and mortared. The interior brick

wall was circular, with mortared fire bricks placed with their ends facing inwards. This inner brick circle was 11 feet across at the center, where limestone blocks and fuel would have been stacked to make lime. Between both walls was a mixture of lime ash and limestone cobbles, some being very large in size. This interior fill probably acted to contain heat and add strength to the structure. For two feet outward from the interior brick wall, this ash-cobble fill was colored orange from the heat.

The center of Lime Kiln 3 was filled with kiln wall fall; many glazed and warped brick fragments, coal, limestone cobbles, and lime ash. The rest of the kiln material fell down the slope toward the canal. The discovery of coal in this central chamber indicated that in the latter period of use for this kiln, coal was used as fuel for the lime-making process instead of exclusively wood. Along the canal on the back berm slope was a lens of lime ash, which had been exposed by erosion. This ash lens outlined where the opening to Lime Kiln 3 would have been. Limestone and fuel once were loaded through an arched opening, where lime ash would also have been sifted out. This large ash lens was probably the waste from this process, accumulated over the years that the lime kiln was in use.

A single shovel test was placed within this ash lens, 40 feet west of the lime kiln outer wall remnant. This shovel test discovered multiple layers of lime waste down to a 1.25 foot level. Non-uniform pockets of lime, charcoal, and kiln slag were identified. Limestone cobbles and brick fragments were also found throughout the shovel test. Sterile soil could not be reached, and no artifacts other than brick and charcoal were found.

To further test Lime Kiln 3, a test trench of 2 ft x 4 ft was placed across the canal side area where the inner brick wall would have been. It was hoped that evidence of the kiln opening or of the iron grate used to separate the fuel from the ash could be found. The stone rubble fill and collapse material was very thick on the slope. The trench reached the 3.0 foot mark before digging became too difficult and dangerous. Some of the bricks recovered by this trench were facing the wrong way (melted end outward) and had no lime glaze, suggesting that they were originally higher up in the structure. It was speculated that many more feet of rock and brick would have to be moved to find the kiln bottom.

The center point of Lime Kiln 3 was located by measuring off of the inner wall curvature. From this point, the center point of Lime Kiln 4 was measured, it being 30 feet and 40 degrees north of Kiln 3. Kiln 4 was represented by a large hummock, created by extensive structural collapse directly onto the feature instead of down the slope, as was the case with Lime Kiln 3. Brick and limestone cobbles covered this hummock. No wall features were observable above the surface.

Lime Kiln 5 still had much of its interior wall visible above the surface. The bricks in this kiln were even more consumed than those of Kiln 3. This suggested that an even higher temperature was reached. The center point of Kiln 5 was measured from the center point of Kiln 4, it being 30 feet and 350 degrees north. Kiln 5 also had an interior core diameter of 11 feet. No outer wall remnant could be identified.

From the center point of Lime Kiln 5, the center point of Lime Kiln 6 was measured, it being 62 feet and 35 degrees to the north. Kiln 6 consisted of a large hummock of structural collapse. Several rodent holes were burrowed into the space

between the inner and the outer walls. This seems to be a favorite location for burrowing animals of the area, as several of the kilns demonstrated similar holes with the burned lime ash fill from between the walls being kicked out onto the surface. Lime Kiln 6 had no inner wall sections visible on the surface, but three feet of outer wall still existed. The distance from the center of the hummock to the wall remnant was 13.5 feet; the same measurement demonstrated by Kiln 3.

Lime Kiln 2 was the most difficult to locate. The ground between Kiln 3 and the railroad trestle showed no elevation differences, nor were there any brick fragments or limestone cobbles on the surface as was found around Lime Kiln 1. Observation in this area did discover a small lime ash lens on the surface exposed by erosion. Three shovel tests were placed between the trestle and Lime Kiln 3.

The first shovel test located many kiln bricks and limestone fill, and sterile soil at 1.2 feet in depth. This material was similar to that which filled the center chamber of Lime Kiln 3. The second shovel test found pure lime kiln fill in the form of several fire bricks, limestone cobbles, and orange-colored lime ash. This shovel test apparently found the fill between the inner and outer wall of Kiln 2. The third shovel test actually located part of the limestone block outer wall. This section of wall was made up of flat limestone slabs, placed in a north-south direction.

A single shovel test (ST56) was placed within a second ash lens, at 30 feet west of Lime Kiln 2. Again, many layers of limestone ash and slag were found down to 1.25 feet in depth. Non-uniform pockets of lime, charcoal, and kiln slag were also identified. Brick fragments and charcoal pieces were found throughout. Sterile soil was not reached, and no artifacts other than brick and charcoal were recovered.

A transect of shovel tests was placed north-south within the forest east of the lime kilns. A total of twelve shovel tests were completed at 20 foot intervals from the property line to the railroad trail. A large limestone block was also found on the surface in this area, and several of the shovel tests found brick and limestone fragments.

Two of the shovel tests located a deep brick midden, which was represented above the surface by a raised area. This brick midden had complex stratigraphy, with layers of brick fragments, brick ash, white ash, and coal ash. No diagnostic artifacts were found in any of these layers.

Several additional shovel tests located parts of this large midden. One shovel test found somewhat different stratigraphy, with loam with cinders being found from surface to 0.5 feet. Cinders were found beneath this layer, as was coal-burning furnace slag, orange-colored loam, and a wire nail. Beneath this was lime kiln ash and limestone cobbles to the end of the shovel test at 1.7 feet in depth. Several other shovel tests located similar lime kiln remnants.

Three additional shovel tests were placed on the south side of the railroad track to test for a continuation of the brick midden in that direction. One shovel test found more limestone kiln materials (brick with emerald-green lime glazing, limestone cobbles, and lime ash). A separate shovel test did find a continuation of the brick midden, with the same stratigraphy as that found on the north side of the tracks.

It appeared from all of this that, when the railroad was constructed in the late 1800s, the path was graded and filled using construction material from Lime Kilns 1 and 2, and by using large quantities of brick waste (possibly from the brickyard across the canal). In the process, Kilns 1 and 2 were demolished. The railroad track was then laid

over this filled and graded path. Periodically, coal burner waste from the train engines was dumped alongside the railroad track, and possibly along the canal in the Canal Park Annex.

North of the brick midden, shovel tests did not locate any midden features. Sterile soil was encountered between 1.0 and 1.25 feet in depth, and no diagnostic artifacts were found. One shovel test near the northern edge of the Canal Annex property did find a midden of brick, limestone cobbles, and lime ash, which was probably another filling of the landscape using lime kiln rubble. The area along the property line had also been used as a dump for 20th Century materials from the residency located on the next property north.

Canal North-East

Shovel tests were continued north along the Wabash and Erie Canal back berm from the Canal Park Annex north to the levee. The only feature located was a modern collapsed shed, located about 225 feet north of the lime kiln property. Shovel tests ended at 575 feet from the lime kiln area, with no artifact concentrations, features or diagnostic canal-era materials being found.

The plowed field north of the last shovel test was walked to the modern levee (see topographic map), with no surface artifacts being found. At the time of the survey, the City of Delphi was using the northwest corner of this field as a dumping area for organic waste (wood chips, tree limbs, etc.).

The only point of interest in the entire stretch of land from the lime kilns to the levee on the east side of the canal was around the 325 foot mark (north of the lime kiln

property), where a rectangular feature could be seen 80 feet off of the canal back berm and outside of the project area. This feature was noted by a distinct change in vegetation, and is in the right location to be the remains of the Hubbard Barn, which was identified on the 1868 map of Delphi and Pittsburg.

Sunset Point – An 1839 Canal Construction Camp and Late Woodland Native American Occupation.

The extreme southern tip of the VanScoy field contained Sunset Point (Figure 15 and 16), the earliest historic site to be identified by the Wabash and Erie Canal survey projects. This site was originally identified from a small scatter of early ceramic sherds in a recently plowed field. The artifacts recovered from the surface dated to between 1830 to 1840. No artifacts of a post-1840 or canal-era style were found at this location.

A number of shovel tests and three test units completed in 1995 were used to further explore this site, as well as the above-mentioned surface collection. The test units indicated that the northern part of the site had a low density of historic artifacts, with increased density being found away from the Wabash River and toward the canal towpath. The shovel tests overall were of little use, owing to the scarceness of historic artifacts and to the density of silt build-up over the entire site. The historic artifacts recovered were exclusively from 1830 to 1840, and consisted almost entirely of ceramic sherds.

Figure 16: Northern Section of the Canal Construction Camp Site.

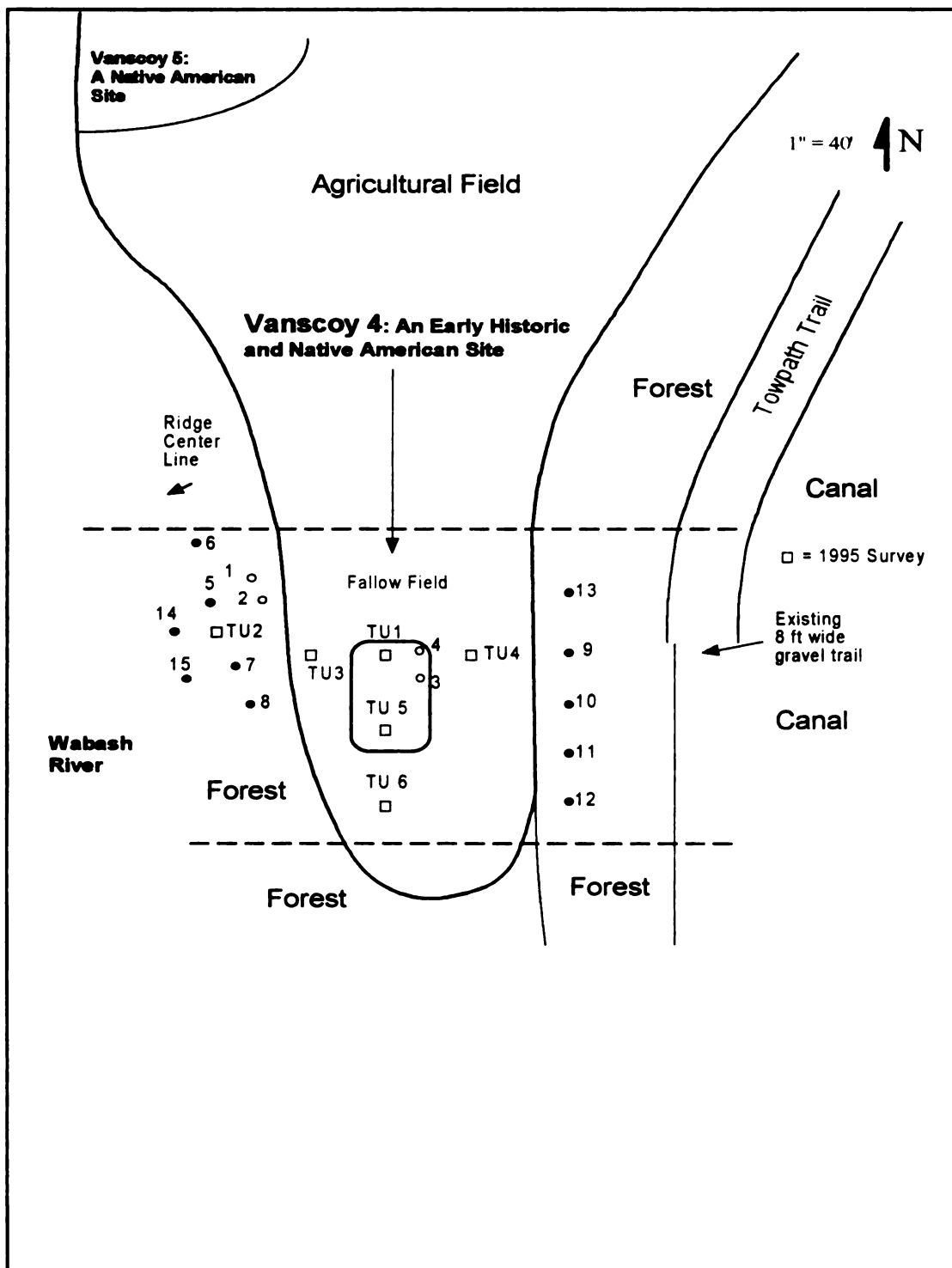
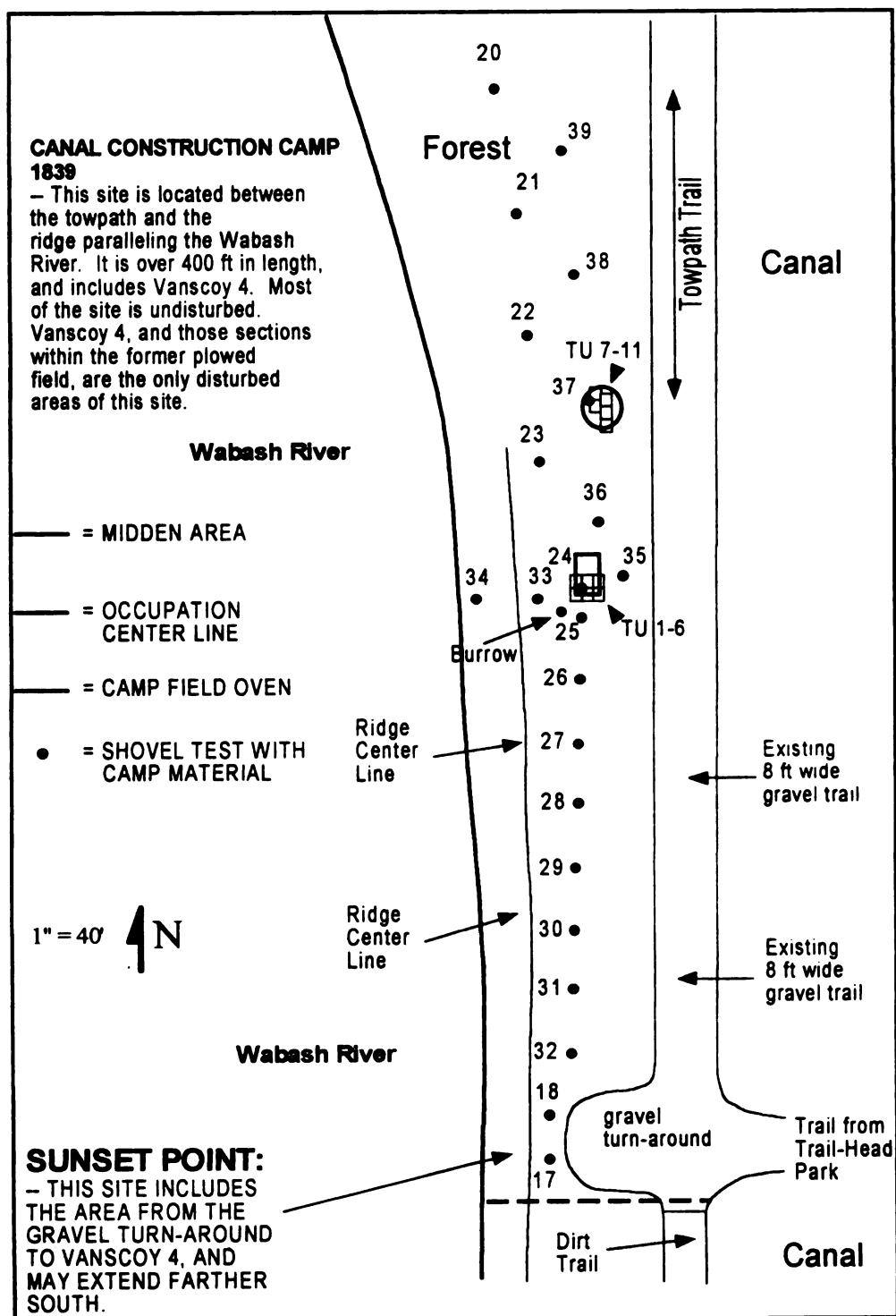


Figure 17: Southern Section of the Canal Construction Camp Site.



The 1995 survey of the Sunset Point area was most important for the Native American occupation identified beneath the canal construction camp layer. Test Unit 2, with the dimensions of 3 ft. x 3 ft., did not produce historical materials from the construction camp, but did locate an extensive Late Woodland (A.D. 800-1400) occupation. The total depth of this test unit was 6.1 feet, with the Native American occupation being between 1.6 feet and 4.5 feet in depth.

Native American artifacts encountered chert flakes (including heat-treated samples), lithic tools, fire-cracked rock, and slate. Bone, ceramics, and mussel shell (some burnt) were also found in most levels. Ceramic sherds, including rim sherds, were also found. Shell-tempered and smooth surfaced sherds were found in the upper levels of Test Unit 2, with grit-tempered and cord-marked sherds being found at lower levels. Animal bones were also found, representing a variety of species types. A small hearth was found at the very bottom of the Native American occupation. This hearth was bisected by the west wall of the unit, and consisted of a large amount of charcoal and burnt mussel shells.

The Sunset Point area was again studied in 1996, with three more test units being placed within the disturbed plowzone area in the northern part of the site. These test units found a small number of early historic artifacts within the disturbed layer, with Native American artifacts mixed in. An undisturbed inch or two was consistently located beneath this disturbed layer, which contained Native American artifacts, including chert, FCR, and ceramic fragments.

The four shovel tests were placed along the Wabash River ridge line, which recovered Native American artifacts exclusively. Artifacts were first encountered at

roughly the 1.75 foot mark, and proceeded down to the average shovel test ending depth of 2.5 feet. Because of the deep deposits indicated by Test Unit 2 (1995), artifacts probably continue down beyond this point.

The age of the Sunset Point Native American component could not be determined from the artifacts recovered by these 1996 tests, though a Late Woodland (A.D. 800-1500) occupation was probable, based on information recovered in 1995 (Bischoff 1996). The ceramic sherds recovered followed the same pattern as seen in Test Unit 2 (1995), with shell-tempered, smooth-surfaced fragments being found higher in the test units than grit-tempered cord-marked sherds. This difference was interpreted in 1995 as a transition from an Early Late Woodland to Late Late Woodland occupation (with the shell-tempered vessels being the later of the two).

Five shovel tests placed along the canal towpath recovered no artifacts, with an average depth of 1.5 feet being reached. No complex stratigraphies were encountered. Two additional shovel tests were placed closer to the Wabash River and off of the ridge top. These shovel tests were also negative for artifacts, with an ending depth of almost 2.0 feet.

The historic ceramics recovered at the northern part of Sunset Point test units dated to between 1820 and 1840, and included a wide variety of styles and glaze types (purple transfer-print, blue hand-painted, polychrome sprigware, edge impressed and painted, Historic Blue, whiteware, and pearlware). Unfortunately, most of the historic component in the field area had been disturbed by plowing. The several test units placed to date in the center of the plowed area (TU1 and TU3-6) had recovered no features or structural evidence of the construction camp (Bischoff 1996 and 1997).

By observing artifact densities alone, it can be demonstrated that a centralized area within the northern part of Sunset Point was the location of most of the historic artifacts recovered in 1995 and 1996. Shovel tests on the Wabash River ridge and the towpath margin proved negative for historic artifacts, as did the plowed agricultural field to the north of Sunset Point. It appeared, therefore, that early 19th Century activity was directed to the south, between the river and the towpath. This interpretation matches evidence from the undisturbed parts of Sunset Point, that the early historic occupation in this region was primarily engaged in construction activities in the Deer Creek Dam area.

The undisturbed part of Sunset Point, an early 1800s canal construction camp, was located in 1996 south of the plowed field and between the Wabash River and the Wabash and Erie Canal towpath. This section of Canal Park lands was not tested by the archaeological surveys of 1993 or 1995. Initial testing at Sunset Point was along the top of the ridgeline bordering the Wabash River in hopes of finding Native American deposits like those found in the northern part of Sunset Point. In Test Unit 2 of this area, Native American materials were first encountered at 1.6 feet beneath surface. It was expected that shovel tests of this depth would find evidence of any Native American activity at Sunset Point.

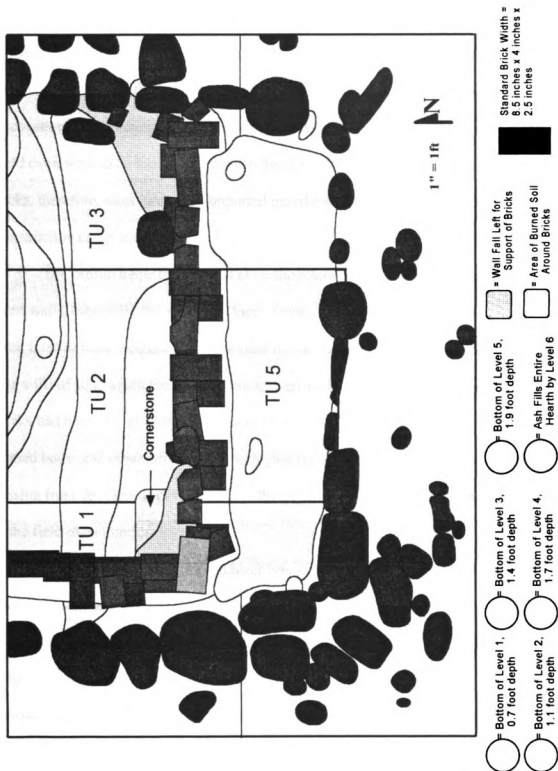
Four shovel tests were also placed at the west ends of two gravel turn-arounds to test for subsurface stratigraphy along the ridge, which may be impacted by trail construction west from the turn-arounds. These shovel tests did not find any canal-era artifacts or Native American materials.

A number of shovel tests were placed along the ridge top west of the Wabash and Erie Canal towpath. No artifacts were found. A single shovel test, Shovel Test 23, was placed in the depression between the towpath and the river ridge instead of on the ridge top. This shovel test found a number of soft-paste whole bricks.

Eventually, six test units (TU1-6) would be used to expose just a portion of the large field oven discovered by ST23 (Figure 18). Shovel Test 23 itself became the southeast corner of Test Unit 1. The field oven exposed had a unique construction. The inner wall consisted of eight courses of unmortared brick, with several bricks built back into the earth surrounding the outside of the wall. The purpose of these extended bricks was to form tie-backs, which supported the wall and reduced the chance for collapse of the structure. These tie-backs were staggered to increase the total surface area. This tie-back construction pattern was very similar to Wabash and Erie Canal engineering features, which used tie-back logs to give strength to wooden structures, such as locks, wharves, and waste weirs.

A cut limestone cornerstone was also placed at the southwest corner of the field oven interior. It was unclear whether this stone was used as support for the wall, or support for a structure for cooking food (such as a large iron spit). The corners of the field oven could not be fully excavated as wall fall held up much of the unstable brick wall in the corner areas.

Figure 18: The Construction Camp Field Oven.



A large outer wall of unmortared stones and cobbles was set out from the brick wall by 0.5 to 1.5 feet. The final excavation depth for this feature of the field oven was 1.1 feet. Additional excavating in Test Unit 5 revealed that many more stones were exposed with greater depth. The stone wall exposed would probably fill in with deeper excavation. It is interesting to note that no rocks or cobbles such as those used in the field oven were to be found anywhere in the Sunset Point vicinity. This large amount of rocks, therefore, must have been imported into the area for use in this specific construction camp feature.

The profile maps for the field oven show how many bricks are missing from the oven walls, especially from the west face. Bricks found during excavation of the field oven interior were weighed and sizes were noted. Between the bricks and the stone wall was a fill of soil, which the tie-back bricks were embedded within. This area behind the bricks had been disturbed in a few places by rodent burrows, which had brought ash, burned bone, and other artifacts up into higher layers. There was no evidence of rodents passing from the interior of the bricks to the exterior. A single rodent burrow was located in the field oven interior.

At a depth of 1.1 feet, an ash layer was identified between the brick and rock wall. Along with the ash layer was sterile soil placed between the tie-back bricks. This soil immediately behind the bricks had been colored red-orange by the intense heat of the field oven. The ash layer identified between the brick and rock walls was uniform in consistency and in elevation. This layer was encountered at the same depth in TU4-6, and appeared to be construction-related and not use-related. Test Unit 5 was excavated

between the bricks and the rocks to test for the stratigraphy of this ash layer. Test Unit 5 below level 2 was excavated in 0.25 foot levels.

The stratigraphy revealed by Test Unit 5 showed that the gray-white ash layer was continuous down to 1.6 feet in depth, with an additional layer of white-colored ash of 0.2 feet beneath. The final two layers above sterile soil found by TU5 consisted of an orange-colored burned soil layer beneath the ash, then a maroon-colored soil layer immediately above sterile. A distinct and close-fitting wall of placed rocks was also exposed along the south face of this test unit. No artifacts were recovered from any of the orange or the maroon-colored soil layers encountered while excavating the field oven, though burned land snail shells were found.

Artifacts found by TU5, levels 3-5, were all from the two ash layers, and were almost exclusively of calcined bone fragments. These bone fragments were very similar in condition and type to those found within the field oven. No ceramic or glass samples came from within TU5, though several square nails were found within the ash layers. A slightly decorative horn comb fragment was also found in TU 5, Level 3. The bones recovered are uniformly burned, suggesting that they were brought to an intense heat prior to or during the deposition of the ash layer, and not burned while in-situ by heat from fires interior to the brick wall. Other sections of the area between the brick and the rock walls were not affected to the level of heat that would have been necessary to generate the calcined condition of the bone, though they were equally exposed to the heat from the interior of the field oven.

Several cobbles from the outer wall or hearth area had fallen into the field oven interior while it was being used. These stones demonstrated multiple spalings and

fractures from the intense heat. Several stones of the hearth were also discolored by the heat of the field oven interior. None of the stones that made up the south wall of TU5 demonstrated any of these intense-heat morphological changes. This suggested that the ash in TU5 came from someplace else, but was placed between the brick and rock walls while still hot enough to affect the soil.

The area within the field oven was also excavated. This excavation took place in Test Units 1 through 3, was conducted to a 2.75 foot depth overall, and only involved the area interior to the bricks. The south wall of TU2 was excavated to 3.0 feet to expose the sterile soil for the profile map. Artifacts recovered from the three interior test units (TU1-3) included hand-blown glass bottle shards, blue-edged and scalloped plate fragments, clay pipe pieces (including some that were glazed brown or green), a single purple transfer-printed sherd, a gunflint spall, square nails and nail fragments, tin fragments, metal strapping and braces, and many calcined bones. This assemblage of artifacts dated to 1830 to 1840, based on the ceramics recovered.

The stratigraphy along the south wall of TU2 was much different than in the center of the field oven. The southern wall stratigraphy showed a number of deposition events, including one where burned sterile soil was placed on top of older ash deposits. What this stratigraphy was probably revealing was a number of ash cleanings, where ash from the middle of the oven was piled in the corners and the edges of the field oven. The burned sterile soil was probably from a cleaning that dug into the dirt floor of the field oven.

The excavated depth of the center of the field oven was deeper than the depth of the ash layer revealed by TU5 on the exterior of the brick wall. The burned sterile soil

beneath the ash layer in TU5 was 0.2 feet higher in elevation than that revealed inside the brick wall. It was clear from the profiles and artifacts recovered from within the brick wall area that this section was being used to cook a large amount of food. It was unclear, however, what the purpose was of the ash-filled area south of the bricks.

The ash-filled area represented by TU5 was completely enclosed by the outer wall of stone, showed little stratigraphy which would suggest active use of the area, demonstrated the same burned soil beneath the ash layer which indicates a high level of heat, and proved to have a very flat top for the ash layer which was unlike the undulating surface exposed by TU1-3. Seeds recovered from TU5 also indicated that much more local brush was used as fuel, as represented by the higher number of Seeds Type 1 present when compared with the interior of the field oven.

Comparing the ash deposit tested by TU5 with the ash layers interior of the bricks excavated by TU1, 2, and 3, several differences can be observed. Test Unit 5 (ash) had no ceramic sherds, no pipe fragments, no egg shell, no 0.75 inch nails, no glass, and no metal. Burned corn was also recovered at a higher frequency interior to the bricks.

Test Unit 5 (ash) also had more seeds Type 1 present than found in TU 1-3. This seed type comes from an unidentified plant that still grows in the Sunset Point area in **prolific numbers**. Dried parts of this plant were apparently used as tinder or fuel for fires **at the** construction camp. TU5 recovered 54 whole or partial seeds Type 1 to a total of 6 **for the** entire ash deposit within the bricks.

All the ash levels for TU 1-3 and TU5 were bagged and screened using fine **window** mesh. What was left was hand screened through 1/4 inch screen. The residual **was bagged** and saved for later analysis. The residual from TU1 and TU5 were analyzed

by a volunteer Michigan State University student. The fine water screen analysis results are very similar to the analysis already given for artifacts collected using 1/4 inch screen. TU1 contained examples of metal, glass, and eggshell; whereas TU5 had none of these except for a single tin fragment. TU5 contained a much greater weight of seeds (the vast majority being again of Type 1) than the interior unit. The similar weights of the bone samples for both areas was also expressed.

This ash area between the rocks and the bricks may indicate an earlier dumping of hot ash and coals from the field oven or from another fire pit, perhaps placed around the bricks to discourage plant growth or rodent burrowing. It also may have been placed as part of the field oven to act as insulation for the heating process, much like the fill between the inner and outer lime kiln walls. The soil behind the bricks would have supported the brick wall structure, but the ash would have insulated the cooking chamber; retaining heat and making sure the stone outer wall did not crack.

A third possibility was that the ash and oven residue was used during construction just as fill for the area between the bricks and the rock wall. This would result in no special purpose for the ash layer excavated by TU5. The inner brick wall may have been used as the field oven until rocks were available, then it would have been cleaned of ashes, which were then used as fill.

A later occupation than that of the canal construction camp was represented in the field oven test units by a number of artifacts recovered from Level 2 (0.8 to 1.1 feet). These include unburned pig mandible fragments, a number of small and medium-sized animal bones, two clay pipe fragments, and several square nails. This artifact collection

was similar to that found in the 1840-1860 occupation layer of TU 7-11, and probably was part of the same occupation event.

After locating the field oven, it was decided to test the area north and south of the field oven with a transect of shovel tests placed at 20 foot intervals. These shovel tests were placed in the low area between the towpath and the Wabash River ridge. The average depth for these shovel tests was 1.5 to 1.8 feet in depth. A soil change was visible at 0.8 to 1.0 feet for all these tests, where a lighter-colored silty-loam soil emerged. This soil change was visible at the field oven at a 0.7 foot depth.

The shovel tests south of the field oven found only a single square nail fragment and small quantities of charcoal. However, as TU7 and TU8 later revealed, the depth reached by these shovel tests was not adequate to cover the maximum depth for finding canal-era artifacts. Additional shovel tests were also placed to the east and west of the field oven, with no artifacts being found. It was next decided to place a transect of shovel tests to the north of the field oven, with an interval of 40 feet, and located so that they would fall exactly between the first line of shovel tests placed in this area.

The shovel tests north of the field oven recovered a number of historic artifacts. These included brick and charcoal fragments, aqua pane glass shards, square nails, and animal bone. One shovel test recovered early 19th Century ceramic sherds. It was decided that a test unit would be excavated to further explore this shovel test.

Test Unit 7 eventually identified a large sheet midden roughly forty feet north of the field oven. Eventually, five test units were excavated at this location, finding a large

amount of early 19th Century ceramic, bone fragments, metal nails and other objects, and a number of brick fragments. Artifacts recovered dated to between 1820 and 1840.

Comparing all the test units excavated north of the field oven, the canal construction camp occupation appeared in a consistent layer of 0.5 to 0.6 feet in thickness, but at a variable depth beneath the surface. The horse trail, root activity, and uneven soil build-up appeared to be the main causes of this difference in depth below surface for the construction camp layer.

In many of the test units, a later occupation was identified by square nails and charcoal fragments. Based on organic build-up over the canal construction camp layer, this second occupation probably took place between 1840 and 1860. This second occupation might have been associated with one of the many reconstruction and repair operations that involved the canal during this time.

Artifact distributions revealed some information about the nature of deposition within the construction camp midden, and about the lifestyle of the Irish workers who lived there. Two separate dumping episodes were observed within the distribution of bone and ceramic sherds within the test units of the midden. The majority of ceramic fragments were found in Test Units 7, 8, and 9, with TU9 being the epicenter of ceramics for all the units.

Bone fragments were similarly plotted. In this case, Test Units 9, 10, and 11 were shown to have the highest bone densities, with TU10 being the epicenter. These three test units also had the majority of burnt bone, with TU11 being the epicenter.

It appeared from this data, then, that Test Unit 7, 8 and 9 experienced a separate dumping event, which involved mostly broken ceramics. This material had a large

spread pattern from the epicenter in TU9, as demonstrated by refits occurring in all the test units, but had a distinct center of concentration. The second identifiable event involved the dumping of bone and burned bone fragments, centering on TU10, but spreading out into TU9 and 11. Bones probably spread into all the other units as well. It was also suggested by the ceramics recovered in Test Unit 10 and 11 that two different dumping phases took place. Ceramic sherds from these two units were mostly smaller, individual pieces with one or no refits, and little refit association with the other test units.

No stratigraphy could be identified within the construction camp layer for Test Units 7-11, and the high number of inter-level refits for ceramics suggested that the two episodes were close enough in time to form into one larger midden. It is also unknown from the data which dumping came first, or if both were part of a single overall dumping event.

The construction camp midden found in Test Units 7-11 gave insights into the lives of the Irish workers who once lived at Sunset Point. Several Indiana state government documents described provisioning the canal workers and constructing shanties for them and their families (see project area history section). An interesting piece of information gathered from the ceramics is that, even though construction at Deer Creek lasted only one year (1839), the ceramics recovered suggested a much longer occupation if taken at face value. Pearlware ceramics, both edged and of the "Old Historic" style, mostly were phased out by the middle of the 1830s, with whiteware transfer-printed styles being manufactured. The date range for the ceramic vessels was 1820 to 1840, based on style, decoration, and paste (Majewski and O'Brien 1987, and Lofstrom et al 1982). It is likely that state contractors were provisioning the canal

workers were buying second-hand camp materials and odd lots from local merchants. This would explain the large ceramic date range.

The ceramics from both the construction camp midden and the field oven were almost exclusively flatware (plates of various sizes and platters). Very few cup and saucer fragments and no service pieces were represented. This was very different from the ceramic assemblages found at other 19th Century residential sites in the area, such as the Lock Keeper's House and Paper Mill Structure 6 (Bischoff 1996). At these sites, up to half the ceramic sherds found were from hollowware service pieces or cups and saucers. It appeared that a lack of service pieces and tea services were part of camp living -- only the minimum necessary for daily life being provided by the State of Indiana.

Other insights about the nature of canal construction camp life come from the faunal assemblage, both from the midden area and from the field oven. The State of Indiana mentioned many times the need for provisioning the Irish canal workers. Contractors for these provisions appeared to have provided cows and pigs as the main meat staples of the workers' diet. Corn was also represented in a number of test units.

A number of additional animal species were also represented at the camp. Fish bones were found in several units of the camp midden area, but only one fish vertebrae was recovered from the field oven area. Bird bones (probably from chicken and turkey) were found evenly distributed at both locations, as were egg shell fragments. Smaller game (rabbit-sized) were much more numerous in the camp midden, which also had the only evidence of burned mussel shells. Identifiable deer bones were also exclusively

found in the midden area (the unburned antler fragments found above the ash layer at the field oven not being counted within the construction camp occupation).

All of this faunal evidence suggested that the State of Indiana was providing the camp workers with a basic diet of cow, pig, chicken, eggs, and corn. The Irish added variety to their diet by hunting deer and smaller game, and by fishing in the Wabash River. Firearms apparently were present at the camp, based on the gunflint spall from the field oven, the musket ball from the sheet midden, and the number of lead slag fragments found (usually a by-product of musket ball manufacture).

Comparing the large and medium-sized fauna from the construction camp with the slaughterhouse fauna assemblage, patterns also emerged in meat processing. The Canal Slaughterhouse site was processing carcasses into side and hindquarters, disposing of the extremities and cutting through the vertebrae and proximal ribs as part of the process. The canal construction camp was getting their meat already processed into side and hindquarters. No large animal extremity bones were found at either the camp midden or the field oven. A few medium-sized animal extremities were found in the camp midden (represented by Test Units 7 through 12), but these might have been associated with the number of deer bones from that area. Cranial bones and pelvis bones were also noticeably absent.

The main identifiable skeletal elements found at both the midden and the field oven were long bone fragments. Ribs and vertebrae were also represented. No difference was visible in the processing of large versus medium-sized animals, as was seen at the slaughterhouse.

There was a difference, though, in the processing taking place at the field oven and at the camp midden. The field oven had mostly long bones represented; few ribs and vertebrae were present compared to long bone numbers. The camp midden showed a more even distribution between the three elements.

It appeared that, at the field oven, the side and hindquarters were being further processed into racks of ribs and haunches for cooking. The roasted meat was then removed from the oven for further processing into rib sections, steaks, and roasts, which would have been consumed throughout the camp, then deposited in middens near the shanties. Deer and other wild animals caught and used for food appear to have been entirely processed in the construction camp.

Some of this meat would have been consumed around the field oven (a traditional social setting), as evidenced by the number of plate sherds, pipe fragments, and bottle glass deposited in the oven. As the meat cooked, the fire would be fed using logs and brush from the surrounding forest (as shown by the number of Type I seeds present), and by using discarded construction material (which would explain the large amount of nails present within the field oven at all levels). Some type of provision crate or barrel that used 0.75 inch nails seems to have been a favorite item to throw into the flames. These nails made up half (24) of the total of square nails and nail fragments recovered from within the field oven. Only two similar nails were found in the five Test Units of the camp midden.

One of the interesting discoveries of the 1997 season of excavation at Sunset Point was the local impact the construction of the canal had on local water patterns. The stratigraphy of Sunset Point radically changed with the introduction of the canal. The

soil before the construction camp period was consistently made up of sandy-silt from the deepest depths to the construction camp occupation (see Bischoff 1996, Test Unit 2, profile, and Bischoff 1997, Sunset Point section). The construction camp occupation was noticeable in every unit excavated at Sunset Point by camp artifacts within a sandy-silt matrix. Several test units, however, also had camp artifacts in a silty matrix, which occurred higher up in the test unit. This silty matrix was found to make up the canal era time period for all the test units at Sunset Point. The end of the canal as a transportation system was clearly identified at Sunset Point, and at other sites along the canal, because of the shift from silty tan-colored soil to a dark brown loam.

The construction of the canal, therefore, changed the local water patterns along the canal. Free-flowing water, which deposited sand in its wake, was replaced by standing water along the canal. Many *Documentary Journal* entries describe the adverse affect of flooding on canal features and embankments located along Indiana's natural water system. Sunset Point describes this interaction in miniature. If the construction of the canal was significant enough to change the soil deposition of the area around the canal, then it would have been significant enough to alter the local water flow patterns as well. The invasive nature of the canal on the environment is thus described on the macrocosmic and the microcosmic scale.

Previous Archaeological Work in the Study Area.

In addition to the work completed by Michigan State University, two other archaeological projects directly relate to the Wabash and Erie Canal. During the summer of 1993, the canal was the subject of a large contract archaeology mitigation in

downtown Lafayette, Indiana. This project studied roughly nine city blocks of intact canal wharf impacted during Lafayette's rail relocation construction. A large number of canal-era and post-canal use artifacts were recovered, but the primary importance of this project was the study of canal wharf construction and its placement within an urban setting.

Ball State University in 1991 conducted limited testing of the Wabash and Erie Canal prior to highway construction around Fort Wayne, Indiana. One result of this survey was the location of the Gronauer Lock, which was part of the canal section between Fort Wayne and the Ohio border. The following mitigation revealed much about Indiana lock construction and maintenance (Cochran 1991 and 1991b).

A number of non-canal archaeological projects have taken place in the region over the last fifty years. Several of these were completed within or near areas in which the Wabash and Erie Canal is located. The following presents some of the more significant archaeological projects in the region, and is limited to those projects, which were located from the city of Lafayette in Tippecanoe County to where the canal crosses the Wabash River in Carroll County.

James O. Bellis of Indiana University conducted in 1966 a non-comprehensive archaeological surface survey of a proposed Army Corps of Engineers reservoir along the middle and southern forks of the Wildcat Creek, which is located just south of the 1995 survey project lands (Bellis 1966). This area consisted of 15 square miles, and was located about seven miles below the Wildcat Creek mouth in Tippecanoe County. Bellis, with the help of Mulvey, located 13 prehistoric sites within the area; none with historic components.

A more comprehensive archaeological survey of the proposed Wildcat reservoir project area was undertaken in 1976 (Guendling et al. 1977). Results of this survey identified 174 prehistoric sites along the middle and south fork areas of the Wildcat Creek, ranging in cultural affiliation from the Paleo-Indian through the Late Woodland. Also identified during the survey were four historic sites: a ca. 1830-1840 brick house, a mid-19th century Federal style house, an 1830-1890 mill site, and the site of an Indian massacre known as Spur's Defeat (Guendling et al. 1977). The mill and the two houses appear to be canal-related and part of the Wabash and Erie Canal agricultural and transportation system.

James R. Jones III of Indiana University completed in 1984 a survey of early historic sites in Tippecanoe County, concentrating on floodplains within and near the Wea Village across from Fort Ouiatanon, the Fort Ouiatanon area, and the area around Prophetstown and Kethtippecanonk near the mouth of the Tippecanoe River (Jones 1984). Part of this survey included areas along the Wabash and Erie Canal in Wayne Township. This survey identified 184 sites, 44 of which had an early possible historic component and 72 with later historic components which ranged from the 1830s to present. Few of these later historic sites fell within the time period of the Wabash and Erie Canal, and none appear to be directly canal-related. One of these sites was resurveyed by Michigan State University in 1993.

A Note on the Archaeological Data Collected.

The archaeological data presented above was further interpreted for this project so that the information uncovered by archaeological, as well as documentary, research could

be used in the analysis section of this work. In many cases, statistical formulae could only use the data after conversions and distillation of data took place. The vast amount of material actually generated by the four years of archaeology research within the project area could not all be presented in this chapter, but can be found in the number of field reports submitted to the Indiana State Archaeologist in the Division of Historic Preservation and Archaeology, Indianapolis, Indiana.

The next chapter deals with Central Place Theory and the statistics used for this project, and examines several case studies that used Central Place Theory in determining regional settlement patterns. The archaeological and historical data presented above will then be used with Central Place Theory to study the Wabash and Erie Canal project area.

Chapter 3

Central Place Theory

Central place theory deals with regional analysis. As has been stated above, the geographic region examined by this project includes parts of three central Indiana counties -- over thirteen linear miles of Wabash and Erie Canal and 200 acres of land on either side of the transportation system. The archaeological and historical data accumulated that deals with this project area, however, needs to next be placed within a central place theory context. To accomplish this, an introduction to central place theory and a statement of the compatibility of the project area with general central place theory concepts must be made. The following section will introduce classic central place theory and its modern modifications and critiques, and several case studies that have applied central place theory to regional studies. The next chapter will begin with a discussion of why central place theory can be applied to the Wabash and Erie Canal case study.

Classic Central Place Theory: Christaller and Lösch.

Central place theory developed as an explanatory model for why towns appeared at evenly spaced locations within a rural landscape. The first geographer to study this phenomena was Walter Christaller in the 1930s. Christaller's work resulted in central place theory, a model which explained regional settlement within a market economy under ideal conditions. August Lösch studied the same problem in the 1940s, and produced several modifications on Christaller's original work (King 1984: 7).

Christaller's central place model started with a number of assumptions. The primary assumption was that the location of market centers would be determined by competitive features of a market economy. Another assumption was that the landscape was a featureless isotropic plain, with the basic population dispersed in such a way to maximize profits and minimize costs. A mature central place landscape would have the entire region filled by farms, villages, towns, and cities. The ideal geometric form taken by the interaction of these various settlements is that of a hexagonal grid, the reasons of which will be explained later (Smith 1976: 10-12, and Paynter 1982: 31).

Because the ability to develop certain specialized functions are disproportionate across the landscape; some central places attract population and additional functions more than others. A system of central places with three levels of market centers, thus, is created. These market centers are part of a regional settlement hierarchy, where each market center at one tier (or order) is equidistant from all other centers of the same tier (Figure 19). Round market areas for each central place are transformed by competition with similar central places throughout the region, altering market areas into hexagonal forms (Figure 20). This hexagonal landscape form is repeated at each hierarchical central place tier (Smith 1976: 10-11).

Both Lösch and Christaller assumed an isotropic plain and a static time element when developing their two versions of CPT. Lösch added to these two conditions several further assumptions. One was that the agricultural population, which formed the basis of the regional settlement pattern, was evenly distributed as another criteria. This criteria denied any feedback relationship between agricultural production and central markets and urbanization (Lösch 1954).

Figure 19: Basic Hexagonal Market Center with Surrounding Centers.

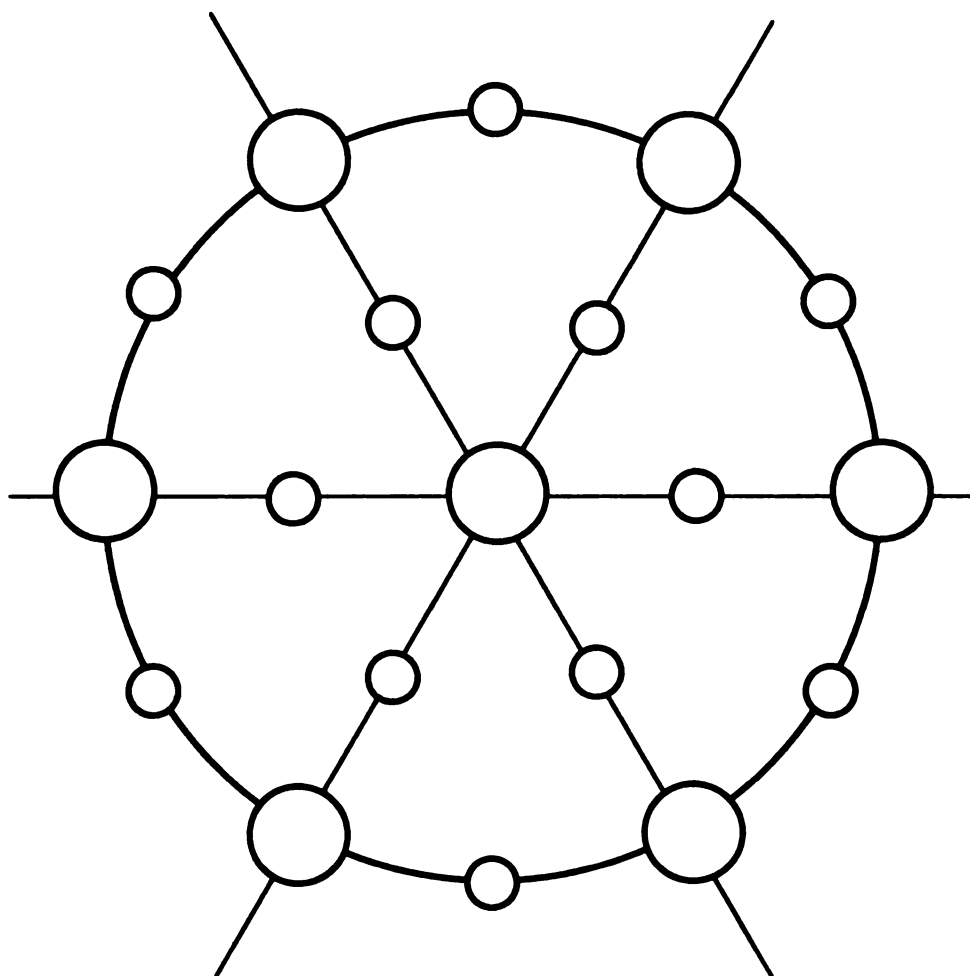
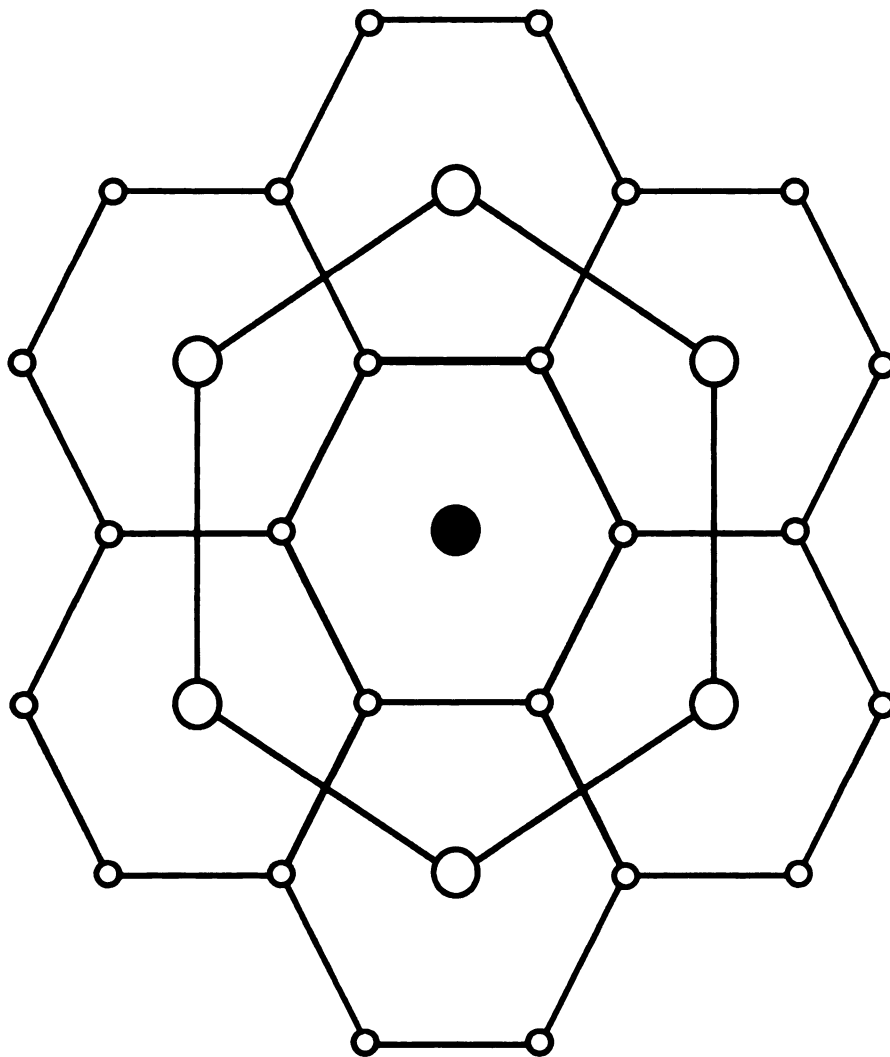


Figure 20: Fully Developed Christaller Hexagonal Market System.



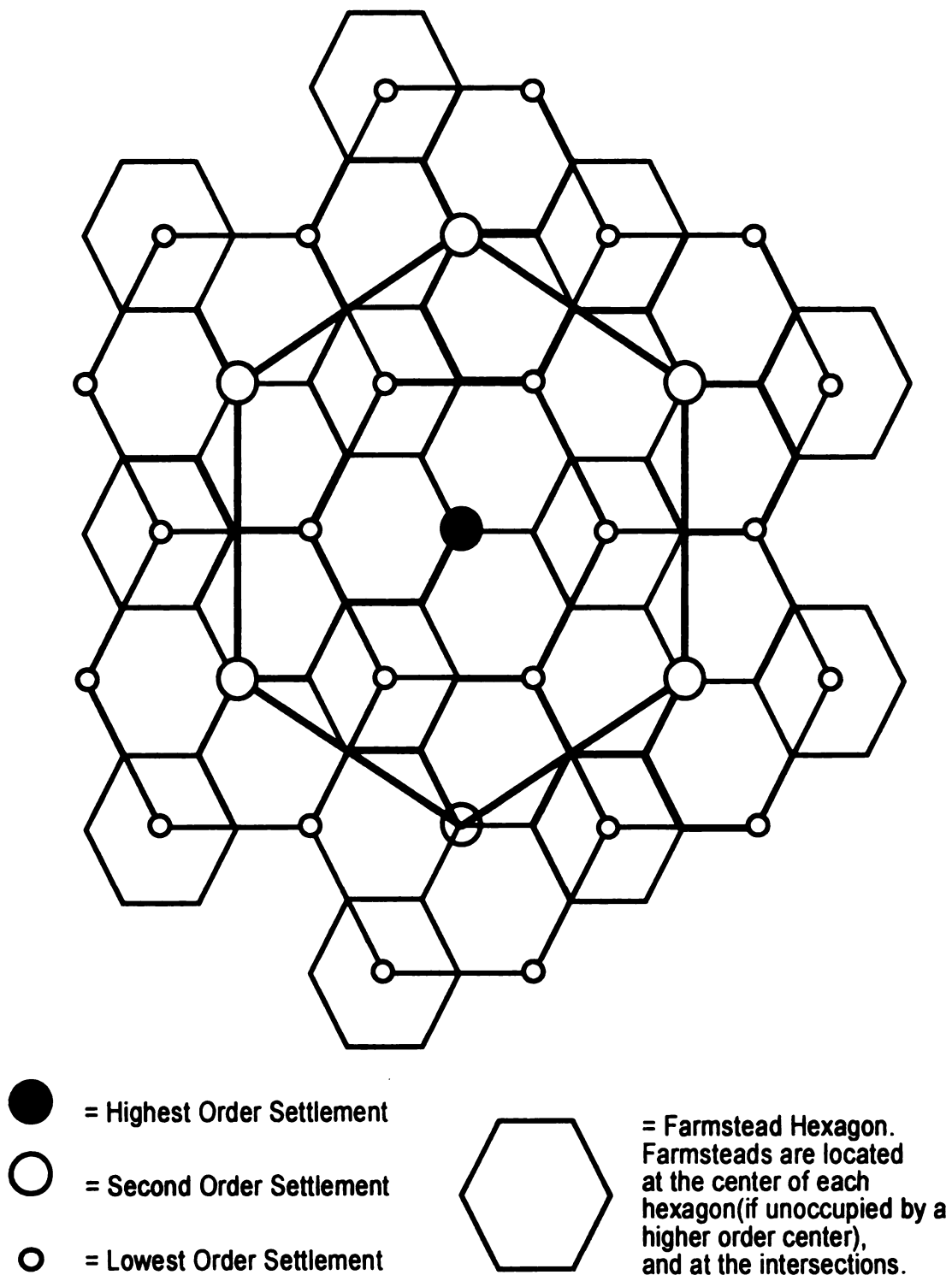
- = Highest Order Settlement
- = Second Order Settlement
- = Lowest Order Settlement

Lösch's other assumptions dealt with human behavior -- that settlements were located to maximize profits and incomes, and minimize costs. Consumer behavior was also indifferent to patronage (Lösch 1954: 94-97). Marshall notes that Christaller's original central place model also assumed that "a farming population is... distributed at a constant density" (1969: 12).

Lösch's acceptance of the farmstead as the lowest order unit was one of his major contributions to expanding central place theory. Overall, Lösch's hierarchy was much more complex than Christaller's (Figure 21), with the central area of a bounded region being more function dense than the periphery (Berry and Parr 1988: 71-74).

Marshall examines another of Christaller's original assumptions, that perfect competition exists, except for the factor of location, which can form local topographic monopolies -- and hence, central places (ibid: 12). Marshall goes on to link Christaller's CPT with modern economic theory by examining the model within ranges of goods, survival thresholds, and critical distances. He summarizes his interpretation of CPT as, "the supply of a good is economically feasible only when the maximum distance that consumers are willing to travel to buy the good is equal to, or greater than, the radius of a circle containing the threshold population (1969: 13). In CPT, this radius forms the basis of interaction between central places (Smith 1976: 13).

Figure 21: Lösch's Hexagonal Market System, Including Farmsteads.



Eventually the radius of a good in Cristaller's CPT meets that of other market central places, and the classic hexagonal form is generated (Marshall 1969: 14, and Smith 1976: 13). The differences between the threshold limits of various goods results in several actual radius limits projecting from a central place. Bread, for example, can be viably hauled a shorter distance than coal. Goods can, therefore, be ranked via their threshold requirements (Marshall 1969: 15-16).

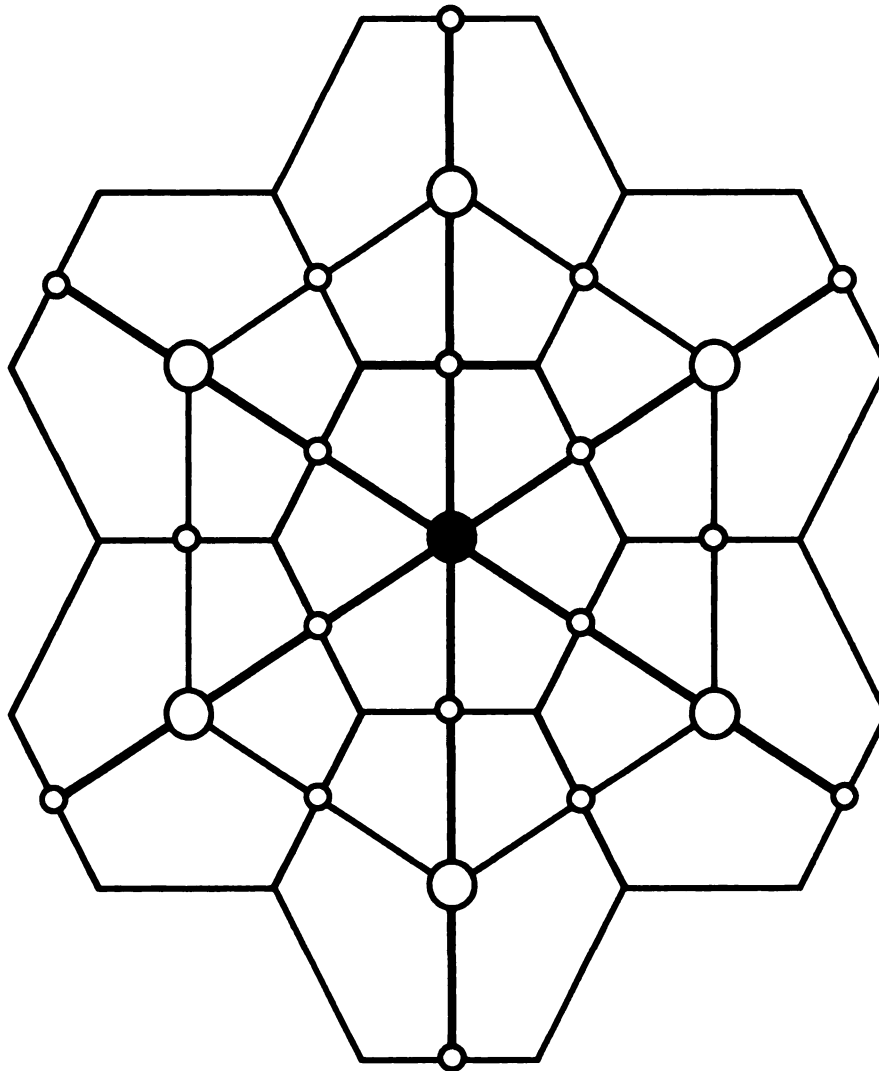
To optimize production, goods or functions with larger radii would be located at central places with greater distances than those central places that produce goods with smaller radii. The end result is the emergence of many small centers specializing in short radii goods or services (gas stations, as an example), and a few larger central places that contain lower radii services or goods and larger radii goods or services (an international airport, as an example). These centers with large radii good or service production are also located at specific distances from each other (Marshall 1969: 15-19). Again, this pattern is maximized with hexagonal geometric shapes. The same logic is used by Christaller to explain the rise of third and higher order central places (Smith 1976: 13).

Christaller developed his version of CPT by starting with the top, the highest order central place on the landscape, and worked his way down. Without going into central place formation timing or causality, he noted a general trend of suppliers moving out from established centers as demand rose to create new centers in the region. Smaller centers are added to the landscape concentrically around larger urban centers as the regional system grows (Smith 1976: 46).

Lösch, on the other hand started from the bottom and worked up when developing a central place hierarchy. Small centers provided basic necessities were the first central places to develop within a region, followed by larger centers as demand intensifies, with new centers being located at interstitial places between established centers (Smith 1976: 47). Lösch did not label this process an evolutionary sequence, but his ideas were later developed by Skinner into an evolutionary process, which began with the lowest central places within a hypothetical region (1964 and 1965). Skinner's evolutionary model centered on the growth of small markets, which stimulated center creation and the transformation of smaller centers into larger ones. Over time, the process fills up the landscape between established centers (1964 and 1965).

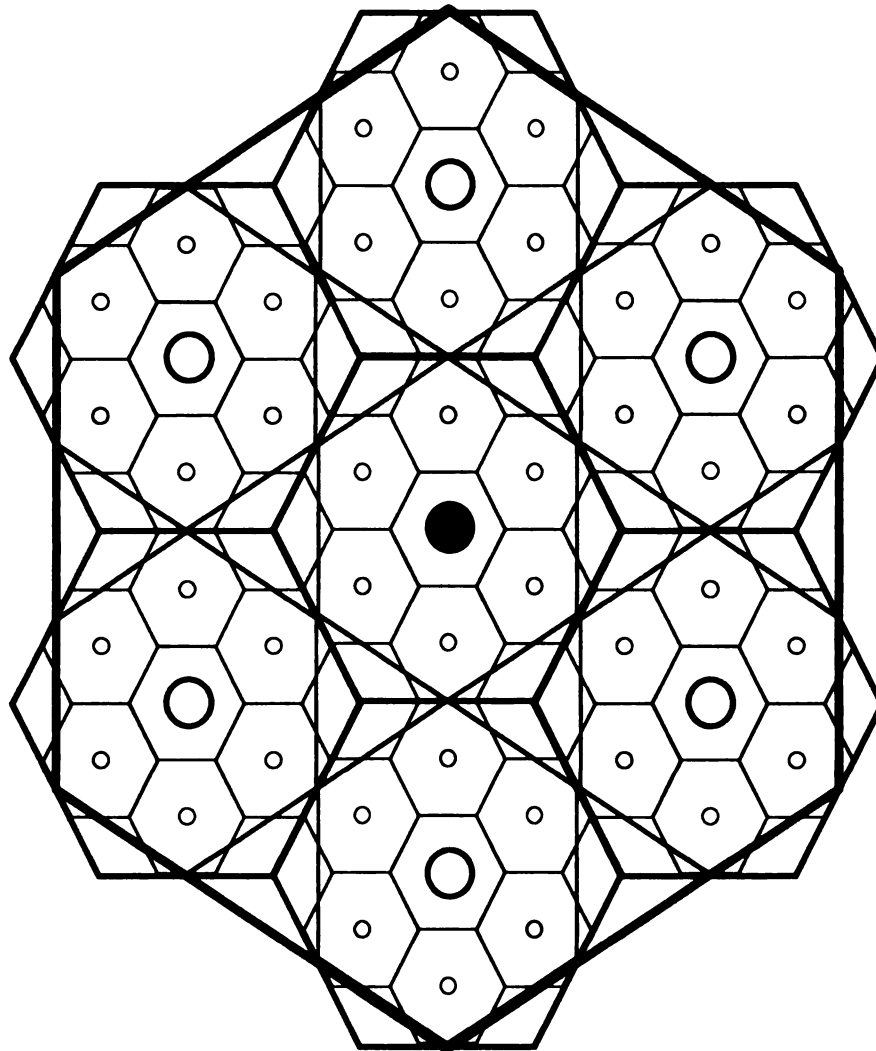
Christaller did come up with two alternative central place models to account for conditions with expanded criteria. His first alternative model involved his "traffic principle," where larger centers were connected by major roads (Figure 22). These roads attracted smaller order centers, located on the road so as to maximize regional transportation benefits. Roads linking lower order centers would in turn attract even lower order centers, so that the entire geometric landscape would be altered to take advantage of regional transportation systems (Marshall 1969: 29-31). Haggett (1977: 64) noted that the change produced by transportation skewing of central places comes about from the producer of a road to concentrate on maximizing movement within a region, not the minimization of a producer's product distance. Christaller's second alternative model, which he termed the "separation principle," involved an attraction of smaller order centers closer to larger centers to facilitate political administration and control (Figure 23) (Marshall 1969: 31-32).

Figure 22: Christaller Hexagon System with Settlement Focused on Transportation Routes Between Centers.



- = Highest Order Settlement
- = Second Order Settlement
- = Lowest Order Settlement

Figure 23: Christaller Hexagon System with Settlement Focused on the Administration of Lower Order Centers.



- = Highest Order Settlement
- = Second Order Settlement
- = Lowest Order Settlement

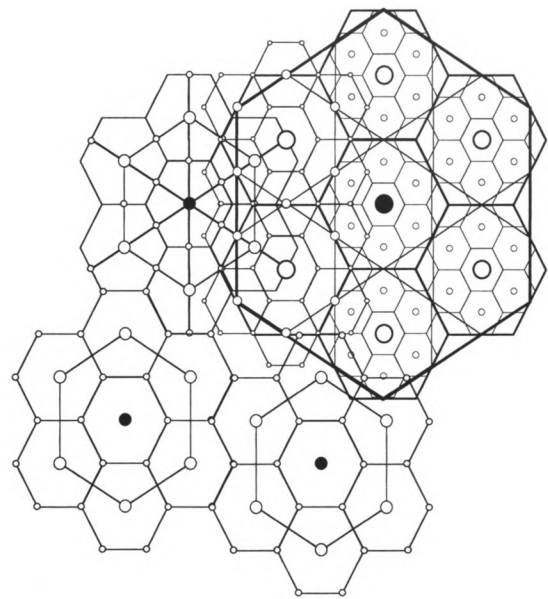
The Geometry of Central Place Theory

The geometric form resulting from market interaction within Lösch's and Christaller's central place modeling was that of a hexagon. A hexagon maximized each individual market area within a filled plain and under regional competition. Lösch added that the individual farm was the fundamental unit of this system, with production sites being located midway between three farms. In this case, only a limited number of hexagon sizes were possible. One service center can only serve 2, 3, 4, 7, 9, 12, 16, 19, 21, 25... farms, the size of which being dependent on economies of scale or transportation costs (Lösch 1954: 116-22).

Beckmann and McPherson examined Christaller's CPT rule of threes. This rule states that "each higher order center is surrounded by six n th order centers, each of which is equidistant from a total of three higher order centers. There are thus $6/3 = 2$ n th order centers for each center of highest order" (Beckmann and McPherson 1970: 30). They then go on to give the quantitative formulae for the geography of CPT hexagonal patterning, and the three variations of such (transport-oriented, market-oriented, and administrative-oriented) and the statistics of each.

Modern CPT has refined Christaller's hexagonal grid structure by adding physiographic or population influences (Berry and Parr 1988: 94-103), or by reexamining the relationship between geometric structure and center order hierarchy (Woldenberg 1968, Parr 1978, and Tinbergen 1960). Woldenberg's alternative model (Figure 24) is given as an example.

Figure 24: Modern Hexagonal Grid Structure, Based on Woldenberg's Model.



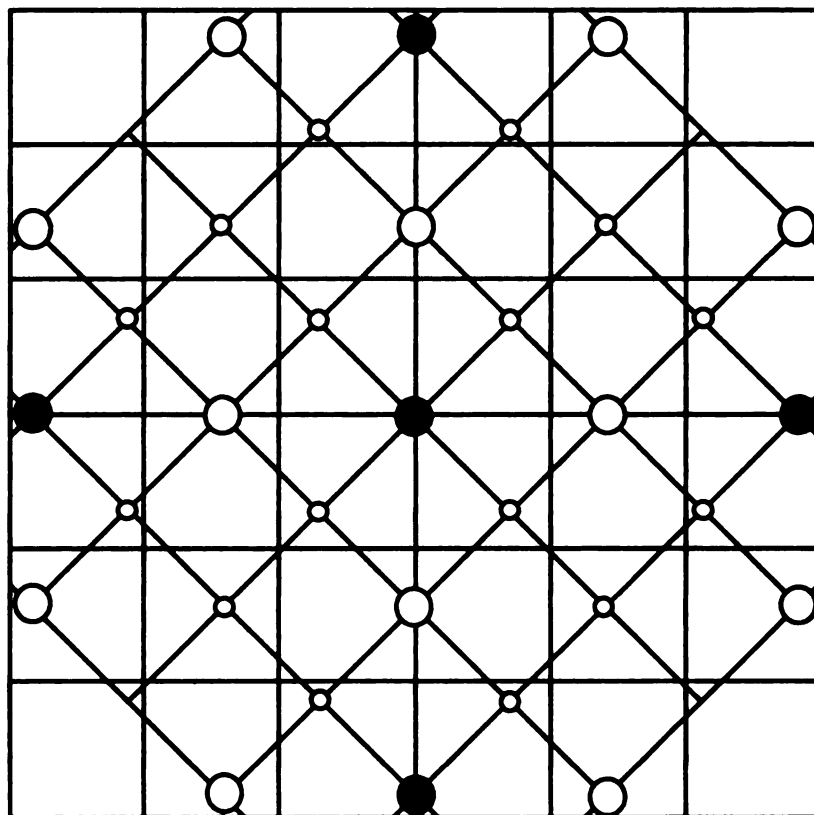
- = Highest Order Settlement
- = Second Order Settlement
- = Lowest Order Settlement

Berry and Parr also note that regional studies have experimented with square grid systems, which match well with 19th Century United States land surveys (1988: 64-68). Haggett also examined the interaction of the square base unit within a region. Haggett (1977: 65-67) stated that the optimum pattern would be for local roads to bisect square land plots directly in the middle, which would facilitate resource bulking and transportation at the farmstead level (Figure 25). In reality, the construction of public roads by central authorities at higher levels than the farmstead led to roads being created along the edges of square plots, so as to reduce the overall cost to the township or county.

Functions and Settlement Size in Central Place Theory

Another prediction of central place theory involves market complexity. Central place theory predicts that higher order market centers will have higher order functions, as well as all lower order functions. Lower order centers will not have higher order functions. A village (a lower order center) placed equidistant between two major cities (higher order centers) is an example of this, where both the village and the cities will have retail stores (a lower order function), but only the cities will have a mass transit system (a higher order function). As Hodder and Orton (1976: 60) stated, "Centres of each higher order group perform all the functions of lower order centres plus a group of central functions that differentiates them from the lower orders."

Figure 25: Haggett Settlement Pattern, Based on a Square Grid System.



- = Highest Order Settlement
- = Second Order Settlement
- = Lowest Order Settlement

An alternate model to CPT is the “rank-size rule,” originally put forth by G.K. Zipf in 1941. This rule states that,

“settlement systems often have a settlement population size distribution such that when these settlements are ranked in a descending array by population size, a settlement of rank r has a population equal to $1/r$ that of the largest settlement in the system” (Johnson 1977: 496).

The “rank-size rule,” therefore, predicts that more smaller-sized settlements would be found than larger settlements in proportions different than the geometric predictions put forth by CPT. The “rank-size rule” effect has been attributed to a number of causes. Berry speculated that it comes from the economic gains of centralized labor. Smith attributes it to, “... the economy in which competitive forces, necessary to a regular commercial central-place hierarchy, are minimized” (1976: 32).

Several authors have attempted to reconcile the differences between CPT predictions and the “rank-size rule.” One suggestion has been that, by expanding the area of study, the settlement size versus settlement function number curve evens out into a much straighter curve, such as predicted by CPT (Berry 1958: 83-91, and Marshall 1969). Smith summarizes this situation by stating:

“In effect, disturbances created by any number of non-isotropic conditions – variations in population density or demand, landscape irregularities, differential distribution of transport facilities, and the like – would shift centers out of line with one another, even though they might be identical with respect to regional central place functions (1976 b: 29).

It is the influence of these skewing forces, then, that could be producing the “rank-size rule” curve of settlement distribution (Johnson 1977: 497). Johnson concludes

that the “rank-size rule,” however, is consistent with the functional hierarchy of CPT (1977: 499). He also states that the overall deviation of the settlement curve from that predicted by CPT in itself can lead to new analytical and research questions.

One drastic version of the “rank-size rule” is a “primate” distribution of settlements within a region. In this case, larger settlements are much larger than expected and less in number, and smaller settlements are much smaller than expected and much larger in number (Berry 1961: 573-87). This “primate” situation is common in colonial settings, where administration and political control is more important than market forces.

Modern Versions of Central Place Theory

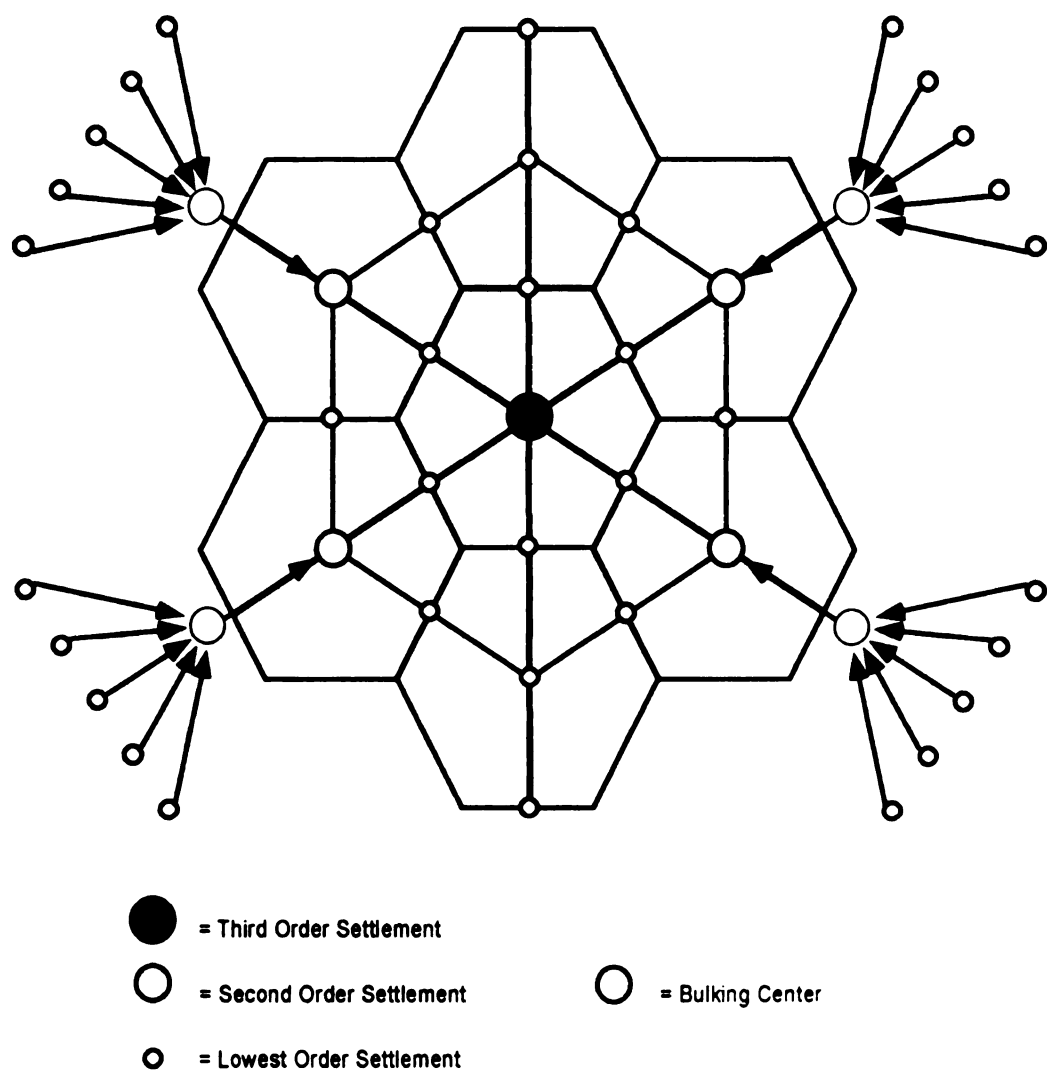
A modern variation of the classic central place landscape involves periodic markets. In this case, periodic market centers emerge for only part of the year, thus forming actually two or more geographic central place landscapes within the same region (Berry and Parr 1988: 126, and Smith 1976: 15-18). Skinner’s study of market systems in China has dealt with this CPT variation. His work demonstrated that the region normally had a five tiered central place hierarchy. The three lowest tiers had periodic markets, which formed and were disbanded at regular time periods (1964 and 1965). Periodic central places have been found by geographers in other parts of the world, including India and West Africa (Berry and Parr 1988: 128-130). Schwimmer also suggests that periodic markets may be an evolutionary stage in the formation of a mature regional central place pattern (1976: 123-145).

In non-market systems, movement minimization, activity area centralization, functional maximization, and distribution maximization can be examined using central place theory. This expanded modeling has been applied to a number of archaeological situations, including Mesoamerica, North America, Europe, and Mesopotamia (Johnson 1977: 495).

Johnson also suggested that centralized locations are chosen for their ability to be an efficient administrative center, for their history (time-depth) as a regional focus of settlement systems, and for a minimization of center to village (or village to farmstead) movement costs (1977: 473). Johnson (1977: 473) also stated that it is the minimization of movement that favors the development of multiple regional centers when regional development reaches a critical size. Over time, regional development would lead to spatial uniformity of centers on the landscape.

Another modern central place concept is that of “Dendritic-Merchantile Systems”. In a dendritic central place settlement pattern, trade routes are controlled in such a way that market interaction flows in a dendritic fashion, and not in a uniform hexagonal fashion (Figure 26). Goods flow from first order centers to a single second order center, with no competition available to allow a shift to more economical centers. These second order centers serve exclusively a single higher order center, and so on, until one or two primary centers become the sole focus of all regional trade (Smith 1976: 34).

Figure 26: Dendritic Central Place Theory: Market-Reducing Collection Centers Attached to a Classic Central Place System.



The dendritic system follows a tributary pattern, much as streams entering larger river systems, and eventually a single primary river system. Central Place spacing still occurs, but the form of the lower order centers is spherical and not hexagonal because of the lack of competition between centers at the lowest level (Smith 1976: 34). The standard central place hexagonal form reemerges at higher orders in the region.

The economic nature of such a system is based on resource and trade control or administrative restriction from higher order centers. The result is an exploitative situation, where the overall lack of competition leads to a disproportionate number of lower order centers of smaller than expected population size (Smith 1976: 34).

This type of central place system has been studied by Vance (1970), who developed a similar alternative central place model where development was also from the top downward, in the attempt to explain variations found in colonial central place development. His model, referred to as the Mercantile Model, identified the role of international trade in the initial establishment of central place systems. Merchants seeking new markets and resource areas established centers at the edges of local systems and pushed central place development into the interior along linear routes (Smith 1976: 47). Over time, central places along the lines put forth by Christaller would develop in the interior, projecting outward from the initial lines of advancement. As development occurred over time, the initial points of trade maintained their dominance and eventually emerged as regional or national economic centers (Vance 1970:151).

The major differences of Vance's model when compared to classic CPT are that the first stages of central place formation were caused by external forces. The Mercantile

Model also predicts a linear rather than a concentric pattern of settlement and urban development (Smith 1976: 47).

Johnson's re-examination of Vance's Mercantile Model prompted him to label Vance's model a dendritic-type situation. He notes that the normal interactive processes of competitive central places has been disturbed by colonial dominance of regional commercial interaction, resulting in noncompetitive colonial centers instead of normal CPT competing markets (Johnson 1970: 83-92).

Schwimmer refutes this notion, stating that Vance's model and dendritic CPT are actually two separate situations. Vance's model can be applied to all systems of trade where most commercial interaction takes place on a long-distance wholesale basis. Competition among firms emerges within larger centers of exchange than among competing centers. As Vance (1976: 128) stated, "The result is an integrated system of local and import-export trade, expressing central-place formation at the lower levels and mercantile formation at the upper levels."

Kelly also studied the modern Navajo economy, concluding that powerful white merchants were able to control the flow of goods into and out of the Navajo Reservation via control of a few key higher order market centers. Poor roads, geographic isolation, and limited transportation routes facilitated this control. The result was a dendritic central place system, where major suppliers dictated the terms of interaction with lower order centers (Kelly 1976).

Mintz has conducted a similar study of Haitian market interaction, which produced similar results. In the Haitian system, more first order market centers existed than expected, with only a few higher order urban centers. The Haitian economy placed

farmers in an unfavorable condition, which produced a dendritic market system (Mintz 1960).

Langhorn has studied dendritic CPT in Michigan lumber towns and has put forth a variation of this model. In his case, the railroad acted as the accumulator of surplus for the core area it serviced, but the railroad also acted as the middle order centers as well. Usually exploitative transportation systems that are designed to facilitate resource extraction in the hinterland use bulking centers along the route to accumulate resources. In Langhorn's case, railroad spurs were fanned off of the main trunk line for local area exploitation. Langhorn (1988) also noted that transportation system defined the resource path to the highest order center.

Critiques of Central Place Theory

Johnson notes that a major criticism of central place theory is that it is more applicable to retail marketing systems. When non-marketing systems are analyzed using central place theory, the model breaks down (Smith 1974). Hodder and Orton also note that attempts to apply CPT to prehistoric settlement systems with non-market economies have not produced predictable central place results and that other models appear to have better fits with prehistoric data (1976: 64-69).

Johnson pointed out in his discussion of the value of central place theory to archaeology that a developing settlement system with an uneven spatial distribution of agricultural settlements may not pass a crucial threshold for creating regional centralization. The potential efficiency from centralization of demand may not be gained until this threshold population density is reached (Johnson 1977: 493).

Another criticism of central place theory use in archaeology has been the association of functional size with population size. As Johnson points out, the population of a settlement does not necessarily pre-determine the functions covered by the settlement (Johnson 1977: 495). This project, fortunately, has many historic documents that list the functions covered by each settlement within the project area.

Geographers have found a strong correlation between settlement size and function (Berry 1967, and Webber 1971: 15-28). This relationship, however, appears to be curvilinear. In other words, as population increases, the functional size per unit of population decreases. Functional size estimates (number of functions) found within a settlement, therefore, can be inflated if only the population size is known (Berry 1967, and Garner 1967: 303-60). The difficulty for archaeologists has been in determining how large a prehistoric settlement was at a specific point in time (Johnson 1977: 495).

Johnson cautions against accepting results from archaeological studies that base functional size on non-direct measurements, such as population estimates (1977: 495). For this project, archaeological survey was able to prove the validity of several historic maps that expressed regional settlement via single dwellings. Historical documents also listed settlement functions. An accurate dwelling to function ratio could, therefore, be generated for all settlements within the Indiana project area.

Johnson notes that time depth is important when determining the overall settlement pattern of a region. A study area may be moving toward a steady state that is close to a predicted CPT model, or may be in a long-lasting stable "rank-size rule" state (Johnson 1977: 497-498). Johnson further notes that, as the study area increases, the affect of topography, population distribution, demand differences, etc., should skew the

settlement rank curve away from the predicted form. Borders could also affect the overall settlement study, as could lumping several isolated regional trade networks into one large regional study (Johnson 1977: 498).

M.J. Webber examined classic CPT and its underlying environmental and behavioral assumptions. Webber contradicts many of the behavioral assumptions, but asks, “how far from Lösch’s ideals may reality depart without invalidating the bases of the theory?” (1971: 23). To test the environmental assumptions of CPT, Webber created hypothetical finite areas with boundaries that forced the hypothetical regions into various geometric shapes (1971: 24-25).

The results of Webber’s tests were non-hexagonal patterns, especially at regional boundaries. Webber (1971: 25) also stated that land quality and other variables similarly changed the regional geometric shapes. He also noted that economies of scale and cumulative causation from increased urban densities would lead to functional results that diverged from CPT predictions. Webber, therefore, predicted a concave curve when function is compared with population size (similar to that created by the “rank-size rule”). He also notes that eventually, diseconomies of scale would be met, which would reduce the number of functions found within an urban center (1971: 25-26).

Hodder and Orton (1976: 84-85) also noted that the physical nature of a resource belt or of a bounded space can skew CPT results. J.W. Watson (1955: 46-47) concluded that social distance is just as important in determining overall settlement patterns as is transportation technology.

Berry and Parr critique CPT by pointing out that the system is examined in a state of equilibrium. No explanation of adjustments or change to maintain this state of

equilibrium are made. The systems are, therefore, “static” and do not contain any “dynamic” processes (1988: 76-76). They also note that changes can occur within a stable central place system, which involve the changing nature of the functions provided by a central place. In this case, consumer demand shifts would result in the rise or fall of a certain function, thus changing its threshold range, and possibly the overall market radii of a central place (Berry and Parr 1988: 105).

Another change not accounted for by CPT is a basic change in the number of structural levels within a regional central place hierarchy. In this case, forces precipitate a structural change in the hierarchy of a region, by either causing certain centers to lose population, or by causing the creation of a new order of settlement within the landscape (Berry and Parr 1988: 107).

Central Place Theory and the Problem of Settlement Timing

One major problem of classic CPT is that it cannot account for the processes that create centrality or the timing of central place development (Mitchell and Hofstra 1995: 128). As Marshall (1969: 40) has stated, “Christaller’s models... rationalize a state of affairs which is feasible, but they do not point to any evolutionary process by which their logical arrangements of central places could have come about.”

Martyn Bowden et al. (1971: 32) stated the problem as:

“By what stages does a network of central places develop following the passage of an agricultural frontier? For how long does “sorting” take place among low-order central places before the establishment of the fundamental, integrated pattern of rural and urban centers? In sum, how does competition develop among central places emerging on the frontier?”

Brian Blouet (1975: 3-11) attempted to merge CPT with historical change over time. His primary goal was to examine how mature CPT settlement patterns emerged within a hypothetical region. In his case, he put forth a series of phases, each of which had a different level of central place organization. His evolutionary phases are summarized below:

Phase 1 – Limited function settlements. Competition leads to evenly spaced settlement to maximize regional resources.

Phase 2 – The emergence of villages. Surplus crops lead to exchange beyond the local region. Central places emerge locally as centralized markets develop. Specialized services also emerge at these market centers. Larger settlements would also be evenly distributed to maximize regional exchange.

Phase 3 – The emergence of towns. Inter-regional trade development connects village regions into a larger trade network. Villages that are in more optimal locations to support inter-regional trade would develop into regional towns. These new towns would support functions not found at other locations as greater specialization occurred. Small, badly located villages would decline in importance as towns emerged.

Phase 4 – The establishment of centers of manufacturing. The Industrial Revolution and technological development leads to some villages developing into specialized manufacturing or resource-exploiting centers. Transportation systems would be developed to link these regions with other centers.

Phase 5 – The growth of urbanization. Major urban centers attract most of the regional functions to the point where any new function is automatically placed in the dominant center. Railways to and from these centers have secondary growth along their routes. Rapid expansion occurs at the major regional centers.

Phase 6 – Dispersion. The major regional center becomes too large, with many negative variables taking place, which drive population out to the suburbs.

Blouet concludes by stating that his model was derived from Western European historical settlement development, and concentrated on the time before and during the Industrial Revolution. He notes that the historic evolution of other geographic areas may follow a similar, but regionally unique, pattern (1975: 13).

Geographic Central Place Theory Case Studies

John Hudson in 1969 produced a classic study of CPT in eastern Iowa. His study examined settlement in that state from 1870 to 1960. Though most of his article examines the use of biology-based models of colonization and spread, a large section is devoted to CPT. Hudson's main argument was that, when a region is initially being settled and exploited, geometrical CPT patterns, or any uniform settlement patterns for that matter, cannot be expected (1969: 373). These conditions occur when overall density in a region is low, or when a region is undergoing settlement diffusion (ibid: 373).

Hudson (1969: 380) in his Iowa case study concluded that:

“When density is low, and unsettled areas are common, settlement locations are essentially independent of each other. As density increases through a continued diffusion of settlements, competition for space becomes increasingly important. The pattern changes from a clustered to a highly regular arrangement as weak individuals are forced out and the average size of holdings increase.”

He further states that CPT patterning requires sufficient competition for space to produce uniformity of spacing. In his Iowa test case, regularity of spacing increased between 1870 and 1960 (Hudson 1969: 380). Hudson also identified several stages of regional settlement, which included colonization, spread, and competition. The latter

stage would apply to CPT, where enough of the landscape has been filled so that central place hexagonal forms would be produced (ibid: 366-373).

G.W. Skinner has applied CPT to a rural Chinese situation, identifying a two-level structure of centers and market areas, which closely follows a classic hexagonal pattern. In this study, lines of communication dominated secondary market placement, with smaller centers being located equidistant between larger centers along major roads (Skinner 1964). Similar outcomes have been produced by Berry and Parr (1988, Chapter 1), Smith (1974), Steponaitis (1978 and 1981), and Lösch (1954).

In Berry and Parr's study of the development of Iowa's modern central place landscape, they used historical time depth as well to demonstrate the process behind mature central place creation (1988: 5-11). The major addition to CPT study from Berry and Parr's Iowa case study was the addition of two new types of central places to the landscape; that of the *hamlet*, with populations of less than 100, and that of the *regional capital*, which was the administrative center of the state. They retained Christaller's three major center orders of village, town, and city (ibid: 14-15).

Berry and Parr also added oral history and interviewing to their data set in the attempt to produce a cognitive landscape. They then compared the cognitive landscape of the people of their test area with the physical development of market centers and the overall interaction of centers within the region (Berry and Parr 1988: 15-16). One result of their study was that the cognitive landscape differed little from the CPT geometric landscape, except where the utilization of markets by consumers produced indifferent results (ibid: 16). Further studies by Berry and Parr of individual consumer goods

compared to local market patterns produced a series of similar maps, which demonstrated the interactive routes of consumers with markets (ibid: 18).

Berry and Parr (1988: 20) concluded after their Iowa analysis that:

“First, a central-place hierarchy is composed of distinct levels of centers providing particular groups of goods and services to distinct market areas. Second, the interdependent spatial patterns of centers (of both the same and different levels) and the interlocking market areas of goods and services of related levels weld the hierarchy into a central-place system. Central-place theory is of great importance since it both explains and predicts these patterns and relationships.”

Berry and Parr also found in their Iowa case study a regular patterning, which created a settlement landscape along CPT lines. Berry and Parr (1988: 20) stated that, “Towns are located midway between the cities (county seats), and villages midway between towns and cities. As one travels along the highways between two cities, a very regular progression of centers is encountered: city, village, town, village, city – all approximately evenly spaced...”

Hodder and Orton also point out the importance of the means of transportation to the eventual distance to the next central place. Foot traffic would develop a tighter pattern than wagon traffic, as an example (Hodder and Orton, 1976: 57-58). Studies of Romano-British walled towns (Hodder and Hassall 1971) and medieval English villages (Brush and Bracey 1955) indicated that the formation of central place settlements were based on practical transportation distances. Hodder and Orton (1976: 58) concluded that rural markets were often located at approximately 10 km from each other, and serviced an area of 3 to 7 km radius. Hodder and Orton, therefore, add transportation technology

to consumer behavior when determining the central place radii which surround central place settlements.

Bowden and LaRose studied CPT development in Vermont from 1790 to 1830 (1971: 32-38). One of their primary goals was to examine the development of CPT over time by examining a frontier situation. In this way, they attempted to deal with a major problem of CPT; that of the cause and timing of CPT settlement development (Bowden and LaRose 1971: 32).

Bowden and LaRose's study tracked central place settlement functions through time, noting where certain settlements rose and where others declined in importance. Bowden and LaRose's (1971: 33) also noted the overall commercial functions found in each settlement at various time periods. The results of their Vermont study suggested that a three-tiered regional settlement system developed as the frontier advanced over time, though this development had different rates in different sub-regions (ibid: 38).

They also concluded that the development of three-tiered settlement followed a recognizable sequence. First, first-order centers emerged serving a local population, with a few district centers emerging. Competition among these district centers (second-order) led to the second stage, where regional centers (third-order) emerged. The last stage occurred when second-order towns grew up on the periphery of major regions and a pattern of many small regions were joined into one large interacting regional pattern (ibid: 37-38).

Bowden and LaRose observed a distinct competition between second-order centers as regional third-order centers were being developed. This competition led to

stagnation and decline of poorly located centers, and the eventual domination of better located centers (ibid: 38).

J.S. Wood has studied the development of 19th Century central places in New England. One of his major contributions to CPT development was to point out that pre-existing settlement patterns influenced later central place development. These earlier patterns within a region would, therefore, skew later market-driven settlement patterns (1984: 348 and 352).

Wood states that the earliest form taken by New England settlement was that of dispersed hamlets and villages, with many separate regional settlement patterns (1984: 335). Local meeting houses were set up to be equally accessible to the local population, which in many cases was not a position of regional centrality. As regional market systems developed and functions increased, new central places developed. The new pattern was more evenly patterned across the landscape (Wood 1984: 341-347).

Wood (1984: 348) stated that roads played a crucial role in determining the rise or fall of central places. As he stated, "Traffic, and thus the road network, determined in large measure where central places would be located and which would ultimately flourish." The connecting of the region with roads facilitating market interaction later led to an overall mature CPT pattern (ibid: 351). Wood (ibid: 352) concluded by stating that, "The rise of central places resulted... from a shift in the scale of economic activity – the development of centrality at existing places."

Robert Mitchell and Warren Hofstra examined southern regional development in Virginia and the Carolinas, which followed a similar pattern as that described by J.S. Wood. Mitchell and Hofstra identified three regional settlement phases. The first was an

open, non-uniform system of loosely linked settlements from 1730 to the 1740s (1995: 130-132). From the 1740s to the 1770s, several primary market towns were developed, but central place patterning was not yet fully developed (ibid: 132-136). After 1790, a well-developed central place market system dominated the landscape (ibid: 136-141).

Mitchell and Hofstra also attribute this overall pattern of temporal development to an overall shift from subsistence farming to rising consumerism, livestock production, and cash cropping. Administrative needs also influenced central place development in their project region (ibid: 141-144).

Carville Earle studied the frontier situation in tidewater Virginia in the 18th Century, examining settlement change over time (1975). Earle (1975, Chapter 4) concluded that several phases in settlement could be identified, which corresponded to various degrees of settlement dispersion, concentration, and functional development. Ironically, Earle's study demonstrated an overall decrease in central place settlements from 1750 to 1776, primarily because of a change in state law, which eliminated the need for tobacco bulking centers in the Tidewater area (ibid: 95-100). Earle's Virginia case study, therefore, demonstrated how regional central places do not always evolve into higher settlement hierarchies, and can instead decrease in complexity with changes in regional or national economics.

Another important point raised by Earle was the periodic market center development found in frontier areas of North America, which were centered on a cash crop. In his study, the seasonal bulking of tobacco created temporary central places, which did not have a central place function at other times of the year (Earle 1976: 162-

Taaffe et al. have also studied regional development in a frontier situation, coming to conclusions that are similar to central place theory, but which are also like the “primate rank-size rule” (1963: 386). Their hypothetical situation involves the exploitation of an area by an external colonizing population over time. The outcome of their study is similar to that discussed by Berry, where a single regional center or centers dominate the landscape and lower order centers exist than middle or upper order centers (Berry 1961: 573-87).

Taffe et al. point to transportation development in a colonial situation as setting up just such a system. Major lines are thrust into the frontier from one or two primary centers. Eventually, economic expansion occurs outward from nodes on these systems to exploit the surrounding region. Interconnections between nodes and primary centers develop after original development. Transportation systems, therefore, are constructed before demand (1963: 386-387). Taffe et al. also note that their development model was a process and not a series of distinct historical stages (ibid: 387).

Taffe et al. tested their hypothesis with data from Ghana and Nigeria. They concentrated on the affect of transportation in a colonial situation, where transportation technology and infrastructure was exported into the region for the purpose of exploiting resources and trade. In both cases, situations developed historically that were similar to their model. Both Ghana and Nigeria demonstrated transportation systems constructed before demand, and later developed “primate” like centers on the coast. Interior railroad nodes later developed, with roads connecting the surrounding area to the rail line. Nodes were later connected as settlement filled in, with development still being centered on the

original routes primarily, but secondary lines also attracting new settlements (Taffe et al.: 387-395).

Archaeology Central Place Theory Case Studies

Taffe et al.'s conclusions have also been applied to archaeological regional testing. Lewis has demonstrated that this process of transportation routes constructed to exploit the historic South Carolina hinterland followed the same process. In this case, the tidewater district extended a number of roads into the wheat-producing area of the state to facilitate crop bulking and transportation to coastal centers. This system also acted to control market processes and the rate of surplus flow. Later in time, roads were constructed parallel to the coast as the region was connected and a more competitive market CPT pattern developed (Lewis 1984).

Another important part of Lewis's study of regional development was crop nature. Lewis and Mitchell have both examined the impact of crop processing needs on settlement pattern creation. Mitchell proposed that wheat as a crop demands central processing stations, dispersed fields, bulking, and an overall extraction system that facilitated central place formation (1995 132-136). Tobacco, on the other hand, needed little processing or storage, and therefore, did not develop processing centers at central locations. Lewis found that rice as a crop was best approached using a plantation system. Rice was processed at a plantation and could be moved from the plantation directly to a coastal center without the need of intermediary processing or handling centers (Lewis 1984).

Hodder and Orton also studied the use of CPT in archaeology, referring again to Haggett (1969: 49) and Lösch's (1954) use of the hexagonal shape as the primary central place settlement pattern. Hodder and Hassall (1971) found that the Roman Britain landscape followed the central place distribution along transportation lines, similar to Christaller's alternative transportation central place model. Vance (1970: 163) has described central place arrangements in feudal systems along administrative distribution lines, similar to Christaller's alternative administrative central place model.

Johnson's study of the Early Dynastic I Period on the Diyala Plains of Iraq (2800 BC) identified central places formed in a rhomboidal pattern. This difference from classic hexagonal patterning was attributed by Johnson to the pathways of the local water systems (1972: 771). Johnson's conclusion was that local environmental constraints had skewed CPT patterning, but elements of Christaller's classic forms were still present (ibid: 776-7).

Kent Flannery has applied CPT to the Tehuacan Valley in Mesoamerica. In his study, Flannery (1976: 170) noted that CPT was not appropriate for settlement before the Late Formative and Classic periods, but that it could be used for later periods of Mesoamerican history. Applying CPT to the Maya lowlands produced a classic hexagonal distribution of major settlement centers across the landscape, with smaller centers being located in roughly hexagonal locations as well (ibid: 171). Center functions were more difficult to determine through archaeology, though a functional hierarchy did appear to be in place in the Valley of Mexico (ibid: 208-212).

One of the more extensive archaeological studies of the development of settlement over time was conducted by Michael J. O'Brien et al. in the Salt River region

of Missouri (O'Brien 1984). Warren and O'Brien discussed the application of Hudson's biological settlement evolution model to the Salt River area. To Hudson's basic framework, they added several economic, socio-cultural, and environmental variables, which could interact to skew the overall settlement pattern over time. These included soil quality, land slope, river locations, cultural origins of settlers, kinship, and economic resource location (O'Brien 1984: 43-52). Warren and O'Brien's conclusions were that a number of stages were identified for the Salt River area, which did parallel Hudson's model, but that the factors mentioned above did skew the results (ibid: 57).

Warren and O'Brien added another important idea to the study of settlement development in a region. They concluded that soil quality and road location within a competitive situation, such as an emerging CPT situation, could cause competition to begin in some areas sooner than in others (ibid: 55).

Steponaitis attempted to apply CPT to a prehistoric Mississippian settlement pattern with evidence from Moundville, Alabama. His conclusion was that CPT did not fit in well with the hierarchical chiefdoms of that settlement system, but some of his results are worth looking into further. The settlement system that he described was one where many farmsteads had their produce bulked at middle order bulking centers, located throughout the region. These middle order centers, Steponaitis concluded, were not at optimal CPT locations, and rather were skewed toward facilitating the main Mississippian center at Moundville. This pattern was repeated throughout the floodplain regions of the Midwest where the Mississippian culture flourished (Steponaitis 1978). The pattern of settlement that Steponaitis describes is very similar to that put forth by

dendritic CPT models, as outlined above. The application of this variation of CPT may be applicable to similar situations.

Paynter has also studied settlement pattern development within the Connecticut River Valley area. His results pointed to the importance of social stratification in the development of market centers. In Paynter's study, three types of settlements emerged with frontier development; bypassed, egalitarian farming communities, stratified urban centers, and somewhat stratified commercial towns. Paynter concludes that the role of the state and local controlling government, and political economy overall, should be factored into regional settlement studies (1982: 40).

Paynter also examines closely the relationship between economic centers and peripheries, noting the exploitative nature of large urban centers (1982: 88). He points out that peripheral areas are usually exploited by core areas, which closely parallel the results of Vance (1970), Schwimmer (1976), and Kelly (1976).

Conclusion

Central place theory, therefore, has a long history in geography and archaeology. After first being presented in 1933 by Walter Christaller, the model has been refined and reinterpreted many times by a number of geographers. Archaeologists started adding their own modifications in the 1960s. Though modern versions deal with many additional elements to make Christaller's central place model more useful within a real-life setting, the basic elements of the model remain the same; hexagonal interactive grid systems, functional and settlement hierarchies, and the importance of roads, markets, and

administration in market-based economies. Next, central place theory will be applied to the Indiana Wabash and Erie Canal project area.

Chapter 4

Hypothesis Testing and Historical and Archaeological Data Analysis.

Central place theory deals with market-based economies on the regional scale. Indiana in the mid-19th Century was a developing market area; an economic periphery for the United States, but still linked to the greater world economic system via the Wabash and Erie Canal, and to a lesser extent by road and water routes. Settlement in the Wabash Valley therefore formed within a market-based economy and had agricultural production as its most important economic activity. Further, no prior non-market based settlement infrastructure existed in the region on a large scale.

North-central Indiana in the early to mid 19th Century was similar to Christaller's transportation-oriented central place model, with smaller roads linking existing settlements and a single dominant transportation system (the Wabash and Erie Canal) constructed through the region (Christaller 1966). Railroad competition became important through the 1860s, and dominant within the region by the 1870s. The canal only enjoyed a transport monopoly from the late 1830s through the late 1850s. However, because the canal was the first transport system to firmly establish contact with the greater United States economic system, it influenced the initial formation of market centers within a nearly unpopulated region.

A quick examination of historic documents and maps also points to a number of different-sized market centers. These market centers were of different sizes, with the town of Lafayette dominating the top position in the size hierarchy and all the other

towns and hamlets falling into lower positions. There are also more smaller or lower-order market centers than there are higher-order centers. Central place theory provides an explanation for regional settlement within a market economy, including those regions with a single primary transportation system, such as was found in this Indiana case study. The Wabash Valley area in Indiana along the Wabash and Erie Canal, after a quick inspection of the documentary evidence, appears to be applicable to a central place theory study.

In order to develop a general model of settlement along the Wabash and Erie Canal, based on quantifiable evidence, central place theory will, therefore, will be used with the previously presented Indiana archival and archaeological evidence. The historic and archaeological data will next be analyzed using statistical methods in order to test a number of hypotheses concerning 19th Century settlement within the project area. In this way, different parts of central place theory can be tested. An overall conclusion of the applicability of central place theory to the central Indiana case study can then be made.

Central place theory is also applicable to the later railroad-era in the study area, when the dominance of the canal was challenged by the emerging national railroad system. The situation changes from a single major transportation systems, to a situation with several competing transport systems. Because the primary economic conditions had not changed, central place theory is still appropriate for study of later time periods in the project area.

The data utilized by this project came primarily from the 1866 Titus Map of Tippecanoe County (TCHA/Archive Room), the 1878 Kingman Brothers Map of

Tippecanoe County (TCHA/L), the 1861 Burk Brothers Map of Lafayette (SIA), the 1868 Durant and Charles map of Delphi and Pittsburg (CCMA/GAF), the 1863 West map of Deer Creek Township (CCMA/GAF), and the 1874 Durant map of Deer Creek Township (CCMA/GAF). The general county data came from the county and township maps, with specific features for the railroad and canal for the 1860s study coming from the city maps. Data also comes from a number of archaeological surveys conducted within the project area by Michigan State University from 1993 through 1999 (Bischoff 1994, 1996, and 1997).

Individual structures noted on each map were used as base references for the data sets. Primary data came from the 1866 and 1878 Tippecanoe County maps and the 1863 and 1874 maps of Carroll County. These maps were chosen because of their comprehensive nature, with individual farmsteads and structures being labeled for each township within Tippecanoe County. The area sample size was roughly two land survey sections of land south of the Wabash River, though this varied over the study area. Individual structures located within this sample area from both the 1860s and the 1870s, therefore, made up the general data set for this study. The 1866 Tippecanoe County data is included on the 1878 map for visual comparison (see Appendix V).

To further standardize the land area, a uniform one and one-half section of land was examined to one side only of the three major transportation systems that passed through the study area -- the Wabash River, the Wabash and Erie Canal, and the Wabash Railroad. The three band areas generated, one for each transport system, were, therefore, held uniform in area for both the 1860s analysis and the 1870s analysis. In this way, comparisons of equal territory could be made for the two different time periods, and for

the three different transportation systems. By dividing the study area data chronologically and by transportation system band, a total of six additional major data sets were generated (see Appendix II).

Several other smaller data sets were used for specific analyses within this chapter. These additional data sets are included within the body of the report, and not in a separate appendix. These smaller data sets dealt with function per settlement, distance between higher order centers, and linear settlement along the canal. All will be explained in more detail when appropriate.

Before beginning the analysis section, a concise summary of the founding assumptions behind applying central place theory to the Indiana project area should be presented. It is assumed that:

1. North-Central Indiana at the time of canal construction was basically a trackless wilderness, with few roads and settlements, and no administrative structure. The roads that appear on later maps were constructed as a result of the Wabash and Erie Canal entering the study region. Many of these secondary roads were constructed to facilitate the later local economy, and transportation of goods to the canal. Historical documents indicate that, at the time of canal construction (1830s), only limited wagon trails existed in the region.
2. The United States, including the State of Indiana, had a market economy during the time in question.
3. The railroad, or any other transportation system, was not a competitive challenge to the canal in the formation of settlement patterns from 1840 to 1852 within the project area. Roads could not match the canal for low shipment costs. Neither could steamboats or flatboats, which had to transport goods from the Wabash Valley to New Orleans (see historical section for a discussion of both wagon road and river transportation).
4. The dynamics of settlement in the region reflect the use of the Wabash and Erie Canal as the main mode of transportation.
5. The basic settlement unit was the farmstead, and the major regional production activity was agricultural farming and processing.

Statistics Used for Hypotheses Testing.

This study will utilize a number of statistical quantitative techniques for testing the nine stated hypotheses. The primary class of statistics used falls under the “descriptive” category. Several measurements of central tendency will be given for each data set, including mean, mode, and median.

Of these, the mean will be the most used for comparing different data sets and variables within data sets as it is one of the most common measures of central tendency (Earickson and Harlin 1994: 84). “The mean describes the point about which a distribution of numbers is centered” (Earickson and Harlin 1994: 84). Adding all the data measurements, then dividing by the total number of measurements generates the mean.

For most hypotheses in this study, data will be presented in histogram form, with frequencies given for specific measurements. Because the mode, or the peak of the frequency distribution, is not always equal to the mean, skewing can result. Skewing takes place when the highest part of a frequency distribution is located either to the left of or to the right of the mean (Earickson and Harlin 1994: 102-103). Skewing will be important for some hypothesis analyses.

Kurtosis is another varying factor found with histogram data sets. Kurtosis measures how peaked or flat the distribution of data appears in the histogram (Earickson and Harlin 1994: 102-104). Both kurtosis and skewing are important for describing a data set in relation to a normal distribution, and can give some indication as to which parts of the data set are most removed from a normal curve. In both cases, a computer should be used to compute accurate measurements of skew and kurtosis (Earickson and Harlin 1994: 104).

Another basic descriptive statistic is the percentiles plot, which graphs observed values of a variable against its percentiles. This graph creates a visual representation of the percentage of the data that is less than or equal to an observation. In this way, percentile plots are useful in comparing the distribution of different groups or variables (Feldman et al. 1996: 19).

Several other descriptive statistics will also be used and presented within this study, but not used in the specific hypothesis analyses. These include: count, minimum and maximum values, range, sum, variance, standard deviation and standard error. Several of these are used by more complex statistical formulae, such as the Kolmogorov-Smirnov Test of goodness of fit, but are not in themselves used to compare variables within data sets or individual data sets.

For each histogram generated, the data set mean and standard deviation are used to generate a hypothetical normal distribution for the variable data. The hypothetical curve is generated by computer within the Statview computer program and is a graphic example of what form the data set would follow if the data was normally distributed. The difference between the normal curve and the histogram can give a visual idea of where the data differs most from normal, where skewing results, and whether kurtosis takes place (Feldman et al. 1996: 15).

The generation of a normal curve is accomplished by using the Kolmogorov-Smirnov test for goodness of fit. The K-S Test is one of a “class of non-parametric statistics (that) has been formulated to test hypotheses that the probability distribution based on a set of observed frequencies is comparable to a specified theoretical probability distribution” (Earickson and Harlin 1994: 254). Because data from settlement in the

study area is not part of a larger normally-distributed population, standard statistical “T” and “F”-Tests cannot be performed. In this case, the K-S Test is appropriate.

The Kolmogorov-Smirnov Test is based on the premise that *the cumulative probability distribution* of a random sample matches a theoretical cumulative probability distribution. As Earickson and Harlin state:

“In the Kolmogorov-Smirnov one-sample test, the null hypothesis states that the population distribution which an independent, random sample is drawn is not significantly different from some theoretical, or expected, *cumulative probability distribution*. If the maximum absolute difference between the theoretical and observed cumulative distribution functions at any point along those distributions is too great to be attributed to sampling error, the null hypothesis is rejected” (1994: 255).

The hypothetical expected distribution is generated by using the mean, standard deviation, and number of observations of the actual data set. From these, a normal distribution is generated (in the case of this study, this process was done by the computer program Statview).

Each measurement in the actual data set is compared to its location on the generated hypothetical data set to measure how much the actual value varies from the hypothetical value. A summing of the absolute variations of all measurements is then generated. This summed value is referred to as the chi-square value for the test. The chi-square value is converted into a p-value, which is a representation of how well the data fits the alpha or critical value. The null hypothesis is rejected at a specific *alpha* level of significance if the value of the summed variation exceeds the value shown on the following table at sample size (n) (Earickson and Harlin 1994: 255-256), or if the p-value

is greater than the alpha value (Feldman et al. 1996: 229-231). The *alpha* value chosen for this study was (0.05).

Because the K-S Test is sensitive to outliers, measurements that occur far from the majority of measurements in a data set, K-S Tests for this study will be run twice (Feldman et al. 1996: 90). The first test will include all data from a data set. The second will remove drastic outliers. The definition of an outlier will be given for each test.

Another statistical analysis used by this study is multiple regression analysis. Multiple regression analysis tests the relationship of variables to each other. It attempts to get at the questions of, “How much does one variable change for a given change in the other? How accurately can the value of one variable be predicted from knowledge of the other?” (Earickson and Harlin 1994: 207).

The classic graphic analysis of two variables is the scattergram, where measurements of one variable are plotted on the X coordinate and the measurements of a second are plotted on the Y coordinate (Earickson and Harlin 1994: 208). The relationship of the two are, thus, visually presented. Studies can be made of the slope of the relationship, which is the linear function between the two variables. The scattergram can also present information on the clustering of points on the scatter diagram, the positive or negative nature of the slope, and the uniformity of the slope itself (Earickson and Harlin 1994: 208-209).

The strength of the association can also be described, whereas the more linear the points on the scatter diagram, the more associated the two variables (Earickson and Harlin 1994: 206). This strength is measured with the R-squared value, which is “the proportion of the dependent variable’s variability that is explained by the independent

variables (with a maximum value of 1)” (Feldman et al. 1996: 54). This value is further refined by modifying the R-squared value by the number of independent variables in the test. The result is the Adjusted R-squared value, which is “especially useful for comparing a variety of models with different numbers of independent variables” (Feldman et al. 1996: 55). The lower the Adjusted R-squared value, the lower the Adjusted R-squared value, the weaker the ability for the independent variable to predict the dependent variable.

This classic example is expanded in multiple regression to include comparisons of a number of variables and their measurements with one particular variable. The fundamental theory behind this test is that causality is frequently multivariate, with a number of variables being associated with and influencing a single variable (Earickson and Harlin 1994: 212). Multiple regression tests the association of each of the independent variables with the single dependent variable (Feldman et al. 1996: 52).

When data is of a nominal nature, parametric statistics are not applicable. A number of non-parametric statistics have been developed to deal with measurements based on frequencies of occurrence or nominal categories. In this study, the chi-square test will be utilized to determine functions within central places in the final hypothesis. The chi-square test “provides a standard for deciding whether two sets of frequencies are statistically independent. If the differences between the observed and the expected frequencies are small, the conclusion is that the differences could have arisen by chance. On the other hand, if the discrepancies between what is expected and what is observed are large, one might decide to reject the null hypothesis in favor of an alternative” (Earickson and Harlin 1994: 238-239).

Chi-square data is often sorted into contingency tables. In this case, data is sorted along two major characteristic categories, with single counts of data being placed in the appropriate contingency table cell (Earickson and Harlin 1994: 241). As an example, a contingency table can be made to test whether there is a relationship between settlement size and number functions present. Each separate case would be placed in an individual cell, so as to correspond with the correct row for settlement size and the correct column for number of functions present.

After contingency tables are created with actual data present, a hypothetical normal distribution is generated within the contingency table cells based on the total counts for each row and column and the expected frequencies for each cell. The difference between the actual and expected counts for each cell are generated and summed for the entire contingency table. This summed chi-square value is then compared to a critical value table for the appropriate degrees of freedom and alpha value (0.05 for this study). If the chi-square value is lower than the critical value, then the null hypothesis is rejected (Earickson and Harlin 1994: 241-243). The computer program Statview also converts the chi-square value into a chi-square p-value that can be directly compared with the alpha value. If the chi-squared p-value is small, then a relationship is assumed (Feldman et al 1996: 82).

One disadvantage of the chi-square test is that it is not valid when the minimum expected value of any cell is less than five. Actual data cells can be less than five, but the expected value cannot (Feldman et al. 1996: 82).

Even if a chi-square test determines that an association is found between two characteristics (say settlement size and function number), the strength of that relationship

is still unknown. The Cramer's V test examines the strength of the relationship by adjusting either the number of rows or columns in the contingency table, depending on which of the two is smaller. The Cramer's V test creates a contingency coefficient, which is a transformation of the chi-square statistic so that a number that has a range of between 0 and 1 is generated. The closer the value is to 1, the greater the degree of relationship between the two characteristics (Earickson and Harlin 1994: 245, and Feldman et al. 1996: 83).

An Introduction to the Hypotheses to be Tested.

One of Christaller and Lösch's primary assumptions in central place theory was that settlement in a region is evenly spaced at all hierarchical levels. Lösch used as his fundamental unit the farmstead, whereas in Christaller's model, farmstead non-random spatial uniformity was assumed, but not made a formal part of his centrality hierarchy (Lösch 1954, and Christaller 1933). Random settlement within the project area would show neither of these forms.

The first hypothesis to be tested, therefore, is whether settlement within the Indiana project area was randomly spaced or not. The following hypothesis will use archival and archaeological data for testing. This hypothesis can be expressed using the statistical notation as follows:

Alternative Hypothesis 1 -- Random spacing of settlement occurs within the project area. (The project area in this case is defined as Carroll County and Tippecanoe County, Indiana.)

Null Hypothesis 1 -- Non-random spacing of settlement occurs within the project area.

Christaller and Lösch hypothesized that settlement under central place theory would follow a distinct geometric pattern, with higher order centers and lower order centers in a hierarchical relationship with each other that was based on a hexagonal grid (Lösch 1954: 116-22, and Beckmann and McPherson 1970: 30). Christaller produced two alternative central place models. One involved his “traffic principle,” where central places orient toward regional transportation systems (Marshall 1969: 29-31). The other was his “separation principle,” that involved skewing of lower order centers by the administrative control of larger centers (Marshall 1969: 32-32).

Assuming that settlement in the region is non-random, the second hypothesis tests whether non-random settlement was formed in a central place pattern of settlement development, as expressed by Christaller and Lösch, or not. The following hypothesis will use archival and archaeological data for testing, and can be expressed using the statistical notation as follows:

Alternative Hypothesis 2 – Non-random patterned settlement in the project area did not follow any identifiable central place theory forms.

Null Hypothesis 2 – Non-random patterned settlement in the project area followed identifiable central place theory forms.

The third hypothesis that will be tested is whether settlement directly along the Wabash and Erie Canal transportation system was random, or whether it was non-random. Historic and Archaeological studies of linear transportation systems have demonstrated that regular spacing of settlement occurs along the transport system (see Skinner 1964, Smith 1974, Berry and Parr 1988, Hodder and Hassall 1971, Lewis 1984,

and Brush and Bracey 1955, among others). The following hypothesis will use documentation and archaeological data for testing.

Alternative Hypothesis 3 -- Linear settlement directly along the Wabash and Erie Canal occurred randomly.

Null Hypothesis 3 -- Linear settlement directly along the Wabash and Erie Canal was evenly spaced (as suggested by central place theory and several central place theory case studies), given a major transportation system constructed through an isotropic plain.

The above hypotheses will test whether central place theory is appropriate for interpreting settlement in the project area associated with the Wabash and Erie Canal. This hypothesis will also test what variation of central place theory should be used for interpretation of the region if settlement along the canal proves to be non-random. Settlements will be defined by the number of structures historically identified as being associated with a particular settlement, and will be divided into the following categories: farmsteads\individual structures, cities, hamlets, and towns. These divisions will be created using natural statistical breaks in ranked settlement size (see discussion under Hypothesis 3 analysis), or by cultural definitions as stated in historic documents in the latter half of the 19th Century.

Towns and cities were historically identified on all the primary maps used in this study. The two cities in the study area were Lafayette and Delphi. The towns located within the project area were Granville, Americus, Transitville, Wea Station, and Chapmanville. A “hamlet” for this study is defined as an identifiable cluster of individual structures that are not associated with a specific industry (such as a mill). Hamlets may or may not be historically identified as a specific settlement. Hamlets

occurred only in two places within the project area: at Jewettsville in Washington Township, and at the junction of the Wabash and Erie Canal and the Wildcat Creek in Fairfield Township. All other clusters of structures were either suburbs of the city of Lafayette, which would later be incorporated into that city, or were associated with a mill or industrial complex and were historically labeled as such.

Hypothesis 4 tests central place theory patterning at the individual structure level, based on ideal geometric spacing. The classic hexagonal pattern of central place theory has distinct mathematics relationships between settlement units. This hypothesis attempts to recognize hexagonal geometric spacing within the forming market system of central Indiana. The background of this test comes from several studies in the 1960s and 70s that attempted to understand the statistical relationship behind the geometry of central place theory (see Dacey 1966, Beckmann and McPherson 1970, Lösch 1954, and Parr 1969). Regional variables, which may be influencing the results, are also discussed. This hypothesis can be stated as follows:

Alternative Hypothesis 4 — The settlement pattern for the study area cannot be identified at the individual structure scale as being a central place theory-based pattern.

Null Hypothesis 4 -- Settlement in the project area at the individual structure scale can be identified as a central place theory-based pattern.

If there is no classic identifiable central place theory geometric pattern, then other variables may be influencing settlement so that it skews away from a pattern. This skewing has been the subject of a number of geographical and archaeological studies (see Johnson 1977, Webber 1971, Hodder and Orton 1976, and Berry and Parr 1988).

Because this project deals with a number of variables, statistical tests can be conducted to identify whether one or more of these variables are skewing settlement results.

Alternative Hypothesis 5 -- The distance between structures in the study area cannot be explained by one or more variables presented in this project.

Null Hypothesis 5 -- The distance between structures in the study area can be explained by one or more variables presented for this project.

The sixth hypothesis deals with whether settlement along the canal was independent of canal engineering features, or whether it is linked to canal features, such as locks, aqueducts, bridges, and wharves. This hypothesis is first tested using historic data, and then tested using archaeological data.

Alternative Hypothesis 6 -- Settlement along the Wabash and Erie Canal was located independent of canal engineering features.

Null Hypothesis 6 -- Settlement along the Wabash and Erie Canal was oriented toward canal engineering features.

Comparisons of Study Area Settlement in the 1860s and 1870s.

The above hypotheses will be run twice, using data from Tippecanoe and Carroll Counties for the 1860s and 1870s. The two different iterations will test whether settlement patterns changed in the region as railroad competition increased in the 1860s and 1870s. This hypothesis will use both archival and archaeological data. Another hypothesis for this section, therefore, can be stated as:

Alternative Hypothesis 7 -- There will be no difference in settlement orientation within the study area from the 1860s to the 1870s.

Null Hypothesis 7 -- There will be differences in settlement orientation within the study area from the 1860s to the 1870s.

Comparisons between the two time periods do not, however, deal with the three separate transportation routes in a statistically valid manner. Hypothesis 8 deals with an equal area of settlement to one side of each transportation route, then compares settlement data again across time and across transportation settlement bands. By comparing equal areas, land area can be held constant, thus allowing for a more accurate examination of variable change over time.

Alternative Hypothesis 8 – Settlement along each of the three major transportation routes in the project area was not different when equal areas of land along each were examined.

Null Hypothesis 8 -- Settlement along each of the three major transportation routes in the project area was different when equal areas of land along each were examined.

Market Complexity and Function.

Market complexity as expressed by function is another variable dealt with by central place theory. Central place theory predicts that higher order settlements will have more functions than lower order settlements, and that higher order settlements will have all lower order functions plus additional functions not found in lower order settlements (Hodder and Orton, 1976: 60). There is enough archival data for this project to divide settlement structures into higher and lower order centers, based on the number of residential dwellings and retail/manufacturing buildings.

The following two hypotheses can, therefore be presented:

Alternative Hypothesis 9 -- The population size of a settlement will have no relationship to the number of functions or types of functions found within the settlement.

Null Hypothesis 9 -- The population size of a settlement will have a relationship to the number of functions or types of functions found within the settlement.

The data for these hypotheses will come from archival and archaeological sources and will exclusively deal with the canal in the 1860s. The data will be divided so that settlement size is tested against the number of diverse functions found within a settlement. These functions will include the following categories: agricultural, manufacturing, retail sales, service businesses, and local or regional administration. Agricultural functions include warehousing, grain elevators, and agricultural processing. Manufacturing includes light or cottage manufacturing and heavy, industrial manufacturing. Light manufacturing involves small shop manufacturing that does not require much capital investment in specialized buildings or machinery. Light Manufacturing includes barrel-making, crate and furniture-making, cigar rolling, shoe-making, and carpentry, as examples. Heavy manufacturing would include wagon-making, machine shops, forges, breweries, and large-scale lumber mills.

The retail sales category included hardware stores, dry goods, and grocery sales. Service businesses involved hotels or inns, lawyers, physicians, or any other service that did not involve the making of goods or the selling of products. Administration involved county administration, or administration of a section of canal or railroad. Chi-square and

scattergram plots were used to test the hypotheses, as well as general comparative statistics.

An Introduction to the Data Variables for the Individual Structure Data Sets.

The analysis section of this chapter used a number of variables dealing with individual settlement along the Wabash and Erie Canal corridor in Tippecanoe and Carroll Counties. Before going into the actual data analysis, a description of the data variables and the relevance of each is necessary. The lesser data sets will be described as they are used in each hypothesis testing section. The following paragraphs will refer to the sample data section presented on the next page (Figure 27):

The first variable, “Date,” refers to whether an individual structure was appropriately placed within one of the two time period data sets; either that of the 1860s, during the canal-era (when the canal still dominated local economics), or the 1870s, during the railroad-era (when the railroad dominated local economics). This variable, therefore, places an individual structure into a temporal context.

The next variables were used to place each structure in spatial context. First, the Township the structure was located within was given, then the section number. No distinction in the data set was made between counties. Washington, Fairfield, Wayne, and Union Townships are within Tippecanoe County, and Deer Creek Township is in Carroll County. Measurements are made to known structures and canal features identified in Fountain County, but no structures from within that county are used in the individual structure analyses.

The 1878 Kingman Bros. map of Tippecanoe County and the 1874 Durant map of Carroll County identified farmsteads and other buildings. The 1866 map of Tippecanoe County and the 1863 map of Carroll County showed individual structures, but did not identify whether the structure was a farmstead or not.

Figure 27: Sample Data Section for Historical and Archaeological Data Analysis

<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>
Railroad-Era	Wayne	Section 3B	Three	Individual Structure
Railroad-Era	Wayne	Section 3B	Five	Farmstead\Homestead
Railroad-Era	Wayne	Section 3B	Seven	Individual Structure
Railroad-Era	Wayne	Section 3B	Eight	Individual Structure
Railroad-Era	Wayne	Section 3B	Nine	School
Railroad-Era	Wayne	Section 1	One	Farmstead\Homestead
Railroad-Era	Wayne	Section 1	Two	Farmstead\Homestead
Railroad-Era	Wayne	Section 3	One	Individual Structure
<u>Distance to Nearest Neighbor (in feet)</u>	<u>Distance to Second Nearest Neighbor</u>	<u>Nearest Road</u>	<u>Nearest Road in Opp. Direction</u>	<u>Distance to Nearest River Feature</u>
1656	1794	138	1518	.
1242	1656	138	1794	.
552	1242	138	276	.
552	1932	138	966	.
1518	1656	138	414	.
552	5520	690	2760	.
2070	2208	138	4278	10764
1104	3588	138	2070	16974
<u>River Feature</u>	<u>Distance to Wabash and Erie Canal</u>	<u>Distance to Nearest Canal Feature</u>	<u>Canal Feature</u>	<u>Distance to Nearest Railroad</u>
.	4416	4416 Basin	6900	
.	4692	4830 Basin	5520	
.	6210	6486 Basin	4692	
.	7038	7314 Basin	3450	
.	7314	7866 Basin	2898	
.	3174	3450 Basin	8556	
Ford	7176	8280 Bridge	2898	
Ford	12006	12006 Basin	9384	
<u>Distance to Nearest Railroad Feature</u>	<u>Railroad Feature</u>	<u>Distance to Nearest Town</u>	<u>Town</u>	<u>Distance to Nearest Body of Water</u>
.	.	.	Granville	5658
.	.	.	Granville	4416
.	.	.	Granville	4968
.	.	.	Wea Station	4140
.	.	.	Wea Station	3450
.	.	.	Granville	6486
18354 Station	.	.	Granville	9246
18768 Station	.	.	Granville	13386
<u>Body of Water</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>	
Flint Creek	Yes	Yes	Yes	
Flint Creek	Yes	Yes	Yes	
Flint Creek	Yes	Yes	Yes	
Flint Creek	Yes	Yes	Yes	
Flint Creek	Yes	Yes	Yes	
Wabash River	Yes	Yes	Yes	
Wabash River	No	Yes	Yes	
Wabash River	Yes	No	No	

A comparison of the two map sets gave an indication of which individual structures were present for both time periods. It was assumed that an identified farmstead from the 1870s would be the same in the 1860s as long as the structure was in the same location. All structures within a section were assigned a unit number, with structures added in the 1870s being given additional sequential numbers. In this way, all structures for both time periods were assigned one exclusive number, which was used for tracking purposes as the data tables were compiled. All structures were also given a historical function, such as “homestead” or school, as best determined by historical and archaeological research. Structures that could not be assigned a function were labeled as “individual structures.”

The “Type of Structure” category is used to differentiate structures by residential and commercial/industrial function. The latter category includes; ice houses, mills, blacksmiths, tanneries, retail stores, or any other establishment not used as a residency or farm. Most of the unidentified “individual structures” were probably also farmsteads or homesteads during the time of the creation of the 1866 Titus map.

It was further assumed in assigning function that the four historical maps were only showing the major house or residence associated with a farm, and not outbuildings or barns. This assumption was given strength when the historic maps were compared with archaeological survey results from Carroll and Tippecanoe Counties, which will be further explained below.

All measurements used in the data analysis section were from individual structures to other structures or features identified on these three maps, or to structures identified by archaeological research completed in 1993 through 1998. All distances

were first placed on the same scale then the distances from structures to other structures or topographic features were measured and the distance given in feet¹. For example, the distance from the J. Fisher Farmstead, Section 19, Washington Township to the canal aqueduct over Sugar Creek (not shown on the 1878 map, but located through archaeological survey) was 0.044 miles, or 3036 feet.

The Role of Archaeology in Data Refinement.

Archaeology played a crucial role in this analysis by testing the accuracy of the two 1860s and two 1870s maps. The 1993, 1995, and 1996 surveys of Tippecanoe, Carroll, and Fountain Counties identified 18 canal features, surveyed a total of 13 of 25 linear miles of canal and over 200 acres within the study area, and explored 53 canal-era historic sites. The accuracy of the four primary maps used in this analysis chapter, therefore, was established through the comparison of historic data appearing on the four primary 19th Century maps and archaeological research. The results section demonstrated how over thirty canal-era commercial and residential structures were located by archaeological survey, which matched the exact location on historic Tippecanoe County or Carroll County maps. In addition to these sites, fourteen canal-related structures were located that matched the described location indicated by the 1847 Chief Engineer survey of Wabash and Erie Canal of canal features (Documentary Journal 1848). These canal features are also found on some of the four primary 19th Century maps.

¹ The 1866 and 1878 maps of Tippecanoe County both had the same scale of 1 inch = 0.5 miles, the 1863 maps of Deer Creek Township in Carroll County had a scale of 1 inch = 1.0 mile. The 1878 map of Deer Creek has a scale of 2.5 inches per mile.

The description of historically indicated structures was also elaborated on by archaeological research. Archaeology in some cases identified the function of structures noted on either the Carroll County or Tippecanoe County maps (see results section). In this case, archaeological survey was able to identify whether farm machinery fragments, residential material, or commercial-related artifacts dominated historic sites linked with documented structural sites on the 19th Century maps. Several structures shown on the two county maps as being “individual structures,” as represented by a black square with no associated features or commentary to indicate their actual historic function or use. In this study, most unidentified individual structures turned out to be farmsteads. A complete list of archaeologically-identified sites appears in the function variable discussion section below.

Archaeology confirmed the accuracy of the four primary Carroll County and Tippecanoe County maps, located canal features, and gave insights into the historic function of several structures noted only as “individual structures” on the 19th Century maps. Archaeology, therefore, has played a crucial role in the establishment of the data base for this project.

Archaeological research aided data refinement in the “Type of Structure” category in the following cases (see the Archaeology Results Chapter section for a complete evaluation of each):

1. One unidentified structure on the 1866 and 1878 Fairfield Township map was identified by archaeological research as being a farm.
2. Three unidentified structures on the 1866 and 1878 Tippecanoe County maps in Washington Township were identified as being farms.

3. One unidentified structure on the 1866 and 1878 Tippecanoe County maps in Washington Township was identified as being a mill support structure.
4. One unidentified structure on the 1866 and 1878 Tippecanoe County maps in Wayne Township was identified as being a farm.
5. The use and association were revealed of five out of six structures built near the Delphi paper mills located along the canal to the southwest of Delphi.
6. A previously unknown commercial structure was located west of Delphi along the canal.

More Data Variable Descriptions.

The next two categories deal with nearest neighbor data. This data deals specifically with the question of whether settlement in the project area was random or patterned. The “nearest neighbor” and the “second nearest neighbor” variable categories were also used in a test of geometric patterning. These two variables measured the distance from a specific structure or farmstead to its next or second next nearest neighbor. Archaeological research was not significant for these categories, except for where previously unknown sites were involved.

In some cases, as with all the other variable categories, data was missing for some structures. Either the structure was near the edge of a historic map for short-distance variables, or certain variables with longer average distances (such as distance to the nearest railroad feature) meant that potential locations for shorter railroad features would not be covered by the county maps. To generate accurate data for the data set that reflected the available historic maps, areas without data for certain structures and for certain variables, therefore, existed.

The “nearest road” and “nearest road in the Opposite Direction” variable categories examined the distance from a structure to the nearest county road, as identified on the 1860s or 1870s maps of Carroll and Tippecanoe Counties. The purpose of studying county roads was to examine transportation at all levels, not just at the level of the three major transportation systems within the region – the Wabash River, the Wabash and Erie Canal, and the Wabash Railroad. These two variables measured the distance from a specific structure to the nearest road or nearest road in the opposite direction to the nearest road. The inclusion of roads in this study also allowed for examining the importance of a variety of landscape features in determining regional settlement patterns.

The next nine variables deal with the three major transportation routes through the project area. The first three, the “Distance to Wabash River,” the “Distance to Wabash River Feature,” and the “River Feature” categories examine the association between settlement in the region and the Wabash River. These variables measure the distance from an individual structure to either the Wabash River or the nearest Wabash River feature. The nearest Wabash River feature is then identified.

The 1978 Kingman Bros. Map noted where several of these river features (such as fords, ferries and bridges) were located. Other historic documents (see history section) mentioned other key river crossing points in the Tippecanoe County and Carroll County area, such as Kite’s Ford in Washington Township, the ferries at Americus and north of Jewettsville, and Davies Ferry in Fairfield Township. Several of these river features were also located during archaeological survey, either by identification of ancient road paths, such as Davies Ferry and a ferry crossing in Wayne Township, or by the intersection of the river crossing by modern roads in the same location (See Archaeology Results

Chapter). Archaeology also aided this study by identifying the location of Kite's Ford, and by confirming the location of the extinct hamlet of Jewettsville as described on the 1866 Tippecanoe County map. All of these features are noted on the Township maps found in the Appendix section.

The next three variables, "W & E Canal," W & E Canal Feature," and "Canal Feature examine how settlement and the Wabash and Erie Canal were related to each other in the study area. These variables measure the distance from a specific structure to the canal or nearest canal feature (such as locks, guard locks, basins, and bridges). That feature is then identified. None of the 19th Century county maps accurately identified where most of the Wabash and Erie Canal features were located, but the 1847 Report of the Chief Engineer to the State of Indiana gives a detailed and accurate account of all the canal features in Tippecanoe County at that time. Canal features did not change much in location or structure, as was demonstrated in other 19th Century documents dealing with Wabash and Erie Canal repair and reconstruction orders. What the Report of the Chief Engineer did not provide was specific site locations. Archaeology, in this case, proved to be invaluable by identifying the actual site of all the major canal features within the study area.

Archaeological research has aided the refinement of data in this category in the following cases:

1. The "Culvert" over Sugar Creek in Washington Township was actually a small aqueduct, which required two complicated stone abutments and a large wooden frame for the transport of barges over the creek.
2. Lock #34, the Wea Aqueduct, and several hundred feet of associated earthen embankments in Union Township were located.

3. The Kite's Ford Guardlock was found.
4. Lock #33 in Carroll County was located.
5. The Wildcat Creek Dam and towpath bridge abutments were found.
6. The northern margins of the Widewater turn basin were identified.
7. Several other turn basins in Wayne Township were located.
8. Remnants of the Flint Creek Aqueduct were found in Fountain County.
9. The northern section of Deer Creek Dam was located, as well as several hundred feet of improved towpath.
10. The original location of the Deer Creek dam and Reservoir were identified.

All canal features are noted on the township maps in Appendix V.

The next three variables, "Railroad," "Railroad Feature," and "RR Feature" examine how settlement in the project area was associated with railroad transportation. These variables measured the distance from a structure to the nearest railroad or railroad feature (such as stations, watch houses, and depots). That feature was then identified. The 1861 Burke Bros. map, the 1966 Titus map, the 1978 Kingman Bros. map, and the 1866 Duarte map all noted where several of these features were located, as did the two primary Carroll County maps. Archaeology did not significantly affect the data in these categories. All railroad features are noted on the township maps in the Appendix V.

The "Nearest Town" and "Town" categories relate individual structures to the nearest identified town of the same time period. For this study, 19th Century historically-identified towns were used instead of creating central place categories based on the

clustering of individual structures on a landscape. These variables measured the distance from an individual structure to the nearest town, then identified that town.

Several new lower-order towns were platted between 1866 and 1878, and the City of Lafayette spread outward to incorporate the Elston and Linwood additions. These latter two areas are noted on the “Town” data. The 1866 areas that would later become Elston and Linwood were dropped from the overall data base as they were in the process of becoming incorporated into Lafayette. In this way, the two areas in 1866, which in that year had high population densities, would not skew the statistical analysis of this project by over-representing suburban Lafayette areas. All towns listed in this study can be found on the township maps in the Appendix V.

The “Nearest Body of Water” and “Body of Water “ variable categories deal with the relationship of individual structures to the nearest major body of water. These variables measured the distance from an individual structure to the nearest body of water, and then identified the body of water. To be noted in this study as a major body of water, the water source had to be identified on the four primary 19th Century maps as being major sources of water. These variables are included in this study to determine whether closeness to a major body of water had an effect on settlement location.

In an attempt to refine the comparative study between settlement along the Wabash River, the Wabash and Erie Canal, and the Wabash Railroad, a uniform area of land one and one-half sections out from each of the three transport systems was analyzed. In the case of the Wabash River and the Wabash and Erie Canal, this area was south of each feature. In the case of the Wabash Railroad, this area was north of the transportation feature. If the transportation route was blocked in any way (such as where the Wabash

Railroad comes near Lafayette), then an equal amount of land was included on the opposite side of the feature so that an exact one and one-half section of area was continuously included in the comparative study (See Township Maps, Appendix V).

The last three categories, “RR,” “WE,” and “WA,” all refer to whether an individual structure should be included in one of the three transportation “band” data sets. “RR” refers to whether the structure belongs within the “Railroad Band” set, “WE” refers to whether the structure belongs within the “Wabash and Erie Canal Band” set, and “WA” refers to whether the structure belongs within the “Wabash River Band” data set. Some structures listed in the general data set will not appear in any of these modified data sets, or will only appear in one or two. Because each data set is divided into structures that existed in the 1860s and structures that existed within the 1870s, some structures may only be found in the data set of one time period and not the other. Hypothesis 8 compares the data from the three different transportation band areas and compares the two time periods to determine the relationship between transportation system and settlement across time.

Hypothesis 1: A Test of Random or Ordered Settlement Patterning.

The first hypothesis to be tested dealt with random vs. non-random settlement within the project area. This hypothesis was stated as follows:

Alternative Hypothesis 1 -- Random spacing of settlement occurs within the project area. (The project area in this case is defined as Carroll County and Tippecanoe County, Indiana.)

Null Hypothesis 1 -- Non-random spacing of settlement occurs within the project area.

This hypothesis was tested using data from the general Tippecanoe County data sets for both the 1860s and 1870s (Appendix I). For this test, the “nearest neighbor” and “second nearest neighbor” variables were used. The “nearest neighbor” variable measured the distance from a specific structure to the nearest other structure in the project area. Examination of the complete “nearest neighbor” data set would give an idea of the regularity of spacing between individual structures in the region. The “second nearest neighbor” variable would also be able to indicate the strength of the settlement pattern. In other words, a well-developed settlement pattern would have regular spacing between more distant structures, as well as closer structures. The settlement unit for this test was an individual farmstead or individual structure.

Analysis of the “nearest neighbor” variable for both the canal era data and the railroad era data determined that the alternative hypothesis -- that non-random settlement occurred -- was the better of the two hypotheses (see Figure 28 and 29). Data from both time periods as expressed in histogram form, when compared visually to a normal curve, demonstrated dramatic differences between the normal curve and the actual data. These differences were also found by using the K-S test for Normalcy, which resulted in low p-values for each test (see Tables 2 and 3). The 1860s “nearest neighbor” analysis had a p-value of 0.0018 and the 1870s “nearest neighbor” analysis had a p-value of 0.0052. Any p-value under 0.05 results in the Alternative Hypothesis being rejected).

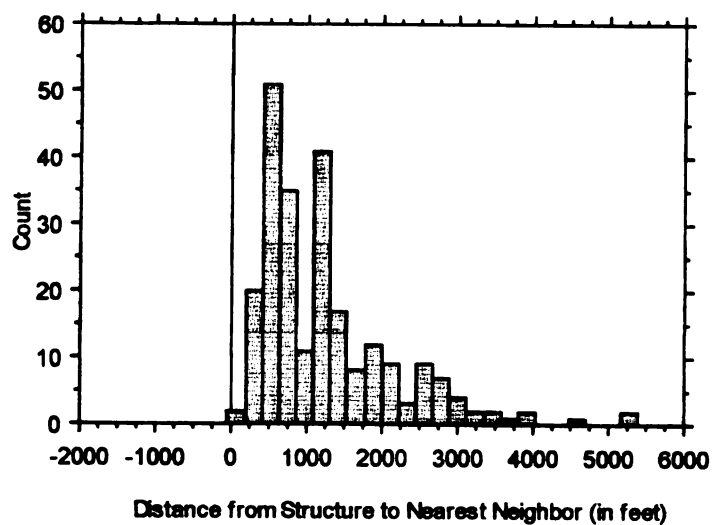
Nearest Neighbor Analysis – Canal Era (1860s)

Table 2: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	239
Count, Ideal Normal	239
Maximum Difference	.172
Chi Square	14.067
P-Value	.0018

20 cases were omitted due to missing values.

Figure 28: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



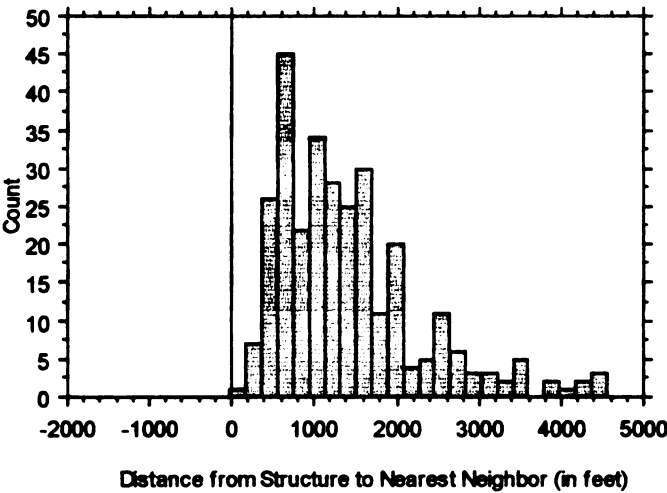
Nearest Neighbor Analysis -- Railroad Era (1870s)

Table 3: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	296
Count, Ideal Normal	296
Maximum Difference	.142
Chi Square	11.919
P-Value	.0052

14 cases were omitted due to missing values.

Figure 29: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



The p-value was a numerical representation of how well the actual data fit into a theoretical normal curve generated from the data. In the case of Hypothesis 1, the Null Hypothesis was accepted (because of the low p-value), meaning that settlement in the Wabash and Erie Canal corridor in Tippecanoe County was not random and was patterned (Earickson and Harlin: 254-260).

The 1860s data set “second nearest neighbor” variable analysis (Table 4, Figure 30) did not produce p-values that were less than the 0.05 alpha value, therefore, the Alternative Hypothesis, that random patterning occurred, should be accepted. The p-values for the “second nearest neighbor” for the 1860s was 0.0840, which still was relatively low, since p-values can fall between 1.0 and 0.05 (the latter being the alpha value for this test). The “second nearest neighbor” for the 1870s time period (Table 5, Figure 31) was lower than the alpha value of 0.05, being 0.0058. This indicated that the Null Hypothesis for the railroad era should be accepted. Settlement even at the distance of the “second nearest neighbor” for the railroad era was patterned.

One of the weaknesses of the K-S test is that outliers (in other words, small amounts of data which are far from the data set median) will skew results and affect p-values by making them lower. A test with extreme outliers, therefore, would not accurately represent a real vs. ideal comparison (Earickson and Harlin: 254-260).

Two analyses (one for each time period) of the “nearest neighbor” variable were run again with the elimination of the most extreme outliers from the data set. For the canal era data, all rows with a “nearest neighbor” value greater than 3400 feet were eliminated from the K-S Test for Normalcy.

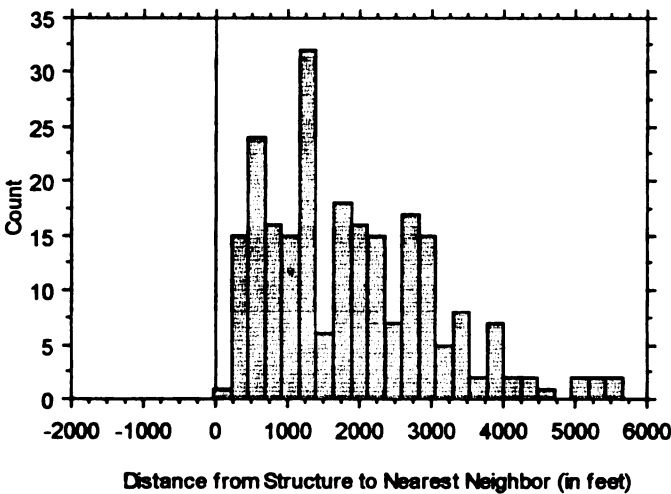
Second Nearest Neighbor Analysis – Canal Era (1860s)

Table 4: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	230
Count, Ideal Normal	230
Maximum Difference	.117
Chi Square	6.339
P-Value	.0840

38 cases were omitted due to missing values.

Figure 30: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



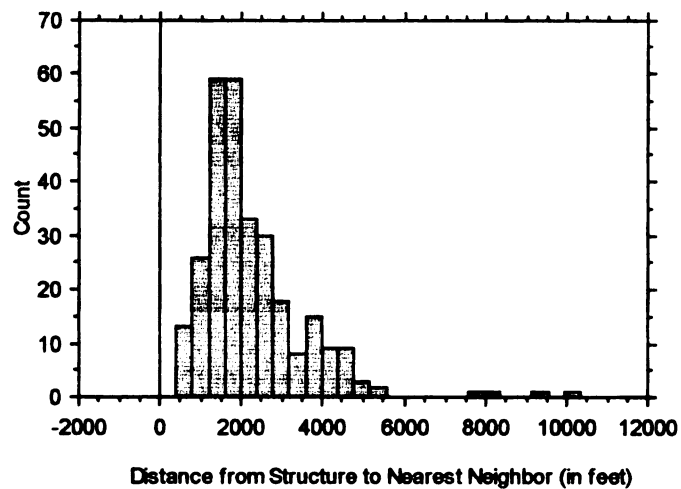
Second Nearest Neighbor Analysis – Railroad Era (1870s)

Table 5: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	288
Count, Ideal Normal	288
Maximum Difference	.142
Chi Square	11.674
P-Value	.0058

30 cases were omitted due to missing values.

Figure 31: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



For the railroad era, all values over 4000 feet were eliminated. These distances were arbitrarily chosen by examining the histograms for the two variables and selecting a cut-off point for outliers that would eliminate the most extreme distance values while retaining the majority of measurements.

For this test, the 1860s data produced a p-value of 0.0238 and the 1870s data produced a p-value of 0.0229, both of which were less than the alpha value of 0.05 (Tables 6 and 7, and Figures 32 and 33). Though both p-values were increased by this elimination of outliers, the overall results and interpretations were not changed, that settlement within the study area was patterned and not random.

One further test of settlement was completed for this Hypothesis. The general data was again tested, only this time with all non-farmsteads/independent structures taken out of the data set. In this way, clusters of structures around mills, churches, or schools would be eliminated so that a settlement pattern based on only farmsteads and independent structures could be tested. The results of this test (again with outliers eliminated) also produced low p-values (Tables 8 and 9, and Figures 34 and 35). The 1960s data set produced a p-value of 0.0253 and the 1870s data set produced a p-value of 0.0263. Both values are still well under the 0.05 alpha value, so the Null Hypothesis is still accepted, that there is non-random settlement within the study area.

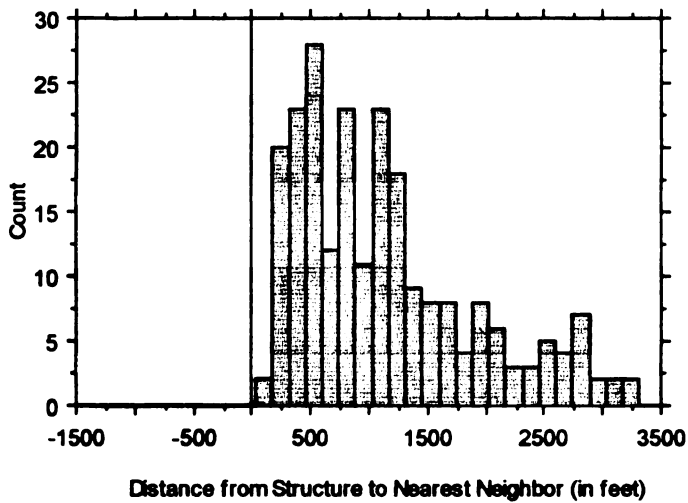
The test of Hypothesis 1, using general “nearest neighbor” and “second nearest neighbor” data, “nearest neighbor” data minus outliers, and “nearest neighbor” data minus outliers and special structures (such as churches and schools) suggested that non-random, patterned settlement took place within the central Indiana study area.

Nearest Neighbor Analysis – Canal Era (1860s) No Outliers

Table 6: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	231
Count, Ideal Normal	231
Maximum Difference	.139
Chi Square	8.866
P-Value	.0238

Figure 32: Histogram
Split By: Actual/Ideal Measures
Cell: Actual

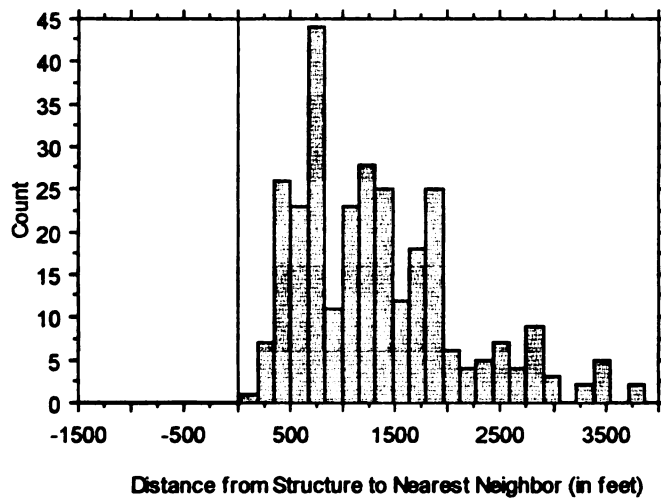


Nearest Neighbor Analysis – Railroad Era (1870s) No Outliers

Table 7: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	290
Count, Ideal Normal	290
Maximum Difference	.124
Chi Square	8.938
P-Value	.0229

Figure 33: Histogram
Split By: Actual/Ideal Measures
Cell: Actual

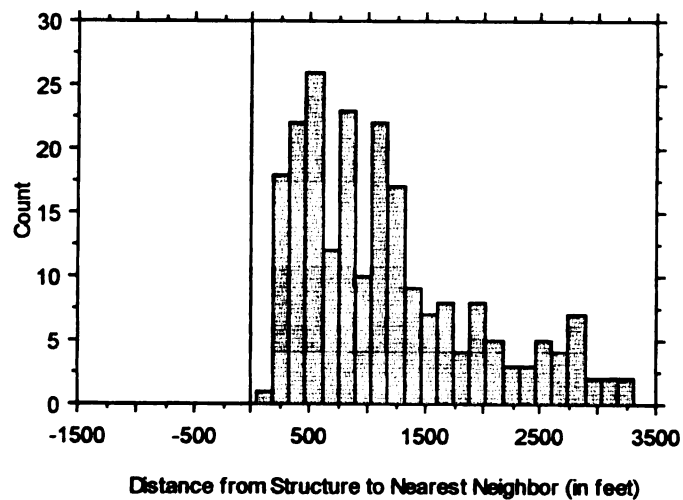


Nearest Neighbor Analysis – Canal Era (1860s) **No Outliers, No Special Structures**

Table 8: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	220
Count, Ideal Normal	220
Maximum Difference	.141
Chi Square	8.736
P-Value	.0253

Figure 34: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



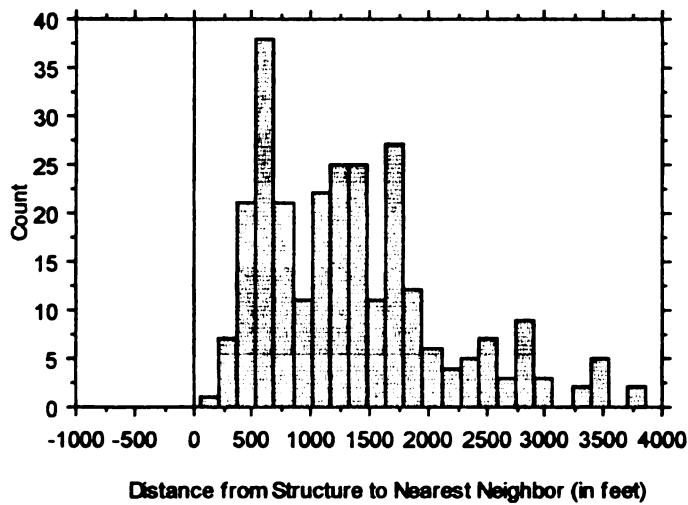
Nearest Neighbor Analysis – Railroad Era (1870s)

No Outliers, No Special Structures

Table 9: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	267
Count, Ideal Normal	267
Maximum Difference	.127
Chi Square	8.659
P-Value	.0263

Figure 35: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



The form of the non-random settlement identified by the K-S tests was difficult to interpret from the histograms produced (see Figures 28 through 35). Regular peaks appeared on a number of the “nearest neighbor” histograms, but at varying distances and intensities. Also, visually observing the township maps did not identify whether the individual structure settlement pattern fit into a Central Place model or a different geometric pattern. The results of the above tests suggested that non-random patterning did occur in the project area, but the nature of this pattern was not obvious. More analysis, therefore, had to be undertaken before a central place model can be accepted.

Hypothesis 2: A Test for Settlement Patterning in Identifiable Central Place Theory Geometric Forms.

The second hypothesis to be tested examined whether non-random settlement in the project area occurred in Central Place forms, or whether it did not. Hypothesis 2 was stated as follows:

Alternative Hypothesis 2 – Non-random patterned settlement in the project area did not follow any identifiable central place theory forms.

Null Hypothesis 2 – Non-random patterned settlement in the project area followed identifiable central place theory forms.

Central place theory predicts that settlement within a region can orient in three different primary patterns. Market-oriented settlement forms hexagonal patterns that optimize economic market forces. Administration-oriented settlement would optimize administration control over communities. Transportation-oriented settlement would orient toward best facilitating a local transportation network (Marshall 1969: 29-32).

If any of these forces were paramount in the settlement of Tippecanoe County, then a single variable should be much more uniform than the rest. If all of the three variables proved to be random, then overall settlement would most likely be random. For this project, the courthouse for each county in question was the primary administration unit, housing all major County, State, and Federal functions. Post offices were to be found in many smaller communities, but all formal legalities were concluded at the courthouse.

It was easy to see from the county maps from both time periods that settlement on any level did not orient toward the county seat. Though populations were usually more dense around courthouse-holding towns (Lafayette and Delphi), which usually also were the highest order town in the region, populations away from the administrative center were little influenced by the administrative center. The fact that smaller settlements were not skewed toward the three county seats in the Project area suggests that an administration-oriented settlement pattern did not occur in the project area.

To test the two remaining central place models, the variables of "nearest road," and "nearest town" were examined. The "nearest town" variable (the distance from a farmstead or individual structure to the nearest town) would represent the strength of a developing market system (see Bowden and LaRose 1971, and Wood 1984). For this variable, hamlets were not included when measurements from individual structures were made, as their circle of influence was not great enough in either 1860s or 1870s to affect much of the countryside away from their borders. The "nearest road" variable would demonstrate the strength of road access on settlement placement. To clarify, it is the

uniformity of distance and not the closeness of the nearest variable feature in this case that is important.

For the “nearest road” K-S Test for the 1860s and 1870s, all values over 3500 feet were removed from the data sets. This distance was chosen arbitrarily by examining the histograms of the original data sets for natural outliers under the “nearest road” variable. When examining the K-S test results for distance from individual structures to the “nearest road” variable (Tables 10 and 11, and Figures 36 and 37), it is apparent that this landscape feature had a very low p-value for each time period (under 0.0001), and hence was not likely to be random. The histograms for “nearest road” for both time periods also showed a remarkable uniformity when compared to all other variables in the general data histograms (see Appendix III).

The histograms for “nearest town” for the 1860s and 1870s data sets demonstrated a near-normal distribution (Figures 37 and 38). This normalcy was further confirmed by the K-S tests for the “nearest town” variable. The p-value for the 1860s “nearest town” test was 0.8043, and the p-value for the 1870s test was 0.2473 (Tables 12 and 13). Both are over the alpha value of 0.05, meaning that a normal distribution of settlement in relation to towns is expected.

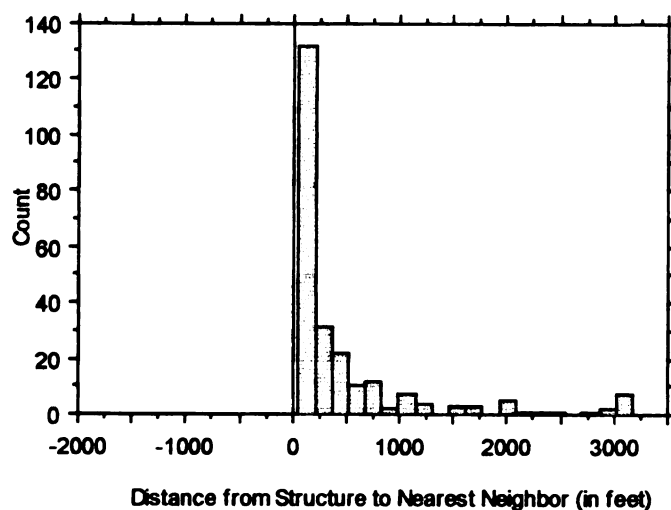
The histograms and K-S test for administration influences demonstrated the highest p-values, and therefore, the least likely influence on settlement in the region. It can be concluded, therefore, that settlement in the project area was oriented toward a local/regional transportation network first, then a market-optimizing system, and least of all, an administrative settlement pattern.

Nearest Road Analysis – Canal Era (1860s) **No Outliers**

Table 10: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	244
Count, Ideal Normal	244
Maximum Difference	.307
Chi Square	46.107
P-Value	<.0001

Figure 36: Histogram
Split By: Actual/Ideal Measures
Cell: Actual

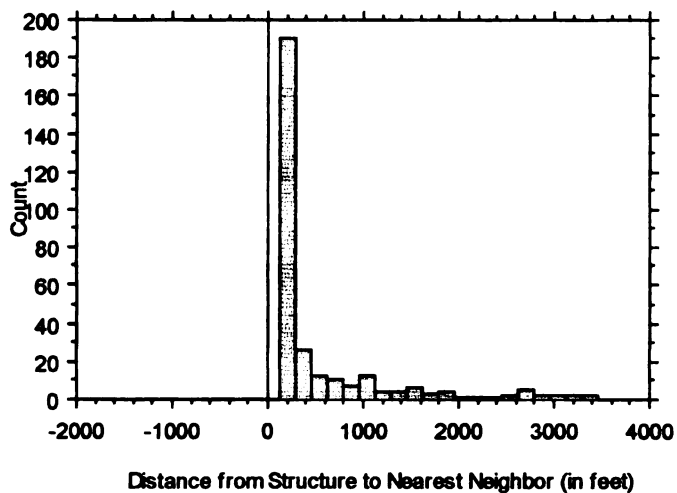


Nearest Road Analysis – Railroad Era (1870s) **No Outliers**

Table 11: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	298
Count, Ideal Normal	298
Maximum Difference	.292
Chi Square	50.799
P-Value	<.0001

Figure 37: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



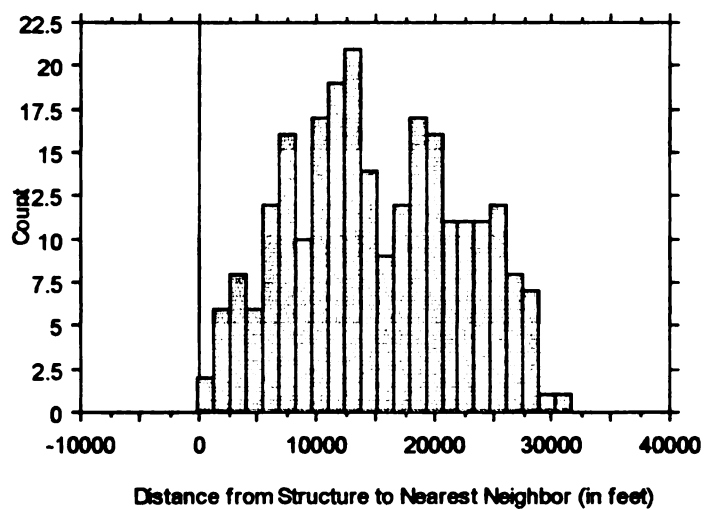
Nearest Town Analysis – Canal Era (1860s)

Table 12: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	247
Count, Ideal Normal	247
Maximum Difference	.061
Chi Square	1.822
P-Value	.8043

4 cases were omitted due to missing values.

Figure 38: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



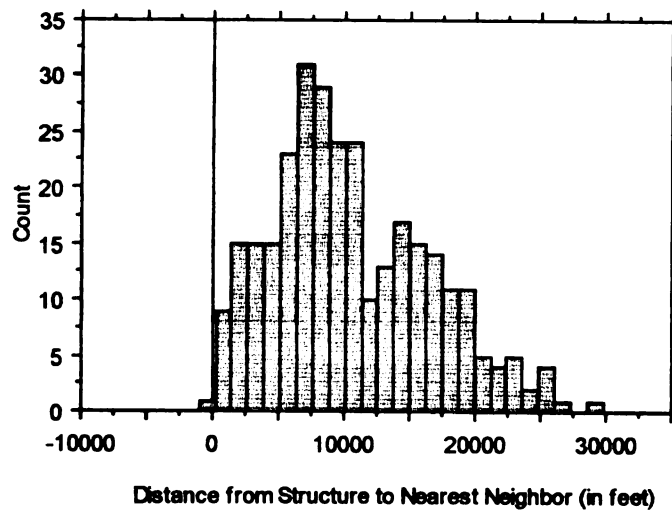
Nearest Town Analysis – Railroad Era (1870s)

Table 13: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	299
Count, Ideal Normal	299
Maximum Difference	.084
Chi Square	4.181
P-Value	.2473

8 cases were omitted due to missing values.

Figure 39: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



For this analysis, the Alternative Hypothesis was therefore rejected, and the Null Hypothesis accepted. It can be concluded that settlement within the project area at the individual structure level oriented primarily toward the local road system.

The above analyses suggested that, whatever the geometric pattern forming in the project region, the pattern was oriented at the individual structure scale toward a local road transport system. However, local roads were not the only transportation feature in the region, and settlement did not just occur at the individual structure level. Three major transportation systems were also present in the area: the Wabash River, the Wabash and Erie Canal, and the Wabash Railroad. The canal was dominant in developing local infrastructure during the first data set (1860s), and the railroad was dominant during the second data set (1870s). If a study of larger scale settlements associated with major transportation systems can identify a central place theory pattern, then it can be concluded that the pattern forming in the area (as suggested by the individual structure analysis) was indeed a central place pattern.

Hypothesis 3: A Test of Random or Ordered Settlement Patterning Linearly Along the Wabash and Erie Canal.

The third hypothesis tested whether settlement directly on the Wabash and Erie Canal was spaced randomly, or whether settlement followed a central place theory form. This hypothesis was stated as:

Alternative Hypothesis 3 -- Linear settlement directly along the Wabash and Erie Canal occurred randomly.

Null Hypothesis 3 -- Linear settlement directly along the Wabash and Erie Canal was evenly spaced (as suggested by later studies of central place theory), given a major transportation system constructed through an isotropic plain.

Hypothesis 2 demonstrated that, within the project area, individual settlement was primarily oriented toward local road transportation routes. Hypothesis 3 recognizes that, other than local linking roadways, a number of major transportation systems (river, canal, and railroad) existed within the project area at both historic time periods. This hypothesis examined the most influential transportation system for the mid-19th Century (1860s data), the Wabash and Erie Canal, to test whether settlement directly along the canal was following an identifiable central place theory pattern or not. To test for central place patterning at higher settlement scales, a different data set from the same region was used; one that dealt with all settlement located on the Wabash and Erie Canal in Tippecanoe County in the 1860s (see Table 14). The new data set included hamlets, towns and cities with the farmsteads located directly on the canal.

This new data set was tested using general statistics, histograms with an over-laid normal curve, and with the K-S test for normalcy. The histograms generated (Figures 39 and 40) suggested that normal spacing existed along the Wabash and Erie Canal in the 1860s, but the low p-value (0.1244) from the K-S Test (Table 16) indicated an overall random distribution, though a weak one (1.0 being perfectly normal).

Table 14: Linear Settlement Along the Wabash and Erie Canal.

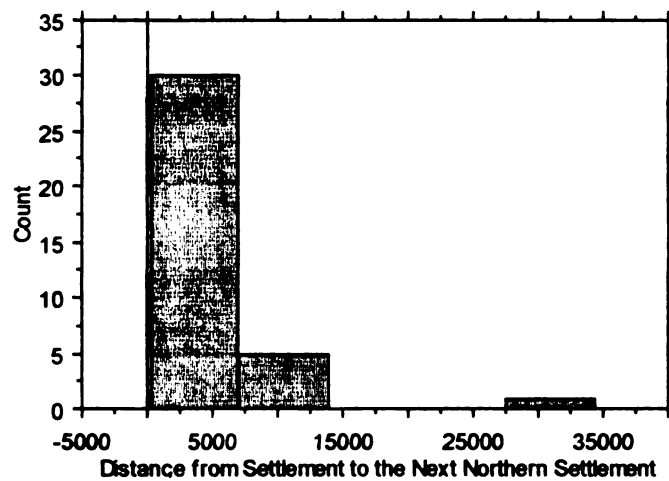
<u>County</u>	<u>Settlement</u>	<u>Distance to Next Settlement to the North</u>
Tippecanoe	Farmstead	.
Tippecanoe	Farmstead	9936
Tippecanoe	Individual Structure	1656
Tippecanoe	Farmstead	8004
Tippecanoe	Americus	3174
Tippecanoe	Individual Structure	3312
Tippecanoe	Farmstead	3312
Tippecanoe	Individual Structure	2208
Tippecanoe	Farmstead	3726
Tippecanoe	Farmstead	6348
Tippecanoe	Individual Structure	552
Tippecanoe	Individual Structure	1242
Tippecanoe	Jewettsville Hamlet	2622
Tippecanoe	Farmstead	966
Tippecanoe	Farmstead	3726
Tippecanoe	Individual Structure	552
Tippecanoe	Farmstead	276
Tippecanoe	Farmstead	2622
Tippecanoe	Individual Structure	12834
Tippecanoe	Wildcat Hamlet	3726
Tippecanoe	Individual Structure	6624
Tippecanoe	Individual Structure	2484
Tippecanoe	Individual Structure	1518
Tippecanoe	Individual Structure	276
Tippecanoe	Lafayette\Linwood	2622
Tippecanoe	Individual Structure	34362
Tippecanoe	Farmstead	2898
Tippecanoe	Farmstead	4692
Tippecanoe	Farmstead	1242
Tippecanoe	Granville	8142
Tippecanoe	Individual Structure	1380
Tippecanoe	Farmstead	2346
Tippecanoe	Individual Structure	552
Tippecanoe	Individual Structure	276
Tippecanoe	Farmstead	690
Tippecanoe	Individual Structure	6762
Tippecanoe	Individual Structure	11178

Linear Settlement Along the Wabash and Erie Canal, Including Individual Structures – Canal Era (1860s)

Table 15: Descriptive Statistics for Linear Settlement Along the Canal Data Set

	Distance from Settlement t...
Mean	4412.167
Std. Dev.	6053.106
Std. Error	1008.851
Count	36
Minimum	276.000
Maximum	34362.000
# Missing	1

**Figure 40: Histogram for Descriptive Statistics for Linear Settlement
Along the Canal Data Set.**



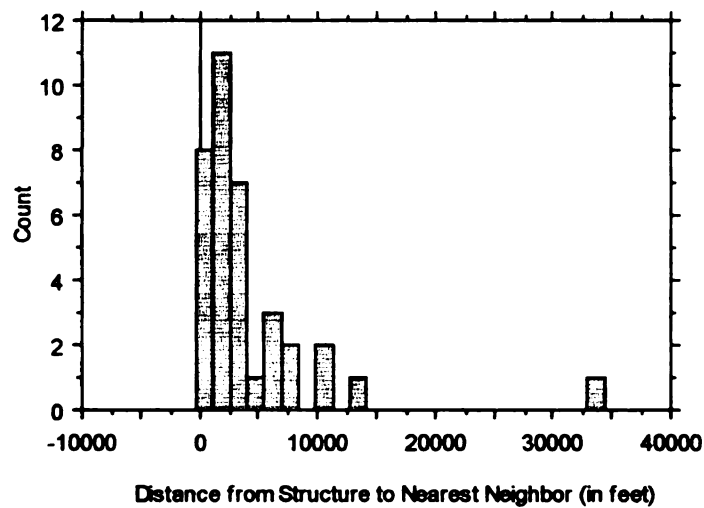
Linear Settlement Along the Wabash and Erie Canal Data Set Analysis – Canal Era (1860s)

Table 16: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	36
Count, Ideal Normal	36
Maximum Difference	.278
Chi Square	5.556
P-Value	.1244

2 cases were omitted due to missing values.

Figure 41: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



By examining the Township maps, located in Appendix V, a visual relationship between higher-order settlements and the canal can be noted. All the settlements of hamlet size and larger in the 1860s within the project area were located on the canal. The only exception was the city of Delphi, which was linked to the canal by a 500-ft feeder waterway, and was therefore technically on the canal.

Table 17 shows the relationship in the 1860s between all higher-order centers within the study area in the 1860s and the Wabash River, the canal, the railroad and other settlements. All higher-order settlements during the 1860s were located on the canal, though not all were located on the Wabash River or the Railroad. The strong relationship between the Wabash River and community location also indicated the strength of the river as the primary transportation route prior to the canal's construction. The building of new major transport systems on the settlement structure of older systems was an occurrence met throughout the analysis section.

Table 17: Settlement Along the Wabash and Erie Canal of Hamlet Size or Larger.

<u>County</u>	<u>Settlement</u>	<u>Distance to</u>	<u>Distance</u>	<u>Distance to</u>	<u>Distance to Next</u>
		<u>River</u>	<u>to Canal</u>	<u>Railroad</u>	<u>Settlement South</u>
Carroll	Delphi	4140	0	0	34638
Tippecanoe	Americus	0	0	14490	26358
Tippecanoe	Jewettsville Hamlet	1380	0	11316	25392
Tippecanoe	Wildcat Hamlet	19320	0	3036	15318
Tippecanoe	Lafayette	0	0	0	46368
Tippecanoe	Granville	1380	0	24012	67482
Fountain	Riverside	.	0	.	31464
Fountain	Attica	.	0	.	42090
Fountain	Portland	.	0	.	47196
Fountain	Covington	.	0	.	40986
Fountain	Vicksburg	.	0	.	.

This pattern would change in the 1870s, when new higher-order settlements within the project area would develop exclusively along the railroad (see Township Maps, Appendix III). The lack of secondary railroad communities between Lafayette and the towns of Attica and Delphi during the 1860s demonstrated the lag-time between the construction of a new transportation system (the Wabash Railroad was completed in 1856) and the time when optimizing central places emerged along its route.

This data highlights the relationship in the 1860s between settlement and the Wabash and Erie Canal, but does not indicate the pattern of settlement linearly along the canal. To study this relationship, the distances between settlements must be examined. The distances indicate even spacing between higher-order canal settlements along the canal (see Table 17 and Figure 42), but a marked difference in spacing interval can be observed between settlements north of the city of Lafayette and south of Lafayette. Settlements south of the city averaged a spacing of 45,843 feet, with a maximum and a minimum of 67,482 feet and 31,464 feet. Higher order central place settlement North of Lafayette had an average spacing of 29,614 feet, which was 35% smaller than the interval distance found South of the city.

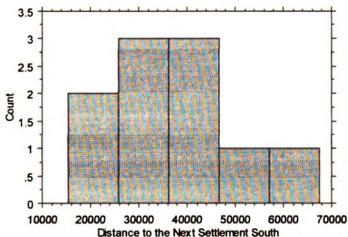
An explanation for this difference can be found in the documented economic use-history of the Wabash and Erie Canal. The section of canal between Lafayette and Fort Wayne was often referred to as the most commercially used and economically successful part of the canal (see Wabash and Erie Canal History Chapter). Canal use on the Northern Section was also established earlier and used longer than the southern section between Lafayette and Terre Haute, which also was less used and less economically successful than the northern section.

Linear Settlement Along the Wabash and Erie Canal, Hamlet Size and Higher Order Settlements – Canal Era (1860s)

Table 18: Descriptive Statistics for Linear Settlement Along the Canal Data Set

	Distance to the Next Settle...
Mean	37729.200
Std. Dev.	14574.264
Std. Error	4608.787
Count	10
Minimum	15318.000
Maximum	67482.000
# Missing	1

**Figure 42: Descriptive Statistics Histogram for Linear Settlement
Along the Canal Data Set, Hamlet Size and Higher Order Settlements.**



This information suggested that the increased transportation use resulted in a quicker filling-in of central places along the northern route as markets were exploited between larger linear nodes along the transportation route.

There is precedence for this conclusion. O'Brien's (1984: 55) study of the Salt River area of Missouri concluded that variations in topography and transportation access (in the form of a major regional road) led to different regional timings of the creation of central places. Differential use of the Wabash and Erie Canal, therefore, led to a different central place development timing rate north and south of Lafayette, Indiana.

When examining *all* linear settlement along the Wabash and Erie Canal in Tippecanoe County, including individual dwellings and individual structures, a normal distribution results (see Table 16). This is not surprising in that the data included a mix of higher-order settlements and individual farmsteads, and only tested those structures that were directly on the canal. Farmsteads in central Indiana, it appeared, were primarily concerned with the agricultural aspects of the landscape and formed a broader regional settlement pattern (such as Central Place market-oriented hexagons), even with a major transportation route being located in the region.

It appeared from this study that the order of a central place did have an affect on which transportation system the central place was oriented towards; which is a subject not brought up in the central place theory literature. Farmsteads oriented toward county roads, whereas higher-order central places oriented toward regional transportation systems. This pattern may provide, with further study, yet another variation on

Christaller's original model, where individual central place orders orient toward separate landscape features.

Earlier analysis in the Hypothesis 1 section determined that, regardless of the normalcy outcome for farmsteads directly along the canal (see Table 14 and Table 16), individual structures in the project area *were* part of a greater regional settlement pattern. Higher-settlement in the 1860s appeared to be oriented toward the canal instead of a general regional settlement pattern. Later 1870s in-filling of area beyond the canal, indicated that a maturing transportation-oriented central place pattern may have been forming in the study area. This would explain the non-random settlement at the farmstead level, the non-random settlement at the higher-order level, the orientation of higher-order settlement toward the canal, and the later development of regional higher-order centers away from the Wabash and Erie Canal.

A study of the geometric representation of higher-order settlements along all transportation routes for the 1860s and 1870s time periods revealed patterns similar to that expressed by James Vance in his "*The Merchant's World*" study, which also dealt with central place theory in a developing frontier situation (1970). As the railroad became dominant in the study area, smaller supporting communities filled in along its route to take advantage of centrally located market exploitation nodes. Also, hamlets along the Wabash and Erie Canal ceased to exist as such (Jewettsville and the Wildcat Creek hamlet) by 1878.

Figure 43: Map of Deer Creek, Washington and Fairfield Townships, Showing the Canal, the Railroad, and Settlements Above the Hamlet Scale.

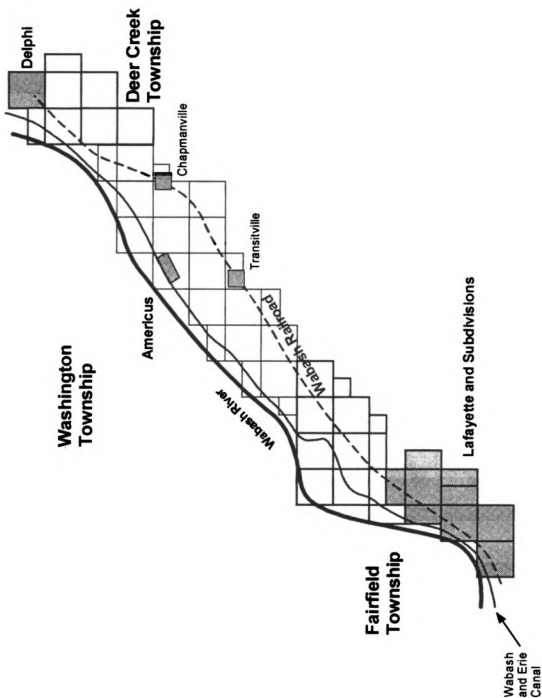
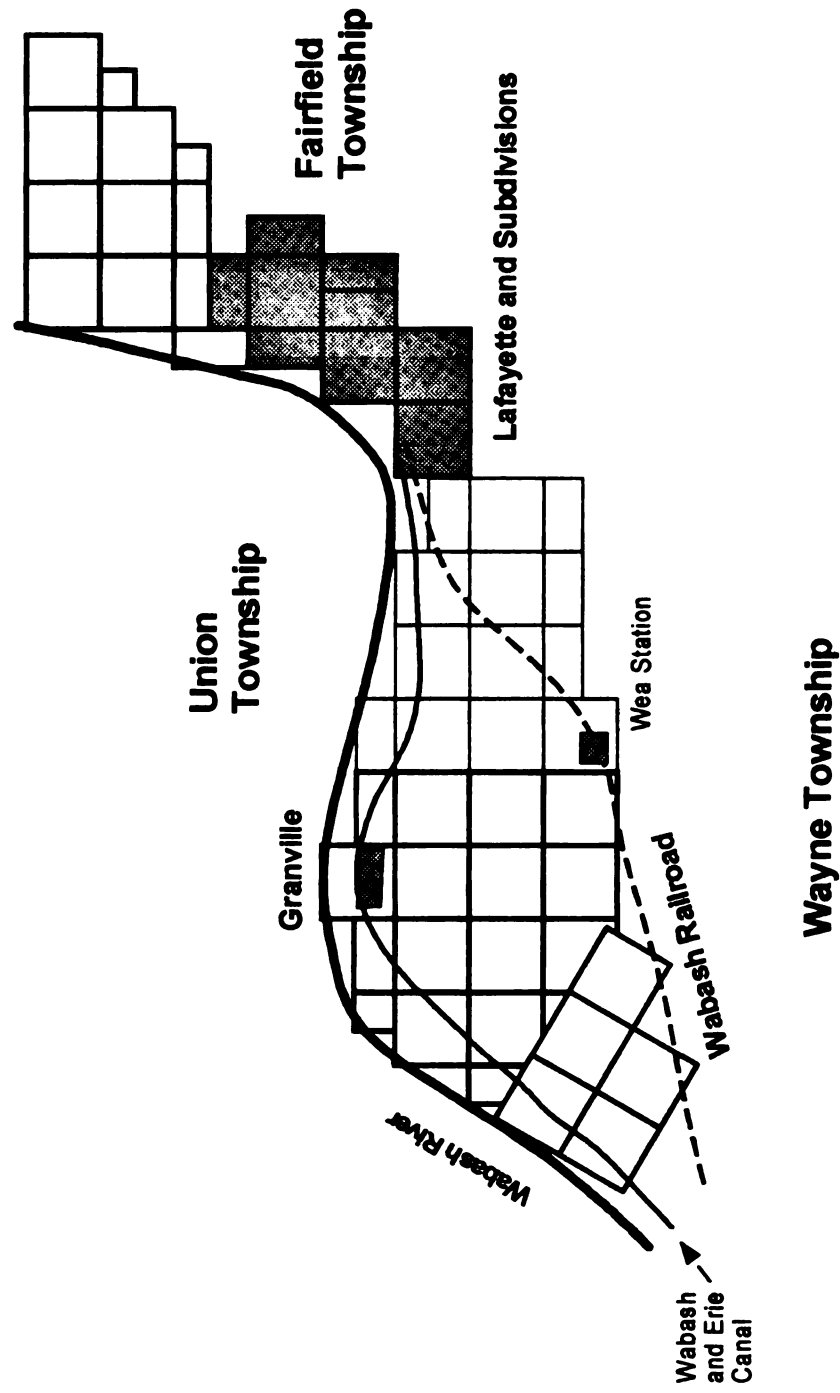


Figure 44: Map of Wayne, Union, and Fairfield Townships, Showing the Canal, the Railroad, and Settlements Above the Hamlet Scale.



As the new railroad transportation route became established, the pattern that emerged was more like Vance's maturing frontier stage than his earlier single-transport route stage, with several transportation routes and linear Central Places emerging. Several other case studies from geography and archaeology found similar results (Paynter 1982, Mitchell and Hofstra 1995, Lewis 1984, Wood 1984, and Bowden and LaRose 1971).

An additional factor to consider is that later economic structures (such as the railroad) did not exist in a developmental vacuum. The Wabash and Erie Canal was placed so that existing river communities were intersected in the 1830s and 40s (see Wabash and Erie Canal history section). The railroad was also placed to intersect existing commercial points (though not necessarily all of the lower-level communities). The previous regional structure, developed by the influence of the canal, was, therefore, later exploited by the railroad. This may be why two smaller rail-oriented communities developed north of Lafayette, and only one developed to the south; old economic patterns were being followed.

For the analysis of Hypothesis 3, the Alternative Hypothesis was therefore rejected and the Null Hypothesis accepted. Linear settlement along the Wabash and Erie Canal was therefore evenly spaced and overall matched a central place theory pattern. In this case, the data and analyses fit a transportation-oriented central place pattern that was in a state of development toward a mature regional central place settlement system.

The results of data analysis dealing with Hypothesis 2 showed that settlement on the individual structure scale *did not* orient on the Wabash and Erie Canal or on the

railroad. Hypothesis 3 showed that larger scale communities *did* orient toward the dominant transportation route(s) of the 1860s or 1870s. This section also demonstrated that, for Hypothesis 3, linear settlement did occur randomly along the canal at the individual structure level. Settlement at higher scales, however, *was* evenly spaced along the Wabash and Erie Canal, but this spacing was contingent upon the economic strength of the canal section.

For all scales of settlement, therefore, settlement was orienting toward the most important transportation system *at that scale*; county roads at the individual structure scale, and the canal or railroad at higher settlement scales. Settlement at any scale within the project area was less likely to take place away from the various transportation systems while the market region was forming. As transportation systems were expanded (such as the addition of the railroad) more areas filled in within the region, giving the landscape a more classic Central Place hexagonal form.

Hypothesis 4: A Test of Central Place Theory Geometric patterning at the Individual Structure Level.

Hypothesis 4 attempted to show Central Place patterning at the individual structure level, based on ideal geometric patterning. Similar statistical studies have been done by a number of geographers, including Dacey (1966), Beckmann and McPherson (1970), Lösch (1954), and Parr (1969). This hypothesis attempted to recognize hexagonal geometric spacing within a the central Indiana forming market system.

Alternative Hypothesis 4 — The settlement pattern for the study area cannot be identified at the individual structure scale as being a central place theory-based pattern.

Null Hypothesis 4 -- Settlement in the study area at the individual structure scale can be identified as a central place theory-based pattern.

Hypotheses 1 through 3 proved that settlement in the project area at both historic time periods was not random. It was also shown that settlement was oriented at the lowest scale first toward local road systems, and next toward a market pattern of settlement, and that larger settlements were oriented toward major transportation systems in a central place theory pattern. The above hypotheses have concluded that an alternative form of central place theory (Christaller's "traffic principle" model) was probably the best fit in determining settlement at all scales in the project area, but it was difficult to identify the emergence of classic hexagonal forms of interaction from either the statistics dealt with so far or from the historic maps.

It should be noted here that classic central place theory deals with mature market systems with intact hexagonal lattice settlement patterns. There will be cases when Central Place hexagonal patterns are forming and are not yet of the mature type. Market forces would also take time to "push" settlement into optimal locations away from less optimal locations as regional space fills up with settlement units. Similar cases have been noted by several archaeologists and geographers, namely Paynter (1982), Michell and Hofstra (1995), Wood (1984), and Bowden and LaRose (1971). In these cases, uniform patterning may not be apparent and the entire region may appear to be randomly settled.

It has already been speculated that a central place theory settlement pattern early in formation may look like random patterning or may be more random in nature. The shift from random settlement, as determined by the K-S Test for Normalcy, in the

“second nearest neighbor” variable for the canal era to a non-random settlement pattern during the railroad era may be an indication of a maturing regional settlement pattern that was starting to fill in geometrically. Testing an even later data set (perhaps from the 1880s) could determine if this was the case through an overall continued lowering of p values.

Because of the nature of Central Place hexagonal patterns, a “forming” Central Place market structure should still have non-random clusters of settlement at or near specific distances. Examining these clusters may lead the researcher toward ideas about the emerging form of settlement within a market economy (ideally hexagonal in form).

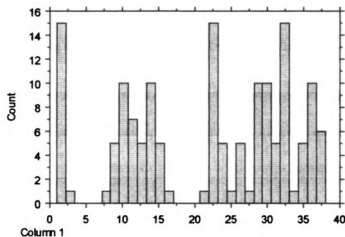
In the Tippecanoe County case, two major settlement patterns can be hypothesized: a square grid pattern, or a Central Place hexagonal pattern. The grid pattern could emerge from the federal law that land west of the Appalachians was to be sold in square or rectangular sections or fractions of sections (Berry and Parr 1988: 54-68). If settlement followed this powerful influence of early land settlement, then specific intervals should be encountered in the distance between settlement units as the grid system is maximized, regardless of whether the region is fully mature or forming. Settlement under such conditions could still be placed in such a way that hexagonal formations emerged, but the land sale limitations would be a boundary factor, such as Webber discussed (1971: 24-25).

Exact distances are not important for this study, but *proportional* distances are (see Lösch 1954, and Beckmann and McPherson 1970 for examples of this. A mature grid system would have all immediate nearest neighbors at an equal distance, with the fifth nearest neighbor (ranked by distance) at a 71% farther distance than the last four

neighbors. A mature hexagonal settlement pattern would have the first six nearest neighbors at the same distance, then the seventh at a 73% farther distance.

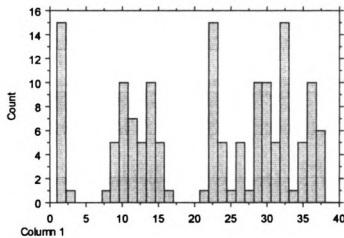
Forming settlement patterns, based on either of these geometric forms, would also have specific distance patterns in an ideal isotropic plain. For the ideal grid pattern, the nearest neighbor could only occupy positions that were 0%, 100%, 140%, 230%, 290%, 300%, 330%, 360%, 430%, etc. greater than the ideal spacing. The hypothetical histogram of this pattern is given in Figure 45.

Figure 45: Hypothetical Ideal Distribution for Settlement in a Grid Pattern.



For the hexagon market system, the next nearest neighbor could only occupy, in an ideal case, positions that were 0%, 40%, 100%, 125%, 185%, 200%, 220%, 265%, 330%, etc. greater than the ideal case. The hypothetical histogram of this pattern is given in Figure 46.

Figure 46: Hypothetical Ideal Distribution for Settlement in a Hexagon Pattern.



These two ideal forming settlement patterns, therefore, create probability patterns of their own with which data can be compared. Central Place forming hexagonal patterns would have four peaks present in any histogram of settlement out to 150% beyond the ideal distance from a single unit, with a fifth forming at 185% beyond the ideal. The grid pattern forms three peaks in the histogram, with a distance gap between 0% and 100% beyond the ideal distance for a formative grid settlement pattern. A further peak would form at a distance of 230% beyond the ideal.

What these studies suggest is that, as a non-random settlement fills an ideal isotropic plain, settlement units would locate themselves at identifiable intervals from each other, and that the *proportion* of these intervals can be examined to predict what the specific final settlement pattern will be.

When comparing this theoretical data to the actual data from Tippecanoe County (Figures 28-31), the histograms for “nearest neighbor” and “second nearest neighbor” for

both time periods do form four or five uniformly-spaced peaks, which are reminiscent of a Central Place pattern and not a grid pattern. However, the proportions between the peaks are clearly much larger than either settlement pattern predicts.

Figure 47: Nearest Neighbor Analysis – Canal Era (1860s)
No Outliers, No Special Structures

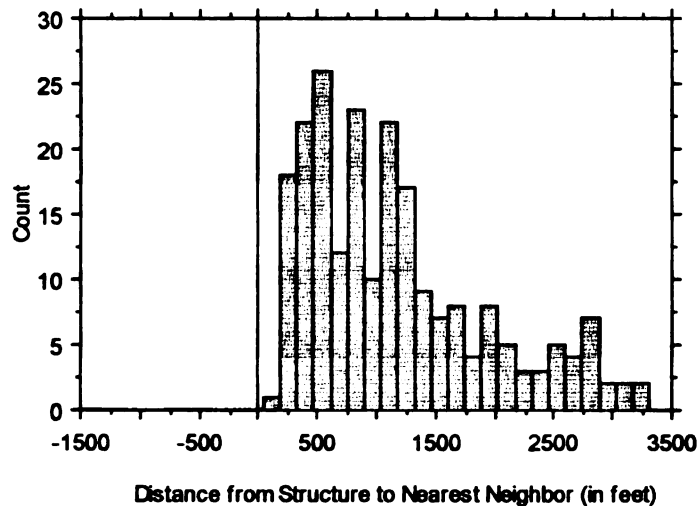


Figure 48: Nearest Neighbor Analysis – Railroad Era (1870s)
No Outliers, No Special Structures

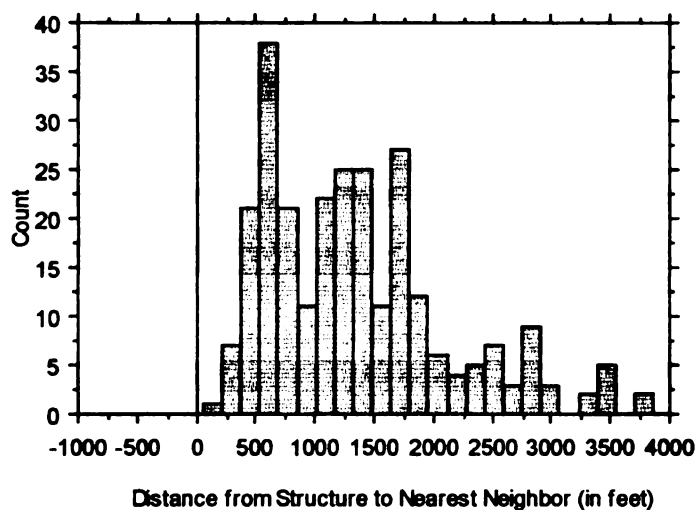


Figure 49: Second Nearest Neighbor Analysis – Canal Era (1860s)
No Outliers, No Special Structures

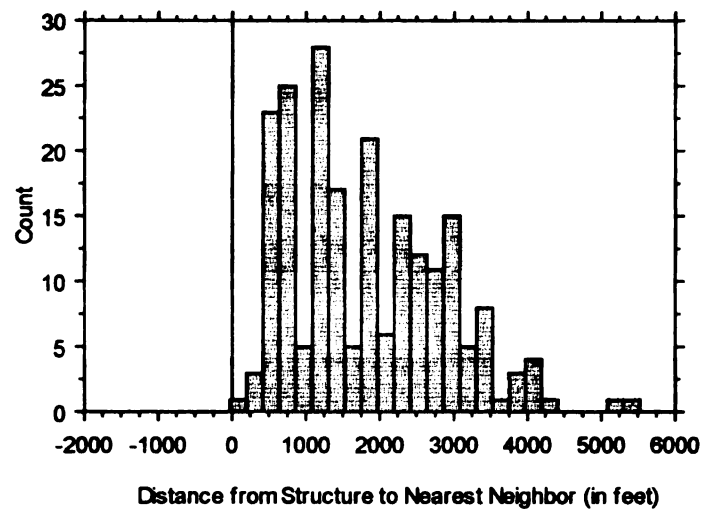
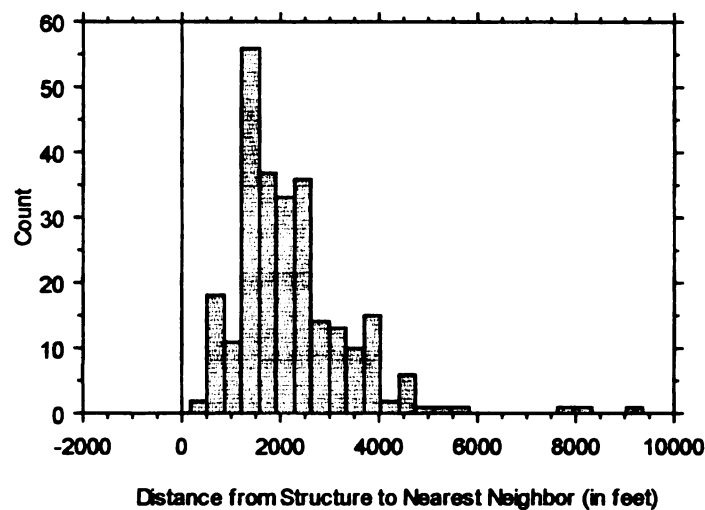


Figure 50: Second Nearest Neighbor Analysis – Railroad Era (1870s)
No Outliers, No Special Structures



The Alternative Hypothesis was therefore accepted and the Null Hypothesis rejected. The study area settlement pattern at the individual structure level, could not be identified as following a central place theory geometric model. This is not surprising in

that Lösch has received much criticism for choosing individual farmsteads as his fundamental unit of centrality (see Webber 1971). This difference between the visible peaks found in the analysis results and the ideal peak pattern could have been caused by the following situations:

Situation 1. The sample size was too small to identify peaks within the distance of 0% to 200% beyond ideal.

Situation 2. The settlement in the region was much too early in its formative process to make this study useful. In other words, not enough nearest neighbors were being located within the 0% to 200% to form partial patterns, which could suggest an overall geometric direction for the region. The result is mostly “noise” without pattern, which should mimic a random settlement pattern. Because the K-S tests for “nearest neighbor” proved otherwise, this was not likely the case for settlement in Tippecanoe County.

Situation 3. It may be that forces take place at the smallest scale of central place theory that affect the overall settlement pattern in a different manner than that which the larger scales of settlement experience. At the smallest level, the speed of a horse or the size of a plow could determine a significant change in ideal settlement patterning. In this way, cultural, biological, and physical limitations or influences upon the basic unit within a Central Place system would skew settlement at this level away from classic geometric patterns. It would be inappropriate, as Webber suggested, to use the farmstead as the basic unit of central place theory (1971: 23).

Situation 4. Other factors are skewing the results to such a degree that a geometric pattern cannot be determined from the data. This latter explanation is probably the most convincing in explaining the peaks shown on the histograms. In this case, cultural, physiographic, geographic, political, or social factors will influence overall central place patterning (not just the individual unit); skewing the results from an ideal expected formation. Several authors have dealt with just this issue in central place theory, including Webber (1971), Hodder and Orton (1976), Smith (1976), and Berry and Parr (1988).

The results of this last analysis suggested that, within the non-random settlement of Tippecanoe County, a geometric settlement form was being created, but that the nature

of the geometric form was undeterminable from the data. The lack of a gap within the histograms (Figures 47-50), however, implied that a grid pattern was not forming.

Situation 4 listed above made above dealt with the possibility of other variables skewing the individual structure geometric pattern away from an ideal form, which would be solely based on the closeness of the nearest neighbor. Central place theory has always stated that the model was based on analyses set within a theoretical ideal isotropic plain, and that many other variables skew real-world results (Smith 1976 b: 29).

One of the most obvious skewing factor in the Wabash and Erie Canal corridor region was the Wabash River, which acted as a block to cross-river market creation, except at key points where traffic could cross. It should be noted that, until late in the 19th Century, the only all-year, all-weather means for crossing the river were the two bridges at Lafayette. Fords and ferries, which made up all the other crossing options, were seasonal only and depended on good weather.

The Wea and Birmingham Bluffs, highlands that marked the edge of the Wabash flood plain to the north and south of Lafayette, were other topographic features that affected settlement. Other features included swamps, marshes, creeks, high ground, flash-flood regions, and forested areas. Environment, therefore, greatly affected settlement in the project area. Some of these environmental features are expressed statistically in this report, such as “Nearest Body of Water” and “Wabash River Distance.”

Soil types are another factor which has been extensively examined in regional settlement pattern studies (O’Brien 1984: 43-52). Soil types have not been included in

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**THE DEVELOPMENT OF THE WABASH AND ERIE CANAL (1832-
1875) IN CENTRAL INDIANA AND ITS AFFECT ON EVOLVING
WABASH VALLEY SETTLEMENT**

VOLUME II

By

Wayne L. Bischoff

A DISSERTATION

**Submitted to
Michigan State University
In partial fulfillment of the requirements
For the degree of**

Doctor of Philosophy

Department of Anthropology

2000

this study, though this variable also probably affected settlement in the project area. Other skewing factors will be dealt with under the next hypothesis.

Hypothesis 5: A Test of the Importance of Selected Variables For Predicting Settlement Pattern Skewing.

Hypothesis 5 examined whether the results of the last hypothesis, that no central place geometric form could be identified for the project area, was a result of the influence of other variables presented in this project. If any single variable was extensively affecting the variable “nearest neighbor,” then that variable would have explained the skew in the project region away from an identifiable geometric form.

Alternative Hypothesis 5 -- The distance between structures in the study area cannot be explained by one or more variables presented in the project.

Null Hypothesis 5 -- The distance between structures in the study area can be explained by one or more variables presented in the project.

Of the twelve variables presented in the general data sets for 1866 and 1878, the variable “nearest neighbor” was crucial for proving patterned settlement in the project region. Multivariate multiple regression comparisons can be made to determine which, if any, of the other variables were useful in predicting the “nearest neighbor” variable.

For this multiple regression analysis, the “nearest neighbor” variable was set as the dependent variable and nine of the remaining eleven variables listed in the general settlement data base were chosen as independent variables. The variables “second nearest neighbor” and “nearest road in opposite direction” were not used in this test because their value was dependent upon the values of “nearest neighbor” and “distance to

nearest road,” which eliminated their independent status. It should be noted here that this test examined only the relationship between *variables*, and not the relationship between the original structure and other structures (Earickson and Harlin 1994, Chapter 8).

Of the nine variables set as independents for the 1866 study, the “distance to nearest road” variable had the lowest p-value for both the 1860s and 1870s data sets (see results, Tables 20 and 22). The p-values for the 1860s data set variables of “distance to nearest road” was 0.0001, with the “distance to nearest body of water” being the only other variable with a p-value (0.0114) less than the alpha value of 0.05. For the 1870s data set, the variables with p-values less than the alpha value were the “distance to nearest road” (0.0009), the “distance to nearest town” (0.0059), and the “distance to the Wabash and Erie Canal” (0.0483). This meant that, of all the variables tested, the “distance to the nearest road” was the most useful for explaining the “nearest neighbor” variable.

The low Adjusted R-squared value (Tables 19 and 21), however, indicated a weak overall association between the dependent and the independent variables. The Adjusted R-squared value for the 1860s data set was 0.138 and for the 1870s data set 0.072. This meant that, even though the “distance to nearest road” variable was the most useful variable in explaining the dependent variable “nearest neighbor,” there was still only a weak relationship between the two (1.0 being strong, 0.0 being no relationship). The “distance to nearest road” variable, therefore, would be a poor indicator of “nearest neighbor” regardless of its low p-value.

**Table 19: Regression Summary for Canal Era Variables (1860s),
"Nearest Neighbor" Variable Compared with Nine Others.**

Count	227
Num. Missing	22
R	.415
R Squared	.172
Adjusted R Squared	.138
RMS Residual	871.312

**Table 20: Regression Coefficients
Distance to Nearest Neighbor (in feet) vs. 9 Independents**

	Coefficient	Std. Error	Std. Coeff.	t-Value	P-Value
Intercept	1444.128	244.222	1444.128	5.913	<.0001
Nearest Road	.299	.067	.282	4.446	<.0001
Distance to Wabash River	-.042	.032	-.158	-1.311	.1914
Distance to Wabash River Feature	-.015	.014	-.109	-1.092	.2761
Distance to Wabash and Erie Canal	.044	.040	.166	1.098	.2733
Distance to Wabash and Erie Canal Feature	.007	.022	.032	.295	.7683
Distance to Railroad	-.001	.014	-.007	-.074	.9412
Distance to Railroad Feature	-.010	.006	-.160	-1.751	.0814
Distance to Nearest Town	-.004	.015	-.032	-.284	.7767
Distance to Nearest Body of Water	.060	.024	.211	2.552	.0114

**Table 21: Regression Summary for Railroad Era Variables (1870s),
"Nearest Neighbor" Variable Compared with Nine Others.**

Count	282
Num. Missing	21
R	.319
R Squared	.102
Adjusted R Squared	.072
RMS Residual	822.286

**Table 22: Regression Coefficients
Distance to Nearest Neighbor (in feet) vs. 9 Independents**

	Coefficient	Std. Error	Std. Coeff.	t-Value	P-Value
Intercept	1101.180	202.053	1101.180	5.450	<.0001
Distance to Wabash River	-.044	.032	-.255	-1.376	.1701
Distance to Wabash River Feature	-.011	.009	-.091	-1.247	.2134
Distance to Wabash and Erie Canal	.067	.034	.394	1.984	.0483
Distance to Railroad	-.009	.012	-.065	-.804	.4224
Distance to Railroad Feature	.013	.011	.098	1.148	.2522
Distance to Nearest Road	.205	.061	.202	3.371	.0009
Distance to Nearest Town	.030	.011	.195	2.774	.0059
Distance to Nearest Body of Water	-.004	.016	-.022	-.267	.7895
Distance to Canal Feature	-.018	.016	-.105	-1.141	.2549

The scattergrams of the “distance to nearest road” variable and the “nearest neighbor” variable demonstrated this weakness (Figures 51 and 52). No visible slope or clustering of values around a slope was apparent.

Figure 51: Scattergram for "Nearest Road" compared with "Nearest Neighbor," Canal Era (1860s).

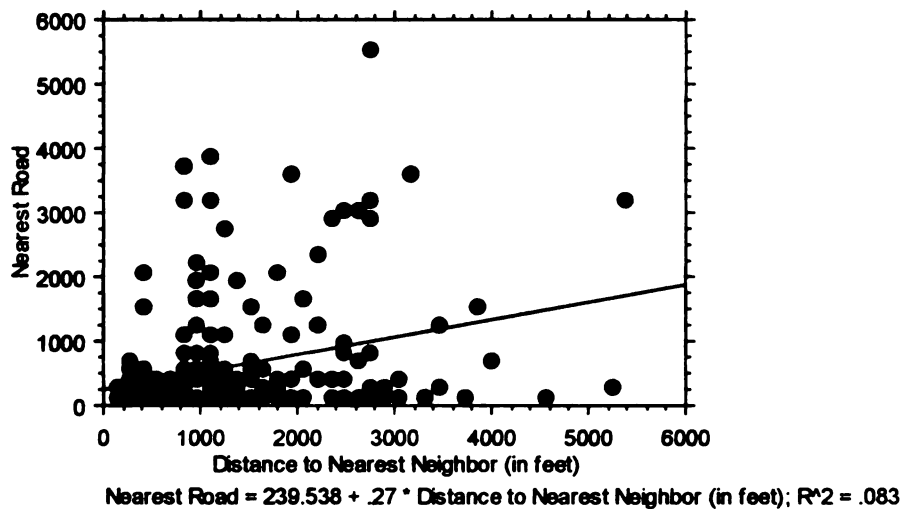
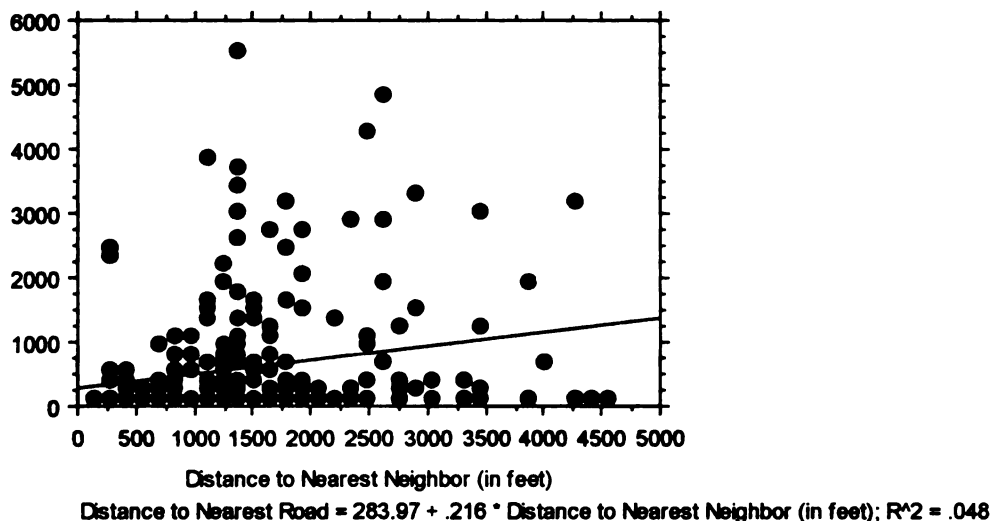


Figure 52: Scattergram for "Nearest Road" compared with "Nearest Neighbor," Railroad Era (1870s).



Also of interest for the analysis of Hypothesis 5 was which variables had the highest p-value, and hence the least ability to predict the value of the “nearest neighbor” variable. The “distance to nearest railroad” variable had the highest p-value, as well as the “distance to nearest town” and “distance to nearest Wabash and Erie Canal feature” variables for the 1860s study (Table 20). The two variables with the highest p-values for the 1870s data set were “distance to nearest railroad” and “distance to nearest body of water” (Table 22).

Multivariate analysis indicated a relationship between “distance to nearest road” and “distance to nearest neighbor” for both the 1860s and 1870s, but did not indicate a strong relationship between the overall regional settlement pattern and the other variables presented in the test of Hypothesis 5. Skewing of the results of analysis of the “nearest neighbor,” therefore, could not be explained by the influence of any of the other variables examined by this project.

The Null Hypothesis, therefore, was accepted and the Alternative Hypothesis rejected. The lack of an identifiable geometric pattern in settlement within the project area could not be explained by skewing from one or more of the variables presented in this project, though the location of the local road system appeared to have had the most influence on settlement patterning.

Hypothesis 6: A Test of the Importance of Canal Features in Determining Individual Structure Location.

Hypothesis 6 dealt with whether settlement in the project area was oriented toward canal engineering features or not. For this analysis, all canal features that would cause a delay in transportation for safety reasons, for economic loading or off-loading, or

for changing from one canal elevation to another, were used. These features included aqueducts, commercial basins, locks, guard locks, and bridges; all of which had a special function that may have attracted settlement. Hypothesis 5 was stated as follows:

Alternative Hypothesis 6 -- Settlement along the Wabash and Erie Canal was located independent of canal engineering features.

Null Hypothesis 6 -- Settlement along the Wabash and Erie Canal was oriented toward canal engineering features.

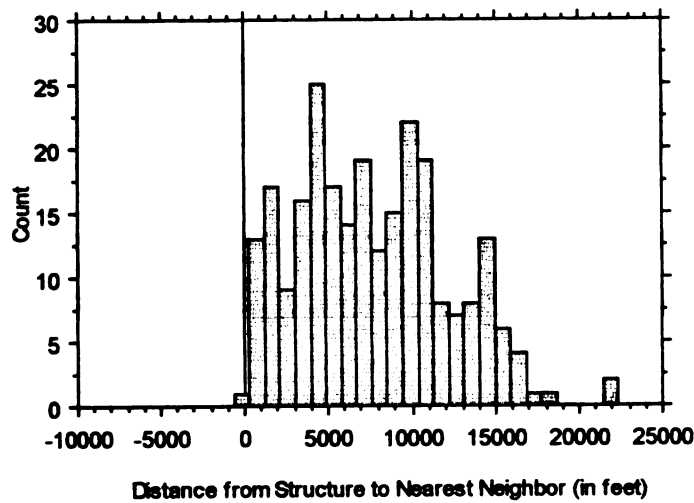
Analysis of the “distance to Wabash and Erie Canal feature” for both the 1860s and 1870s data sets involved running both through K-S tests for normalcy, and by generating histograms with normal curves overlaid (Figures 53 and 54). The p-values produced by the K-S test were above the alpha value for both time periods (Tables 23 and 24). The 1860s data set produced a p-value of 0.3403 for the “distance to Wabash and Erie Canal feature” variable, and the 1870s data set produced a p-value of 0.2133. The histograms supported this conclusion, with the frequency bars producing a near-normal pattern (Figures 53 and 54). The K-S test indicated that the “distance to Wabash and Erie Canal feature” variable for both time periods was likely normal, leading to the Alternative Hypothesis being accepted and the null Hypothesis being rejected. Settlement, therefore, was not oriented toward canal engineering features.

Distance to Nearest Canal Feature – Canal Era (1860s)

Table 23: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	249
Count, Ideal Normal	249
Maximum Difference	.084
Chi Square	3.542
P-Value	.3403

Figure 53: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



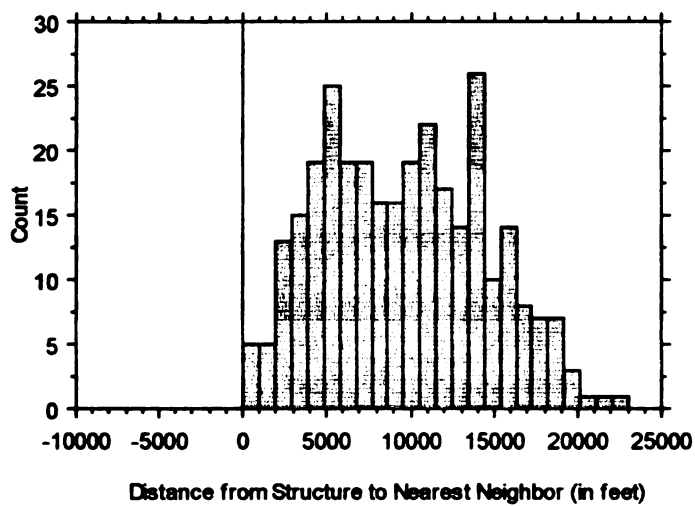
Distance to Nearest Canal Feature – Railroad Era (1870s)

Table 24: Kolmogorov-Smirnov Test for Measurements
Grouping Variable: Actual/Ideal Measures

DF	2
Count, Actual	302
Count, Ideal Normal	302
Maximum Difference	.086
Chi Square	4.477
P-Value	.2133

2 cases were omitted due to missing values.

Figure 54: Histogram
Split By: Actual/Ideal Measures
Cell: Actual



Hypothesis 7: A Comparison of Settlement in the 1860s with that of the 1870s to Determine Change Through Time.

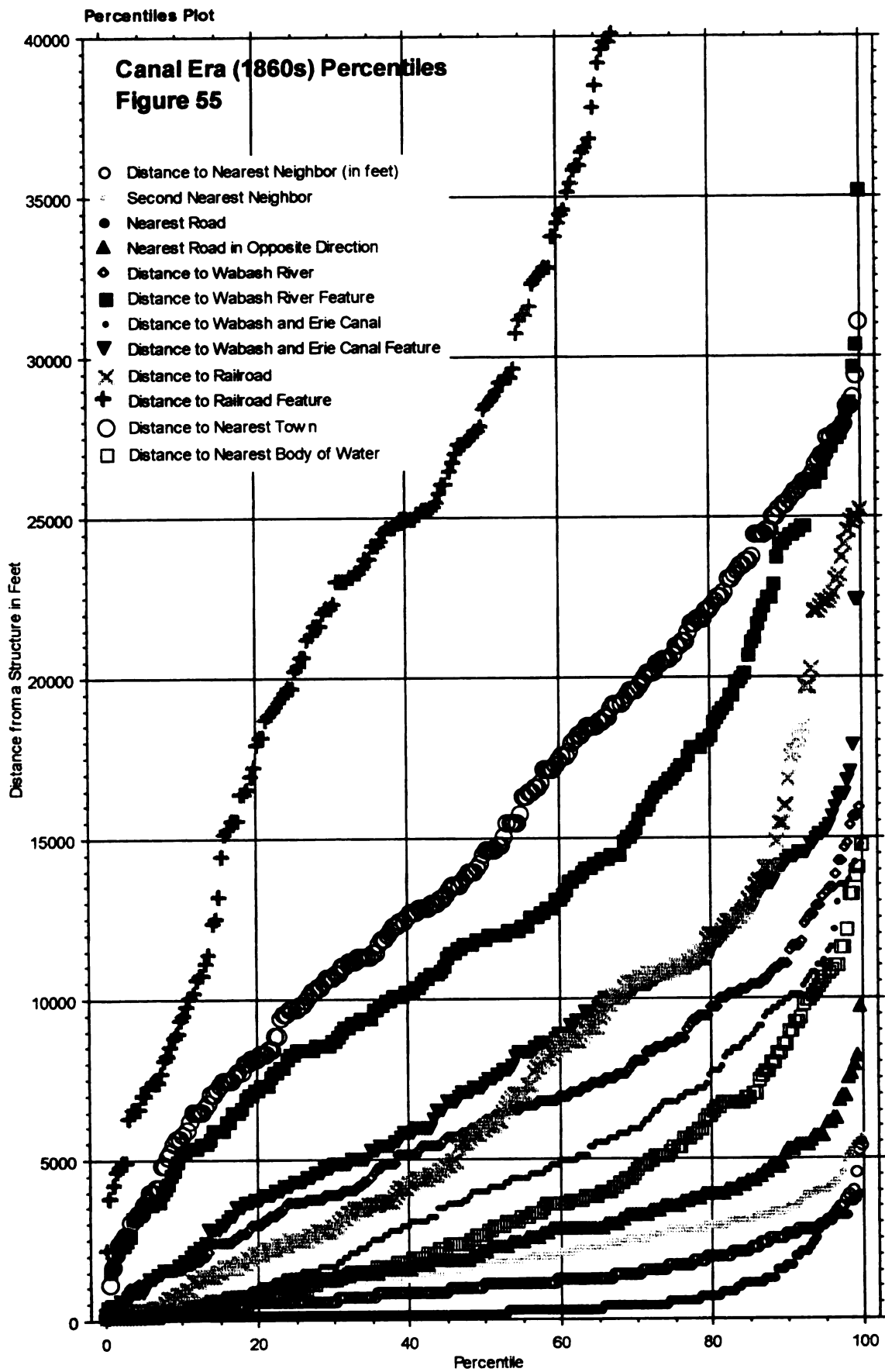
Hypothesis 7 examines the differences between the project area in 1866 and 1878.

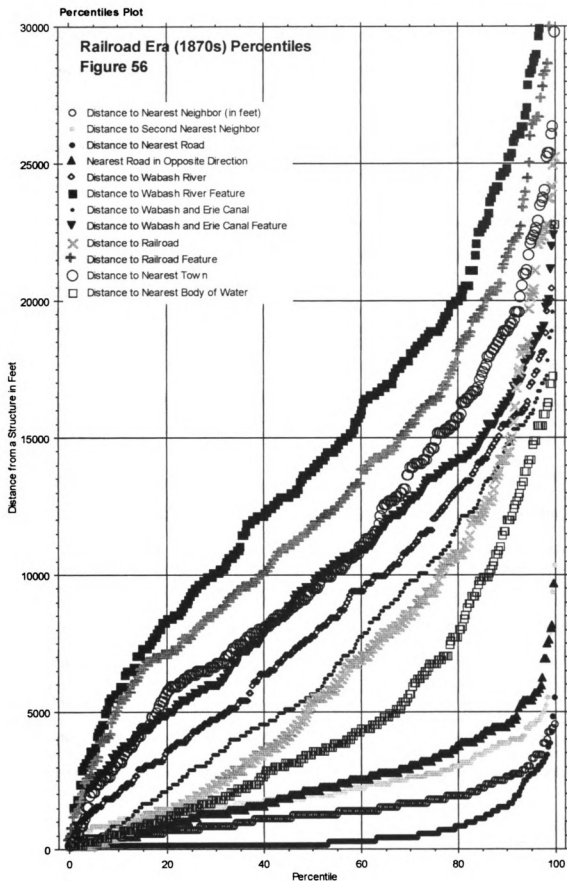
The major change between these two time periods was the dominance of the railroad economically within the region. Many of these differences have been presented already. Additional analyses will be completed before a thorough list of differences will be compiled and the null hypothesis accepted or rejected.

Alternative Hypothesis 7 -- There will be no difference in settlement orientation in the 1860s when compared with 1870s.

Null Hypothesis 7 -- There will be differences in settlement location between the 1860s and 1870s.

The percentiles graphs demonstrate the twelve measurements that were created for each structure within Tippecanoe and Carroll Counties for study project area. The 1860s data set is represented by Figure 55, and the 1870s data set is represented by Figure 56. For this graph, the steeper the slope, the closer the feature was for all settlement units. The 1860s percentile graph demonstrates that certain trends existed at the time, with little crossing-over between lines. This implied that the trends for the region changed little, regardless of where an individual structure was on a certain percentile line. In other words, if a certain structure was 1.0 miles from its nearest neighbor, it was most likely that the canal, then the railroad, then the nearest town would all be farther away. This pattern would be the same for all structures, though the distances of each variable may vary. A structure that was 2.0 miles from its nearest neighbor, would likely have the same variables at the same *ranked* distance beyond the “distance to nearest neighbor” variable.





The only major exception to this rule of no crossing of percentile lines was the “distance to railroad” variable (Figures 55). It has been stated above, that the railroad was a new feature to the region and had not yet been incorporated into the greater regional settlement pattern by the 1860s. For half of the settlement structures in the 1860s, the Wabash River was closer than the railroad, and railroad features were distant and presumably hard to access. Half of the settlement structures were also closer to a canal feature than to the railroad itself. The canal for the entire population was closer than the railroad and ranked accordingly when all variables are examined.

These trends change drastically by the 1870s (Figure 56). The railroad was by then generally as close to all settlement structures in the region as the Wabash and Erie Canal, and the railroad was closer, for the majority of settlement structures within the project area, than the Wabash River and Wabash and Erie Canal features. The closeness of railroad features also surpassed the closeness of Wabash River features and comes closer to the nearness of canal features. It should be noted that, between the two time periods, *the physical location of the Wabash Railroad did not change*. All settlement changes associated with the railroad involved changes in individual settlement structure locations only.

No other variable showed such a marked change in overall ranking as that of the railroad and its features. All other variables retained their ranked order when compared to all other non-railroad variables. All of the above reflects the affect of railroad dominance on mid to late-19th Century settlement in the project area. The results of testing Hypothesis 7 were that there was a distinct difference in settlement orientation

from the 1860s to the 1870s. The Alternative Hypothesis was, therefore, rejected, and the Null Hypothesis accepted.

Hypothesis 8: A Test of the Affect of Transportation System Form on Settlement Change Through Time.

Hypothesis 8 examined the settlement differences along each of the three major transportation routes that were constructed through the project area. All three routes were studied with an equivalent area of settlement, then comparisons were made. This hypothesis was stated as:

Alternative Hypothesis 8 – Settlement along each of the three major transportation routes in the project area was not different when equal areas of land along each were examined.

Null Hypothesis 8 -- Settlement along each of the three major transportation routes in the project area was different when equal areas of land along each were examined.

A foreseeable problem for any analysis dealing with comparisons of canal data with the other two major transportation systems in the project region was the lack of uniformity in the general data set. In other words, within the general project area, only the southern/eastern bank of the Wabash River was examined. Settlement along the Wabash and Erie Canal was thoroughly tested on *both* sides of the canal. The Wabash Railroad was almost exclusively tested on the north side of the tracks. This situation created problems for comparative studies dealing with settlement responses to the three transportation systems individually.

To avoid this problem, a 1.5 Section-wide band of area along one side of each feature was examined exclusively from both borders of Tippecanoe County through the project area. In this way, an equivalent area of settlement was examined for each transportation system. For the Wabash River and the Wabash and Erie Canal, the southern/eastern side was chosen. For the Wabash Railroad, the northern/western side was chosen. Because of the physical location of the three transportation systems, the areas chosen overlapped greatly.

One other requirement for this study was the modification of the band when one transportation route came close to the Wabash River (such as where the railroad approached the river just south of Lafayette). When this occurred, an equivalent area was included on the opposite side of the transportation route, so that the same area for all three transportation system was retained.

New data sets were generated from the original data sets for the 1860s and 1870s by eliminating all values that did not fit into a certain band area. In other words, within the 1860s general data set (Appendix I), for the Wabash and Erie Canal data set, only structures with a “yes” in the WE column would be kept in the data pool. In this way, six new data sets were created; one for each of the band areas, and one for each of the time periods in question (1860s or 1870s).

General statistics (Tables 25-26) were generated for each of the three transportation systems, and for each of the two time periods (1860s and 1870s). The results were then used to create cross-transport comparisons for each of the three transportation systems, and for the two time periods.

Table 25: Descriptive Statistics for Canal Band, Canal Era (1860s).

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing
Distance to Nearest Neigh...	1198.009	876.976	229	138.000	5382.000	9
Second Nearest Neighbor	1843.555	1143.566	220	138.000	5658.000	18
Nearest Road	561.277	842.475	238	138.000	5520.000	0
Nearest Road in Opposite...	2438.773	1815.183	238	138.000	9660.000	0
Distance to Wabash River	5971.689	3322.721	238	138.000	15594.000	0
Distance to Wabash River...	12577.013	6577.301	225	414.000	29670.000	13
Distance to Wabash and ...	4199.143	3199.283	238	138.000	13524.000	0
Distance to Wabash and ...	7369.664	4236.326	238	138.000	17802.000	0
Distance to Railroad	7547.672	6373.963	238	138.000	25254.000	0
Distance to Railroad Feat...	30890.438	14864.059	224	0.000	61824.000	14
Distance to Nearest Tow n	15062.466	7196.624	236	138.000	31050.000	2
Distance to Nearest Body...	3381.000	3027.910	238	138.000	13248.000	0

Table 26: Descriptive Statistics for Railroad Band, Canal Era (1860s).

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing
Distance to Nearest Neigh...	1309.231	905.603	156	138.000	5244.000	5
Second Nearest Neighbor	1968.365	1090.821	148	138.000	5382.000	13
Nearest Road	593.143	832.851	161	138.000	3726.000	0
Nearest Road in Opposite...	2378.571	1753.572	161	138.000	9660.000	0
Distance to Wabash River	6954.000	3447.935	161	138.000	15870.000	0
Distance to Wabash River...	12802.297	6388.201	148	414.000	29670.000	13
Distance to Wabash and ...	5083.714	3752.798	161	138.000	14766.000	0
Distance to Wabash and ...	8379.429	4673.680	161	138.000	22356.000	0
Distance to Railroad	5243.143	3487.624	161	138.000	12558.000	0
Distance to Railroad Feat...	28704.932	14494.854	148	0.000	61824.000	13
Distance to Nearest Tow n	16795.208	6807.099	159	2622.000	31050.000	2
Distance to Nearest Body...	4003.714	3550.584	161	138.000	14766.000	0

Table 27: Descriptive Statistics for River Band, Canal Era (1860s).

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing
Distance to Nearest Neigh...	1206.245	882.313	220	138.000	5382.000	7
Second Nearest Neighbor	1854.171	1150.652	211	138.000	5658.000	16
Nearest Road	568.414	858.468	227	138.000	5520.000	0
Nearest Road in Opposite...	2459.683	1796.510	227	138.000	9660.000	0
Distance to Wabash River	5687.789	3113.834	227	138.000	15594.000	0
Distance to Wabash River...	12412.940	6619.810	215	414.000	29670.000	12
Distance to Wabash and ...	4100.485	3179.893	227	138.000	13524.000	0
Distance to Wabash and ...	7378.441	4239.580	227	138.000	17802.000	0
Distance to Railroad	7797.304	6413.468	227	138.000	25254.000	0
Distance to Railroad Feat...	31212.505	15040.009	214	0.000	61824.000	13
Distance to Nearest Tow n	15090.453	7186.769	225	138.000	31050.000	2
Distance to Nearest Body...	3400.150	3041.995	227	138.000	13248.000	0

Table 28: Descriptive Statistics for Canal Band, Railroad Era (1870s).

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing
Distance to Nearest Neigh...	1388.292	873.219	233	138.000	4554.000	4
Distance to Second Near...	2273.336	1398.713	226	414.000	10350.000	11
Distance to Nearest Road	595.671	894.309	237	138.000	5520.000	0
Nearest Road in Opposite...	2437.220	1779.575	236	138.000	9660.000	1
Distance to Wabash River	6530.835	3708.155	237	414.000	19872.000	0
Distance to Wabash River...	13186.938	6767.322	226	414.000	31602.000	11
Distance to Wabash and ...	5086.203	3640.858	237	138.000	19596.000	0
Distance to Canal Feature	8098.144	4163.065	236	276.000	19872.000	1
Distance to Railroad	7127.089	6228.698	237	138.000	25254.000	0
Distance to Railroad Feat...	13003.420	6596.090	224	276.000	30774.000	13
Distance to Nearest Tow n	10997.356	6150.508	233	138.000	29808.000	4
Distance to Nearest Body...	3848.861	3010.364	237	138.000	13248.000	0

Table 29: Descriptive Statistics for Railroad Band, Railroad Era (1870s).

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing
Distance to Nearest Neigh...	1433.510	831.914	196	276.000	4278.000	3
Distance to Second Near...	2255.713	1147.092	188	414.000	8004.000	11
Distance to Nearest Road	562.402	770.094	199	138.000	3726.000	0
Nearest Road in Opposite...	2208.000	1617.212	199	138.000	9660.000	0
Distance to Wabash River	8799.407	4516.802	199	414.000	22770.000	0
Distance to Wabash River...	14136.191	6474.726	188	414.000	31602.000	11
Distance to Wabash and ...	7338.271	4664.335	199	138.000	22632.000	0
Distance to Canal Feature	9950.636	4566.526	198	552.000	22356.000	1
Distance to Railroad	5065.779	3472.053	199	138.000	17388.000	0
Distance to Railroad Feat...	10675.651	5409.087	189	276.000	30360.000	10
Distance to Nearest Tow n	10885.015	6237.846	195	276.000	29808.000	4
Distance to Nearest Body...	5237.759	4579.175	199	138.000	22770.000	0

Table 30: Descriptive Statistics for River Band, Railroad Era (1870s).

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing
Distance to Nearest Neigh...	1404.353	900.521	221	138.000	4554.000	3
Distance to Second Near...	2301.070	1427.832	215	414.000	10350.000	9
Distance to Nearest Road	605.598	918.332	224	138.000	5520.000	0
Nearest Road in Opposite...	2457.390	1803.127	223	138.000	9660.000	1
Distance to Wabash River	6145.313	3607.935	224	138.000	19872.000	0
Distance to Wabash River...	12920.411	6916.075	214	276.000	31602.000	10
Distance to Wabash and ...	4860.188	3607.681	224	138.000	19596.000	0
Distance to Canal Feature	7969.964	4140.595	223	276.000	19872.000	1
Distance to Railroad	7374.991	6319.127	224	138.000	25254.000	0
Distance to Railroad Feat...	13211.547	6532.217	212	276.000	30774.000	12
Distance to Nearest Tow n	11172.380	6231.295	221	138.000	29808.000	3
Distance to Nearest Body...	3799.929	2983.905	224	138.000	13248.000	0

The “mean” statistic can be useful in analyzing a number of variables from different data sets. In this case, the data sets from the three transportation band areas and the two time periods were examined and the means of distances for each of twelve variables listed (Table 31). The mean, as used here, gave the *average* value for the entire data set. These averages were then compared and general trends noted.

Table 31: Comparisons of Means for Transportation Band Variables.

	1866				1878		
	Wabash River	WE Canal	Railroad		Wabash River	WE Canal	Railroad
	Band	Band	Band		Band	Band	Band
Nearest Neigh.	0.848	0.842	0.87		1.011	0.997	1.003
2nd Nearest N.	1.278	1.271	1.269		1.668	1.644	1.573
Nearest Road	0.403	0.397	0.403		0.448	0.439	0.397
Near. Op. Road	1.824	1.802	1.746		1.835	1.814	1.623
Wabash River	3.988	4.252	4.667		4.368	4.707	6.347
Wab. Riv. Feat.	9.283	9.417	9.339		9.672	9.885	10.417
Canal	2.782	2.882	3.116		3.31	3.519	5.118
Canal Feature	4.799	4.823	5.059		5.68	5.798	7.061
Railroad	5.656	5.43	2.909		5.697	5.46	3.429
Railroad Feat.	18.027	17.962	7.311		9.941	9.687	7.451
Nearest Town	10.455	10.401	11.958		7.869	7.726	7.187
Nrst. Bod. Wat.	2.446	2.429	2.628		2.684	2.731	3.596

An examination of the change in the means of the twelve variables across space and through time revealed that:

1. The average distance to the nearest neighbor for each individual structure or farmstead between the 1860s and 1870s actually increased. Hypothesis 1 showed that the overall settlement was becoming more patterned in the region. The increase in distance might have been, therefore, linked to this patterning. The “second nearest neighbor” variable also showed an increase across time periods. It should be noted that, overall, the canal in the 1860s had the lowest average distance between structures, with the river being second. This ranking does not change in the 1870s, but the distance between nearest neighbors for the three transportation bands

becomes more uniform. The 1870s band mean “nearest neighbor” values had only a 45 foot range of difference, as opposed to the 113 foot range in the 1860s. The average mean range for the “second nearest neighbor” variable was 125 feet in the 1860s, but only 47 feet in the 1870s. Recalling the p-value scores for the “distance to the second nearest neighbor” variable in Hypothesis 1, the 1870s data set indicated patterning, though the 1860s data did not. Again, all of this suggests an overall maturing of farmstead patterning in the region.

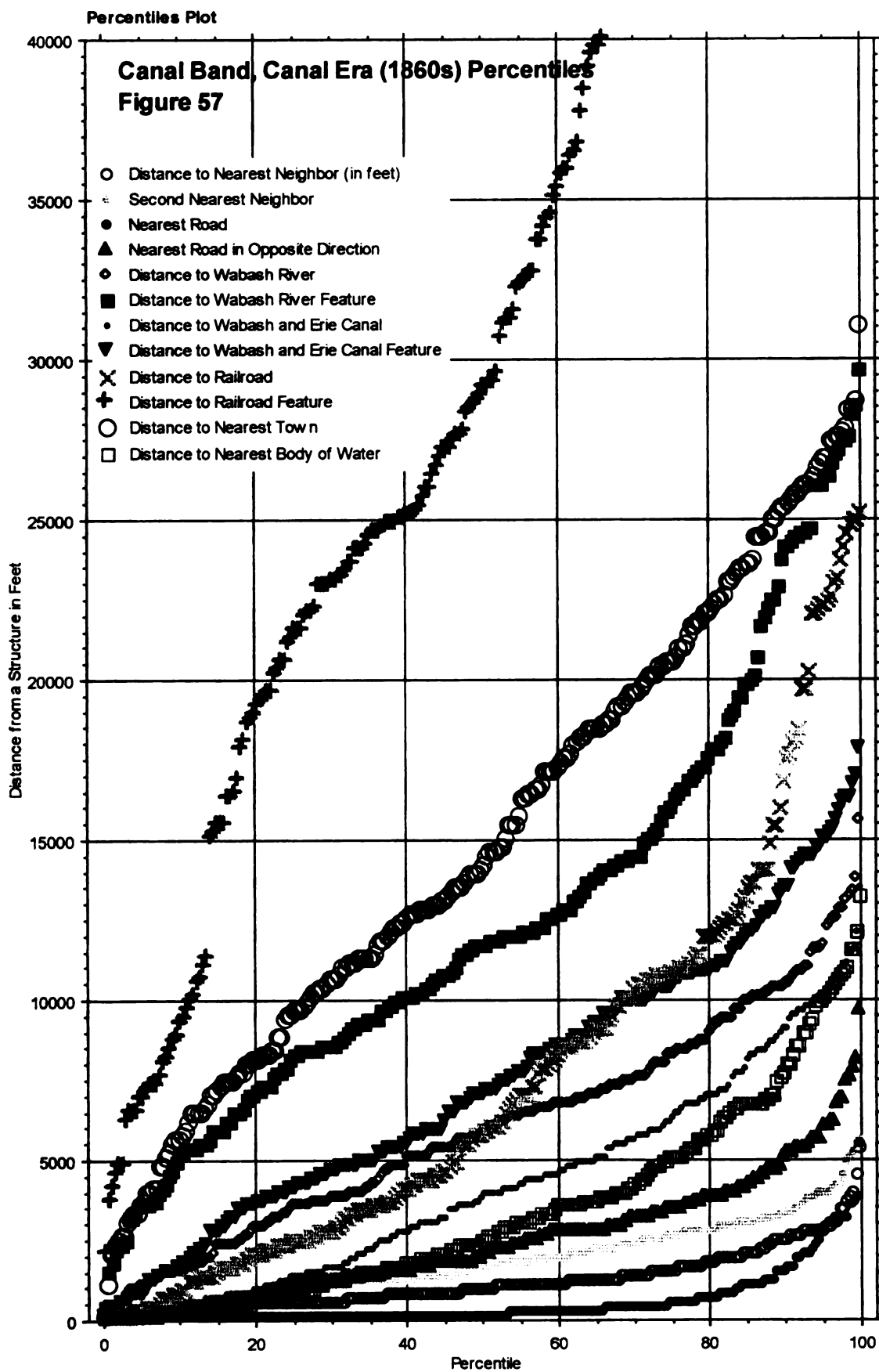
2. Average distance to the nearest road changed slightly from the 1860s to the 1870s, with distances increasing in the canal and river bands, but decreasing with the railroad band. This change was not great overall, only by 31 to 37 feet on average per structure, but the pattern does suggest the increasing importance of the railroad and the decreasing importance of the river and canal.
3. The averaged distance to the Wabash River increased with distance from the river for both time periods. This distance in general increased by the 1870s for all transportation band areas. Again, this probably indicates the decreasing importance of the river as a transportation system.
4. Wabash River features were generally the same distance from individual structures across transportation band areas, but increased in distance slightly by the 1870s.
5. Settlement distance from the Wabash and Erie Canal and canal features increased by the 1870s, especially for the railroad band area. Again, this mirrors the shift in importance from canal transportation to railroad transportation in the study area.
6. Distance to the railroad decreased for individual structures in the railroad band area for both the 1860s and 1870s. The average distance to the nearest railroad does not change much by the 1870s for all the band areas.
7. Distance to the nearest railroad feature decreased dramatically near the railroad, and decreased in general by the 1870s (for reasons explained below).
8. The distance to the nearest town was larger in the railroad band area in the 1860s than in band areas closer to the Wabash River. This situation reversed by the 1870s, so that towns were nearer to individual structures in the railroad band area and farther away the closer settlement was to the Wabash River.
9. The “nearest body of water” variable did not change much, except to slightly increase by the 1870s, especially in the railroad band area.

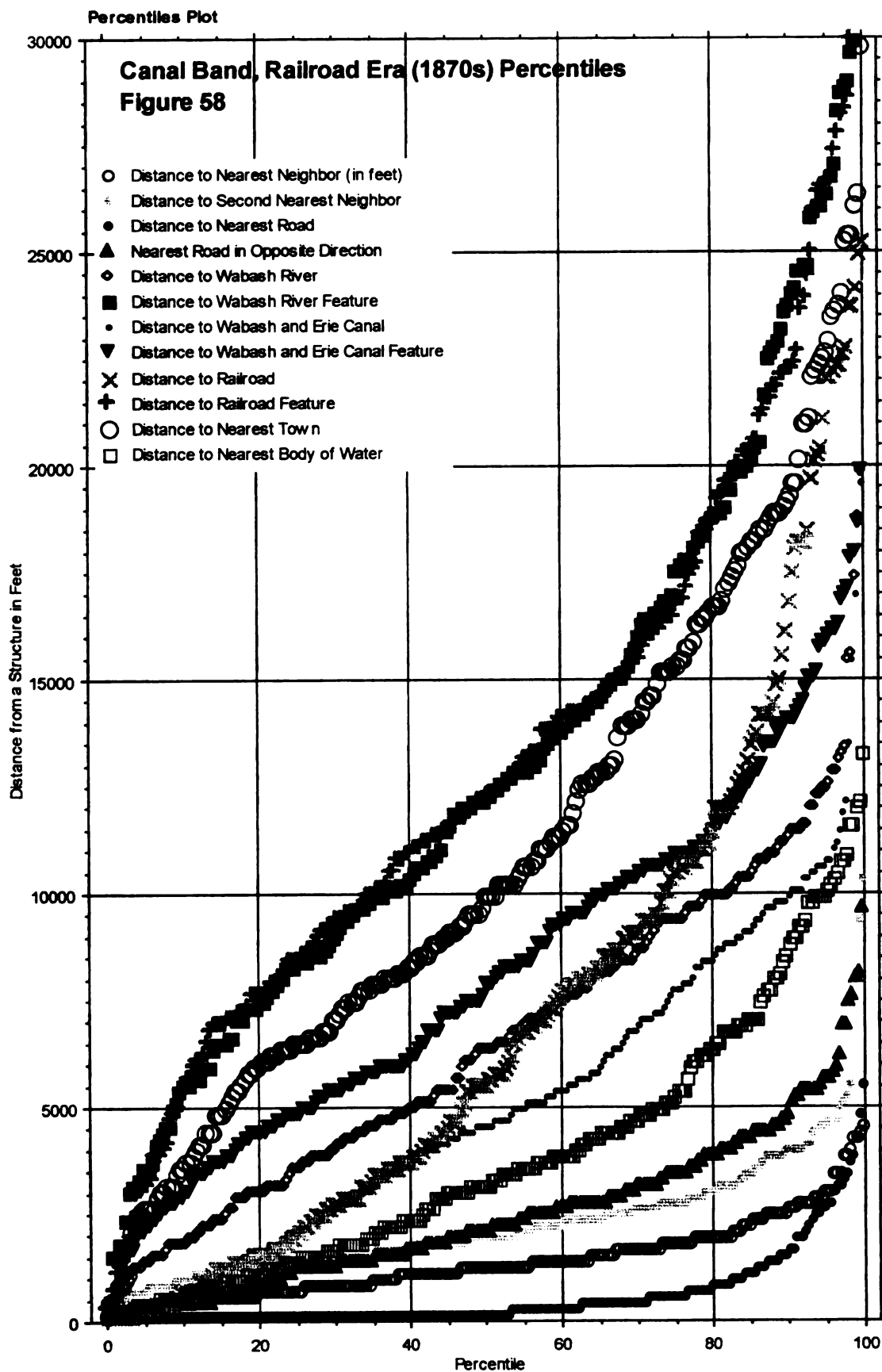
The Wabash and Erie Canal Data Set:

Examination of the canal percentile graphs (Figures 57 and 58) for the canal-era (1860s) vs. the railroad-era (1870s) produced similar results to the general data set percentile comparisons (see Hypothesis 7). Settlement generally moved farther from the canal (as described by the upward movement of the orange line), but did not move significantly closer toward the railroad. Settlement was also moving away from canal features and closer toward railroad features, though this latter change was more from the *construction* by the railroad of more features between major cities than actual movement *toward* pre-existing features. It should be noted here that, when comparing percentile plots, the *Percentile Values* on the vertical measure must be lined up to create accurate comparisons.

General distance to the nearest town also changed somewhat; with rural settlement being located closer to towns overall. The increase in size for Lafayette and the creation of the railroad towns of Wea Station, Transitville, and Chapmanville can explain this movement.

All the other variables stayed in relatively the same percentile position, indicating that no regional changes between the two time periods influenced their general distance from the individual structures found within the project area. These unchanging variables included: “nearest road,” “nearest road in the opposite direction,” nearest neighbor,” “second nearest neighbor,” and “distance to nearest Wabash River feature.”



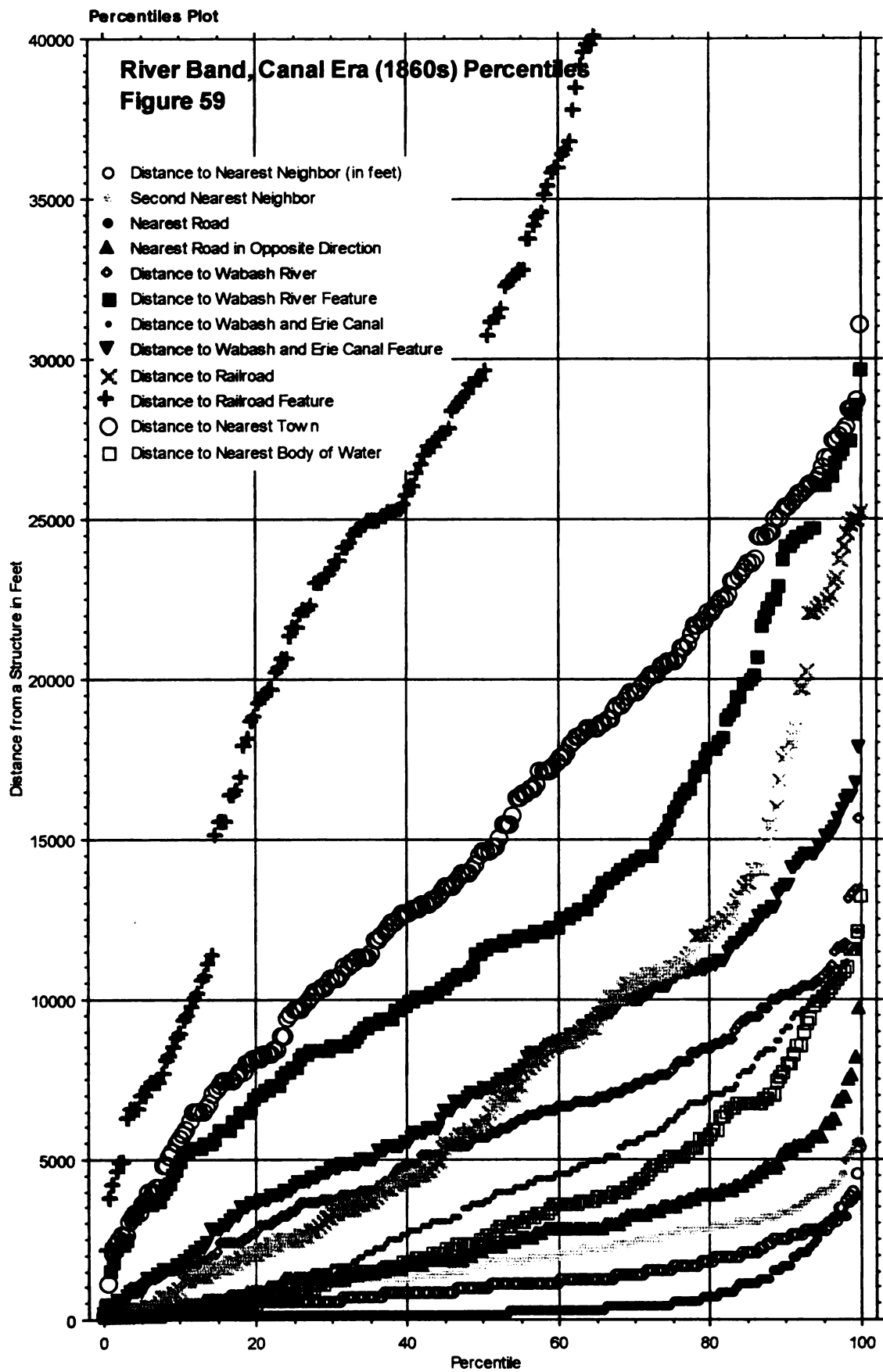


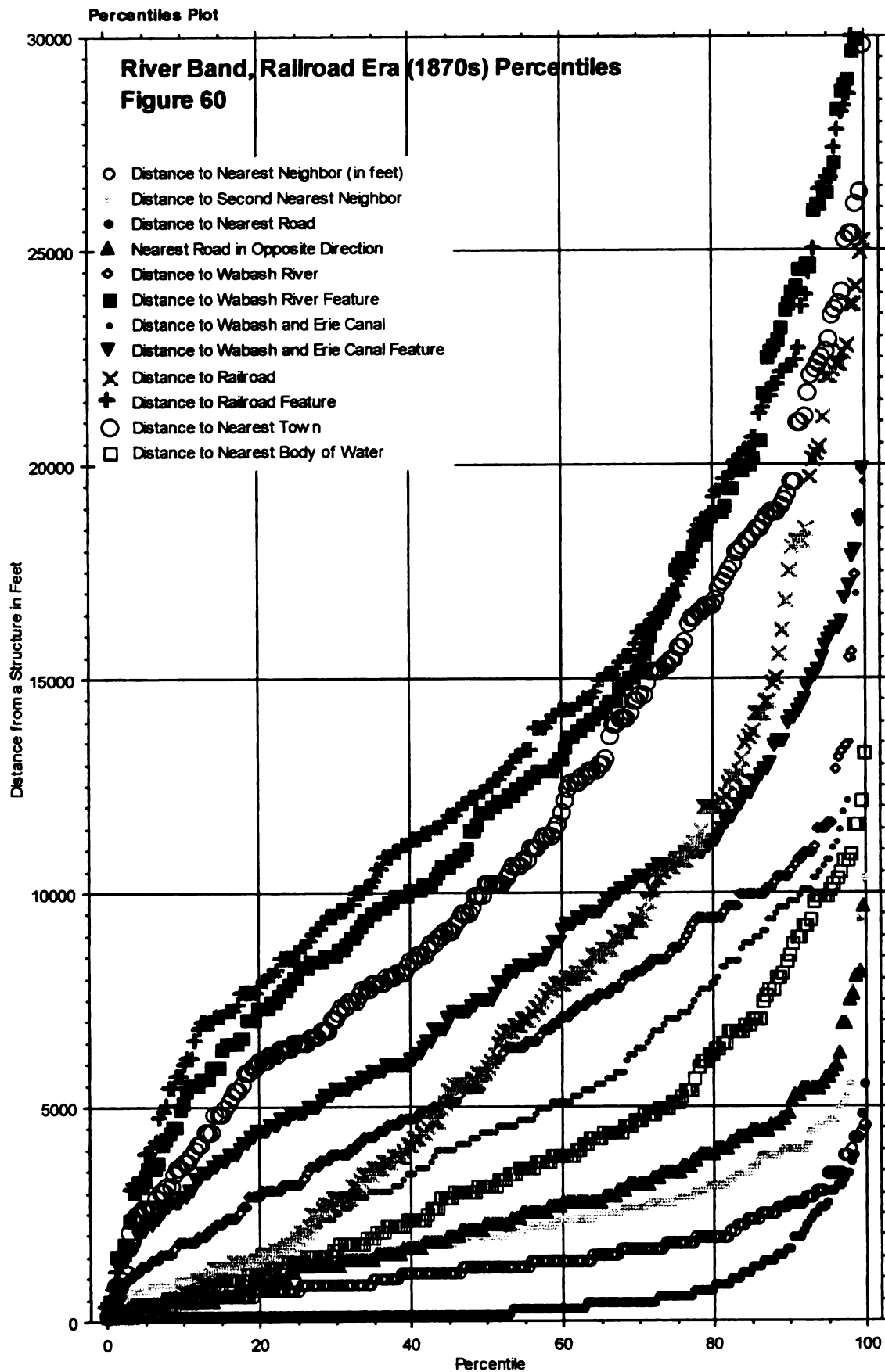
It can be seen from the above results, that it is important in a study such as this to identify whether general settlement was moving toward a pre-existing feature (settlement being located or relocated to optimize a landscape feature), or whether more features were being constructed or moved around within the project area (features being located or relocated to optimize settlement). It will be noted within this analysis section whether the former or the latter are taking place for each variable described.

The Wabash River Data Set:

Examination of the percentile plots for the Wabash River data sets (Figures 59 and 60) for both the 1860s and 1870s revealed almost the same results on the closest five variables (“nearest road” through “nearest body of water”), with almost no identifiable shift between time periods. The shift of settlement away from the canal was also apparent (as described above for the canal data set). The general distance to the railroad for this data set stayed roughly the same, even increasing somewhat in the lower percentiles. The big difference for the Wabash River data was the shift of settlement away from the Wabash River.

The overall distance to Wabash and Erie Canal features increased slightly, with the overall distance to Wabash Railroad features decreasing greatly. The average distance to a Wabash River feature stayed the same. The only other change was that towns became closer, probably for the same reasons stated already under the canal data set analysis.



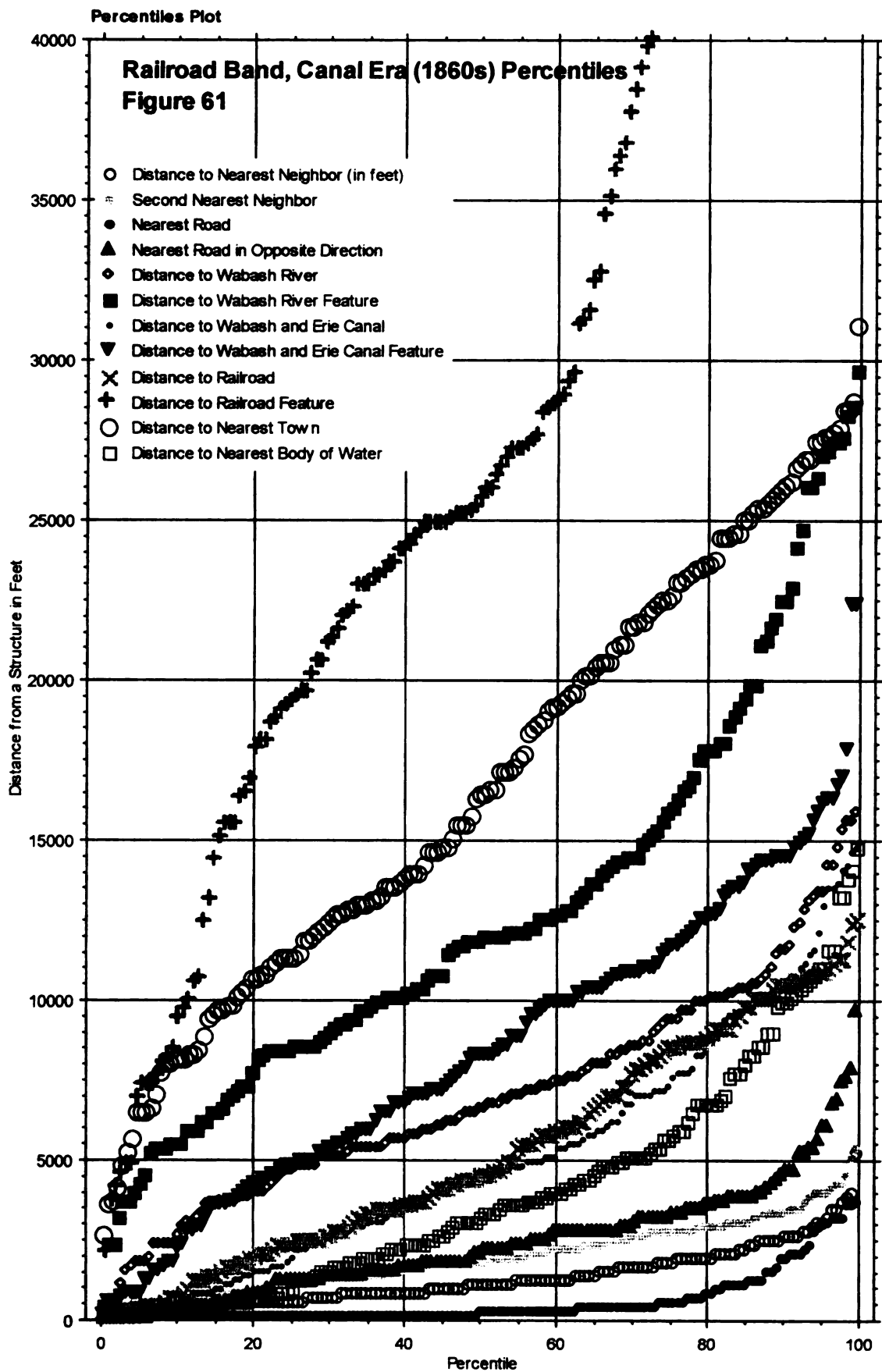


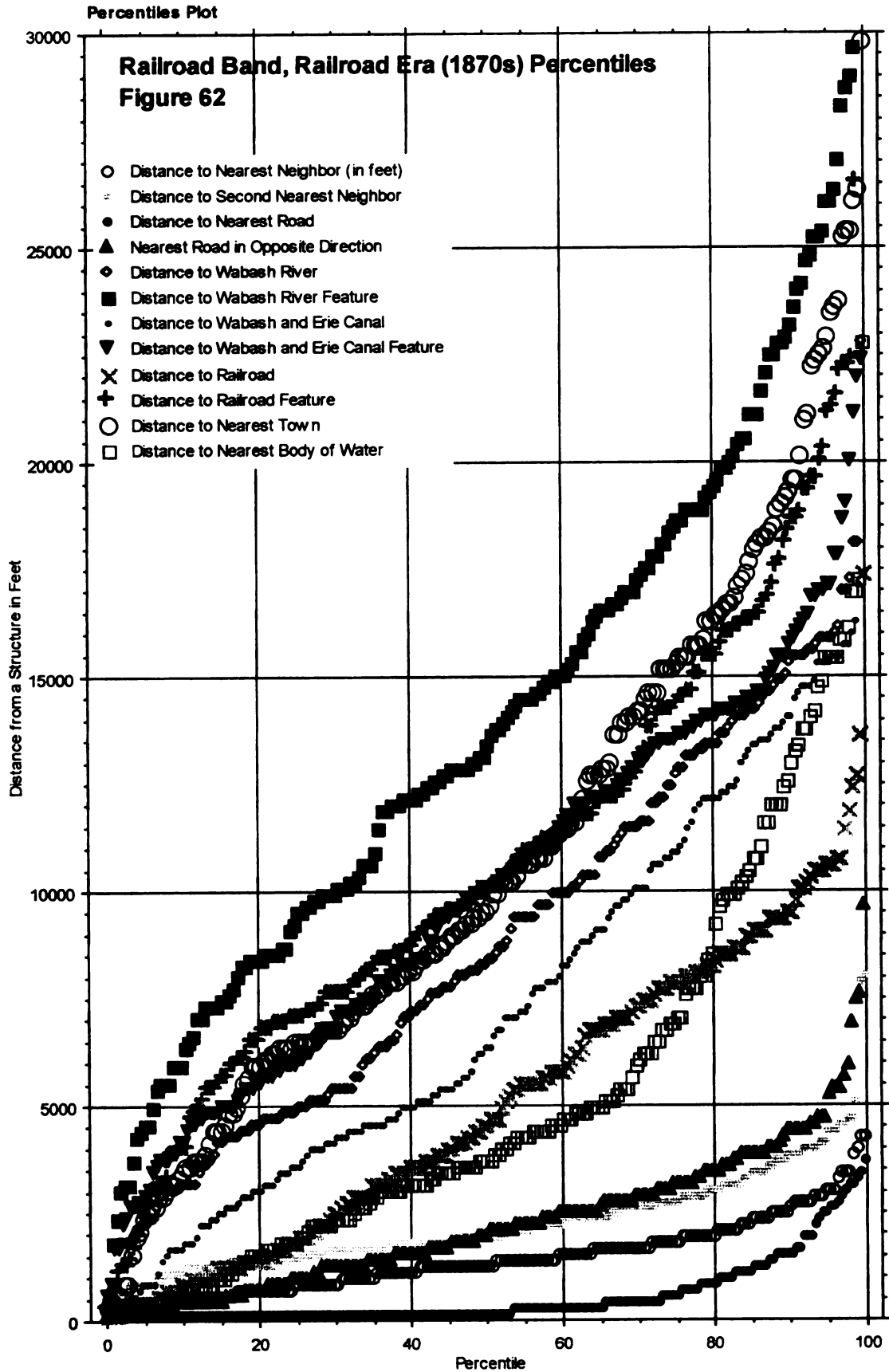
The Wabash Railroad Data Set:

This data set demonstrated several changes between the two time periods not seen in the last two data sets on the percentile graphs (Figures 61 and 62). For the 1860s, the first five variables were similar to all the other data sets examined with percentile analysis, except that the variable “nearest body of water” was more distant overall (not surprising since the settlement band studied was farther from the Wabash River than the other two). Overall settlement in this band, however, did appear to be moving away from water sources. This may have been a general regional tendency that was being masked by the project area’s proximity to the Wabash River.

Settlement for this band area moved actually away from the railroad slightly between the two time periods. Settlement moved farther away from the canal, with the largest movement being found in the higher percentiles. Settlement also moved away from the Wabash River significantly.

All of the above supported the general trend for the region of settlement moving away from the older forms of transportation and toward the railroad. The above results do not explain movement away from the railroad in the band area between the two time periods, except perhaps that settlement was becoming more evenly distributed throughout the entire region (an idea speculated about in Hypothesis 1 under the analysis of the “second nearest neighbor” variable).





Comparing Transportation Types

When comparing percentile graph changes for the 1860s across transportation bands, several differences emerged:

1. The percentile distance to a Wabash River feature was farther away the farther from the Wabash River the transportation band was.
2. Railroad features were closest to settlements in the railroad band area.
3. Wabash and Erie Canal features were farthest from individual structures and farmsteads in the railroad band.
4. The distance from individual structures and farmsteads to the Wabash and Erie Canal for all three transportation bands was the same.
5. The variables of “nearest neighbor,” “second nearest neighbor,” “nearest road,” “nearest road in the opposite direction,” and “nearest body of water” were roughly the same for all transportation bands.
6. The “distance to nearest town” variable was slightly farther away for settlement in the railroad band area, which reflected the influence of the canal on higher order settlement location.

For the 1870s data, several characteristics can again be stated when comparing the three transportation band areas:

1. The variables of “nearest neighbor,” “second nearest neighbor,” “nearest road,” and “nearest road in the opposite direction,” were roughly the same for all transportation bands.
2. The “nearest body of water” variable diverged around the 80th percentile so that the railroad band had a general greater distance between individual structures or farmsteads and major sources of water than the other two bands.
3. The distance to the Wabash and Erie Canal increased greatly the farther from the Wabash River the band was, especially between the canal band and the railroad band. This movement away from the canal was significant, especially since this variable had the same percentile distance for each transportation band in the 1860s without cross-band differences. In other words, by the late 1870s, people were physically moving away from the Wabash and Erie Canal.

4. The distance to the Wabash River also increased the farther a structure was from the river.
5. The distance to the nearest Wabash River feature slightly increased with distance from the river.
6. The distance to the nearest town was actually less for the railroad band than for the other two bands at this time period. This was the opposite of what was found in the 1860s data, reflecting the strength of the railroad in affecting regional settlement at higher levels.
7. Settlement in the railroad band was closer to the railroad than the other two bands.

Comparing the Two Time Periods:

The following, then, were the major results of comparing the percentile data across time periods:

1. The railroad had a profound effect on local settlement in the project region, but not by attracting settlement toward that transportation system. Settlement distance to the railroad stayed roughly the same, or even increased slightly, from the 1860s to the 1870s. What did change dramatically was the distance to the Wabash and Erie Canal and to the Wabash River for settlement overall.
2. Railroad towns drastically reduced the distance to the nearest town for much of the project area settlement, especially for settlement farther from the Wabash River. This reflects the overall central place in-filling going on in the 1870s with the shift of regional economic infrastructure from the canal to the railroad.
3. Development of railroad support features along the route of the railroad significantly reduced the distance of all settlement to those features.
4. The basic pattern of settlement, which included distances to roads and neighbors, did not change in either ranking or in distance between the two time periods. The railroad, apparently, did not have much of an effect on the basic relationship between settlement units. No major social or economic shift could be determined from this data. It can, therefore, be assumed that the coming of the railroad shifted settlement to simply

exploit the new transportation route, rather than to form new settlement patterns.

To conclude, the above analyses did indicate that settlement within the study area changed between the 1860s and the 1870s, especially in relation to the three major transportation systems and distance to central places. The data also indicated that differences were to be found when each transportation band was compared at a single time period. These differences were more pronounced in some variables than others. The Alternative Hypothesis for Hypothesis 8 is, therefore, rejected, and the Null Hypothesis accepted. Settlement along each of the three major transportation routes in the study area was historically different, both across time and space, for each of the three examined transportation band areas.

Hypothesis 9: A Test of the Relationship Between Settlement Size and Market Function Complexity.

This hypothesis tested market complexity, which is another major element of Central place theory. In Christaller and Lösch's original central place models, higher order centers had social, political, and economic features that were not to be found in lower order centers (see Hodder and Orton, 1976: 60). The following hypothesis can therefore be stated:

Alternative Hypothesis 9 -- The population size of a settlement will have no relationship to the number of functions or types of functions found within the settlement.

Null Hypothesis 9 -- The population size of a settlement will have a relationship to the number of functions or types of functions found within the settlement.

Hypothesis 9 examined the relationship between population size (as represented by number of structures in a settlement) and settlement function in the 1860s within the project area. Numbers and feature types came from historic documents and maps from the time period. These documents were used to generate feature type categories and raw numbers for each of the five settlements included in the data set for this hypothesis (Tables 32 and 33).

By examining Table 32, there is a visible relationship between settlement size and number of functions. Central place theory predicts that larger order settlements would have more functions than smaller order settlements. This general listing of data appeared to support that conclusion, and hence the hypothesis.

When plotted as a scattergram (Figure 63), the data again came to the same result, that there was a distinct relationship between population (in this case stated as number of structures) and number of functions. For this study, the total population of Lafayette and Delphi were represented by the number “100” for structures. Both cities historically had many more structures, but they also had many business under each settlement feature heading. As an example, Lafayette had many hotels, but just one in any settlement regardless of size would trigger a “Yes” response on the function table. Another factor that would skew the test results would be building size. The City of Lafayette had many buildings that housed a number of offices, light industries, or retail stores.

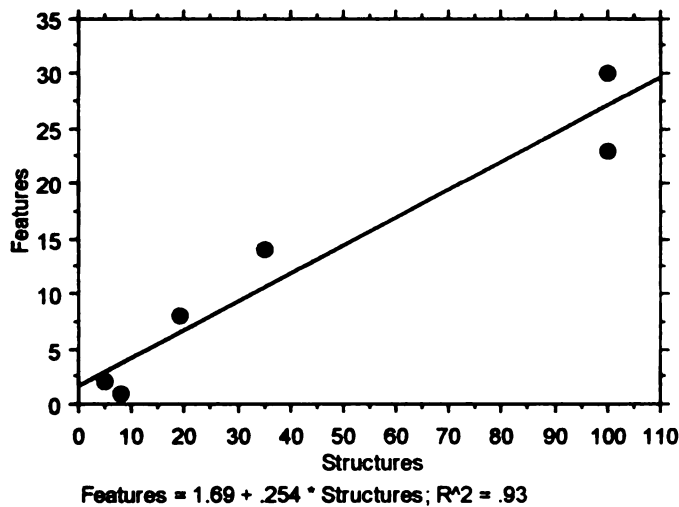
Table 32: Settlement Feature Comparison.

	Lafayette	Americus	Granville	Jewettsville	Wildcat Hamlet
Population (Structures)	100 + Str.	35 Str.	19 Str.	5 Str.	8 Str.
Canal Basin	Yes	Yes	Yes	No	No
Canal Station\Wharf	Yes	Yes	Yes	No	No
Grain Elevator	Yes	No	Yes	No	No
Stockyard\Slaughterhouse	Yes	Yes	No	No	No
Warehouse	Yes	Yes	Yes	Yes	No
Hotel	Yes	Yes	Yes	Yes	Probably
Church	Yes	Yes	No	No	No
Light Manufacture	Yes	Yes	No	No	No
Heavy Manufacture	Yes	Yes	No	No	No
Doctor Office	Yes	Yes	No	No	No
Legal Representative	Yes	Yes	No	No	No
Lawyer Firm	Yes	No	No	No	No
Service Profession	Yes	Yes	No	No	No
Retail Store	Yes	Yes	Yes	No	No
School	Yes	Yes	Yes	No	No
Town Cemetery	Yes	Yes	Yes	No	No
Construction Firm	Yes	No	No	No	No
Financial Institution	Yes	No	No	No	No
Artist	Yes	No	No	No	No
Commercial Painters	Yes	No	No	No	No
Photographer	Yes	No	No	No	No
Boat Yard	Yes	No	No	No	No
Lumber Mill	Yes	No	No	No	No
Flour Mill	Yes	No	No	No	No
College	Yes	No	No	No	No
County Administration	Yes	No	No	No	No
Canal Administration	Yes	No	No	No	No
Publisher	Yes	No	No	No	No
Lumber Yard	Yes	No	No	No	No
Total Features	30	14	8	2	1?

Table 33: Settlement Feature Comparison Summary.

<i>Town</i>	<i>Structures</i>	<i>Features</i>
Lafayette	100	30
Americus	35	14
Granville	19	8
Jewettsville	5	2
Wildcat Hamlet	8	1
Delphi	100	23

Figure 63: Scattergram of Structures vs. Features.



Yet another potential skewing factor is population versus physical structures present. This test assumes that general population size can be represented in a settlement by structures present. In a more detailed analyses of population size and function, census material would be used for greater accuracy.

Regardless of skewing variables such as those mentioned above – multiple functions per structure, structure counts over 100, and structure vs. population – the results of this test do generate an accurate representation of the association of population size and function. The results of the above analysis supported the Null Hypothesis for Hypothesis 8 and rejected the Alternative Hypothesis. There was, therefore, within the project area a relationship between settlement size and number and types of functions.

It was next attempted to discover if any differences between feature types were to be found between the various settlements within the project area that had businesses described on the 1866 map of Tippecanoe County (results presented in Table 34). This data set did not include Carroll County information. For this study, the settlement data was sorted into three groups: “hamlets” were communities with under 10 structures, “towns” were communities with from 10 structures to 50 structures, and “cities” were communities with larger than 100 structures.

Table 34: 1866 Number of Businesses Classified by Type of Business and by Type of Settlement, Used for Chi-Square Analysis.

	<u>Hamlets</u>		<u>Towns</u>		<u>Cities</u>
<u>Agricultural</u>	0		4		9
<u>Service</u>	3		6		74
<u>Retail</u>	0		5		93
<u>Light Manufacturing</u>	0		3		11
<u>Heavy Manufacturing</u>	0		1		21
<u>Construction</u>	0		0		34

The feature types were also divided into six separate groups. The “Service” category included features dealing with services for people that did not generate a physical product. These types of features included physicians, colleges, hotels, blacksmiths (who usually mended items, rather than produced items for individuals), lawyers, administrators, and restaurants. The “Retail” category included features that involved the selling of physical goods. These types included dry goods stores, groceries, clothing stores, hardware stores, and harness shops. The “Light Manufacturing” category involved features that produced single-person items that could be crafted in a residence-sized structure. These features included cigar makers, coopers, clothing makers, shoe makers, and harness makers. The “Heavy Manufacturing” category involved the manufacture of larger industry items, usually in a specific factory-sized structure. These features included pump manufacturing, brewing, carriage making, boat yards, and furniture makers. The “Agricultural” category included agricultural-linked storage or processing features. This category included, flour mills, grain elevators, and livestock yards or tanneries. The final category, “Construction,” included features dealing with professional building manufacturing. These included masons, house painters, carpenters, and building contractors.

The final result is a contingency table, which sorts the business data from 1866 by function type and by settlement size. Contingency tables are necessary for chi-square analysis of relationships between variable categories. In this case, the two variables being examined were “Settlement Size” and “Feature Type.”

By examining the contingency tables without running the chi-square test, a relationship between the two variables does exist. As settlement population increases, the

number of features also tends to increase. This increase in settlement size also was associated with an increase in the number of separate feature types (as has already been proved above). It is the increase in *number of features* that the chi-square test would analyze to test whether a relationship existed between population size and function types. The actual results of the chi-square test are given in Tables 35 through 40.

For the Tippecanoe County data already presented, the chi-square test (Table 35) indicated a relationship between population size and feature type (high chi-square value, low chi-squared p value), but the Cramer's V test indicated that the overall relationship was weak (0.219, 1 being strong). In other words, some of the feature categories may be found only at certain population sizes, but there was no strong relationship between all of the feature categories and certain population sizes. As an example, even though building construction firms existed only at the city level (settlements with more than 100 structures), other categories increase in numbers in more random forms (compare the increase in "Agriculture" with the increased in "Heavy Manufacturing," for example).

Because chi-square does not deal well with expected cells with a value of less than 5.0 (of which there were several in the above test), the data was reduced to a smaller contingency table (Table 41). The chi-square test of this new data set (Table 42) again produced low chi-square p-value again (0.3313), but not low enough to indicate a relationship between settlement size and feature type. It also resulted in another low Cramer's V value (0.091), which indicated that if there is a relationship, it is weak at best.

More data from a larger region could make the original chi-square test more valid. This would allow for a more refined test of settlement and function by examining more variables.

Table 35: Summary Table for Population Size, Feature Type

Num Missing	0
DF	10
Chi Square	25.215
Chi Square P-Value	.0050
G-Squared	.
G-Squared P-Value	.
Contingency Coef.	.295
Cramer's V	.219

Table 36: Observed Frequencies for Population Size, Feature Type

	Service	Retail	Light Manufacturing	Heavy manufacturing	Agricultural	Construction	Totals
Hamlets	3	0	0	0	0	0	3
Town s	6	5	3	1	4	0	19
Cities	74	93	11	21	9	34	242
Totals	83	98	14	22	13	34	264

Table 37: Expected Values for Population Size, Feature Type

	Service	Retail	Light Manufacturing	Heavy manufacturing	Agricultural	Construction	Totals
Hamlets	.943	1.114	.159	.250	.148	.386	3.000
Town s	5.973	7.053	1.008	1.583	.936	2.447	19.000
Cities	76.083	89.833	12.833	20.167	11.917	31.167	242.000
Totals	83.000	98.000	14.000	22.000	13.000	34.000	264.000

Table 38: Percents of Row Totals for Population Size, Feature Type

	Service	Retail	Light Manufacturing	Heavy manufacturing	Agricultural	Construction	Totals
Hamlets	100.000	0.000	0.000	0.000	0.000	0.000	100.000
Town s	31.579	26.316	15.789	5.263	21.053	0.000	100.000
Cities	30.579	38.430	4.545	8.678	3.719	14.050	100.000
Totals	31.439	37.121	5.303	8.333	4.924	12.879	100.000

Table 39: Percents of Column Totals for Population Size, Feature Type

	Service	Retail	Light Manufacturing	Heavy manufacturing	Agricultural	Construction	Totals
Hamlets	3.614	0.000	0.000	0.000	0.000	0.000	1.136
Tow ns	7.229	5.102	21.429	4.545	30.769	0.000	7.197
Cities	89.157	94.898	78.571	95.455	69.231	100.000	91.667
Totals	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Table 40: Percents of Overall Total for Population Size, Feature Type

	Service	Retail	Light Manufacturing	Heavy manufacturing	Agricultural	Construction	Totals
Hamlets	1.136	0.000	0.000	0.000	0.000	0.000	1.136
Tow ns	2.273	1.894	1.136	.379	1.515	0.000	7.197
Cities	28.030	35.227	4.167	7.955	3.409	12.879	91.667
Totals	31.439	37.121	5.303	8.333	4.924	12.879	100.000

Table 41: Summary Table for Population Size, Feature Type

Num. Missing	0
DF	2
Chi Square	2.209
Chi Square P-Value	.3313
G-Squared	2.345
G-Squared P-Value	.3097
Contingency Coef.	.091
Cramer's V	.091

Table 42: Observed Frequencies for Population Size, Feature Type

	Service	Retail	Manufacturing, Constr. an...	Totals
Hamlets and Tow ns	74	93	75	242
Cities	9	5	8	22
Totals	83	98	83	264

The three tables dealing with percentages (Tables 38, 39, and 40) revealed much about the relationship between feature type and population size. By looking at which variables made up the greatest percentage of features at any given population size, it could be determined which type of feature was more important at which level. At the “Hamlet” scale, settlement features involved only support services (hotels, warehouses). At the “Town” settlement level, service businesses, retail stores, and agricultural support structures dominated settlement features. At the “City” level, retail stores increased in frequency, as did building construction and heavy manufacturing. Agriculture became less important within the total number of settlement features, as did light manufacturing (barrel making, clothes making, etc.).

Some trends, therefore, can be stated for this data set. As settlement population size increased, feature types shifted from a pure service role to an expanding role within the region. Manufacturing shifted from light, cottage industries to heavier industries with formal factory structures. The emphasis on agricultural support changed from being a primary importance at mid-population communities, to being less important in larger communities. Retail sales increased with community size, as did features specializing in building construction.

The above chi-square, scattergram, and descriptive analyses of settlement size and function indicated that there was a relationship in the project area between settlement size (as expressed by number of structures) and function number and type. The Alternative Hypothesis is, therefore, rejected, and the Null Hypothesis accepted.

Conclusions

The analysis of historical and archaeological data from the project area north and south of Lafayette, Indiana, demonstrated that settlement in the Wabash Valley could be accurately interpreted using central place theory concepts and modifications. Wabash Valley settlement followed central place theory predicted patterns at larger scales of settlement; settlement hierarchies existed, and predictable settlement spacing took place along the single major linear transportation line.

Central place theory, however, is a model based on the quantification of data, not on data qualification and intuitive explanations. Central place theory also lacks in explanation for settlement development timing and causality. To examine the Wabash Valley data presented by this project, a qualitative framework for dealing with data intuitively will be applied to historic settlement along the Wabash and Erie Canal. For this project, the data will be qualitatively analyzed using the Kite Framework, a data analysis framework developed in the field of Geography.

Chapter 5

An Introduction to the Kite Framework, and Using the Kite Framework with Historical and Archaeological Data.

One of the major weaknesses of central place theory is its lack of a time element and its lack of causality when explaining the formation and change of central places within a region. Political ecology and the Kite Framework will be used in this study to provide a qualitative analysis of the development of central places and central place functions within the central Indiana study area, explaining why central areas developed at certain times and in what forms.

Political ecologists deal with several issues that have long been of interest to anthropology and archaeology, namely the interaction of social systems, economics, political infrastructure and the human-environment relationship. Whereas anthropology has dealt with these issues from a cultural perspective, geography has been approaching the issues from a spatial orientation.

Settlement studies are the ideal vehicle for examining the greater human and environmental feedback system. Settlement within a region necessarily involve a spatial element – where towns, villages, hamlets, and farmsteads are placed in space. It also involves a socio-cultural element – a logical system that determines why settlements are placed at specific locations, and what drives the timing of settlement creation, expansion, and constriction. Early works by Christaller and other geographers concentrated on the geometry of settlement spacing within a market economy, but did not deal with the difficult subjects of causality and timing. While earlier geographic research dealt with

the environment either as a static element, or from a narrow topical perspective, the Kite Framework, developed by Campbell and Olson (1991), attempted to bridge the gap between the environment and human interaction by incorporating the environment as an active part of a cultural feedback system, instead of a static backdrop for human activity.

The theoretical background of the Kite Framework is political ecology, a term used to identify research that examines the dynamic feedback systems that exist between society and the environment (Blaikie and Brookfield 1987, Oreskes et al. 1994, and Blaikie 1995). The role of human interaction within social structures, with the environment, and within a temporal framework are the basic foci of the political ecology approach to research. Political ecology attempts to merge traditional social and ecological sciences into a multi-disciplinary approach to regional problems (Zimmerer 1994).

Application of concepts from political ecology to a regional case study involves mapping the linkages between societal and biophysical processes (Zimmerer 1994). The identification of the driving forces behind societal and biophysical change is also described. Definitions of concepts – such as what it means to reach a “sustainable” ecological/human interaction – and descriptions of problem goals are presented. The dynamics of scale and time are introduced to the feedback system model that is generated within a political ecology framework (IGBP 1994:83 and Oreskes et al. 1994).

Political ecologists then use a combination of quantitative and qualitative analyses to form predictive models. Critical variables, such as time, scale, power, values, beliefs, and morals are included in the analyses, though such variables make accurate modeling difficult and more complex than data-based quantitative models. The conclusion of this

process is the generation of models that predict outcomes and explain specific regional research problems, test and develop appropriate theories, and that are replicable by other researchers (Linstone 1996, Cambell and Olson 1991a).

Political ecology is an appropriate theoretical approach to the Wabash Valley in that the region in question was part of a greater economic, economic, and social structure. Feedback systems existed historically, where groups from outside the region influenced events within the Wabash Valley. Regional events also affected greater Indiana and national issues. The role of the environment in Wabash Valley history also was crucial, especially in determining Wabash and Erie Canal history.

One of the major challenges faced by research taking a political ecology approach has been deciphering and categorizing the vast amount of data that can be derived from the ecological and cultural landscape (Nassauer 1995 and Naveh 1991). Since political ecology deals with complex feedback systems, it is an appropriate theoretical base for Wabash Valley settlement pattern analysis.

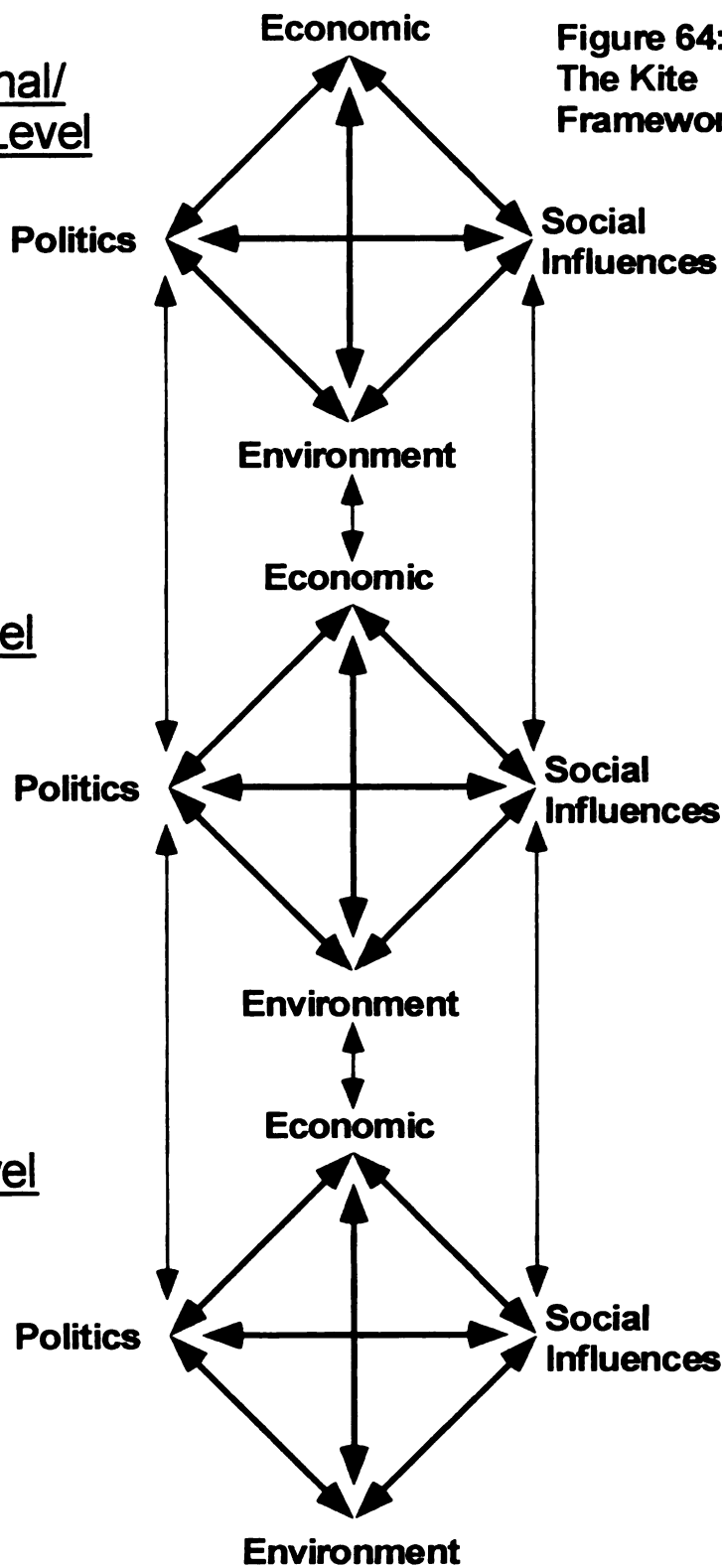
Two other difficulties faced in political ecology research are the defining of space and time, and the merging these two dimensions with social, environmental, and cultural data. The Kite Framework was developed by Campbell and Olson (1991a) to deal with the issues of space, time, and feedback within a dynamic ecological and cultural landscape; issues that previous political ecology models had not dealt with thoroughly. The Kite Framework was designed to illuminate the nature of the interactions between these landscape elements, and to organize the vast amount of data compiled from ecological and cultural research. Enhancement of the modeling of the relationship between humans and biophysical processes is also a Kite Framework goal.

The Kite Framework organizes data within four primary variable categories: *Economics, Social Influences, Politics, and the Environment*. All data elements gathered, whether cultural, social, or environmental, are systematically placed within each variable category. The placing of data elements within each of the four categories is an intuitive process, based on the knowledge and skill of the researcher. Data elements used with the Kite Framework are, therefore, qualitative (Campbell and Olson 1991: 14-15). It is implied by Campbell and Olson (1991) that researchers with similar backgrounds would organize data within the Kite Framework in similar patterns, hence making the conclusions derived from using the Kite Framework replicable.

Interaction between the four variable categories involves constant feedback (Figure 64). Each single variable influences the other three. For example, the stated political goals of the Whig Party in 1840 would fall under the politics category, but the belief that the landscape should be controlled would fall under the social category. Obviously, some data could fall under a number of categories. In this case, either the best fit would be chosen, or the data would be listed under several categories (Campbell and Olson 1991: 14-15). Campbell and Olson's (1991) work was influential because it placed the environment as an integrated element within the entire feedback system. Previously, the environment was either not inserted as a factor in regional geographic research, or it was dealt with on a topical basis, and not as part of a complex interactive socio-environmental system (Campbell and Olson 1991:3-5).

International/
National-Level

**Figure 64:
The Kite
Framework**



Scales of study is another important part of the Kite Framework. Individual time periods or events are divided into three scales of interaction. These three scales are the *Local, Regional, and National Scales*, though even more scales can be utilized if necessary. Data for a specific time period or case study is again organized within this expanded Kite Framework. Interaction within this expanded framework occurs between variable categories and across scales of interaction (Campbell and Olson 1991: 13). In this way, environmental factors at a local level can influence national politics, or regional political decisions can affect local and national economic issues. There is no fundamental restriction to the interaction between scales, except that which is identified is through the allocation of *Power*.

Once data is divided into various variable categories and scales, *Power* is assigned within the Kite Framework. *Power* is defined as the ability to make or influence decisions and allocate resources “within and between societies at different scales. Power influences the goals of development and the policies pursued, but it also affects the direction of interaction between social, political, and economic forces” (Campbell and Olson 1991: 19). In the case of this study, power will be assigned to a specific scale and variable category that makes key decisions or has the most influence upon whether an event takes place during a period of Wabash and Erie Canal history.

Power is also influenced by other variables and scales of interaction. Even though one specific scale and variable category has the most power during a specific event or time period (as an example, the Federal government when passing a national budget), other scales and variables can influence the variable category that has power. In this way, many positive or negative influences from other social or environmental areas, or

from other scales of interaction, can significantly alter primary decision-making, even if power is assigned to a specific variable at a single scale of interaction (Campbell and Olson 1991: 19).

Individual time periods are then chronologically merged together and tracked through time and at three major scales of study: the *Local*, the *Regional*, and the *National* scales. Power is also followed across time and scales of interaction. By mapping the influences of power across scales and through time, a winding, braid-like pattern can be identified. This “*Braid of Time*” is crucial in using the Kite Framework as an interpretive framework because it sets events into historical contexts and adds chronological depth to decision-making (such as why a canal was built, and how initial decisions influenced later decisions). In this way, the Kite Framework provides the diachronic depth that central place theory lacks (Campbell and Olson 1991: 20). As Campbell and Olson state, “The outcomes of induced change in social, political or economic conditions are recognized to involve an interaction between them, a synergism, whose full impact may only become evident over a longer period of time” (1991: 20). The overall result is that, even though the Kite Framework is intuitive, the process of using the Kite Framework permits a comparative perspective if a different researcher analyzes the data group again.

The Kite Framework, then, follows different scales of interaction and variable categories through time. Power is also tracked, with changes in power between scales and variable categories being noted. The Kite Framework, therefore, “not only incorporates relevant developmental forces – social, political, economic and environmental – in a pattern of dynamic interaction but also addresses the questions of

space, time and power over which the interactions take place” (Campbell and Olson 1991: 21).

As data is incorporated into the Kite Framework, the researcher identifies elements that may be important in answering specific research questions. *As Power, Time, and Scales of Interaction* are examined, causality can be derived from the interaction of various Kite Framework elements with each other. The Kite Framework can also account for multiple causal processes, and can aid in building solutions to specific research problems. The Kite Framework can also act as a model for predicting the results of specific actions on the overall socio-environmental system². (Campbell and Olson 1991:26). The end result is a problem-specific Kite Framework with an intuitive interpretation of causality between framework elements (Campbell and Olson 1991: 25). In this way, the Kite Framework can be used to answer questions of chronological timing and causality that central place theory is lacking.

Historic documentary data from the Wabash Valley will, therefore, be organized with the Kite Framework, with intuitive explanations being made by the author for why certain events in the history of the Wabash and Erie Canal occurred at certain times. An explanation will also be presented of overall settlement timing and form within the project area after examination of the historical data organized using the Kite Framework. In this way, the author will generate an overall qualitative and intuitive explanation for events and decisions dealing with the Wabash and Erie Canal through during specific historical time periods. Archaeological data will then be inserted into the Kite

Framework, where appropriate, and a new intuitive explanation will be generated. The comparison of the two iterations will then study the usefulness of archaeological research to the refinement of the Kite Framework.

Canal history will start with the 1820s, when the debate over whether to construct a canal or not was the primary focus of the State of Indiana. The ending point for this study will be 1875, when the Wabash and Erie Canal was officially closed. To facilitate the Kite Framework study, Wabash and Erie Canal history will be divided into several distinct periods of canal history. Each period will represent a number of years of either stability or change for the canal. The duration of the period will be given, as well as why it is dealt with as a distinct historic episode. The Kite Framework will then be used to place historical data into a variable framework for overall interpretation.

The documentary and archaeological data will be placed within the four major Kite Framework variable categories. The data will also be attributed to one of three scales of focus for each canal time period. The three major scales necessary for understanding the Wabash and Erie Canal are the *National/International Level*, the *State of Indiana Level*, and the *Local Level*, which correspond to the Kite Framework's National, Regional, and Local scales of study. People at each level had their own unique perspective on canal issues, and acted according to that perspective during times of change or decision-making events. Power, as a factor in decision-making within each canal episode, will also be dealt with. Which variable category has the majority of power during a decision event determined greatly the outcome of events (Campbell and Olson

² For a complete discussion of the role of the environment in regional geographic research, see *Man's Role in Changing the Face of the Earth* by W.L. Thomas, or *Environment and Land Use in Africa* by M.F. Thomas and G.W. Whittington.

1991). Where possible, power will be attributed to a certain variable and scale as a distinct canal event or episode is interpreted.

An overall interpretation of events will then be generated within a Kite Framework to make sense of the larger historic events. This interpretation is intuitive, and should be replicable by other researchers with similar backgrounds in history, geography, archaeology, and settlement pattern analysis. The Kite Framework will, therefore, be used to show a continuum of decisions and events from before the canal was constructed to its final demise; filling in the causality behind historical events, political and economic decisions, and regional settlement change over time.

Archaeological data will then be inserted into the overall canal information presented within the Kite Framework, where applicable, and the results of such will be examined. The comparison of the Kite Framework interpretation with and without this archaeological data will study the usefulness of archaeological research to the overall refinement of the Kite Framework.

Campbell and Olson (1991b) demonstrated that the Kite Framework could be used as a tool for explaining why certain socio-environmental disasters occurred in East Africa during the 19th Century. In the same article, they also presented predictive results if certain changes were made. They accomplished this by adding new information into the Kite Framework and generating new intuitive results. This project follows the same dual interpretive approach. First, an explanation, based on Kite Framework organization, is generated for specific Wabash and Erie Canal time periods. Second, an intuitive prediction is generated for what would happen next in Wabash and Erie Canal history, given certain actions and new data being placed within the Kite Framework; data and

changes that were historically relevant and available to those who made decisions about the canal in Indiana at all scales of interaction. In this way, the usefulness of the Kite Framework in facilitating explanative results and predictive results can be examined.

Time Period -- 1820-1827: Indiana Searches for a Commercial Route to the East Coast.

The situation prior to construction of the Wabash and Erie Canal was as important to canal history as what happened after the first spade was sunk into Indiana soil at Fort Wayne. This earliest phase of Wabash and Erie Canal history began in 1820 and ended in 1827. The time period in question was after statehood, but before the decision to grant land to the State of Indiana for canal construction by the United States government. Most historic accounts of the canal do not deal with this important part of canal history when attempting to explain why the Wabash and Erie Canal transportation system failed in the mid-1870s. This project, however, will begin with this crucial time period.

The time period of 1820 to 1827 involved the State of Indiana petitioning the United States government for financial aid in constructing a transportation system from central Indiana to Lake Erie. This financial aid was to be in the form of a large land grant (described in the history section of this report). This time period pre-dated any concrete construction or engineering plans. The primary focus for the State of Indiana was to gain a transportation route to the East Coast, and to meet its perceived obligation to the people of the State of Indiana by providing internal improvements for the common good.

This episode in canal history eventually resulted in the State of Indiana being granted alternating sections of land by the United States government along the proposed canal corridor, from Lake Erie to the Tippecanoe River. Future profits from land sales

along this corridor would, therefore, be used as collateral for obtaining loans for canal construction. After 1827, several other land grants were given by the Federal government for the completion of the Wabash and Erie Canal. These later land grants followed similar Federal, state, and local reasoning.

The important historical factors at work in this time period will next be presented within a Kite Framework. Events, attitudes, or ideas that historically occurred between 1820 and 1827 will be placed within their respective variable categories for interpretation and analysis. Variable categories will also be divided into the three scales of interaction, so that a total of twelve variable areas could potentially be presented. Comments on power for each time period and the actual interpretation of the Kite Framework will follow the variable presentation.

Variable Presentation for the Time Period -- 1820-1827:

National/International-Level: Political Category.

1. The time period in question was the era of Andrew Jackson. Western states were becoming more and more powerful as the political center of the country shifted west. Federal interest in the concerns of western states was, therefore, on the increase (Blank 1916: 132, and Cottman 1907: 118).

2. Expansion and the nature of expansion westward were also major topics of discussion. The need to "claim" land through occupying land after the Revolutionary War and the War of 1812 was an important goal of United States government. The fear of European colonial powers exploiting western areas first was a very visible threat (Cottman 1907).

3. The National government also had a political goal in supporting the expansion of the United States economy. Westward expansion was viewed as facilitating general trade and making the entire country stronger. Increased trade would make the United States a more formidable international power and would open up markets overseas. Expansion west, therefore, would benefit the international position of the United States with world economic and political interactions (Goodrich 1961: 217-220).

National\International Level: Economics.

1. National pressures existed to exploit the western wilderness (a long-standing political and social goal, with deep Colonial roots). East Coast investors were intensely involved with land speculation and viewed the western states as the next focus of profits based on land development and subdivision. Land speculation also was usually followed by resource exploitation and settlement expansion. New markets, therefore, were also expected by Eastern Merchants (Goodrich 1961: 190, and Wyckoff 1988).

2. Not only United States investors envisioned large profits in the western states. Many foreign investors (English and Dutch mostly) were interested in land and development projects west of the United States East Coast population base (Goodrich 1961: 179).

3. Profits from investing in the west were expected by both of these groups to come from a number of sources:

A. The first investors to exploit settlement of the west could dominate western markets and have a monopoly for a number of years.

B. The first investors to start developing the western lands would be the first to exploit western resources in a target region.

C. There was a distinct interest in making money from loaning to western state governments. Governmental institutions were seen as better investments because it was expected that they would be more likely to pay money back than individuals, and would be interested in upholding their honor within the global economy (Benton 1903: 65).

D. There was an interest in opening up markets for finished goods in the west. The classic situation of raw materials flowing east and finished products flowing west would therefore be attained, with the profits from such as system being gathered by the investors (Cottman 1907).

E. There was money to be made in shifting populations west. Controlling transport routes and investing in towns along immigration routes would lead to high profits generated from the moving of immigrants and their families (Odell 1916: 103)

F. This time period was noted for being flush with investment capital; English, American, and Dutch merchants had large cash resources and few outlets for speculative investment. The economic boom of the 1820s and early 1830s were unparalleled in merchant-capital history (Goodrich 1961: 191)

G. Investors on the East Coast and overseas desired to invest in large projects rather than a number of smaller projects. Large projects required less overseeing

and could be run by in-place systems of management, such as the State of Indiana. The investors of this time period were very hands-off in determining what was done with the money once it was invested. They also preferred financial overseeing to be handled by subordinated or associated groups (Goodrich 1961: 191).

H. The Federal government hoped that a transportation route would increase the value of surrounding Federal lands, thus making more money for the United States (Poinsatte 1969: 33-34).

National/International-Level: Social.

Several Social ideals of the early 19th Century had a profound affect on decisions to construct the Wabash and Erie Canal. The following are some of the major social ideals of this time period:

1. The people of the United States believed that continuous development and economic growth should be the goals of all citizens and their representatives (Goodrich 1961: 253).
2. Their was a national goal of linking all the nation with a series of transport routes which would support economic growth, defend the nation from foreign rulers, and link the people symbolically (Scheiber 1969, Chapter 4).
3. The citizens had a practical notion of needing to defend the nation. Linking the various areas with a transportation network would facilitate national defense (Cottman 1907).
4. The ideology of the time was Federalism, where the goal of an individual should be to control the landscape through force and action. This ideology was expressed in all aspects of life, from gardens to clothing styles. The notion of being in harmony with nature would not come about until later in the Victorian era.
5. A major aspect of Jacksonian ideology was that the state played a paternalistic role in the lives of the people and that private enterprise should be treated with suspicion. Public works, therefore, acted to expand democracy and equality, and retained control of important systems in the hands of the representatives of the people (Scheiber 1969, Chapter 4, and Meyers 1960).

National/International-Level: Environmental.

1. Environmental decisions were not as important at this time as were geographic issues. Choices made to unify the country rarely took into account the environmental nature of the landscape. Investors speculated in the west, but left much of the developing

to subordinates and sub-contractors (See Wabash and Erie Canal history section for examples).

2. Federal choices on whether to fund canal construction west of the Appalachian Mountains did not take into account the environmental differences between the East Coast and the west.

3. The theme of disassociation from the subject of discussion was common among Federal governmental arguments, as well as investors at this time. Federalism still left much power up to the state governments, and only rarely became involved in what was viewed as internal state affairs (Goodrich 1961: 216-248)

State Level: Politics.

1. The western states were gaining more power as the population shifted westward.

2. All of the western states looked to the Federal government for aide in improving their economic infrastructure. They also had a distinct interest in a Federal military plan for defense against Native Americans or European powers that still existed in the Great Lakes and Mississippi Valley area. Part of this military plan involved the movement of Federal soldiers and militia units from the East Coast to the west (Poinsatte 1969: 31).

3. Increased manufacturing and resource exploitation in the west, it was felt, would increase the power of the western states in the Federal government.

4. There was a major competition between western states at this time to be the first to have an international transportation system. Whichever state was the first to develop a route west, it was assumed, would reap the largest economic and population growth rewards. This was a legitimate concern for western state governments, since the opening of the Erie Canal had led to New York City surpassing the earlier economic centers of Philadelphia and Boston (See Goodrich 1961, Chapter 5).

5. The State Indiana was lagging behind in its canal and transportation building program behind Ohio and Pennsylvania, and its politicians were determined to catch up so as not to be left behind in the "transportation race" (Fatout 1972, and *Indiana Register*, Jan 8th 1825).

6. Construction of a transport system which linked the State of Indiana with eastern markets would also reap huge rewards on the politicians who voted on construction; both in monetary rewards and in political votes (it was ignored that failure would have the opposite response) (Fatout

7. 1972: 71).

State Level: Economics.

The State of Indiana also wanted to open up large areas of the state for development. The goals of the State were similar to those of the Federal Government presented above:

1. The State of Indiana wanted immigration into the region. The population of the state in the 1820s was small, and both agricultural and resource exploitation was lacking in skilled and unskilled laborers. Merchants investing in land speculation and development needed buyers to make a profit on the millions of acres waiting to be exploited and workers to help open new lands for settlement. Land speculation would also fail if not enough immigrants came west to make a profit. A large number of cheap laborers was expected—by investors, state officials, and merchants alike—once a working transportation route east was established (Odell 1916: 103).

2. The State of Indiana wanted economic ties with the rest of the world. The state needed markets for raw resources and agricultural products so that immigration west would not be hindered and the economy would expand (Comstock 1907).

3. The State had little experience with government at any level, especially with economic management. No large projects had ever been undertaken by the State of Indiana, and its one attempt to construct a canal around the Ohio Falls at Jeffersonville, Indiana in 1819 had been a pronounced failure (Fatout 1972: 18).

4. The State of Indiana wanted an immediate opening of the interior and under-populated areas of the state. By developing the wilderness area along the major interior river routes, it was expected that growth would expand outward, thus developing the state at a more rapid pace than if it went from the Ohio River north. This was a rational expectation, since most of the interior population already existed along major rivers, and a rudimentary economic system was already established using river transportation (Comstock 1907).

5. The State of Indiana wanted transportation links with the east. The State of New York with the Erie Canal had demonstrated the profits and economic growth that could be achieved by a state-sponsored transport system.

6. Transportation system development was seen as the easiest and most logical way to open up the interior of the State. Much experience had also been gathered within the United States on canal construction and operation. Several successful canals had been constructed on the East Coast, and the Erie Canal was the greatest political, economic, and social transportation success in the history of the United States at that time (Senate Journal 1827-28).

7. Private capital was scarce before 1845 (Goodrich 1961: 180).

8. The State of Indiana also had visions of reaping profits on the scale of New York's Erie Canal, which would go to funding other state projects. Indiana politicians also assumed that only at the state-level could such a project as a state-wide transport system be accomplished. Not enough internal infrastructure existed for an established merchant group to construct such a system. The politicians were correct in this assumption. No established state merchant or capital group could have funded or constructed a state-wide canal at this time period (Duden 1909: 163).

9. Farmers were well aware of the high cost of hauling agricultural products by wagon (Esarey 1918).

State Level: Social.

The representatives of the people of the State of Indiana had the above Federal social ideals (mentioned above), with several being of more importance than others.

1. There was an intense pressure within state government to support the people of Indiana with economic development and state-sponsored involvement in internal works projects (Comstock 1907, and Fatout 1972).

2. The state government was subjected to the same ideology that believed that it was the duty of the state to provide for the economic improvement of the people; it was the right of the people to expect the state to better their lives since the state was their representative body.

3. The representatives of the State of Indiana had an acute desire to be linked with the rest of the nation. The War of 1812 demonstrated the danger of being isolated in a hostile world. The government of the State of Indiana wanted links to the East Coast for its own support and feeling of security.

State Level: Environment.

The environment of the State of Indiana was mostly ignored by government representatives debating the canal question. The central part of the state, through which the proposed transportation system would be constructed, was known to have trees and some rivers (the Wabash being the largest), but the area itself was generally a mystery. It was expected at this time that problems of actual construction would be dealt with later.

Local Level: Politics.

1. The more interior settlements in Indiana put political pressure on the State of Indiana for larger state involvement in meeting their needs; especially transportation routes and contact with the larger United States economic system (Comstock 1907, and Fatout 1972).

2. The interior parts of Indiana which were intended to reap the rewards of any state-wide canal system were not well organized at this time period. Most of the interior was not yet divided into counties. The areas with the largest settlement in the state were still in the south and along the eastern border with Ohio (Fatout 1972, and Poinsett 1969: 36).

Local Level: Economic.

Local communities within the interior of the State of Indiana wanted a transport link with the East Coast for a number of reasons:

1. Cheap transportation to eastern markets. Most of the profits for hauling an agricultural crop to the East Coast were eliminated by the high transportation cost and the attrition the crop faced in its long journey east. Transport to New Orleans, and hence by ship to the East Coast, was the only alternative at this time. But this route also was expensive and time consuming (Duden 1909: 161, and Benton 1903: 105).

2. Local citizens wanted cheap labor. A transportation route was viewed as an ideal solution to enticing cheap laborers and immigrants west.

3. Local citizens viewed a transport system as a way to invest locally and make large profits. A transportation system would need laborers and contractors to construct, provisions for the canal workers, raw resources for the physical features, infrastructure buildings, and would generate many secondary economic investment opportunities such as hotels, warehouses, mills, and shops. Local merchants had dreams of becoming big fish in the world economy (Reid 1913, and Poinsett 1969: 12-14).

4. The local communities also wanted control of where any transportation system routes were placed to maximize their economic use of the system (Poinsett 1969: 32-33, and Fatout 1972).

Local Level: Social.

The local citizens along the proposed canal pathway expressed all of the social ideals mentioned above under the State and Federal scales, but added a distinctly regional set of variables not seen at the higher scale levels:

1. Each local community was in competition with all other local communities to be at the forefront of regional economic expansion. This competition was intensely political in nature, but also affected social interactions. Fights, vandalism, and guerrilla warfare were the result of some of the more intense inter-community competition (Fatout 1972).

2. Each town along the proposed canal route had its own ethnocentrism which involved racism toward certain groups, rivalry with other communities, and popularity for certain politicians and leading merchants or town officials (Cox 1860).

Local Level: Environment.

Several problems arose when dealing with environmental knowledge at the local level.

1. United States citizens had not occupied the area of central Indiana until the early 1800s. Most communities along the proposed transport route did not have their first settler until the 1820s; a mere ten to fifteen years before the eventual construction of the Wabash and Erie Canal. Some areas being proposed for construction had NO inhabitants with local knowledge (see the history sections for the towns of Lafayette and Delphi).

2. The limited number of years of occupation meant that longer-term weather cycles were not known, and the small number of settlers along the canal path meant that most local flooding patterns were not known. Larger regional weather patterns were a mystery.

3. No link existed between the people with limited knowledge of the weather at the local level and the planners of the canal at the State or National level.

Kite Framework Interpretation for the Time Period – 1820-1827:

All of the above variables existed at the various levels of scale prior to the decision by the United States Government to give the State of Indiana a large land grant to help fund the construction of a state-wide transportation system from Lake Erie to the Ohio River. One last element must be noted—that of power. Power for deciding on whether the Wabash and Erie Canal would be constructed during this time period rested at the National level and within the political sphere. The federal government had final say as to whether the Wabash and Erie Canal would eventually be constructed or not. federal-level economic or social systems and any system on the state or local levels could not make this decision. Power, therefore, resided in the National and Political variable category.

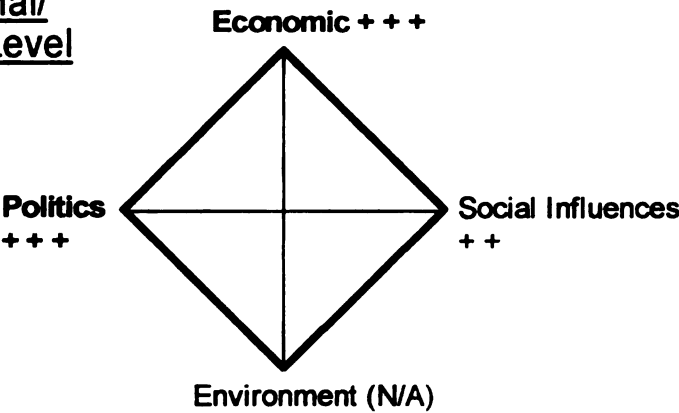
Federal economics, however, did greatly influence the decision of the federal government. As most of the senators and representatives of the time were involved in

economic venture outside of congress, and most had relationships with interested persons in economic areas, national economic expansion weighed heavily in federal decision-making. Congress also had expected good returns on the alternating sections retained by the federal government. In this case, then, the variables that fall under the national-level political and economic categories, would be weighted most heavily in interpreting the events of this period of Wabash and Erie Canal history.

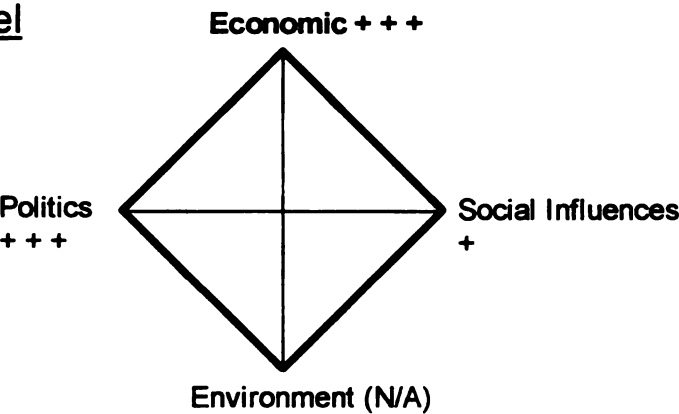
Figure 65 shows a graphic interpretation of the Kite Framework for the above time period. This graphic interpretation is generated intuitively by the researcher as an alternative expression of the organizing process of the Kite Framework. The process of generating a graphic interpretation of the Kite Framework data is unique to this study. Within the graphic interpretation, the three scales of interaction are presented, with a qualitative idea of the strength and positive or negative influence of each variable category on the overall decision-making process at the stated time period, as represented by the “+” or “-” symbol and the number of each. In other words, if political factors added up to a mostly negative local political attitude toward the Wabash and Erie Canal in a given time period and that attitude was influential in decision-making, then that influence would be represented as “+ - - -.” Power within the decision-making process is represented by the bolding of a specific variable category or categories.

Figure 65: Kite Model Graphic Representation: 1820-27

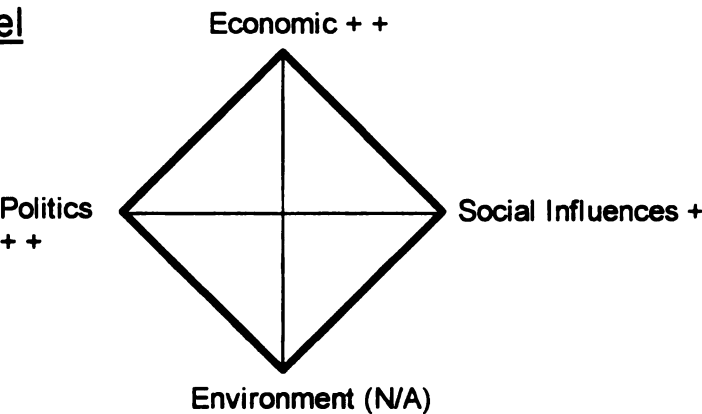
International/
National-Level



State-Level



Local-Level



Returning to the Kite Framework interpretation for the 1820-1827 time period, the federal government had distinct reasons for subsidizing the construction of the canal; defense of the west, linking the country via transport routes, opening markets and enticing immigration westward. The decision also fit in with the national internal improvement and Federalist ideology of the early 19th Century. Influential persons interested in western investment also supported the land grant. The profits and political rewards to be made by expansion west, with a transportation system as the major route, were an understandable enticement for politicians who eventually voted for the federal subsidizing of the State of Indiana's internal improvement plan.

Levels of scale that did not hold decision power were also supportive of the system. Politicians in the Indiana government in the late 1820s saw a canal as meeting their own economic, social, and political goals. International businessmen viewed the canal favorably as a new source of investment with great profit potential. Local citizens also saw a transport route as a cheaper method for transporting their goods east. A transportation system would also link local regions to the rest of the United States, and be a fulfillment of the State of Indiana's role as the economic supporter of its people.

By putting forth the interacting variables in the Kite Framework, it is easy to understand why the State of Indiana was given such an extensive land grant. Power is in the supportive categories of economics and national politics, both of which are positive. No distracters also exist. But can the Kite Framework also be used as a predictive model, as well as an explanatory model? If the results of history were not known, would the Kite Framework be able to predict that the land grant would be given and the canal would be constructed?

Given the variables outlined above, I believe that the Kite Framework would successfully lead to an interpretation of the land grant being given; even without knowing the actual historic results of the decision. Power was found at the National level, which had many variables favoring the land grant. The political, social and economic variables all supported the land grant. The state-level, international, and local level scales also supported the land grant. The environment was not an issue. With this situation, where the scale holding the power had more reasons to give the land than not, and with support from other scales instead of opposition, the giving of land logically follows. In this case, then, the Kite Framework can be used as a predictive model.

The final decision to grant land to the State of Indiana for the construction of a canal or railroad from Lake Erie to the Ohio River was enacted into law on March 2nd, 1827. The nature of this funding would also influence a number of state-level decisions. The canal had to be constructed for the State of Indiana to receive the land in question. Once the State of Indiana started construction of the canal through a section of land, then that land could be sectioned and sold. This condition committed the State of Indiana to constructing the canal, or it forfeited the land back to the United States government.

What the above section has shown is the causality and the timing behind the creation of a canal in Central Indiana. Since central place theory does not explain causality or timing, intuitive analysis using the Kite Framework has given the reasons for the initial construction of the Wabash and Erie Canal in Central Indiana, and an idea into the time frame it was planned and constructed under. As the Kite Framework gives further analysis of specific Wabash and Erie Canal periods, the time frame of the canal, and settlement in the Wabash Valley surrounding the canal, will be presented. Also, the

causality behind specific events and settlement changes will be revealed. In this way, the conclusions of the central place theory settlement analyses, presented in the previous chapter, will be placed into historical, causal, and temporal context.

Time Period – 1827-1836: Indiana Finds Financial Backers for Constructing the Wabash and Erie Canal.

The next period in the history of the Wabash and Erie Canal was the actual funding of the construction project. The State of Indiana used the United States government land grant as collateral, but hard currency funding came from East Coast and English investors. At this point, power in the system shifted from the political sphere to the economic sphere, and included an international element. Negotiations with interested investors by the State of Indiana finally began five years later.

A number of new variables came into play during this phase of canal history, and a number of older variables which were important before the land grant was given were no longer important. During this period, the following variables become prominent:

National\International Level: Economic.

1. The United States Government land grant created a huge amount of land collateral, which could be sold to pay off any loans of money given to the State of Indiana. This land grant made the State of Indiana an attractive investment for East Coast and European investors (Cottman 1907).

2. It was assumed by investors that loans to an official government, even one that was sixteen years old, were more sound and likely to be paid back than loans to individuals. It was also assumed that the State of Indiana would want to have a positive reputation since it was more visible than individual investors and needed continued national economic relationships in the future. It was felt by investors, therefore, that Indiana would be more interested in paying back loans than individual or businesses (Esarey 1918: 431).

3. The National\International-level investors assumed that the State of Indiana knew what it was doing when it came to canal building. Assurances were given by the State that engineers with experience on eastern canals would be used. This attitude was a by-product of the extreme hands-off nature of large-scale investment at this time (Goodrich 1961, Chapter 5).

4. Large-scale investors expected any canal constructed during the early 1800s to meet the profit levels of the Erie Canal, which quickly paid back to the State of New York its initial investment (Goodrich 1961, Chapter 5).

5. A successful transport system could open up other areas of economic investment, such as land speculation, with which the investors could become involved (House Journal 1829).

6. This was the “Era of Good Feeling.” Investment opportunities lagged behind the desire to invest. The amount of profits made during this era was staggering, and every opportunity was expected to meet with success (Goodrich 1961, Chapter 5).

7. Investors were totally ignorant of the economic situation at the regional or local-level within the State of Indiana. The 1832 economic situation was assumed to be less important, because it was believed that constructing the canal would stimulate growth to new levels. It was believed that the transportation system could be built ahead of demand and that demand would follow. Property taxes would increase with this overall economic surge, thus adding new revenues to the state as well as toll profits; all of which would pay back the investors. This situation of construction ahead of demand occurred a number of times throughout North American history with transportation systems. The most notable being the intercontinental railroad lines which were constructed in the 1870s (Mercer 1982).

National\International Level: Politics.

1. Investors believed that they were dealing with a sound and established political government, when in fact the State of Indiana was quite inexperienced with government and had never managed any state project of significance.

2. Investors were totally oblivious to local or regional politics within the State of Indiana. All contact was with political representatives of the State of Indiana (House Journal 1832).

3. The State of Indiana gave assurances of political stability and an interest in making good on all loans given. Government officials were confident that the federal land grant would pay for any loans given to the state (House Journal 1832).

National\International Level: Social

1. East Coast and European investors had no knowledge of the communities through which the canal would be constructed. It was unknown how the local people felt about a canal (either positive or negative), nor how they would interact with the State project. All contact was with political representatives of the State of Indiana.

National\International Level: Environment.

1. International investors ignored the environment of the State of Indiana. Indiana was known to have trees and some rivers, but that was about the extent of the knowledge of potential European and East Coast investors.

2. Potential investors had no idea where the canal was to be built, what the topography was like, nor what the weather patterns in Indiana were like (House Journal 1832: 73).

The variables for economic, social, and environmental variables for the scales of state and local level did not change between 1816 and 1832. The data for these variables and scales will, therefore, not be repeated, with the following exceptions:
State Level: Economic.

1. The State of Indiana had little actual money for funding a canal. Yearly taxes amounted to \$33,000.00 a year (Esarey 1918). Not only could the state not fund a canal, but private investors within the state also could not come up with enough capital to construct a canal.

2. Initial land grant sales were disappointing. It was determined by the state legislature that the canal could not be constructed by land sales alone (Poinsatte 1969: 36, and Esarey 1918).

3. Canal fund commissioner studies produced very positive outcomes for the state from the construction of a canal, with cost figures being much less than actual later costs (House Journal 1831).

4. The canal had to be built or the federal land grant would be lost. The State of Indiana had until the end of 1832 to start construction or forfeit the land grant (Fatout 1972).

5. Political deadlock over whether to build a transportation system in Indiana, what form a transportation system would take, and where it would be located delayed the final decision on whether to construct or not to construct a canal by almost five years (Senate Journal 1827-28).

Kite Framework Interpretation for the Time Period -- 1827-1836:

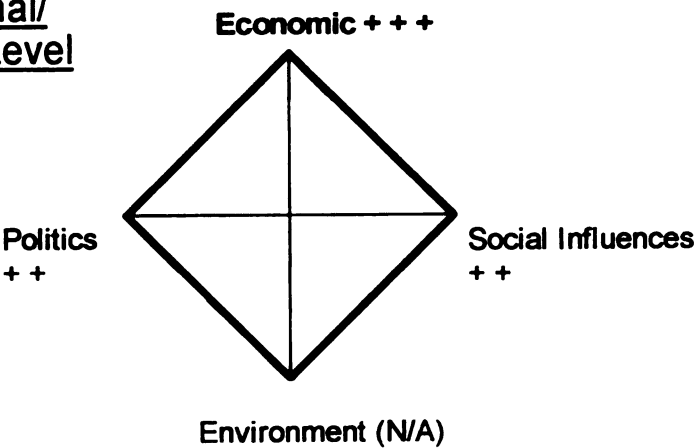
By reading through the above added variables, it is clear that there were some major information gaps surrounding the decision by East Coast and European investors to invest in Indiana's canal project. The state and local level social, political, and environmental context within which a canal would be built were mostly a mystery to investors. Why, then, did they invest?

The concept of Power was very important for understanding why Indiana's canal project was funded or not. Power at this time period in the life of the Wabash and Erie Canal was so overwhelmingly in the Economic and National\International sphere that it totally influenced the next major decision involving the canal. Variables in the economic sphere and at the national/international scale became much more important than those in other variable categories or scales of interaction. Once Power is assigned, then the Kite Framework can intuitively show why the canal was funded by European and East Coast investors (see Figure 66). Basically, the desire for economic profits, the belief that the State of Indiana was a good political and social investment, the absence of negative influences from other variable categories or scales, and the lack of other investment opportunities, led a desire to investment in the Wabash and Erie Canal.

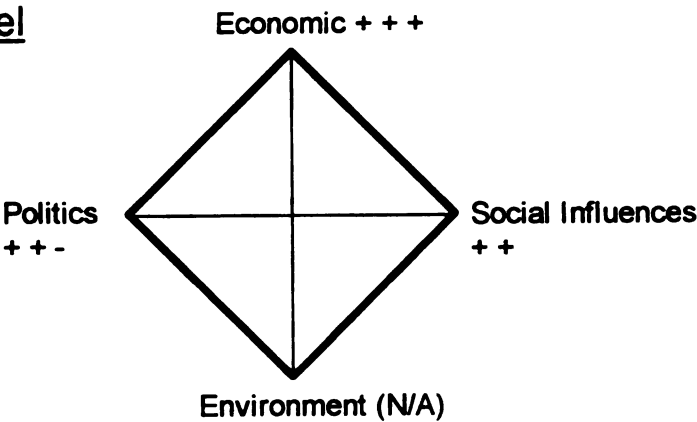
The Kite Framework, without knowing the historic results of this time period, would also predict the funding of the Wabash and Erie Canal based on power lying in the National\International and economic sphere. The assignment of power makes interpreting the Kite Framework easier, and helps to explain why the Indiana canal project was funded historically by English and East Coast investors.

Figure 66: Kite Model Graphic Representation: 1827-1836

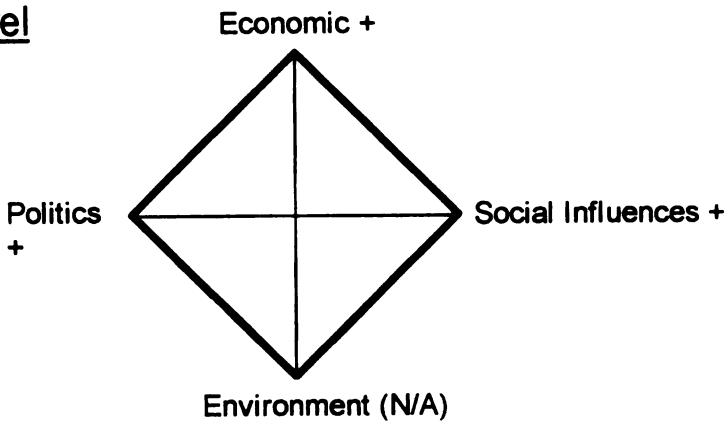
International/
National-Level



State-Level



Local-Level



A number of loans for the funding of the Wabash and Erie Canal were eventually made from 1832 to 1846 by these investors. As soon as the decision to fund the canal was made, the power shifted from the National\International level to the State level.

The Kite Framework successfully illustrates, through examining major variables and assigning power, how the funding of the Wabash and Erie Canal came about. The model, however, also shows how, within the decision to fund the canal project, key elements were overlooked, ignored, or given less credibility. The environment especially was ignored during all financial decisions dealing with the initial construction of the canal, as was local political or social situations. Both would later affect the transportation system in important ways.

The ignoring of the environment as a variable category to be considered would continue until the power within the Wabash and Erie Canal system finally shifted from the National\International level to the Local Level. With the physical start of canal construction, the environment could no longer be ignored nor left out of the decision-making process.

Time Period – 1828-36: Indiana Politicians Determine the Route of the Wabash and Erie Canal.

Before construction on the Wabash and Erie Canal could begin, several major state-level decisions had to be made. Again, these decisions had nothing to do with the environment, and involved mostly state political and economic goals, influenced by local political and economic goals. Power resided with the Indiana government at this point—the state government being the entity that would eventually decide on where the canal would be constructed. State-level economic and political variables remained prominent

during the planning phase of the Wabash and Erie Canal, but local economic and political variables were also influential.

The planning stage of the Wabash and Erie Canal came about after the initial federal land grant was given to the State of Indiana. The two termini of the canal were predetermined by the land grant – The Tippecanoe River in the west and Lake Erie in the east—but the path of the canal between these two points was left entirely up to the State of Indiana. At this time, state-appointed canal commissioners were to decide the final route of the canal. Surveys conducted by the canal commissioners were based on earlier United States surveys, with many modifications being made for political purposes. The geographic position of Indiana made negotiating with the State of Ohio important during this time period. Lake Erie could not be directly reached from Indiana, and a good section of canal had to be made across Ohio lands to link up with Lake Erie at Toledo.

Eventually, a political agreement was made whereas Indiana would give Ohio its claim to federal lands within that state granted to it for canal construction, and Ohio agreed to finish the Wabash and Erie Canal to Lake Erie. Unfortunately for Indiana, the Wabash and Erie Canal was in direct competition with Ohio's other canals, so Ohio only reluctantly and with a tremendous absence of speed completed its part of the canal. This, however, is a separate story.

Another decision made by the State of Indiana at this time was whether the transportation system would end up being a canal or a railroad. Because of the newness of railroads and the lack of sufficient iron for the rails, railroads were technologically inferior to canals in the 1830s. Canals, on the other hand, were respected, experienced modes of transportation which had been successfully constructed and operated in North

America since the 1700s. The Erie Canal was also a well-publicized example of the level of success canals could obtain, and was often referred to when canals and railroads were debated. Eventually, the Indiana government chose a canal for linking Lake Erie with the Tippecanoe River. Most of the other western states chose canals as the transportation system of choice as well. The process of Indiana choosing canals over railroads will not be applied to the Kite Framework.

The final decision on where the canal was located was, therefore, up to the State of Indiana, but the federal Government, local influences, and the State of Ohio created restrictions on the potential decisions open to the canal commissioners. Examining the variables at work before the canal commissioners chose a route for the Wabash and Erie Canal presents the following situation:

National\International- Level, Economics:

1. A general interest existed among major investors to maximize profits and facilitate the ability to tap current and future resource areas, as well as in connecting the canal to a greater national transportation system. A distinct disinterest in monitoring constructing and managing the system was also apparent (Goodrich 1969, Chapter 5).

National\International-Level, Political:

1. The two termini were established as part of the United States initial land grant. Lake Erie and the Tippecanoe River had to be connected by the canal to fulfill Indiana's obligations. How these two were linked was of no concern (Cottman 1907). Eventually, additional federal land grants would be given, extending the Wabash and Erie Canal as far south as Evansville. These later land grants would have the same construction requirements and time limitations as the first (Albjerg 1932).

2. The federal government left all decisions of canal construction, route selection, and management up to the State of Indiana.

National\International-Level, Social and Environmental:

No new information can be given for these two categories that has not already been presented above.

State-Level, Economics:

1. The State of Indiana had a goal of maximizing future profits for the canal. It was believed that opening up relatively unsettled lands in the central part of the state would be the most beneficial to fostering overall state economic growth (Poinsatte 1969: 28).
2. Expense in canal construction was not a stated issue at this point in time as it was the general opinion that granted land sales would cover most of the cost. Future profits and land sales would cover any unforeseen expenses in canal construction. The completion of the canal, therefore, justified any additional expenses for construction (Poinsatte 1969: 33-34).
3. The State of Indiana had an interest in linking known points on the map so that existing population centers (mostly located along major rivers) could be reached. These pre-existing population centers also had rudimentary transportation systems of their own (roads, river, stage, and mail routes) which could be linked to the canal (Cottman 1907).
4. The state government wanted to increase as rapidly as possible the population of the central part of Indiana. Having immigration into this area would facilitate exploitation of the interior area of the state (Poinsatte 1969: 12-41, and Reid 1913).
5. Staying near pre-existing communities facilitated the construction of the canal by providing bases of control and administration and sources of provisions and resources.
6. The cost of the canal was set based on the construction costs of eastern canals and the Erie Canal. Again, these cost expectations did not reflect the unique environmental situation the State of Indiana (House Journal 1831, and Comstock 1911).
7. Minimizing construction costs and maximizing resources were not part of the route selection debate. Resources were assumed to be available, and the initial cost of the canal was expected to be covered by future profits from tolls and land sales.
8. It was assumed that, once constructed, the canal would settle and become more permanent (House Journal 1832).
9. The fact that other state projects in Ohio, Michigan, Illinois, and Pennsylvania would create competition for labor and resources was ignored (Documentary Journal 1837). Canal routes, therefore, were not planned to maximize resource costs.

State-Level, Economics and Environmental:

The State of Indiana, when it was petitioning the United States government for a land grant, and when it was planning the route of the Wabash and Erie Canal, did not identify several economic considerations when dealing with the eventual cost of constructing a canal through central Indiana. These conditions included:

1. Canals in the east had an abundant labor pool to draw from. The local populations were much greater, and were firmly established. Skilled laborers were also more common and available.
2. The countryside of the East was more developed. The woods were less dense and an infrastructure of existing roads made construction easier.
3. The people of the east had a much longer knowledge of the local environment. Longer cycles were known and major flood patterns were experienced.
4. Canal construction in the East was much closer to manufactured goods, existing raw resource mines, established businesses, and provisioning sources.
5. The East Coast also had a gentler environment than the west. This was especially true for winters.

State-Level, Political:

1. Local politicians were very influential in applying pressure to the state government of Indiana.
2. To be politically fair to all Indiana citizens, the government of the State of Indiana tried to please everyone at the same time with a massive 1836 public works program labeled the "Mammoth Internal Improvement Act." This law included many other canal, road, and railroad projects than just the Wabash and Erie Canal. These additional projects did not have federal backing, and it was assumed that profits from future tolls would pay for these additional transportation systems (Documentary Journal 1837, and Laws of Indiana 1835, Chapter 2).
3. The State was inexperienced with running a state-level government, and had little experience with managing a project on the scale of an interstate canal (Esarey 1918).
4. The State of Indiana desired to open up the interior of the state so as to increase its population, stimulate the economy, and increase its overall power within the United States (Odell 1916: 103).

5. There was a major competition between states at this time to be the first to have an international canal system. Whichever state was the first to link with the East Coast, it was assumed, would reap the largest economic and population growth rewards. This was a legitimate fear since the opening of the Erie Canal had led to New York City surpassing the earlier economic centers of Philadelphia and Boston (Fatout 1972, and Goodrich 1969, Chapter 5).

6. Indiana was lagging behind in its canal and transportation building program behind Ohio and Pennsylvania, and was determined to catch up (Fatout 1972).

7. Construction of a transport system which linked the State of Indiana with eastern markets would also reap huge rewards on the politicians who voted for construction; both in monetary rewards and in political popularity (again, it was ignored that failure would have the opposite response) (Fatout 1972: 71).

State-Level, Social:

1. The state government of Indiana also operated under the public works ideology, that it was their duty to provide the citizens of the state with economic development beyond what could be done by local communities and private individuals (Scheiber 1969: 89).

State-Level, Environment:

The State of Indiana mostly ignored the environment at this stage. A general notion of canal construction boundaries was known, but the details of applying canal engineering to Indiana were not dealt with. It was known that:

1. The canal had to be roughly in a straight line and had to follow the most level elevation route possible, with few rises and falls in elevation over the route. Too much of an elevation change would require many expensive locks.

2. The canal could not cross major rivers often because the cost of aqueducts, bridges, and guard locks would be high, and flood damage would be great.

3. The canal had to stay near water so that a constant source of water would be available for watering the canal prism.

4. The canal had to have available sources of raw materials for its construction—either stone or timber. Good clays and loose rock were necessities as well.

These environmental issues had less to do with local terrain, weather patterns, and flood cycles and more with the general needs or limitations of basic canal construction (see General Rules and Specifications 1847, for a complete description of canal

construction guidelines). A general interest in central Indiana topography thus was formed by state politicians at this time as the Wabash and Erie Canal route was decided upon. This interest in matching Indiana topography with the basic needs of canal construction was the first time that environmental issues were included in the canal-construction decision-making process.

Local-Level, Economics:

1. Local competition existed for the final canal route among the many small communities of central Indiana. Sometimes this competition led to violence, vandalism, and guerrilla warfare (Nebecker 1913: 20-23).

2. Local towns knew that any community located on the canal, especially at the temporary terminal end of the canal, would have distinct economic and political advantages over all other communities in the region (Visher 1955: 341-342).

3. It was also known that any community not located on the canal faced the loss of economic and political power and eventual subordination to stronger towns located on the canal (Fatout 1972: 130).

4. Local towns wanted the canal to link with pre-existing roads and river transportation routes.

5. Local businesses and merchants wanted the canal to lower transportation costs for goods coming into the area and raw goods leaving the area.

6. Local farmers wanted the canal to be reasonably accessible for the bulking and later transport of agricultural goods east. The canal would greatly reduce overall costs, leaving the transport of agricultural products from farms to the canal as the only expensive wagon haul needed (Poinsatte 1969: 221).

7. Local communities wanted the transportation route as a way to induce cheap labor west (Benton 1903: 97).

8. Local towns also knew that construction of the canal would bring immediate profits as the community supplied laborers, supplies, provisions, and raw materials for the canal's construction (Way 1993: 112).

9. Plans were also made to construct hotels, warehouses, mills, and other industries, which would be dependent on the canal. These secondary structures would bring much additional profit and economic growth to any community located on or near the canal (Poinsatte 1969: 221).

10. Prior to canal construction, the major river systems within and bordering Indiana were used as transportation routes for agricultural goods. Grain would be shipped south to New Orleans, then to the East Coast by boat. This route proved to be

expensive, slow, and led to a significant loss of the crop in shipment. This earlier transportation system did, however, create the pre-existing settlement pattern which local supporters of the canal wanted to link together with the Wabash and Erie (Duden 1909: 161).

Local-Level, Social:

1. The population of central Indiana was concentrated in small hamlets along the Wabash River and its tributaries (see the early histories of the towns of Delphi and Lafayette).

2. Local ethnocentrism, competition, and animosity existed between the various hamlets. There was a general feeling amongst each community that THEY deserved to have the canal or a branch of the Wabash and Erie Canal reach them, and that if the canal was to terminate in the wilderness, the terminal end should be in their community. (Nebecker 1913: 20-23, and Cox 1860).

3. It was part of the ideology of public works that each community had a civil right to economic development undertaken by the state government (Scheiber 1969: 89).

Local-Level, Environment:

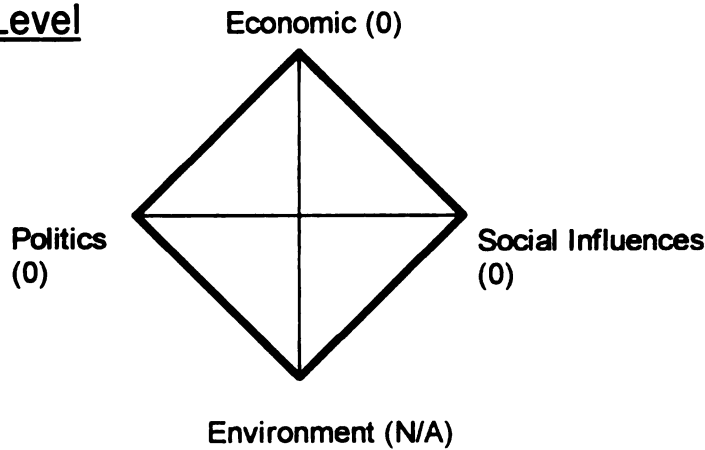
1. The local environment at this stage was not an issue. Each community was more interested in getting the canal to their community than in planning for its most optimal construction. It was believed that the State of Indiana would overcome any natural difficulties.

Kite Framework Analysis for the Time Period – 1828 to 1836: Canal Route Planning.

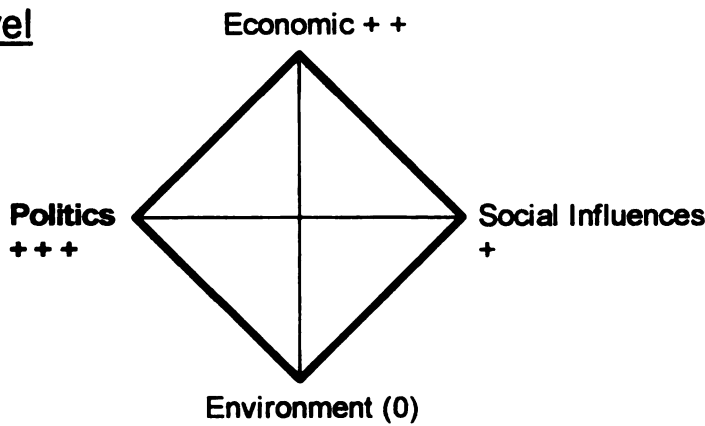
Power during this pre-construction time period was located within the state level scale and within the political variable category. Local political variables also played an important role in decision-making by the State of Indiana at this time. It is these variables, then, that must be considered foremost in understanding why the route of the Wabash and Erie Canal was chosen where it was historically (see Figure 67).

Figure 67: Kite Model Graphic Representation: 1828-1836

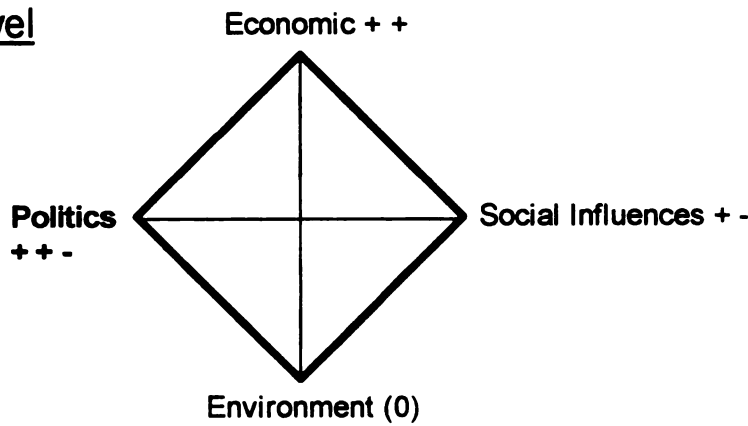
International/
National-Level



State-Level



Local-Level



Economics, social issues, and the environment all had an affect on the final decision-making process, but this affect was small compared to the political debates that canal route planning created. The above issues also did not produce strong counter-arguments of any force to detract from the canal route being decided along political lines. There was a general consensus for all scales of interaction that the economics of the Wabash and Erie Canal would be a success as long as the canal was built. Those communities that were unhappy at the initial canal route, were assured that they would benefit from later state projects.

The various small communities of central Indiana also assumed that the state, after correct political pressure was applied, would bow to its duty to provide all citizens with cheap transportation. Social issues, therefore, remained positive toward canal construction. Most people also assumed that the environment would not to be an important issue in the canal construction and operating process. It was believed that the state engineers could overcome all environmental problems.

This last paragraph points out another facet of the Kite Framework. Identifying where power is located among the various scales and variable categories is important, but identifying whether scales or variable categories without power are supportive, benign, or are critical of the variable and scale with power is also important for interpretation and predictive purposes. In this case, all other variables and scales of interaction were benign or supportive toward canal construction at this time period, so no resistance was felt by state politicians when they choose the canal route based mostly on political decisions. With all power in the hands of politicians, the Kite Framework demonstrates how the route of the Wabash and Erie Canal was chosen on almost purely political grounds.

Using the Kite Framework as a predictive model, the final interpretation would also be that the State of Indiana should plan the route along political lines. The resistance to doing so is too small, and the political pressures too great to interpret this time period doing anything but following a political agenda.

Historically, the State of Indiana chose a politically popular path for the Wabash and Erie Canal, connecting all the small communities along the Wabash River and planning a number of feeder canals to reach those that were not originally connected. This decision by the state is the first time that regional settlement in the Wabash Valley can be explained by the Kite Framework. The fundamental foundation of future settlement that was expected to be stimulated by the construction of the Wabash and Erie Canal was based on earlier river community placement.

Power during this time period shifted from the international level to the state level and political sphere at this time, and would shift again to other variables as soon as the final route was chosen. This shifting of power from economic to political issues, however, later became counter-productive to meeting the original economic goals of the state of Indiana, and led to a general weakening of the canal system.

At this point, an alternative use of the “Braid of Time” component of the Kite Framework should be discussed. The “Braid of Time” is normally used to track changes in power across scales of interaction and between variable categories, but also the overall *number* of changes is important for interpreting why events occurred for a given system. The number of power shifts over a given time period may actually be an indicator of stress within the system being observed. This argument follows logically—the more

shifts in emphasis for a system within a given time period, the less efficient the entire system is. Continuously changing system goals and redefining variable rankings would also add stress to the system and may in itself be a variable of consideration when a final interpretation is produced.

The Kite Framework, when applied to the Wabash and Erie Canal, can further be refined by including archaeological data. Archaeology concentrates on events at the local level, but can give rare insights into larger economic, social, political, or environmental factors. Overall, archaeology is less useful for explaining federal and international decisions relating to the Wabash and Erie Canal. However, because the local level is the most lacking in historic documents dealing with the canal, archaeology can provide much data for the overall variable relationships for several time periods which had strong local influences.

For this time period of 1828 to 1836, archaeological research in the project area can add data of what was NOT in the area as it does for what IS in the area at later time periods. The four years of survey in Tippecanoe, Fountain, and Carroll Counties located many residential and commercial structures, but artifact dating indicated that all of these were built or used AFTER the Wabash and Erie Canal was constructed. Only two sites contained diagnostic artifacts that dated to before the construction of the Wabash and Erie Canal. One of these sites, Sunset Point, proved to be a canal construction camp (hence associated with the canal after all). The other site, Cassens Cabin in Tippecanoe County, is probably another construction-related site, though it may be a temporary

residence from an earlier time period. Settlement prior to the canal, therefore, was sparse and limited to the River, without much expansion into the surrounding region.

These conclusions lead to several additional variable statements for the Kite Framework:

Local Level: Politics

1. The interior regions of the state that was to benefit from the canal had little population. This area could not influence the political decisions of whether to build the canal to any great degree. It is surprising, therefore, that small, interior Indiana communities had such a large influence on early state government decisions.

Local Level: Environment.

1. It has already been stated that the limited duration of regional settlement led to a lack of understanding of the yearly and long-term weather cycles. Archaeological data shows how the limited nature of settlement during this time period would also lead to a limited understanding of the local landscape of the region when the canal would eventually be constructed.

Local Level: Economic.

1. There would be only a limited economic infrastructure within the project area, based on the low level of settlement. The plan of the State of Indiana to connect the river towns left the settlement of central Indiana away from these towns up to migrants to the area who came AFTER the canal was constructed.

All of the above does not change the general conclusions of the Kite Framework, though the interpretation is strengthened by the inclusion of archaeological data. The insight into the unpopulated wilderness that must have existed outside of the river communities before canal construction underscores the problems faced by the State of Indiana in constructing a canal through the project area. The archaeological data also indicated how much the canal would influence the greater pattern of settlement in the project area. The landscape indicated on the 1866 map of Tippecanoe County, except for the river town of Lafayette, was settled and determined AFTER the canal was

constructed. Archaeology, therefore, underscores the initial relationship between settlement in the project area and the Wabash and Erie Canal.

The Kite Framework analysis gives causality to the creation of settlement patterns in the Wabash Valley that were expressed using central place theory analyses in the previous chapter. It was political pressure from existing river communities that gave an original form to where the canal would be placed upon the environment. Also, as archaeological research has shown, the landscape was not filled with farmsteads to the level demonstrated in the analyses chapter. The Kite Framework analyses, especially with archaeological data, demonstrated that the landscape prior to the construction of the canal was not a complete Central Place hexagonal settlement system.

The reality of post-canal Central Indiana was similar to Christaller's original round market forms, where separate settlements exerted influence on surrounding territory, but competition had yet filled in to form hexagonal settlement patterns. The landscape, prior to canal construction, was best labeled as proto-hexagonal. After the canal was constructed, in-filling from landscape exploitation and immigration would increase competition and cause more classic hexagonal and spaced in-filling.

Time Period – 1826 to 1838: Engineers Plan the Rout of the Wabash and Erie Canal from the Ohio Border to Lafayette.

The eventual route of the Wabash and Erie Canal pleased some communities and angered others. The friction between those communities located on the canal and those that were not would hinder construction and management of the canal for a number of years. These regional issues did not diminish as the next time period in the history of the

Wabash and Erie Canal began; that of surveying and engineering the canal route determined by the state commissioners.

Surveying the Wabash and Erie Canal introduced engineers of the State of Indiana to the environment of the canal pathway for the first time. Engineers with experience constructing canals in the east and in Ohio chose routes through the Indiana wilderness, based on the political objectives set forth by the State. Sometimes the political objectives could not physically be met by the surveyors, and detours from the original plan had to be made (Report of the Chief Engineer, House Journal 1834: 16). The eventual route of the canal roughly matched the goals of the politicians, with few modifications and none of major importance.

It should be noted at this time that the engineers operated under a diachronic notion of time; they treated the environment as a static system for planning the path of the canal. This diachronic treatment of time was partly determined by the job description; the State of Indiana presented the task and the surveyors complied. It was also determined by the time of year that the surveys were completed. Survey and planning work usually took place in the late fall or early winter, so that the spring and summer months were free for canal construction. The engineers, therefore, had a limited view of the yearly weather cycle, and obtained little if any knowledge of longer-term cycles. Survey routes were also based on the needs of the canal and of the communities through which it would pass. The engineers, therefore, forced the canal onto the landscape without working with the features of the landscape.

Engineer route selection, therefore, had the following variables:

National\International-Level, All Categories:

1. This scale had no influence on the routes selected between proposed canal towns. The only national influence was the current termini of the canal.

State-Level, Political:

1. With the major points of the route being previously chosen by political action, the survey route itself was not a political issue. The engineering needs of the canal were left up to the canal engineers and surveyors. This separation of engineering and politics was reflected in the Documentary Journals during Indiana's canal era. The Chief Engineer's report was usually separate from that of the canal commissioners or the canal trustees, and little of the actual engineering of the Wabash and Erie was discussed outside of his report.

State-Level, Economic:

1. It was decided at the state-level that costs would be reduced and canal construction speed increased by using timber instead of stone in major canal feature construction; timber being a very plentiful material generated from the act of clearing the land for the canal. Few locations of high-quality stone were known at this time, and the skilled masons needed to use stone as a building material were absent in Indiana. The state engineers and politicians assumed that stone would replace the initial wooden structures at some later date.

This decision, made at the state-level, would later prove disastrous to the life span of most Wabash and Erie Canal features. Short-term cost cutting and time saving in the early 1830s meant that the replacement of wooden structures with stone was dependent on the level of profit the canal made in the future, or on the willingness of additional loan monies being obtained. These conditions were never met, and the engineers of the canal were faced with a continuous dilemma—there was never enough maintenance money to replace the canal structures with stone, and wooden features were more prone to

deterioration and flood damage. The result was that weaker wooden structures were continuously being replaced with weak wooden structures, which increased the stress level on the entire system more often than was necessary (many Documentary Journals discuss frequent repairs of the canal's wooden structures).

2. Other than the decision to use local materials, the State of Indiana eventually paid top dollar for surveyors and provisions for surveying. Competition with other states and the abundance of money in the early years of Indiana's canal era made surveying a very expensive undertaking (Documentary Journal 1837, and Way 1993: 112).

3. Early construction work faced an economic paradox of the state government resisting cost overruns at a general level, but caring little for costs at the operational level. Canal section routes were altered to save money, but lavish amounts were given to engineers, assistants, and other administrators. The overall lack of record keeping led to a haphazard overall financial management of the canal (Documentary Journal 1838: 5, and Cottman 1909: 123).

State-Level, Social:

1. The State had no social issues of note with the surveying of the route between previously chosen points on the Indiana landscape. Some friction did exist with local communities which felt slighted by the state when it came to their earlier political routing decision, but no hindering or animosity toward the surveyors was noted in any of the available records of the time.

State-Level, Environment:

1. Decisions within this variable category were left up to the canal engineers hired by the State of Indiana. Problems with the interaction between surveyors and engineers and the environment have already been discussed.

Local-Level, Economic:

The surveyors themselves operated on this scale of interaction. The surveyors were bounded by:

1. The basic needs of the canal—water, timber, stone, earth, clay sealant, etc.

2. The knowledge that the State of Indiana would pay well and extravagantly for their services (Documentary Journal 1838: 5).

3. The knowledge that the State preferred timber to stone for reasons mentioned above.

4. The engineers had as part of their job description the duty to pick the cheapest route available for the canal, based on water needs, construction material location, water routes, and needed engineering features. Many records exist where the surveyors justify their choices of route location with detailed descriptions of expected cost and construction times (see the report of the Chief Engineer for the years of major canal construction in Indiana 1832 through 1852).

5. Most of the canal feature architecture and the overall shape of the canal were based on the experience of engineers in the east. When construction finally occurred, unique features had to be developed to suit the irregularities of the Indiana environment. The surveyors apparently were basing their cost and time estimates on the much kinder environment of the East Coast (Holliday 1929: 93, and Fatout 1972: 157).

6. Local cost overruns were frequently paid by the canal commissioners.

Local-Level, Social:

1. The Federalist view of the landscape. The landscape was to be controlled, not worked with.

2. Limited knowledge of the people and regions the canal was constructed through.

Local-Level, Political:

1. The knowledge that they were protected politically by being representatives of the State of Indiana.

2. The routes chosen by the surveyors were generally free of the political debate that went on before the major points were chosen. The Documentary Journals show little conflict between the local populous and decisions made by the Chief Engineer or his assistants, except on the Southern Division, where reservoirs were seen as a health hazard (Esarey 1918: 442).

Local-Level, Environmental:

1. Total lack of long-term and seasonal weather knowledge.

2. Absence of knowledge of what would be found beneath the soil once digging commenced.
3. Knowledge of the basic needs of constructing a canal and engineering features to make the canal successful within a diverse environment.
4. Diachronic notion of time.

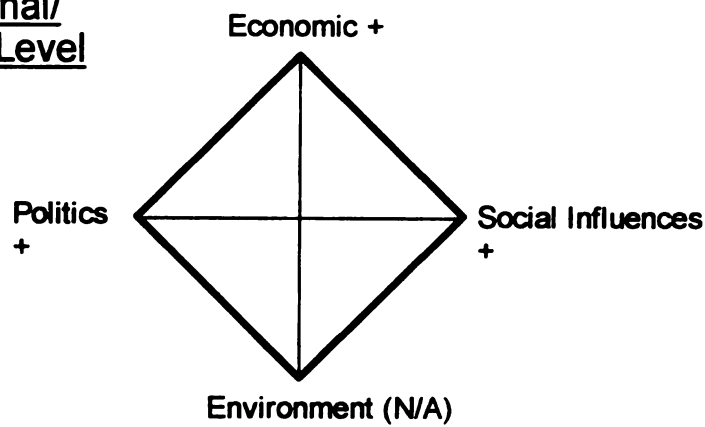
Kite Framework Analysis for the Time Period – 1826 to 1838: The Engineering of the Wabash and Erie Canal.

The Kite Framework, when applied to the above variables, can demonstrate why the canal was successfully engineered without any of the debate or conflict that surrounded other canal-related issues. Power, in this case, rested at the local level with the surveyors and engineers, who concentrated on constructing the canal within the Indiana environment. Power, ironically, was also located at the environmental variable category for the first time. The surveyors were acutely aware of the need to deal with the environment at this stage of canal development, though their lack of knowledge of long-term weather patterns greatly hindered this awareness. The environmental category should, therefore, be looked at to determine what was likely to happen as a result of the survey (see Figure 68).

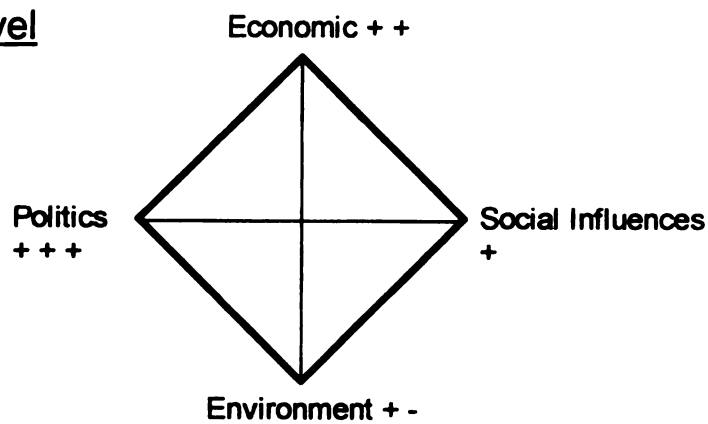
Later events would show that the planned route chosen by the surveyors was subject to intense flooding and water damage during storms and the spring thaw. Though the engineers were basing much of their decisions on the environment, the environment that they were adapting the canal to was not the environment that the canal would experience over time.

Figure 68: Kite Model Graphic Representation: 1826-1838

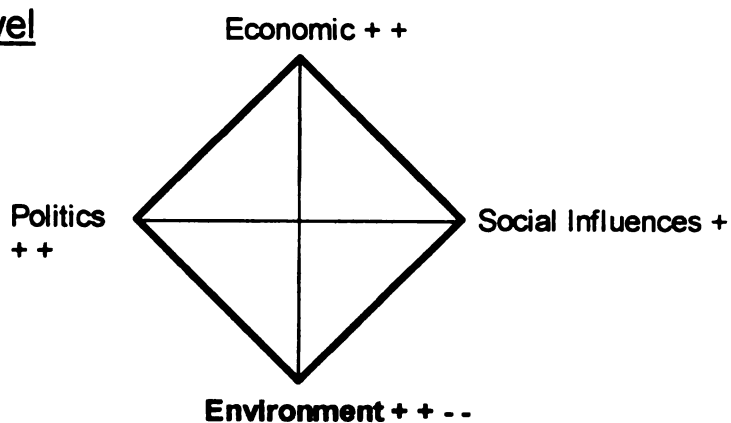
International/
National-Level



State-Level



Local-Level



Returning to the Kite Framework, with no debate from any other scale or variable category, it is easy to see why the final decisions of the engineers would stand without question. Any negative problems faced in the primary variable category were compensated for from the state-level political variable. This compensation brings up again the supportive or detracting influence of minority variable categories on the success of the variable category with primary power.

When dealing with regional Wabash Valley settlement, it has already been shown how small river communities formed the basic framework of later canal-era settlement. But it is the engineering and route planning at this period of time that determined where secondary centers would emerge. As the primary central places grew in population and importance, the development of secondary centers within the region was determined by the location of the canal on the landscape. In this way, even though the primary centers were first oriented toward the Wabash River, these secondary centers were not similarly linked. Several smaller settlements, especially hamlets, that developed along the canal were not located on the river (see Township maps, Appendix VI).

Time Period – 1832-1838: Indiana Constructs the Canal from the Ohio Border to Lafayette.

State-level politicians decided upon the final route of the Wabash and Erie Canal along political lines. Economic maximization, social influences, and especially environmental issues did not play an important part in their final decision. Engineers then chose the most likely route of the canal within this pre-determined plan. The decided-upon path for the canal was unfortunate for later canal maintenance engineers and contractors, since the forty-foot wide channel crossed Indiana's primary watershed.

The final canal design called for the Wabash and Erie Canal crossing a number of rivers and streams, and placed a water-filled ditch and two earthen embankments right across the path of most of Indiana's flood routes.

The political decision of where to locate the canal would later in canal history cost the State of Indiana greatly in maintenance expenditures, and would be an important factor in determining the eventual demise of the canal system. However, these negative events were far in the future for Indiana citizens of the 1830s as communities all along the proposed Wabash and Erie Canal route celebrated the expected coming of prosperity. Ground was first broken in 1832 at Fort Wayne, and Indiana's canal era had begun. The choice of Fort Wayne as the starting point of canal construction fit into the greater plan of Indiana politicians. The politically-appointed managers of the construction of the canal first wanted to connect Fort Wayne to the Ohio border, and then move south from Fort Wayne toward Lafayette, with various canal sections being completed in the years to come.

However, the State of Indiana canal engineers who oversaw the construction of the Wabash and Erie Canal were immediately faced with a major labor problem. The labor conditions expected by the State of Indiana prior to construction and those which it faced in the planning and construction stage were completely different. Also, a number of other financial problems at the time of construction arose which the state politicians and engineers did not anticipate. The below variables give an idea of the situation during the first years of canal construction:

State-Level, Economic:

- 1. The State of Indiana assumed that labor would be obtained locally, with construction jobs on the canal being filled with local laborers from central Indiana communities (Documentary Journal 1836).**
- 2. Indiana politicians assumed that land sales would match predicted sale prices and would pay the interest on loans, as well as pay for maintenance (with toll money being included) while the canal was in use (Poinsatte 1969: 31).**
- 3. The government of the State of Indiana believed that the survey reports indicated exactly what was necessary, and that construction costs could be accurately predicted based on the survey results and the experience of other canal projects (Documentary Journal 1839).**
- 4. It was believed that the cost of provisions would be the same as quoted before the canal was constructed (Documentary Journal 1840: 63).**
- 5. The State of Indiana also did not expect to have to provide for lodging for its canal workers, who would live in the local community, then commute to work on the canal (House Journal 1832: 190).**
- 6. The state politicians believed than any problem with construction could be solved with more money; the money eventually being paid back from canal tolls and land sales.**
- 7. The State of Indiana had a vast reserve of money borrowed from East Coast and English investors.**
- 8. Land sales in the 1830s were not meeting expectations.**

State-Level, Political:

- 1. The State of Indiana assumed that political goals dealing with the canal could be met; that each community that was to intersect the canal or have a canal branch would get such a transport feature in a timely fashion (Comstock 1911: 6, and Laws of Indiana 1835, Chapter 2).**
- 2. The state political organization for the canal was extremely top-heavy, with too many officers, secretaries, and engineers. The extra cost was good for politics (you had many jobs to give to your followers), but bad for canal economics. The cost of these salaries would eventually rise to match the level of tolls taken during the best year of the Wabash and Erie Canal (Documentary Journal 1837 and 1838: 5)**

State-Level, Environment:

1. The State of Indiana did not foresee any problems with the environment that could not be overcome with normal canal engineering and construction practices.

State-Level, Social:

1. State politicians assumed that there would be no problem socially with the construction of the canal. The State believed that each local community would support the canal's construction, and would not interfere with its progress southward.

2. The State had no plans for how to house over 1000 workers, nor any notion of sanitary planning.

Local-Level, Social:

1. Local workers did not want to work on the canal. Such labor was assumed to be dirty, low-class, and backbreaking. Agricultural labor had a higher status, was less labor-intensive, and paid as well (Way 1993).

2. Local communities were willing to fight other settlements if it meant that their town would have an economic and social advantage over other communities when it came to access to the canal (Nebecker 1913: 20-23, and Cox 1860).

3. When some local communities felt that the State of Indiana was not moving fast enough to provide them with a canal, then they felt that they had the right to intervene; either by opening up the canal gates sooner than planned, or by constructing their own side cut (Nebecker 1913: 20-23).

Local-Level, Economic:

1. Local agriculture had more need than labor could demand, paid well, and did not require long-distance movement by local laborers (Documentary Journal 1836).

2. This period of time saw an intense competition between canal construction and agriculture for available laborers, with the canal losing. Competition also existed between several western states for canal laborers (Documentary Journal 1836).

3. Local merchants saw the State of Indiana as a bloated target when it came to swindles and price gouging. They knew that they were the only suppliers for miles in any direction, and were quite willing to fleece the state as they saw fit (Documentary Journal 1837).

4. Among those merchants honest about prices, strict competition for limited resources drove up prices anyway (Documentary Journal 1837).

5. Merchants and speculators also followed the canal, selling alcohol and other services to laborers without regard for State of Indiana restrictions (Documentary Journal 1836).

6. Local landowners saw the construction of the canal as an ideal opportunity to cheat the state of money for wrongful damage claims. Real claims also cost the State of Indiana compensatory damages. The local judicial system generally sided with the complaining party for local social and political reasons (Fatout 1972: 142).

7. Each community on or near the canal believed that the State of Indiana had the duty to provide them with the canal, either by direct construction or by feeders, and to do so in a timely fashion without delay—or they would take action by themselves (Documentary Journal 1854).

8. Any money problems experienced during construction at the local level will be blamed on the State of Indiana.

9. When local canal engineers faced the environment of Indiana for the first time, they realized that innovative engineering structures had to be made so that the canal would be completed. The lack of cut stone was particularly troubling, and led to the completion of canal features based on plank, timber, and stone rubble construction. Any additional expenses that were needed to complete these special features were passed on to the State of Indiana, but the loss in time while new solutions were developed delayed the opening of the canal by months (Several volumes of the Documentary Journal state the need for creating unique canal features).

Local-Level, Political:

1. Intense intra-community competition remained, with each town fighting to be on the canal line if a feeder could be created. Communities also competed to be the terminal end of the canal (Documentary Journal 1854).

2. Local communities were still petitioning the State of Indiana to expand the canal system into new areas. The state responded by planning new routes that intersected the Wabash and Erie Canal. Most of these new canal routes never got to the digging stage, but many were surveyed, which alone cost the state tens of thousands of dollars (Laws of Indiana 1835, Chapter 2).

Local-Level, Environment:

1. The affect of long-term weather cycles was unknown. Also, the affects of burrowing animals, droughts, infrequent water sources, porous soils, and periodic flooding and ice floe damage were not accounted for (Almost every Documentary Journal has a statement from the Chief Engineer on the damage from weather for the year. These start in the 1840s, and carry through to the mid 1870s, when the canal was finally closed).

2. Local citizens believed that if environmental problems arose, it was the job of the State of Indiana to deal with them.

3. The nature of the Indiana wilderness meant that no sanitary conditions existed, medical care was lacking or totally absent, and the affects of any disease would be amplified by the rugged conditions of the physical environment. The worst time for illness was the summer, when temperatures would climb over 100 degrees Fahrenheit and the humidity made canal work a sauna-like experience (Whicker 1916).

The problem of labor involved too few local laborers, and too much competition from other canal projects and from local agriculture. The State of Indiana was forced to solve this labor problem in 1832 by importing over 1000 laborers from eastern states. These Irish immigrants had to be transported to Indiana, fed, housed, and paid a higher than expected wage to entice them into working in central Indiana on the Wabash and Erie Canal. This decision added several more variables to the pre-construction condition:

State-Level, Economic:

1. The State of Indiana had to pay thousands of extra dollars to transport, feed, and house its immigrant Irish laborers.

2. All wages were higher than expected due to mismanagement and the general competition for laborers.

3. Legal fees and costs to injured parties were large and unexpected.

State-Level, Political:

1. The Irish were very unpopular as a labor force. The State was influenced by local political groups and developed plans for controlling and restricting the Irish laborers (Poinsatte 1969: 61-62, and Documentary Journal 1836: 12).

2. The Irish themselves were a political minority that demanded rights and struggled against State control and restriction.

3. The State started to be negatively impacted by intra-community competition; regional arguments became State-level political problems as local communities fought for canal access.

State-Level, Social:

1. Disease and unsanitary conditions led to epidemics and the death of more canal workers, canal managers, and local citizens than any amount of violence between locals and Irish laborers. The cholera epidemics that ravaged the work camps during 1848 also spread into local communities and affected the canal officers at all levels (Whicker 1916).

2. The unsanitary and crowded conditions of the camps were the breeding grounds of diseases, and the lifestyle of the canal workers also added to the unhealthy atmosphere.

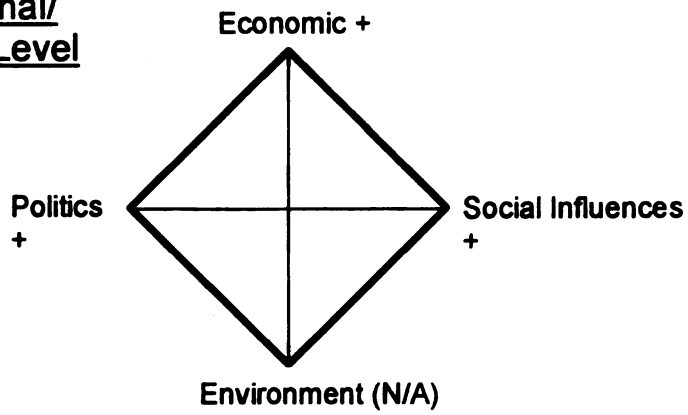
3. Religious conflict among the Irish led to murder, work-stoppages, riots, and guerilla warfare along the canal.

Kite Framework Analysis for the Time Period – 1832-1838.

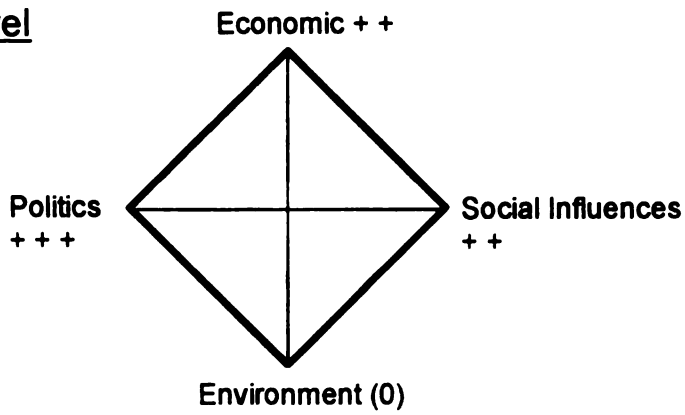
Power during canal construction shifted to the local level (the relationship between the local representatives of the State of Indiana and the local communities that were providing necessary resources and functions), with the three variable categories of economics, social influences, and politics being roughly equal (Figure 69). No single local category dominated. Local concerns and situations were the dominant reason for the State of Indiana making decisions as the canal was constructed toward Lafayette.

**Figure 69: Kite Model Graphic Representation:
1832-38**

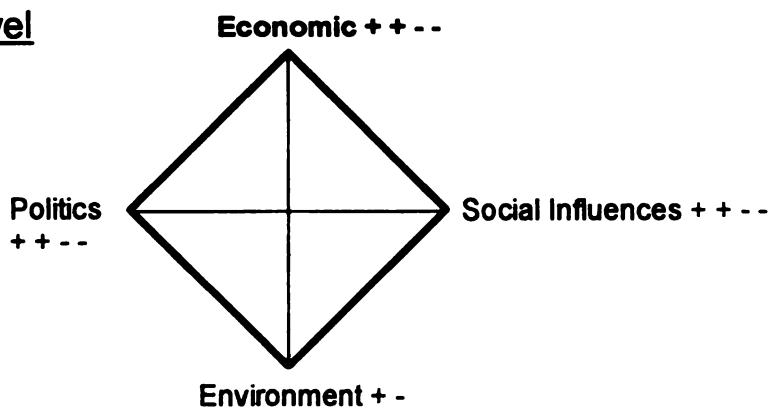
**International/
National-Level**



State-Level



Local-Level



The state at this time merely reacted to local pressures and situations and did not direct events. The standard decision of state representatives given a local crisis was to throw money at it until it went away. The local politicians, merchants, and citizens quickly learned this response and exploited it.

Two major variable groups had a strong influence on local decisions during this time period. The State of Indiana, though reactionary at the state level to local conditions, still controlled the money that drove the economics of canal construction. Local individuals could, therefore, bleed the state to a certain level, but too much would have shifted the power back to the state-level where actions counter to local goals may have taken place. An example of this situation was the 1835 Irish labor riot.

The Irish were very successful in getting social and political concessions from the government of Indiana. The alcohol bans were never enforced, canal workers were well paid, and a wide range of goods and provisions were provided by the state free of charge. However, the state had a limit to the amount of freedom and lawlessness that it would allow the Irish. When the Irish rioted in 1835, the state government called out the militia, arrested and jailed the labor leaders, and passed laws to limit future Irish anti-social actions. Equilibrium was again established.

The Kite Framework can provide an intuitive interpretation to what happened historically by examining the various variable categories mentioned above. The State of Indiana faced many cost overruns, and price increases that were totally unexpected. But because of the seemingly unlimited flow of money, state-level managers of the canal chose to do nothing to solve or modify the planning and running of canal construction; rather, they threw money at the problem until it went away. The Kite Framework easily

shows how the State of Indiana was soon faced with a financial crisis as costs far exceeded expectation in the early 1830s.

The Kite Framework also shows how the social problems with the Irish formed along the canal line. Friction between the Irish, the local community and the State government was very apparent, as was the attempt by the state to placate both the local communities and the Irish so that canal construction could go on. The Kite Framework points out that many variables deal with the successful construction and completion of the canal, especially within the economic sphere, which explains why the Irish were not forced out of the region nor made angry with more violent state-backed coercion.

Using the Kite Framework as a predicative model, without knowing the history behind the construction of the Wabash and Erie Canal, it is easy to foresee the same results. The Irish immigrants who built the canal were an unexpected and costly problem for the canal managers. Increased labor and provision costs would add stress to the entire canal financing system. Unpredicted local community action against the canal for political and economic purposes would also create a cash drain. And unexpected legal and environmental problems would take additional money and time to solve.

Delayed canal construction from environmental problems, mismanagement, and labor unrest would increase local agitation against the canal system. The unexpected costs of canal construction presented within the listed variable categories were incredible and would add greatly to the total cost of the canal. This, when added to the practice by the state government officials to solve problems with money and the promises of more canal access in the future, leads one to expect financial disaster on the horizon if the money ran out.

When it comes to predicting the social problems from canal construction, it is easy to expect conflict between the Irish and local communities, and the Irish and the State. But because power resides in the economic sphere, the construction of the canal would take priority at the local and state level. Social problems with the Irish, therefore, would be solved in ways more satisfactorily for the Irish.

Fundamentally, the Kite Framework at this point would predict that, as long as the money lasted, the State of Indiana would be willing to pay for all the additional expenses needed to get the canal finished. And because of the economic stake that local communities, the Irish laborers, and the local canal representatives had in the completion of the canal, all three groups would cooperate to finish the canal. The social differences between the groups would be dealt with or internally suppressed in order to meet the economic goals of all parties, which in this case involved the timely construction and completion of the canal.

Using the Kite Framework at this point as a predictive tool, disaster looms for the State of Indiana. Social strife is high, epidemics abound, financial expenses are out of control, and the bilking of the state continues at a healthy rate. The State of Indiana, when faced with crises, continuously resorts to increased expenditures as a solution to problems.

The Kite Framework, therefore, would predict that as long as the money lasted, the Wabash and Erie Canal as a very flawed transportation system would continue to slowly be completed southward. If, however, the money faltered, then the entire system would crash. This latter event is exact what happened after 1837, when the Panic of 1837

began, and sent everyone in the State of Indiana scrambling to explain how 82 miles of canal had eaten up \$1,178,391.79 dollars.

Another more subtle cost to the State of Indiana was in time. The delays caused by Irish riots, new canal engineering, and additional construction resulting from unexpected environmental conditions all delayed the canal by months at first, then by years. Another variable that can be added to the “Braid of Time” concept in the Kite Framework is duration with a problem. If a problem lasts for a long time, it tends to have a magnifying element. The longer that the problem affects the system, the higher the difficulty in solving the problem. This comes from inertia and the general tendency of a system to modify itself to accept the problem as a constant and not as an exception.

An example of this was when the State of Indiana decided to use wood in its canal construction. Using wood as the primary construction material started out as an exception to using cut stone. This exception became the constant over time, so that eventually it became very difficult for the State of Indiana to switch to stone construction, since most of the canal maintenance system was designed around replacing wooden structures. Duration of a variable must, therefore, be taken into consideration with the Kite Framework.

The Kite Framework gives an overview of the various problems facing the Wabash and Erie Canal in the mid 1830s. None of the problems were insurmountable, but the widening gap between predicted total costs and actual costs were an increasing bother to the State of Indiana. Politicians at the state level, critical of the canal policy and alarmed by the out of control public works expense, started being heard in the state government. However, as long as easy cash flowed into the state, the canal management

system remained the same. The entire Indiana canal system was finally upset by external forces, not internal forces advocating change.

A study of the overall settlement pattern within the project area can continue at this point. Historic documents and archaeological research demonstrated how, before the canal was constructed, settlement within the project area was light and concentrated in small communities along the Wabash River. But the Kite Framework also included information on the State of Indiana's plan of linking existing settlements within the project area with the Wabash and Erie Canal, resulting in the canal being constructed parallel to the Wabash River. This politically-motivated emphasis on the river towns meant that future settlement along the canal was being influenced at the state-level before construction on the canal began. The state made this decision for the political and economic reasons stated in the variable categories previously mentioned.

By using the Kite Framework, the continuity between river communities and canal-related settlement can be followed through time. The Kite Framework also shows how intense economic interest in the future of the canal was causing many river communities to compete for a location on the Wabash and Erie Canal. It was expected by the citizens of these communities that the canal would lead to rapid growth for any canal town or hamlet. Investment and settlement in the project region, therefore, gravitated toward the canal for economic reasons at the state and local level. The canal, in this case, was constructed before demand, and therefore acted to organize settlement above the level of the original river communities.

Another crucial event listed above was the actual start of canal construction in Central Indiana. As each town along the route of the Wabash and Erie Canal was reached, the transportation landscape was filled in, new areas were opened to major immigration and economic exploitation, and central places expanded. Analysis of the Kite Framework again provides the temporal context, as well as the causality, behind the timing of settlement expansion in the Wabash Valley.

Archaeology can provide much data for this section, especially about the construction of the Wabash and Erie Canal. The canal construction camp site (Sunset Point) located in 1996, adds other variables to the Kite Framework that deal with labor relations with the State of Indiana and the local populations.

Local and State-Level, Social:

1. The Irish canal workers were provisioned with staple foods (corn, chickens, eggs, beef, pork), but supplemented their diet with wild foods (walnuts, deer, fish, rabbit). The cost of these staple provisions was undertaken by the state (Bischoff 1997 and 1999, Sunset Point Sections).

2. This wild food indicates foraging which would have brought the Irish into contact with local Carroll County people as the Irish workers ranged in the area. Racism toward the Irish at this time was high, and fear of the Irish laborer led to murder, armed conflicts, shootings and social agitation. United States citizens at the time, who were the descendants of earlier groups of immigrants, viewed the Irish of the 1830s as being barbarian savages who were of a different species than “normal people”, and who should not come into contact with local communities. It is surprising, therefore, that the Irish were allowed to freely roam away from the construction camp. This foraging must have been a product of the political power of the worker groups at this time period, since the State of Indiana also attempted to reduce or eliminate contact between the laborers and the local population (Bischoff 1997 and 1999, Sunset Point Sections).

3. Irish work camps were made up of families: men, women, and children. Several artifacts indicate the presence of women at Sunset Point, though no evidence of children has yet been found (Bischoff 1997 and 1999, Sunset Point Sections).

State-Level, Economics:

1. The State of Indiana also provisioned the Irish with utensils, plates, cups, and other domestic necessities. The some of the ceramics found at Sunset Point dated to almost ten years *before* construction began on the Wabash and Erie Canal. The ceramics were also odd-lots; few sets were found, and no table service pieces. This points to the state purchasing older items for the canal workers, probably of a second-hand or partial set quality (Bischoff 1997, Sunset Point Section).

2. Work camps were located near sites of particular construction difficulty. The Deer Creek Dam and Reservoir took over a year to complete, forcing the State of Indiana to construct a permanent “shanty” town along the canal. These shanty towns were complex in nature, with several structures, specialized cooking areas, and separate work areas (Bischoff 1996 and 1999, Sunset Point Section).

State-Level, Politics:

1. Various documents point to the Irish having power above their culturally-defined status of the time. The lack of labor resources in the west meant that the Irish had economic value and political clout that would not be experienced by the Irish outside of the canal construction area. This power led to better wages and the retention of certain rights that the State of Indiana attempted to eliminate, such as the daily alcohol allocation. It appears that the right to forage and to move freely were other rights demanded for by the Irish.

This archaeological evidence of how the Irish canal construction camp workers lived during the time of Wabash and Erie Canal construction wonderfully illustrates how archaeology can benefit the Kite Framework. The extra money spent by the State of Indiana in provisioning the Irish, and the amount needed to construct extensive shanty towns and provide basic household items must have been a tremendous unexpected sum. When added to the increased labor costs needed just to induce the Irish to work on the canal, and the other additional costs listed above, it can easily be seen why the State of Indiana was heading toward financial crisis over the cost of the canal. Archaeology, therefore, provided cultural and historical insights into this time period that increased the

overall accuracy of the Kite Framework, though it did not change the conclusions reached above.

Time Period – 1837-1846: Indiana Is Affected by the Great Panic of 1837.

Power during the initial phase of canal construction was located at the local level and in the economic variable category, with the local canal managers making the financial decisions and the State of Indiana paying for the canal. 1837 saw a shift in power to the National\International Level, with the financial crash that would be known as the Panic of 1837 causing the Wabash and Erie Canal a near-fatal blow. This financial crisis marks the next period of Indiana canal history.

The Wabash and Erie Canal in 1837 had been constructed as far as Delphi, Indiana, when the financial crisis brought work to a complete halt. The State of Indiana had run out of money, new loans could not be obtained because of the international financial crisis, and Indiana could not pay its small army of canal laborers. Work on the canal halted until the state could solve its financial problems, reorganized the entire public works management system, and restructured its external loans. The variables important during the Panic years were:

National\International-Level, Economics:

1. The Panic of 1837 caused economic instability throughout the Western world and across all scales.
2. The interest payment on Indiana's canal-construction loans was not paid in July of 1841, nor would payments again be made until 1846.

3. Investors around the world were anxious to get their interest payment so they could shore up problems elsewhere. National and international interest in Indiana's financial management occurred for the first time (Wallace 1963: 260).

4. Investors from the East Coast and England, once they became aware of the situation, were shocked by the fiscal irresponsibility-taking place in Indiana (Bigger: 439-44, and Fatout 1972: 106).

5. Investors demanded that the State of Indiana reorganize its canal administration along economical and more business-like lines, pay the interest payments, and become more responsible with the completion of the rest of the line (Esarey 1918: 532).

6. Investors understood that the State of Indiana land grant still existed as collateral, as did the finished part of the Wabash and Erie Canal. Investors still expected large tolls when the line was eventually finished (Esarey 1918: 532).

7. The State of Ohio was very slow in finishing their part of the Wabash and Erie Canal. The Wabash and Erie was in direct competition for labor and economic markets with other Ohio canals, so the State of Ohio saw no benefit in completing Indiana's canal with any great speed (Fatout 1972: 109). The canal from the state line to Toledo was finally opened in 1843.

8. The forced bankruptcy of the State of Indiana and the sale of the canal already completed would not have reimbursed the bondholders much of their investment money.

National\International-Level, Political:

1. The United States Government stayed out of the debate. The only influence was the general rule that Indiana had to complete the canal or forfeit part of the land grant (Documentary Journal 1839).

National\International-Level, Social:

1. Indiana citizens were angry with the state government over the state improvements mess.

2. Citizens and politicians were embarrassed by the whole situation and wanted to resolve the state's financial problems. National and international scorn was a great embarrassment.

3. There was general support to keep the Wabash and Erie Canal going and extend it further westward.

State-Level, Economics:

- 1. Problems in canal construction, overspending, unforeseen costs, and high salaries had reduced the remaining loan money available to the State of Indiana drastically.**
- 2. The interest payments could not be made from 1841 to 1846.**
- 3. The canal was not opened up on time, especially the crucial link with Lake Erie (Ohio completed its section of the Wabash and Erie Canal in 1843. The slowness of completion meant extra costs because of inflation and lost profits from tolls (Poinsatte 1869: 72).**
- 4. Laborers could not be paid. State-printed scrip were issued to cover expenses, but they were greatly devalued, not trusted, and created anger amongst those who received scrip instead of currency.**
- 5. A canal system was still seen as the best solution to expanding the economy and development of the state. Regardless of the state's financial problems, the Wabash and Erie Canal was still supported as the best solution to providing cheap transportation to most of the State of Indiana (Poinsatte 1869: 73-74, and Esarey 1918: 435).**

State Level, Politics:

- 1. Political turmoil from the Panic of 1837 and the financial situation engulfed the government of the State of Indiana. The loans, interest payments, and management of the entire canal system were hotly debated (Documentary Journal 1839).**
- 2. No alternative to the canal, however, could be decided upon and abandonment was not seen as a practical option as long as the canal could be salvaged.**

State-Level, Environment:

- 1. The State of Indiana was beginning to realize how expensive yearly canal maintenance costs were in the face of the harsh Indiana weather (Esarey 1918: 437).**
- 2. The weakness of using timber as a construction material was starting to show as wooden structures were swept away in spring and summer floods, and rotted beams were having to be replaced at an alarming rate.**

Local-Level, Economic:

1. Canal workers were angry at not getting paid for months. Vandalism and theft was rampant as workers did not get paid. The canal was not worked on through the entire year of 1839 (Way 1993: 210).
2. The Wabash and Erie Canal was operating successfully between Fort Wayne and Logansport, but the crucial link to Toledo on Lake Erie was not completed by the State of Ohio until 1843 (Fatout 1972: 109).
3. The Panic of 1837 reduced all economic activity along the canal, which depressed tolls, reduced traffic, and reduced local investment in the canal through secondary structures and markets.
4. Regardless of the failure of the State of Indiana financially, canals were still seen as the best alternative to wagon hauling or flatboats. Interest in a canal system, therefore, did not diminish on the local level.
5. Toll revenues and water rents from 1838 to 1846 increased each year.

Local-Level, Environment:

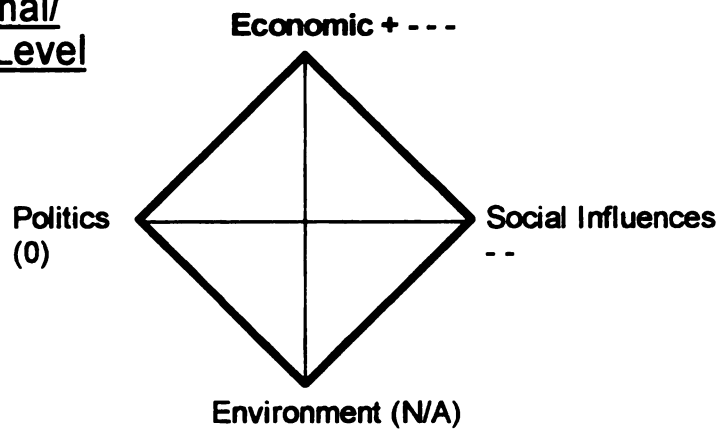
1. Normal Indiana weather required much local maintenance. Overall use -time of the canal was severely limited by freezing. The normal operating season of the canal was Late April or May through early November. Droughts in the summer could also close the canal, as could violent storms. Breaches from sudden flooding and the spring thaw caused the worst damage; the canal could be without water for up to a month while the embankments were repaired. Any delay caused crops to rot and merchandise to pile up in warehouses.
2. The canal was still relatively new and in good physical shape.

Kite Framework Analysis for the Time Period – 1837-1846.

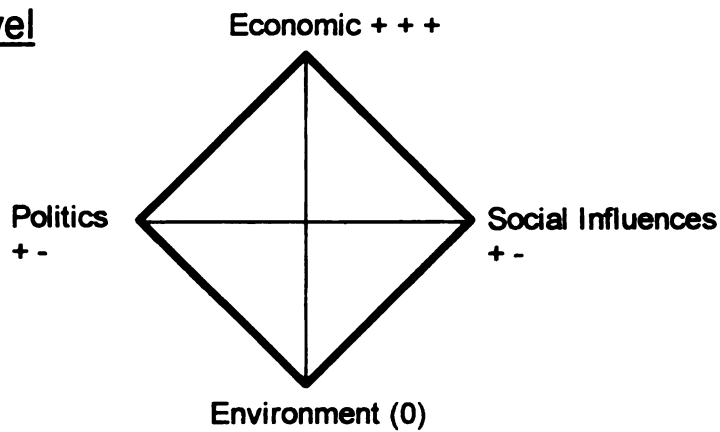
At this point, power within the Kite Framework shifted to the National\International scale, but remained in the economic variable category (Figure 70). The economic structure of the State of Indiana (and to a large extent, the rest of the Western world), and abandonment of the Wabash and Erie Canal seemed imminent.

Figure 70: Kite Model Graphic Representation: 1837-46

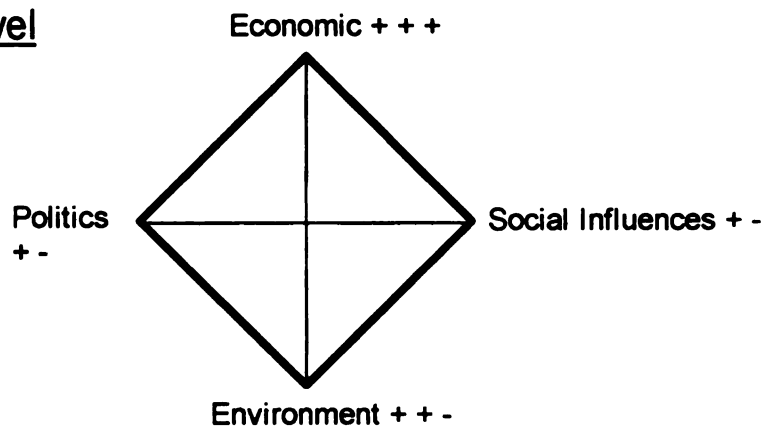
International/
National-Level



State-Level



Local-Level



Intense negotiating with lenders occurred, as did restructuring within the state government. The interest in the canal as an economic facilitator was still high overall, so economic goals at all levels still supported construction of a canal. No competitive alternative to the canal existed in the late 1830s and 1840s. Railroads were proving to be just as much a disaster during this period as canals; even more so because of the limitations of the new technology and the lack of sufficient iron suitable for rails.

Because power resided in the economic sphere, and no alternative to a canal existed, then, if compromises between lenders and the State of Indiana could be decided upon, the canal would continue. This result historically took place, as the State of Indiana agreed to restructure its entire canal management system by turning the Wabash and Erie Canal over to a board of trustees, reduce overall operating costs, especially by reducing administrative salaries, and better maintain the canal by keeping accurate financial ledgers. In exchange, the State of Indiana was absolved of half the bond money due, a restructuring of how the remaining debt was paid back, and enough additional loan monies to complete the canal to Evansville.

In the above case, no major resistance to the completion of the canal came from social, environmental, or political sources at any scale. People were angry, but they were angry toward the state government, not at the Wabash and Erie Canal as a viable system. They believed that the State of Indiana had let them down, not the canal. Once the State got its financial house in order, people at all scales were satisfied, and canal construction toward Evansville continued.

Power, therefore, shifted after 1837 from the State-Level political sphere to that of the International\National economic sphere. The State of Indiana went through with its

political and economic restructuring, but it took the later international economic recovery that allowed construction of the canal to continue. It should also be noted that good weather played a role in this recovery. If the region had been hit by a period of devastating weather, then the system may have been doomed regardless of restructuring. Positive factors from the environmental sphere, and positive interest at the local and state levels, therefore, facilitated the rescuing of the Wabash and Erie Canal in 1846.

A note at this point should be made. The power within Kite Framework during this time period was located in the National\International sphere. The Wabash and Erie Canal would have failed if the international depression had lasted longer than it did historically—no matter how much restructuring took place, or how much Indiana citizens still wanted a canal. It was the event of the economic recovery of the late 1830s and 1840s that allowed continued operation and construction of the canal, with the conditions of restructuring mentioned above. This note points out the importance of the *duration* of stress upon a system. The longer the stress lasts, the less likely that changes in other scales or variable categories can counter the stress.

The Kite Framework as a predictive tool examines first where the power was in the overall canal system (at the National\International scale and in the economic sphere). By looking at power and the other variables presented above, it can be determined that, if the State of Indiana can get its finances restructured to the satisfaction of the lenders (thus eliminating the negative variables at the International/National-Level), and if more money can be made available, then canal construction would continue. No other areas provided enough resistance to take power away from the interaction between the

National\International lenders and the State of Indiana. The overall strength of the economic backing of the canal also would aid a positive outcome.

It is at this point that a comment can be made about the Kite Framework as a predictive tool. Intuitively, it is difficult at certain points in time to predict success or failure of the canal based on the variables available. This would be true of many situations that the Kite Framework is applied to. In some cases, not enough information is available to make a prediction, or the information does not point to a clear predictive outcome for a problem. This in itself may point out a weakness in the Kite Framework; that it is much easier to predict future problems which a system will face from described variable categories than it is to predict decision-making avenues to solve these problems. The input of additional information may solve this problem and clarify decision-making resolutions.

An interesting note from this section deals with settlement and system chaos. As can be seen above, some events do not lead to major changes in settlement pattern, or are too short in duration to cause change. The Panic of 1837 and its aftermath cause cataclysmic events at all three scales examined, and in most Kite Framework variable categories, but the fact that canal construction was continuing after only a year hiatus meant that overall settlement patterning was relatively unchanged.

What this signifies is that, central place theory analysis, because of its diachronic nature, would be less susceptible to historic skew caused by social and cultural turmoil than that expressed by the Kite Framework. One can conclude that, what the Kite Framework gains in understanding of causality and temporal change, it loses in

understanding larger, more fixed social patterns; patterns that models, such as central place theory, are better for examining.

Time Period – 1839-1855: The Wabash and Erie Canal as an Economic Success.

This time period was the high point for canal operation in Indiana. Tolls generally increased each year, and economic growth along the canal was tremendous. The long period of success from 1846 to 1855 for the Wabash and Erie Canal was highlighted by the following variables:

National\International-Level, Economic:

1. Internal improvement loan interest payments were being made by the State of Indiana (Documentary Journal 1851: 102).
2. Though profits were not as high as expected, the chance of at least recovering the investment in Indiana's public works over time was still good (Fatout 1972: 146).
3. The world was in a period of economic recovery. The highly speculative period of the early 1830s was replaced with a long period of slow growth and more cautious planning (Goodrich 1969, Chapter 5).
4. Railroad technology was still being developed. Iron production for rails at this time was not up to needed capacity; costs were still high, and the quality of the iron was wanting (Esarey 1918: 718-719).

State-Level, Political:

1. Management was restructured and streamlined. Regional superintendent positions were created, and more realistic administration procedures were put forth (Barnhart and Carmony 1954: 335).
2. Experience with operating the canal led to greater efficiency, predictability, and better informed decision-making.

3. Politicians supported the canal; no dissent or competing voices threatened its completion south of Delphi to Terra Haute, Indiana (Documentary Journal 1845).

4. The decision to extend the canal south was made so that the federal land grant was not lost.

State-Level, Economic

1. Tolls on the canal were healthy and interest payments were made on time, though the level of profits originally expected was not achieved (Documentary Journal 1847).

2. The canal had no competition and carried manufactured goods, passengers, and bulk items (Poinsatte 1969: 220-222).

3. Winter travel still proved to be a severe limitation for the canal.

4. Maintenance costs were manageable.

5. The canal provided cheaper transport than roads or rivers.

6. The opening of the canal to Toledo, Ohio, in 1843 created a water link from central Indiana to Lake Erie, and from there, to the East Coast (Fatout 1972: 109).

7. Tolls from immigrants coming west stimulated the finances of the canal and added labor to the state (Benton 1903: 97).

8. Merchants viewed the canal as essential to opening markets, keeping transportation costs down, and to providing access to raw resources and finished goods.

9. As secondary construction increased, stimulated by the canal, water rents were taken from mills operating along the canal. These mills used water from the canal to power wheels, then released the water either back into the canal or into a local river system.

State-Level, Environment:

1. The environment was mostly calm at this period, with no larger weather cycles impacting the canals (See Documentary Journals for the years 1846 to 1855).

2. Yearly attrition, though heavy, was manageable and eventually adapted to by the State of Indiana.

State-Level, Social:

1. The government and people of the State of Indiana backed the canal and supported its use and extension south (Documentary Journal 1845).

Local-Level, Economic:

1. Tertiary institutions and businesses linked to the canal thrived. Warehouses, mills, stockyards, hotels, public wharfing, and manufacturing buildings were all constructed orienting on the canal (Cottman 1907).

2. The canal was bringing in many immigrants, as well as new businesses shifting west (Benton 1903: 97).

3. Canal lot prices within urban areas were high and maintain their value (see Lafayette, Indiana tax records for this period).

4. New canal towns and hamlets were platted at equidistant intervals between pre-existing canal towns. Linear central places start to fill in along the canal as market central places are exploited (Poinsatte 1969: 221).

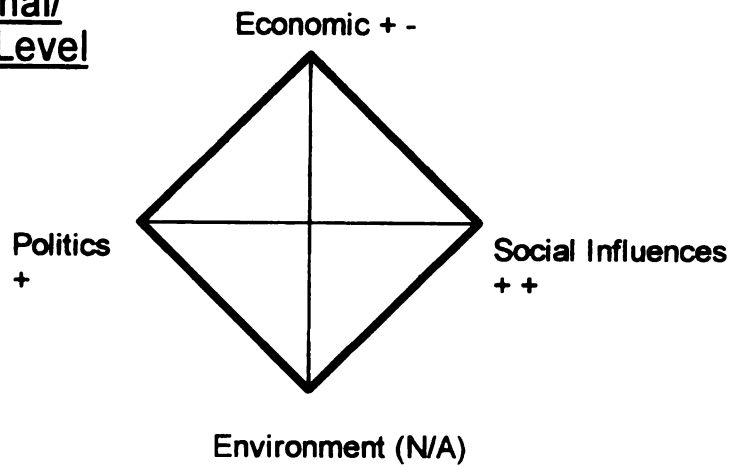
5. The canal was still seen as the only source of cheap bulk transportation, especially for agricultural goods and raw resources.

Kite Framework Analysis for the Time Period – 1846-1855.

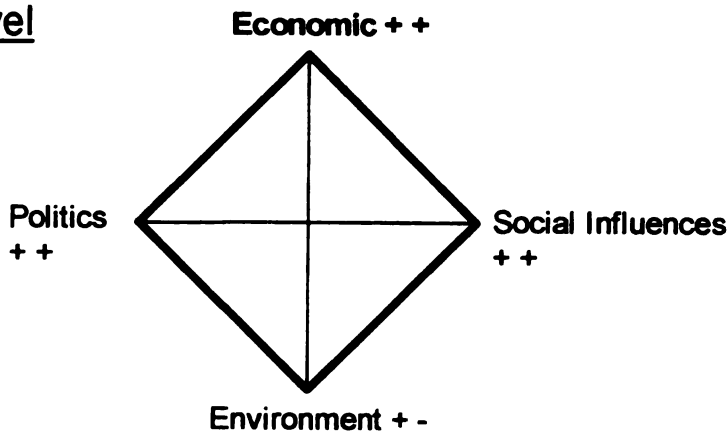
The Kite Framework demonstrates why historically this was a period of stability and profit for the Wabash and Erie Canal, with no thought of closing the system or eventual failure (Figure 71). The environment was stable overall and factored into the yearly maintenance cycle, tolls could cover repairs, no social issues went against the canal as a transportation system, the canal was popular politically and started to be seen as a success, and financially the canal was making money, though not as much as had earlier been expected.

Figure 71: Kite Model Graphic Representation: 1846-55

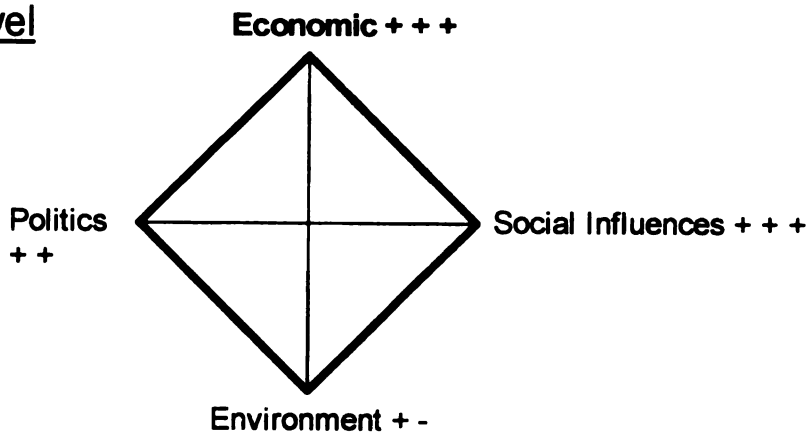
International/
National-Level



State-Level



Local-Level



This period of Wabash and Erie Canal history also demonstrates the ability of the Kite Framework to predict continuity as well as change. No great conflicting stresses are apparent in the variables described above. Conflict between the four major variable categories and the various levels of study is at a minimum. The environmental variable has finally been respected by canal officials and engineers and factored into yearly operations. Most importantly, no competition exists for the canal as a means of transportation. Intuitively, the canal should have been a success during this time period, with no visible reason for closing the system.

This time period of successful canal operation and construction illustrates best how the Kite Framework can explain settlement in the project area. The area in question had little population before canal construction began, but after construction local populations expanded greatly. The City of Lafayette increased in population from 1000 to 6000 citizens between 1840 and 1860. Other areas had equally dramatic increases in population. The population beyond the original river communities was therefore greatly influenced by the canal. The settlement patterns created by the economic influence of the canal would later be exploited by railroads. At the same time, they bounded the railroads on where they could be economically placed upon the landscape of Indiana.

The Kite Framework also explains the creation of additional communities on the landscape along a major transportation system. Granville, Americus, and several hamlets were spaced along the canal to take advantage of the economic pull of the transportation system. The economic dominance of the canal at this time, and its influence on social organization and settlement growth explains why these smaller communities developed where they did.

Archaeology in the project area was extremely useful for examining the relationship between the environment and canal construction. This subject will be especially useful for all the following time period variable statements that deal with the affect of canal maintenance on the health of the canal.

A number of canal features were examined from 1993 to 1998, with several results emerging:

1. Wooden structures that were not submerged and sealed by clay puddling and water immersion were rapidly eroded by exposure to the elements. Documented contract reports refer to frequent replacement of lock gates, wooden abutments, and bridges, but do not reveal the full extent of the maintenance task. Hundreds of wooden culverts, guard locks, etc. used wooden construction materials. This daunting task of replacing wooden features during normal maintenance cycles must have been an incredible strain on the yearly budget of the Wabash and Erie Canal.

2. Replacing canal features was a major undertaking requiring actually closing the canal, removing a section of towpath, back berm, and channel for repairing or adding a new culvert or other canal feature, then rebuilding the whole structure. Archaeological work has demonstrated the truly massive nature of canal features. The Wea Creek complex—with a two span aqueduct, a ten foot lift lock, lock-keeper's house, and several hundred feet of feeder canal and improved embankments – is an excellent example of one of the more complex canal features that had to be maintained by the State of Indiana (as opposed to two rows of iron rail for the railroad). Any damage to a section of canal required a large investment in laborers, materials, and time to repair. Conversely, a damaged railroad section took less effort and time to repair. This comparison demonstrates an advantage of the railroad over the canal that is not mentioned in historical documents or books on the subject.

3. Most features that used stone in their construction still had the stone work intact and useable after 120 years of weathering. The choice to construct the canal originally with wood and not stone, archaeology has shown was a crucial event in the history of the Wabash and Erie Canal; an event which would later lead to the demise of the canal as a transportation system.

4. Sunset Point, the canal construction camp, had demonstrated that the construction of the canal radically changed water flow patterns in the region. This subtle change is not found in any document, but logically fits in with why the State of Indiana had so many problems with maintenance after the canal was constructed. At Sunset Point, water flow patterns shifted from free-flowing movement during flooding which

deposited silty-sand on the floodplain, to a more silty deposition which indicated a lack of water movement. This backing up of water caused many problems for the canal, from increased pressure against earthen walls, to a build-up of ice in the winter.

5. Archaeological survey has demonstrated that canal construction followed old dry river beds and pre-existing lowlands in the attempt to keep costs down. Within the project area, this was especially true around Delphi, Indiana. An ancient cut of the Wabash River was followed, making the canal wider in that area. A natural stream bed was also expanded and improved to make a mill race from the Delphi Paper Mills located on the canal. This use of pre-existing stream and river routes for the canal and mill support features lead to an unforeseen problem for canal operations. Most dry and low-volume stream beds are only filled during flooding periods. By using these landscape features for the canal, the engineers and surveyors did not realize that, when floods eventually did occur, the normal flow of excess water would be directed straight at the canal. Seldom were water control features built to divert this floodwater, at least until after the first damaging flood was experienced. The report of the Chief Engineer mentions several times the construction of tumbles around locks and other canal features to counter this pressure problem. One such lock with this feature was Lock #33 immediately south of Delphi and in the project area.

Archaeology, therefore, has demonstrated how the interaction between the canal and the environment was adverse over the life of the Wabash and Erie Canal. High maintenance costs from the stress between environment and canal would later be a crucial factor in the death of the Wabash and Erie Canal. In this case, archaeology has strongly supported Kite Framework interpretation that deals with the environmental impact on the canal. Overall, the Kite Framework interpretation dealing with the environment is made more plausible because of archaeological data.

Archaeology also gives insights into the international economics of the canal. Few documents dealing with the Wabash and Erie Canal give examples of how far the economic system that incorporated the canal reached. The discovery of oyster shells from the Atlantic Ocean at the Lock Keeper's House near Delphi, Indiana, and coconuts and peanuts at the Lafayette city wharf give an insight into the ability of the canal, even

in its short life, to connect the people of Central Indiana to a much greater economic system.

Economic issues were also dealt with by archaeology in overall settlement patterns. Commercial structures, it was determined, were located along the canal. However, only specific types of structures were directly on the canal, others were located elsewhere. Archaeology and historic documents indicate that warehouses, mills, and large bulk industries (such as bricks, slaughterhouses, and lime kilns) were located on the canal to take advantage of immediate on and off-loading and water power. Retail outlets, light manufacturing, and non-bulk manufacturing (such as wagon-making) were not located on or near the canal. Commercial activity near the canal, even before the onset of railroad competition, was primarily involved in warehousing, milling, and bulking. It can be seen from this that, once railroad competition began, it was much easier for the manufactured goods market, which relied on retail outlets and dry goods stores, to switch to railroads than it was for bulk-oriented commerce.

Ironically, some of these industries negatively affected the transportation system they depended on. Archaeology found that the lime kilns north of Delphi, Indiana, were producing so much sand and gravel from the lime operation that the business was silting up the canal as normal run-off washed particles into the canal channel. There are other accounts of industries located on the canal fouling or silting the canal water they depended on. Slaughterhouses were especially a problem for normal canal operation.

Another variable dealt with by archaeology was the affect of the canal on local economic infrastructure. The archaeological study of the Lafayette city canal wharf revealed eight city blocks of complex wharfing. Historic documents indicate wharfing at

other locations, as well as basins, commercial wharfing along mills and industries, and short side-slips for commercial buildings located on the canal. All of these modifications were at the expense of the town or industry located on the canal. This economic investment in the Wabash and Erie Canal demonstrates the high value of the canal to local economics.

Archaeology, therefore, adds to the overall Kite Framework interpretation by showing how some industries negatively impacted the canal, thus adding to the overall stress level of the canal, and how commercial activity was oriented toward the canal. This commercial activity, however, was mostly of the bulking nature even before railroad competition took away the manufactured goods market from the canal. Archaeology also showed how the canal led to the opening of international markets for the people of Central Indiana.

Time Period – 1852-1860: Railroad Competition Begins.

The 1852 to 1860 time period signaled another major change for the Wabash and Erie Canal. Railroads start to be developed in the State of Indiana, and the economic and political strength of the canal starts to decline. This time period was influenced by a number of new variables:

Federal\International-Level, Economic:

1. Railroads could operate year-round.
2. Railroad technology was improving, with the cost of construction and operation of railroads decreasing.

3. Innovations in iron-making allowed railroads to be safer, less costly to build, and more dependable.

4. By 1857, the Wabash and Erie Canal was not making interest payments on the debt due the bondholders (Fatout 1972: 161).

5. By the end of the 1850s, investors were unhappy with how the Wabash and Erie was being operated; they wanted more profits to make up for their large investment.

6. Rothchilds and Barings of London complained to the government of the State of Indiana of the practice of granting state railroad charters to railroads competing with the canal.

State-Level, Political:

1. The state legislation allowed railroads to be constructed perpendicular to the existing canal system.

2. Politics dealing with transportation had long been divided into railroad and canal factions. The railroad faction dominated by the 1850s, believing that railroads were the key to expanding the economy of the State of Indiana.

3. The State of Indiana no longer had a political link to the canal.

4. The government of Indiana did not want the canal back, nor did they want to assume the bonded debt that it represented.

State-Level, Economic:

1. Politicians and influential merchants were realizing the superior economics of the railroad.

2. Part of the federal agreement to subsidize the State of Indiana for its original canal construction projects was that the entire canal would be completed as initially proposed. This forced the canal trustees to complete the canal south to the Ohio River, even though railroad competition made canals more and more obsolete through the 1850s.

3. The trustees were being pressured by the bondholders to make interest payments.

4. Several factions were contesting at this period of time over the future of the canal. These factions involved: state politicians who felt obligated to pay back canal investors, politicians who wished to totally absolve the state of canal responsibility, by

claiming the state was not obligated to earlier government decisions, politicians who backed railroads and who wished to end the canal as a means of transport, and politicians who supported the continued use of the canal (Fatout 1972: 164).

5. Federal land sales along the canal were still generating profits. These profits, however, were ordered to be applied to the bondholder debt instead of using them for canal maintenance and expansion (Documentary Journal 1859).

6. Tolls on the canal paid for maintenance of the canal, but could not make interest payments.

7. Yearly maintenance costs were much more than expected for the entire system, and higher than usual in the late 1850s (Documentary Journal 1859: 279).

Local-Level, Social:

1. The canal still had an edge socially over the railroad in central Indiana because of time depth—more was invested in the infrastructure of the existing canal than in railroads. Political and economic relationships between people at all levels had become oriented toward operating with the canal. Shifting to railroads would disrupt existing economic administration systems and the general routing of goods. Overall, the economic structure along Indiana's canals from the 1840s had become attuned to the cycle of the canal. All of the above led to a resistance to railroad construction and use.

2. Passenger travel quickly shifted to railroads.

3. Merchandise hauling slowly shifted to railroads.

Local-Level, Economic:

1. Merchants were interested in year-round shipping ability and lower transportation costs, both of which could be provided by railroads (Documentary Journal 1856: 127).

2. Local economic infrastructure, however, was designed to facilitate using the canal as the major means of transportation.

3. Shipping points, warehouses, and agricultural bulking stations were all located along the canal (Documentary Journal 1856: 127).

4. Shipping was shifting toward railroads, especially manufactured (high toll) goods.

5. Low toll bulk goods were still shipped on the canal.

Local-Political, Politics:

- 1. Local political infrastructure was directed toward canal traffic.**
- 2. Toll officers, canal administrators, canal engineers, etc. were all in place and had been working with local government for up to several decades, depending on the canal section.**
- 3. Local laws were designed to facilitate and protect the smooth operation of the canal as opposed to other interests.**

Local-Level, Environment:

- 1. A number of years occurred with greater than average floods in the late 1850s.**
- 2. Summer droughts occurred in a number of these years.**
- 3. Cholera epidemics struck the canal corridor towns; closing traffic and killing canal workers (Esarey 1918: 439).**
- 4. Maintenance costs were much higher in the late 1850s than at any other time for the canal.**

At this point, two distinct parts of the Wabash and Erie Canal must be dealt with separately. The above variables only applied to the northern link of the canal, from Terre Haute to the Ohio border. The southern link, completed in 1853, from Terre Haute to the Ohio River, had several distinctly different variables, which are presented below:

Local-Level, Environment:

- 1. The southern environment was much harsher for canal construction than in the north. Porous soils, swamps, and the lack of stone resulted in construction being more difficult. There were also frequent summer droughts, and a general lack of water that meant expensive reservoirs had to be constructed (Esarey 1918: 442).**

Local-Level, Social:

- 1. The general belief of this time was that rotting wood in standing water (such as a canal) caused disease.**
- 2. Organized vandalism to close the canal began for health reasons based on the fear of disease. Canal reservoirs were the most frequent target of these vandals (Holliday 1929: 90-100).**
- 3. Anger also emerged at the lack of success of the canal as sections were opened south of Terre Haute.**
- 4. No social tradition and local involvement with the canal occurred in the south as it did in the north. The canal was used for too short a period, and railroads in the area shifted the general economic infrastructure away from the canal (Fatout 1972: 157).**

Local-Level, Economic:

- 1. There was little use of the canal overall, mostly because water could not be kept in the canal due to environmental conditions and vandalism, and because maintenance needs could not be met. Few boats meant few tolls were collected (Fatout 1972: 160).**
- 2. No infrastructure was developed centering on canal traffic as it was in the North.**
- 3. Low tolls and railroad competition made the canal an undesirable investment in the southern part of the state.**
- 4. Periodic guerrilla attacks also dissuaded investors in canal-based economic development (Holliday 1929: 90-100).**

State-Level, Economic:

- 1. Land sales for canal lands were sluggish and profits were not matching expectations.**
- 2. Profits from the northern link were used to keep the southern link open.**

Kite Framework Analysis for the Time Period – 1852-1860.

Power in the Wabash and Erie Canal system during the prosperous 1846 to 1855 time period remained in the economic sphere. Neither the State of Indiana nor the canal trustees were interested in reorganizing the way the canal was administrated because investors could still be found, competition was low, and toll profits were increasing. Economic infrastructure along the canal and throughout the Wabash Valley was still oriented toward the canal. The environment was relatively calm and predictable. The canal was still physically sound and well maintained. The economics of the canal were healthy, though the incredible profits needed to pay off the borrowed construction capital seemed to be always just out of reach.

In 1852, the great internal transportation battle in the State of Indiana began. Railroads fought the Wabash and Erie Canal for economic dominance. Power remained in the economic sphere, but shifted to the local level as the canal competed directly with perpendicular railroads, and later parallel railroads.

The interest payment crisis of the late 1850s, when canal tolls dropped below maintenance costs, brought national and international economics again to the forefront; though it can be seen that the environment added unexpected stress to the system which sharpened pre-existing problems. Power returned to the International/National-Level as bondholders sought to get a partial return on their canal investment. All of these canal issues also served to polarize and intensify the railroad-canal competition.

Use of the Kite Framework, when examining the late 1850s, can easily predict what would happen in the southern part of the canal system. The southern link of the Wabash and Erie Canal, facing little social support, poor economic results, high

maintenance costs, almost no political backing at the state and local levels, and with no pre-existing canal-based economic infrastructure, would be expected to close (Figure 72). The southern link was formally closed by the bondholders in 1859, and closed permanently to traffic soon after.

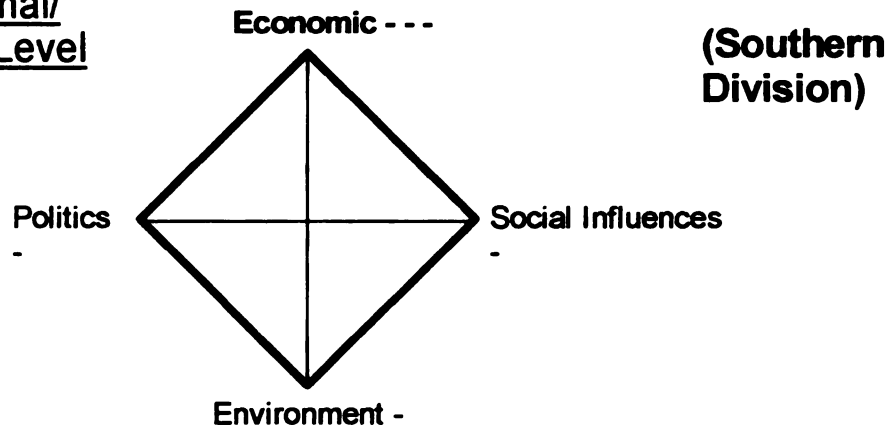
The northern link was more difficult to predict based on available information. The variable categories were too even to predict an outcome for the Wabash and Erie Canal; whether it would be closed or not (Figure 73). The Kite Framework as an explanatory tool was wonderful at explaining why the canal links failed when they did, but the Kite Framework was more difficult to use when attempting to predict what would happen next at a given point of time. This project has been attempting to use the Kite Framework in both ways to evaluate the Framework's overall usefulness.

The human element appeared to be the hardest to account for. Human beings make decisions within each of the four Kite Framework variable categories (politics, social, economic, and environmental). Most decisions follow distinct patterns; past behavior is mimicked in the present and the future. At key times, however, circumstances demand new ideas or directions of decision-making. If changes are made, the system may survive; if changes are not, then the system will fail.

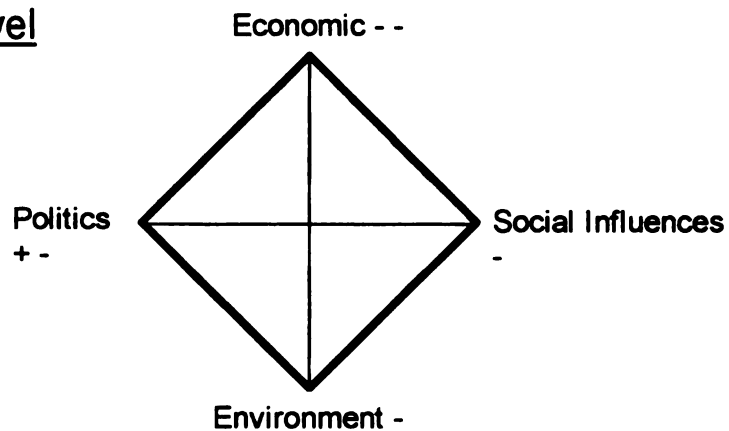
The situation for the southern link was such that the vast majority of possible decisions that the canal trustees could make would all lead to failure of the system. A rational result would, therefore, be to close the southern system so as to relieve some of the pressure on the more prosperous northern link.

Figure 72: Kite Model Graphic Representation: 1852-1860

International/
National-Level



State-Level



Local-Level

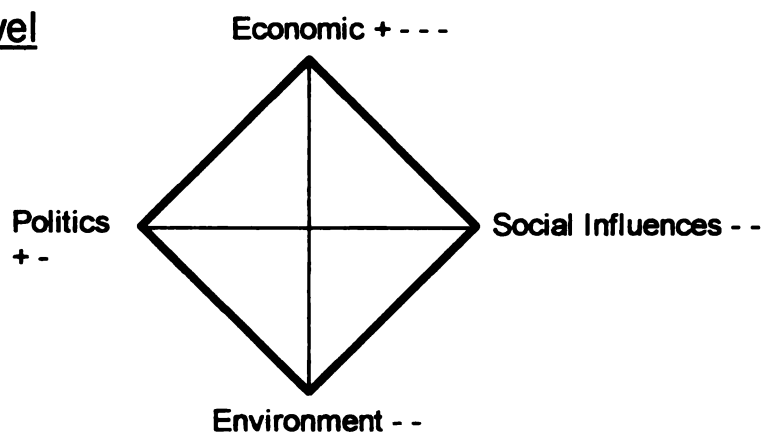
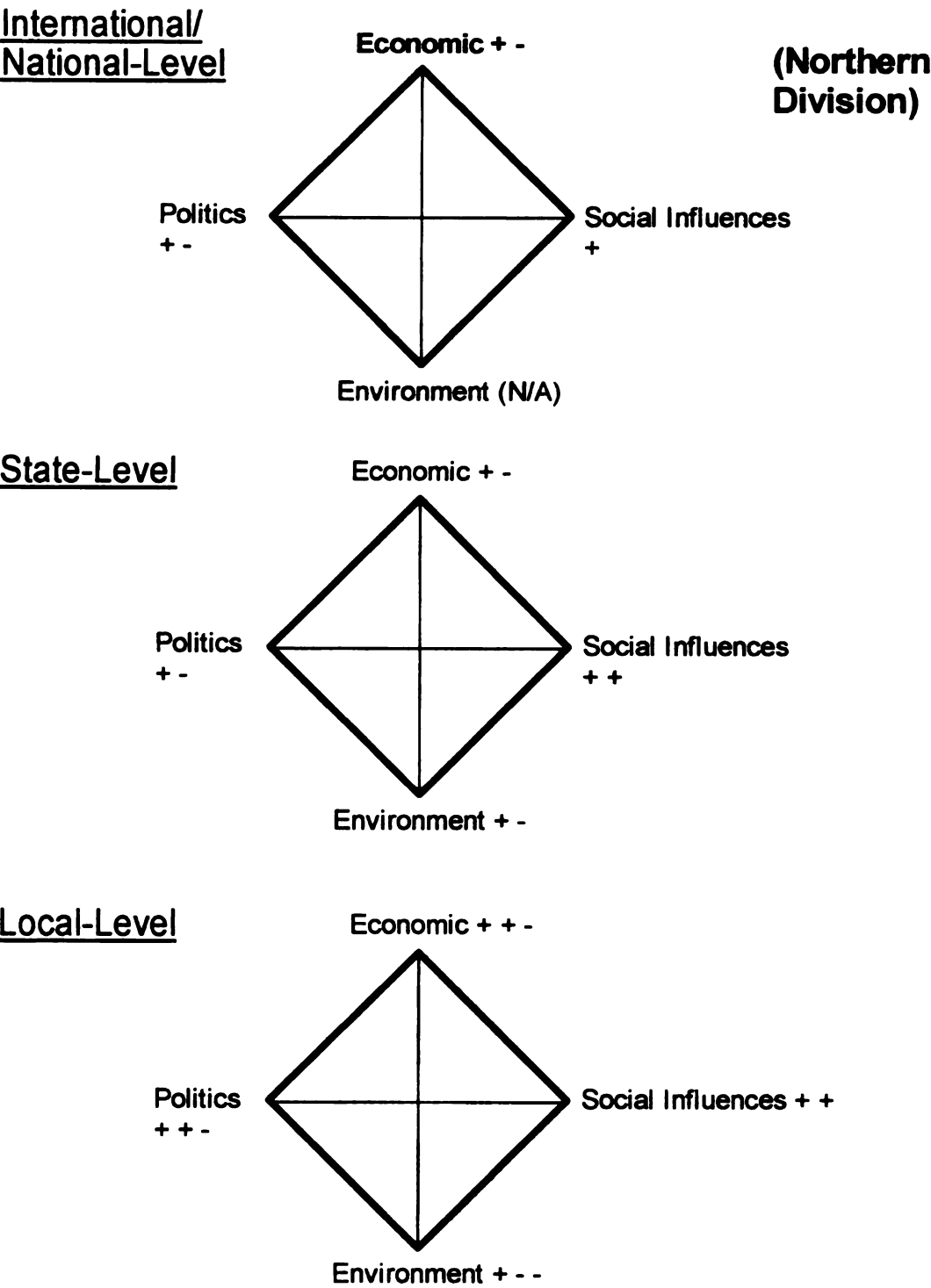


Figure 73: Kite Model Graphic Representation: 1852-1860



As long as basic rational thought was followed, the Kite Framework could come to this conclusion as well. An argument could be put forth that the decision to keep the Southern Section open at the expense of the Northern Section for several years was an irrational decision.

Rational decisions are not always made by human beings. Irrational thought could be a monkey wrench dropped into the mechanisms of the Kite Framework. The larger the system studied by the Kite Framework, the less likely that individual irrational thought will prevail over rational thought. Also, this irrational nature, if identified, may have patterns and predictability, which can be included into the variable categories of the Kite Framework.

The Kite Framework can identify areas, which need to be addressed by a system for the system to survive. For the northern link, the canal trustees needed to:

1. Come to an agreement over the payment of interest once maintenance costs became greater than yearly receipts.
2. Deal with railroad competition.
3. Decide how the political structure of the canal should be after 1860.
4. Decide how to appease the bondholders, and how to pay for the increasing maintenance needs of the canal.

The Kite Framework can intuitively predict that if these issues could not be resolved, then the northern part of the canal system would also fail. If these issues could be resolved, then enough people with social, political, and economic interests in the canal would support the continued existence of the Wabash and Erie Canal.

The canal trustees historically were able to resolve the historic issues presented above. The trustees decided to:

1. Sacrifice the southern link of the canal, thus freeing toll money to pay for maintenance on the northern link.

2. Restructure the administration of the Wabash and Erie Canal so that it was operated by independent companies. The Northern Section was maintained by the Wabash Canal Company. This decision made the operation of the canal a private business venture instead of a joint trustee-State of Indiana venture. It was assumed by the bondholders and the trustees that a private company would be more interested in improving canal administration and operation, and would reduce overall costs. In the long run, it also allowed the canal trustees to distance themselves from the canal and its monthly operation and maintenance.

3. The canal trustees and bondholders were unsuccessful in stopping the state chartering of railroad lines parallel to the Wabash and Erie Canal, but rate cuts on the canal did much to make the canal more competitive.

4. Land sales were no longer used for canal maintenance and instead went directly to pay off the bonded debt.

5. The elimination of the Southern Division allowed canal engineers to concentrate on the maintenance of the more prosperous Northern Division.

The Wabash Canal Company in the 1860s was in charge of the Wabash and Erie Canal from Terre Haute to the Ohio border. The administration restructuring and elimination of the Southern Division gave the canal a period of financial and economic stability. The primary focus of the canal became, once again, economic in nature.

Settlement in the Wabash Valley during this time was still oriented toward the Wabash and Erie Canal. The railroad had not yet influenced the overall settlement pattern of the region, though major canal towns were becoming intersected by railroads perpendicular and parallel to the canal. Political and administrative problems with the canal would not have affected the overall settlement pattern along the system. Change in settlement, therefore, would not be expected at this time, except for infrastructure created along new railroad lines.

Time Period – 1860-1867: The Wabash and Erie Canal Declines.

The time period of 1860 to 1867 (which is the canal-era period dealt with in most of this project) saw the Wabash and Erie Canal lose most of its customers to the superior railroad transportation system. Bulk agricultural products and raw materials became the only major users of the canal. Several important variables occurred in the period of 1860 to 1867.

Federal/International, Political:

1. The bondholders actively petitioned the State of Indiana throughout this time to make good on at least a portion of the original loans (Documentary Journal 1862: 379). Their argument was that the granting of parallel railroad charters had nullified the 1847 Butler Bill which decided the bonded debt of the canal.

2. As long as the canal remained stable, the bondholders were not involved in the yearly administration and maintenance of the canal.

National /International, Social:

1. The bondholders appealed to the social good will of the State of Indiana to pay back the bonded debt. Their pleas, however, fell on deaf ears. (Documentary Journal 1859).

2. The United States as a whole was moving toward having a national railroad network. There was, therefore, pressure to link canal cities with the rest of the country by rail.

National /International, Economic:

1. The bondholders were interested in getting the most money they could out of the canal. The canal overall through the 1860s did make a yearly profit, therefore the bondholders were still willing to back its continued existence (Documentary Journal 1862: 379).

State-Level, Economic:

1. Tolls were primarily generated by bulk goods. Tolls on bulk goods were less than on finished products, but the canal still retained an important economic role within the communities of the Wabash River Valley, and hence in the State of Indiana (Documentary Journal 1862: 383).

2. Profits continuously declined or remained the same for each of the years during this period. The railroad began to siphon off some bulk goods traffic at this time, but not enough to kill the canal (Documentary Journal 1863: 465).

3. Tolls paid for maintenance. Tolls generated at this time were robust for the canal, but the wooden nature of canal features was requiring high rebuilding costs.

4. Land sales slowed and profits from land sales fell as less desirable lots were sold.

5. Railroad routes remained perpendicular to canal traffic until 1856, when direct parallel competition began (Documentary Journal 1862: 379).

6. Local economic infrastructure only slowly shifted from the canal to railroads as the primary transportation route (Fatout 1972: 170).

7. The overall abundance of agricultural goods during this time period meant that there was always too much business for the regional railroads to handle. The canal, therefore, was extensively utilized (Documentary Journal 1867: 465).

State-Level, Political:

1. Railroad supporters continuously call on the state government to grant railroad pathways parallel to the state canals, eventually succeeding so that direct competition began in 1856.

2. Canal proponents diminish as canal profits fell and railroads become more economically dominant in the State of Indiana and in the United States in general.

3. The State of Indiana increasingly wanted to end the bonded debt issue (Fatout 1972: 169).

State-Level, Social:

1. The nostalgia of previous years for the canal diminished with time, but as long as the canal operated efficiently, it was viewed as being a benign feature of the landscape.

2. The closing of the southern link ended most of the social outcry against the canal in the state.

Local-Level, Social:

1. The canal was still a focus of social interaction—pleasure boats and short route passenger ships – and many canal town residents had a long history of the canal being part of social and economic life. As long as the canal was well maintained, it was supported socially. The railroad was new, and to many, an innovation to be feared.

2. The canal still had a positive local impression, without the stigma of being a failed “white elephant.” This attitude did not, however, carry upward in scale. At the highest geographic level, that of the National/International level, the canal was viewed as a major failure.

Local-Level, Economic:

1. Mills in each town relied on canal water. It was in the interest of canal towns, therefore, to keep the canal open and the canal pathway maintained.

2. Agricultural goods and other bulk items were still shipped cheaply on the canal.

3. The canal followed a consistent timetable and stayed open in a predictable fashion. The economic rhythms of the canal towns incorporated canal transportation.

4. Local pleasure boat and social event industries still utilized the canal.

5. The canal was a source of good local city-to-city transportation along the canal line, whereas the railroad did not have many stations along its line. Railroads did not connect all towns at this time either, making canal travel between Wabash Valley towns still desirable.

6. Roads fed into the canal for bulk items easier than they did the railroad. Railroads did not have an economic infrastructure that oriented the local economy toward it as the primary transportation system. Many stockyards, stations, and support services had to be built before the railroad could become locally dominant (see Tippecanoe County maps for 1866 and 1878).

7. Railroads did not serve smaller customers, and had not developed a transportation system other than bulking in the major cities along the route, which was cost-prohibitive to many local farmers.

8. There was a lag time of almost ten years before economic infrastructure in the form of warehouses, elevators, passenger stations, and industries located along the railroad, except for where the railroad intersected pre-existing towns and cities (see *Hypothesis 3* analysis section).

Local-Level, Politics:

1. Mill owners had much local influence and political power at this time.
2. Many merchants and larger landowners still used the canal and backed it politically.
3. Railroad backers had not yet dominated local politics. They could receive route grants from the state for between-city rail lines, but had not yet fostered ties with the local populations along the route.

Local-Level, Environmental:

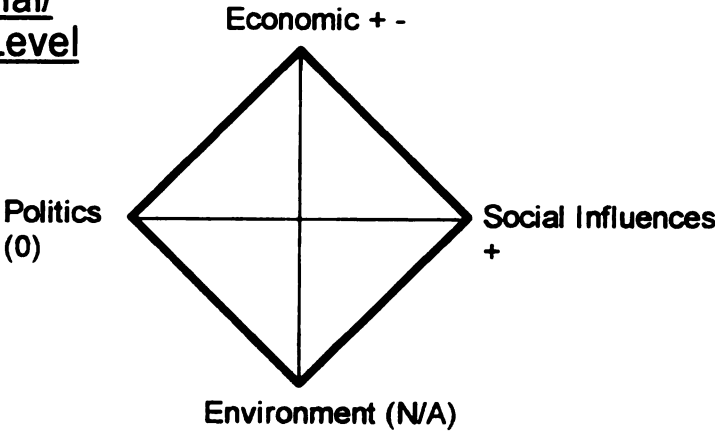
1. The weather remained constant and predictable, without the disastrous years that put pressure on the canal system in previous decades. Local maintenance costs were therefore manageable.
2. A limiting factor at this time was the wooden and earthen construction of the canal, which caused expensive major rehabilitation of canal features necessary throughout this time period.

Kite Framework Analysis for the Time Period – 1860-1866.

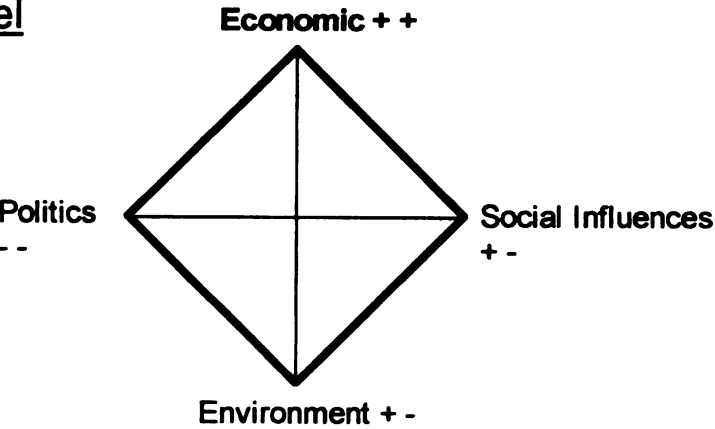
Intuitively, viewing the Kite Framework variables, it is easy to see why the canal survived during this period (Figure 74). With no major crises, a predictable environment, and no added unexpected stresses to the canal system from variable categories other than economic, the canal could continue to survive in the face of railroad competition. This survival came from the long-developed canal-oriented local economic infrastructure and the canal's ability to ship bulk agricultural goods. Social forces supported the canal at the local level, which also aided canal survival.

Figure 74: Kite Model Graphic Representation: 1860-1866

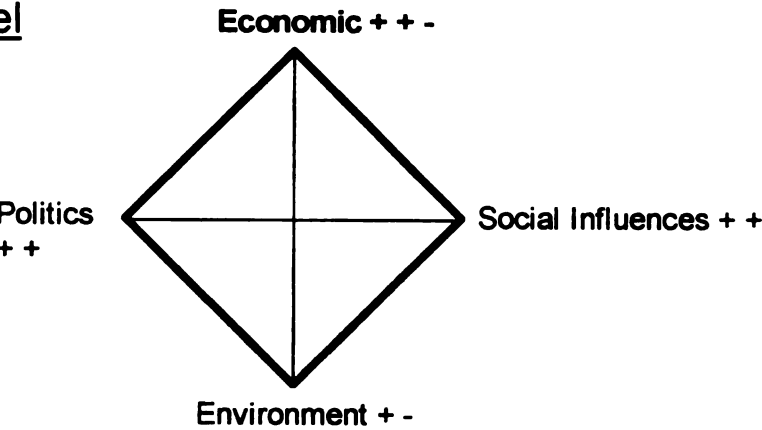
International/
National-Level



State-Level



Local-Level



Politics followed this pattern as well, though state pressure to allow for parallel railroad lines pointed to problems in the future. Economically, the canal still had a significant state and local use, as a primary route for bulk goods, especially at the local level. Power at this time shifted from the political sphere back to economic interests. As long as the canal played an economic use and no other major concerns had to be addressed, economic issues alone would determine whether the canal survived or expired.

The Kite Framework as a predictive tool would indicate that the canal would survive as long as the above variables stayed the same. Several weak areas in the canal system can also be identified by the Kite Framework.

1. Railroad competition. Parallel routes added stress to the canal transportation system.
2. Bad weather could collapse the system of tolls being able to pay for maintenance. As the yearly input of land sale moneys dwindled, bondholders would receive no yearly payment on their investment.
3. As railroads built economic infrastructure and parallel lines, and as local economies shifted toward the railroads, the canal would face stiffer competition.

Settlement at this time period would have started to slowly shift toward railroads, though the overall dominance of the economic infrastructure of the canal would have polarized regional settlement toward the canal still. The Kite Framework as a predictive model would expect settlement to shift somewhat toward the railroad and away from the canal as the former ascended in importance and the latter declined. But during this time period, settlement would still be oriented toward the canal as it had been since the 1840s.

Railroad transportation development followed the same pattern in the Wabash Valley as that of the development Wabash and Erie Canal. Small river communities were connected by the canal, with later central places being developed along its route that were independent of the river. This secondary central place development had a lag-time of between ten and fifteen years. Railroad construction began in the Wabash Valley by connecting primary economic centers (originally river towns). Secondary canal towns were by-passed as not being economically worth connecting by rail. Secondary railroad central places did not develop until the 1870s, with again a ten to fifteen year lag-time. This, then, outlines the basic pattern of settlement as described by the Kite Framework for the study area.

The central place theory analysis chapter demonstrated how changes in central places occurred at higher order levels only from the canal era to the railroad era. Farmstead patterning did not change between the two time periods, except to become more orderly (and ironically, place more distance between individual structures). This time period mostly reveals the causality behind the later shift in upper order settlement toward railroad exploitation. The competition of the 1860s would later lead to the dominance of the railroad as a higher-order organizing influence.

Time Period – 1866-1875: The Wabash and Erie Canal Experiences Slow Death and Eventual Closing.

The year 1866 was the beginning of the end for the Wabash and Erie Canal. That year saw the start of another cycle of bad weather and repair needs that tolls could not match. Additional stress came bondholders demanding interest payments in the late

1860s, which tolls and land sales could not meet. Local interest in the canal also declined as economic infrastructures shifted from the canal to the railroads.

The variables operating for the time period of 1867 to 1874 included:

National/International-Level, Political and Economic:

1. The bondholders realized that they had no leverage to make the State of Indiana responsible for the total of the original canal debt.
2. The bondholders, therefore, attempted to get whatever they could from the canal before the system finally went bankrupt.
3. Federal land sales were still producing some revenue for the bondholders.

Local\Regional-Level, Environmental:

1. A number of bad weather years, especially flooding, caused great damage to the canal physically. The worse year was 1875, when flooding damaged the canal beyond repair (*Lafayette Daily Journal*, August 3-4, 1875).
2. Receipts could no longer pay for damages to the canal.

State-Level, Political:

1. Railroads were expanding, which allowed them to take on more bulk goods.
2. Railroads firmly dominated the state government for transportation issues.
3. The state wanted to end the canal bonded debt debate for good. State politicians also wanted to disassociate the modern state government from the Wabash and Erie Canal and its administration. An Indiana constitutional amendment was passed in 1872, denying any further state responsibility for the bonded canal debt (Indiana Laws 1873).

State-Level, Economic:

1. Railroads dominated both manufacturing goods, bulk goods, and passenger transport. Local economic infrastructure shifts to railroads.
2. The canal handled little traffic. Only short local hauls were being made.

3. Tolls on the canal could not match maintenance needs.
4. The year-round operation of railroads, their dependability and freedom from most adverse weather concerns, and continuous declines in railroad costs finally shifts most customs from canal transportation.
5. The canal was still used for short-haul transport between points not accessible by rail along the canal corridor, and by local passenger and pleasure travel.
6. Railroads were now part of the greater regional economic and social infrastructure; both with management, administration, logistics, and local economic support structures.

State-Level, Social:

1. The people were tired of the canal debt issue, local canal delays and repair problems, and the responsibilities associated with the Wabash and Erie Canal.
2. Railroads were becoming a part of the cultural landscape.
3. Railroads were now part of the greater social infrastructure.

Local-Level, Social:

1. As the Wabash and Erie Canal declined as a transportation system, a conflict arose between mill owners who wanted the canal maintained for waterpower purposes, and farmers who wanted the canal's dams demolished so that more agricultural land was exposed.
2. Conflicts arose between towns where mills were located and regions where canal water-support features were located, which usually were found far upstream from the mills.
3. The physical appearance and navigability of the canal diminished over this time period, making it an eyesore as well as a health hazard and local embarrassment.
4. Social attitude changed from viewing railroads as something to be feared to becoming symbols of progress for a new age.

Local-Level, Economic:

1. Central places between major towns were now being fully exploited by railroads, especially at smaller intervals. Local road traffic could now bulk goods at smaller stations along the railroad pathway.
2. Mills were the only large-scale moneymaking venture left which involved the Wabash and Erie Canal (Documentary Journal 1872: 6).
3. Cash grants from local mill owners, politicians that represented canal areas, and merchants still involved with the canal were asked for and received by the Wabash Canal Company to pay for local maintenance along the canal. Subsidizing the canal increased as maintenance costs increased and major canal structures deteriorated (Documentary Journal 1874).
4. Tolls were eventually abolished on the canal because not enough was made to keep administrators and toll officers in place along the canal line (Documentary Journal 1875: 91-92).

Local-Level, Political:

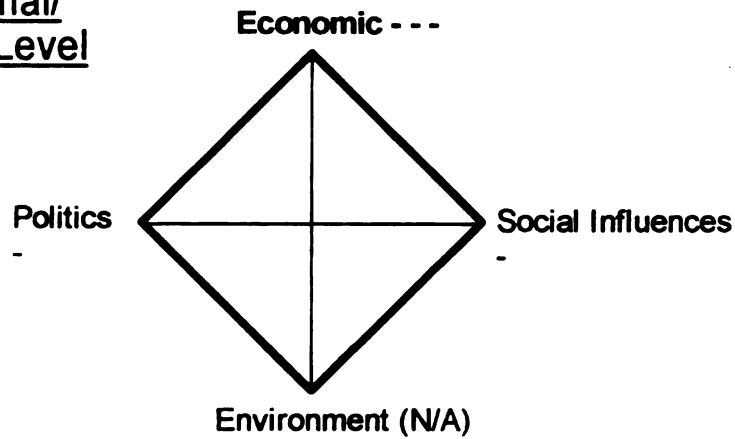
1. Mill operators and local bulk merchants were still a powerful voice in determining the local fate of the Wabash and Erie Canal.
2. Farmers and landowners along the canal, and railroad owners all had a local interest in closing the canal. The former to free up land, the latter to exploit the canal towpath as an easy route for new railroad lines.

Kite Framework Analysis for the Time Period – 1866-1874.

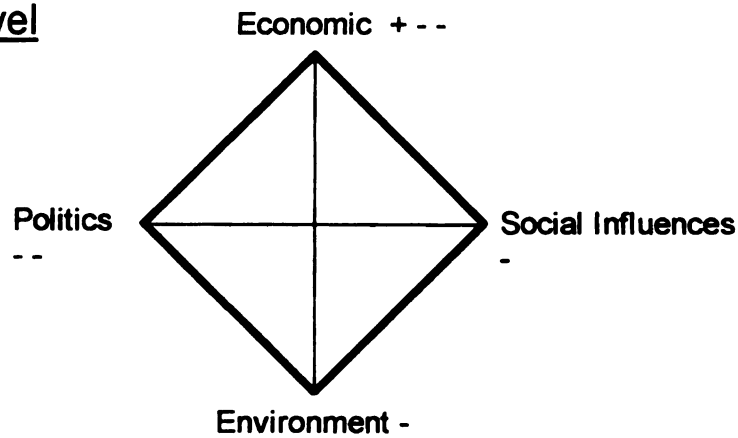
Intuitively, the Kite Framework demonstrates why the Wabash and Erie Canal was doomed during this period of history (Figure 75). Social influences on the state and local level were mostly anti-canal. Economically, the canal was a failure except as a source of waterpower for mills. Politically, the State of Indiana was extremely interested in settling the canal issue and removing it as a concern for the state government. Locally, politics was shifting against the canal. Several years of bad weather and the lack of maintenance money itself was enough to logistically close the canal after 1874.

Figure 75: Kite Model Graphic Representation: 1866-74

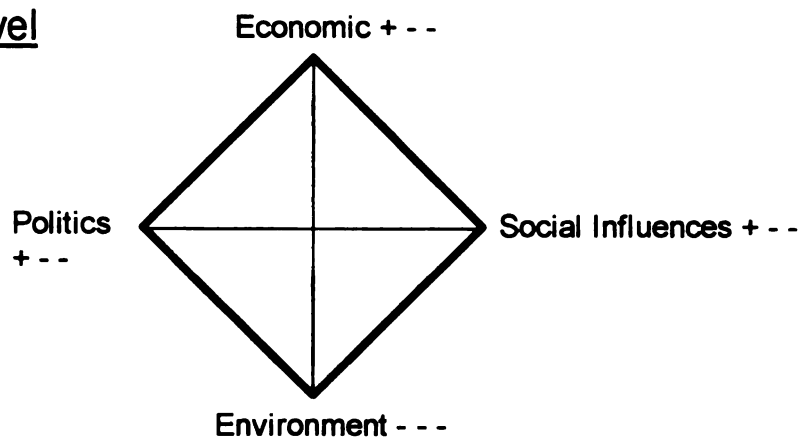
International/
National-Level



State-Level



Local-Level



Using the Kite Framework as a predictive tool, the model points to the Wabash and Erie Canal closing in the 1870s, which is what happened historically (the canal closing in 1875). But the Kite Framework also presents an interesting point. Locally, the canal still had an economic use – as waterpower – and had the political backing of several powerful merchants and mill owners who were established in local economic infrastructures. If allowed by the canal trustees, these merchants would have kept the canal operable as a water source well after 1875. It was the selling of the canal by the bondholders, after the dissolving of the Wabash Canal Company, that closed the canal for good. In this case, ultimate power over the canal reverted back to the National/International-Level and to the economic sphere, where decisions were forced upon local merchants and mill operators.

The ultimate decision to close the canal, therefore, lay with the canal bondholders. The canal as a single entity existed until the trustees declared it closed in 1875. Thereafter, the use of the canal shifted to the local level where the fate of independent sections of canal were decided by a variety of local economic, social, and political variables. Many buyers who purchased various sections of the Wabash and Erie Canal kept the canal open and free of major obstacles exclusively for the mill water rents. With the canal filled with water from this economic use, a small pleasure boat industry and short-distance cargo hauling business also survived. These post-mortem canal uses below Delphi, Indiana, existed until 1881 when angry farmers blew-up the state dam at Pittsburg, which was the major source of water for most of the canal south of the Wabash River.

There is evidence of some sections of Wabash and Erie Canal being used commercially until the 1880s, and other sections being kept clear of major obstacles for the flow of water to mills, though most of this commercial activity ended in 1881 with the dynamiting of the State Dam at Pittsburg. Other sections of canal were allowed to revert to a natural state, were leveled, or were filled.

Thereafter, the canal had no economic use within the project area and was transformed into a number of secondary roles – agricultural field, garbage dump, auto junk yard, drainage ditch, land fill, and county road. Ironically, the canal has seen a resurgence in the 1990s as old towpaths are modified for recreation use. One section has even been watered once again so that the original canal prism has been restored. One day soon, canal boats may again float on Indiana's canals, carrying not immigrants but tourists along the banks of the Wabash and Erie Canal.

Settlement at this time would have been shifting definitely toward the railroad. The Kite Framework would eventually interpret the data listed above to indicate that economic infrastructure would be shifted toward the railroad. Towns, stations, warehouses, and other economic indicators of settlement were definitely orienting toward the railroad and away from the Wabash and Erie Canal, as other analyses has shown. The Kite Framework supports this overall interpretation of regional settlement shift through time by examination of available historical data. The Kite Framework, therefore, supports the analysis results for settlement within the project region.

When comparing the two time periods examined in the central place theory analysis section, and inserting insights from the utilization of the Kite Framework, a

system of central place and farmstead evolution can be identified. As Christaller incorporated into his Central Place Models, two separate evolutionary patterns were taking place. At the farmstead level, the exploitation of the landscape for agricultural reasons, even though having market links, did not follow a market-exploitation pattern. Agricultural exploitation, therefore, was primary to the secondary market structure.

Using the Kite Framework demonstrated the causality and timing of this agricultural exploitation, noting the feedback between the canal, which was part of a larger, central place, system, and the smaller farmstead structures. As the canal was constructed and used, farmsteads exploited more of the landscape, which is demonstrated well by archaeological data. When railroad competition began, the individual farmsteads were able to operate independently of the canal and its relationship to higher-order structures. Farmers could shift their transportation focus to railroads; a choice that was facilitated by local road networks. Without the independence in choice provided by this local road network, farmsteads would have been dependent on canal transportation for access to regional markets, even after the development of the railroad. Such a system would have produced a dendritic landscape, instead of an emerging market landscape.

Both the Kite Framework results and the central place analysis results pointed to a complex feedback system at work in the Wabash Valley. As economic access expanded demand and immigration, the landscape filled in with farmsteads. As farmsteads increased and economic regional strength increased, central places either emerged at nodal points between existing centers or existing centers grew to become higher-order centers. This overall pattern of increased landscape exploitation and central place growth was identified both by central place theory and by using the Kite Framework.

Both approaches to settlement also indicated that the 19th Century Wabash Valley was an emerging market system. Formal patterning was identified, but had not yet matured. Competitive transportation routes could still greatly influence higher-order settlement and expansion. Towns could still be created and abandoned. Further research could examine later time periods to identify when the mature central place settlement pattern seen today in the Wabash Valley finally dominated the landscape.

Kite Framework Conclusions.

Use of the Kite Framework in this case study resulted in a better understanding of the rise of primary and secondary settlement centers within the project area, and how transportation networks grafted onto older transportation routes and settlement patterns. The Kite Framework was especially good for explaining how political, economic, and social decisions and influences interacted to cause change or decision-making in Wabash and Erie Canal history. The inclusion of the environment as a major data category also aided analysis and intuitive conclusion generation. The last chapter also presented a number of general statements about the use of the Kite Framework in a historical case study such as settlement within the Wabash River Valley.

The Kite Framework was more useful as an explanatory aid than as a predictive aid. The use of the framework in both capacities pointed out some general Kite Framework characteristics. The Kite Framework was more useful when good data was available, especially when intuitive understandings of the power relationship between scales and variable categories could be determined. The Kite Framework did not deal well with predicting or explaining situations where the human element had more weight,

or when issues were determined by ideology, beliefs, irrational thought, or random chance.

An interesting point put forth under the above Kite Framework analysis was that scales and variable categories with power could be tremendously effected by other scales and variable categories. These other categories could counterbalance, support, or be benign toward the scale and variable category with power. Another point was the influence upon decision-making and event outcome by stress from rapidly shifting power within the system, or by problems persisting over a long time period. In this case, the longer that stress in the system lasted or the frequency of stress shifts, the less likely it was that other variable categories could counterbalance negative situations.

Overall, the Kite Framework proved to be extremely useful in producing a qualitative explanation for changes or decision-making in the history of the Wabash and Erie Canal. The framework also was quite useful in producing predictive results for historical situations, though borderline situations or situations that dealt with decisions based on irrational thought were less likely to be accurately predicted.

The Role of Archaeology in the Kite Framework.

Archaeology was especially good for demonstrating the operation of the Wabash and Erie Canal while it was a viable transportation system, but it was not very good for providing insights into events that were primarily political in nature. Nor was it good for identifying the shift from canal transportation to railroad transportation, except for noting when lower-order canal settlements were abandoned. Archaeology was, however, great at adding information on the terminal history of the Wabash and Erie Canal.

Archaeological results demonstrated how the canal was used as a garbage dump in a number of locations, how some commercial industries remained viable even after the close of the canal, how mills operated along the canal after the last boat had been grounded, and how the canal was reclaimed and converted again into plowed fields and county roads.

Overall, archaeology was a valuable addition to certain Kite Framework features, and less so to others. Archaeology was most beneficial for local studies, less so for state-level questions, and only rarely useful for international interpretations. Archaeology was most revealing about economic questions, and especially useful for environmental study. Social issues also benefited from archaeology, particularly those dealing with ethnic groups that were not recorded well by history. The more mundane interactions between people were also aided by archaeology. Political interpretation was not directly influenced by archaeology, except for in a broad sense.

Archaeology could not match the historic accuracy of historical documents, but archaeology did add to the general “braid of time” issue by demonstrating change in a broad sense. Scales of power was another feature of the Kite Framework that archaeology did not influence, except for by demonstrating the power of the environment in determining the overall outcome of canal-related issues.

If one area must be chosen that archaeology most benefited, it would have to be the environment and its influence on local and regional issues dealing with the canal. The environment was such an ignored subject in Wabash and Erie Canal history and so poorly understood that insights gained from archaeology brings into focus the entire canal-environment interaction and goes far toward explaining why the environment was

such a determiner of the canal's eventual demise. Archaeology, therefore, adds much to explaining and emphasizing several key sections of the Kite Framework. The overall interpretation of the Kite Framework when applied to Wabash and Erie Canal history was, therefore, was more accurate, comprehensive, and thorough when using historical data and archaeological data than with just historical data.

The Merger of the Kite Framework with Central Place Theory

The Kite Framework proved to be very complimentary with classical central place theory concepts and models. By providing temporal context and causality, the Kite Framework's intuitive approach to Wabash Valley settlement provided event timing, decision-making, and historical context that central place theory lacked. Central place theory, on the other hand, added the powerful spatial modeling and statistical base that the Kite Framework did not deal with. The merger of the two approaches produced an overall interpretation of settlement evolution that dealt with time, causality, and spatial relationships at a number of focus scales. Settlement could therefore be examined from synchronic and diachronic viewpoints, and through qualitative and quantitative approaches. The outcomes of both approaches could then also be compared and contrasted. The end result was a holistic analysis of settlement within the Wabash Valley, as well as a model of research that can be applied to other regional settlement situations.

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Chapter 6

Conclusion

The topic of this dissertation was settlement pattern change in the Wabash Valley of Central Indiana from the mid-1800s to the late-1800s. The nature of this topic bounded the research presented here in several crucial ways: Indiana settlement existed within a market economy, the spatial boundaries of the study area were three counties from the Wabash Valley, the time boundaries were from the 1830s (canal-era) through the 1870s (railroad-era), and the available information was mostly historic and archaeological. The primary problem faced by this dissertation was how to accurately explain settlement pattern change within the Wabash Valley region between the canal-era and the railroad-era.

An overall model therefore had to be developed that dealt with regional spatial patterning at different time periods, that explained the causality behind changes between time periods, and that utilized the available historical and archaeological data. The conclusions drawn from the application of a specific model or models to the Wabash Valley data also had to be replicable and applicable to similar situations. Given these boundaries, several fields of intellectual study were best suited in approaching the problem question of how settlement in the research area changed over time. These fields included geography, history, and anthropology (archaeology).

The field of geography traditionally studies static landscape forms at a specific time period, whether the landscape form is political, ecological, or topographic in nature. History analyzes multiple time periods from the past and/or present, and describes the

changes between time periods. History also deals with issues of causality between observable differences, but relies primarily on the historic record for data and model building. Archaeology studies change through time and causality, but approaches both from a cultural perspective. The nature of archaeology also provides data that is not found in the historic record, and critiques that which is. In this way, the powerful static system modeling of geography could be combined with historical and anthropological modeling of change through time to produce a multi-disciplinary and holistic study of changing Wabash Valley settlement.

Another intellectual decision that had to be made with this dissertation was the choice between approaching Wabash Valley settlement change from a qualitative or quantitative direction. Since the advent of the computer, many research projects have taken a primarily quantitative approach to data analysis. In this way, the ability of the interpreter to conduct accurate statistical analysis, data organization, and statistical interpretation becomes paramount. Statistical modeling is the result, and replicability relies upon the quality of the data and the skills of others in repeating complex statistical procedures.

A more traditional approach to data has been through qualitative analysis. Qualitative analysis is based on the skills, experience, and interpretive abilities of the observer to draw conclusions from data. In this approach, the intuitive ability of the interpreter is paramount, and replicability is determined by another observer having similar background knowledge and experiences.

It was decided that an overall model that combined two pre-existing models from geography best met the above criteria for dealing with changes in 19th Century Wabash

Valley settlement. The first model was “Central Place Theory,” which is primarily used to explain market-based settlement pattern formation at a static point in time, and is best suited to quantitative analysis. The second model was the “Kite Framework,” which is a qualitative organizing tool used in conjunction with a political ecological modeling approach to interpret and predict events within complex social, political, and environmental feedback systems. By using this combined modeling approach, Wabash Valley settlement patterning, causality, and event timing could be examined through qualitative and quantitative methods.

Classic Central place theory deals with the geometric examination of regional settlement within a market economy, with several identifiable scales of settlement interaction. The Wabash Valley was an ideal geographic representation of these conditions, with several identifiable settlement size categories and a known market economy context. The significance of the Wabash River, the Wabash and Erie Canal, and later linear trunk railroads led to a transportation-based historical development. Smaller, regional road networks connected all major cities with individual farmsteads. Several primary towns, such as Lafayette and Delphi, also acted as local administrative centers, with the town of Lafayette also being a Wabash and Erie Canal regional administrative center. The situation, therefore, was ideal for testing Christaller’s models for market, transportation-based, and administrative central place systems.

The nine hypotheses used to test the applicability of Central place theory to the Wabash Valley case study resulted in several general conclusions. The data for the hypothesis came from historical documents and archaeological research conducted by

Michigan State University from 1993 to 1997. The scale of examination proved to be important in determining whether settlement followed administrative, market, or transportation-oriented patterns. For the Wabash Valley study, it was shown that only higher order settlements were oriented exclusively to a single major transportation route (similar to Christaller's transportation-exploiting settlement system), and that the lowest order settlements were oriented toward a market-exploiting settlement pattern. Higher order central places first emerged along the major transportation routes, with smaller communities emerging later at points equidistant between larger communities. This form of delayed central place in-filling was demonstrated in Vance's (1970) hypothetical frontier region, when people began exploiting areas away from primary nodal points on interior transportation systems. This evidence suggested that the Indiana study area was following a *forming* Central Place settlement pattern.

The results of the hypotheses indicated that the lower-order market-exploiting settlement system was probably in the process of being formed. Also, farmstead analysis did not match the pattern proposed by Lösch; contrary to his predictions, settlement pattern at the individual structure level could not be identified as following a Central place theory geometric model. This result supported criticisms of his notion of central place patterning at the individual farmstead level. Attempts to determine the geometric shape of the Wabash Valley settlement were inconclusive, though patterning of some kind was apparently taking place. Again, this is suggestive of an immature central place pattern.

The examination of transportation routes within the Wabash Valley study area allowed for the generation of a transportation hierarchy for each level of settlement.

Smaller farmsteads were oriented toward local roads. Larger settlements were first oriented toward the Wabash River, then toward the Wabash and Erie Canal, and finally toward the railroad. As the dominance of each form of transportation changed over time, the orientation of higher order settlements toward them changed. Smaller canal and river settlements that did not attract a major railroad in the 1870s, lost population or did not grow. Smaller settlements were also created in the 1870s to maximize areas along the railroad that did not have previous higher-order settlements. The orientation of farmsteads toward these major transportation routes did not change over time.

It was clearly demonstrated that the general form of the next generation of transportation was determined by higher-order settlement along the previous transportation line. Survivability after a transportation shift, however, was apparently linked with the size and order scale of a settlement. Lower-order central places above the individual farmstead level were less likely to survive or to expand than higher-order central places.

Another conclusion from the analysis of Wabash Valley data was that the economic strength of a region determined the central place patterning found, and the number of levels within the total central place hierarchy. The economic strength of the Wabash and Erie Canal was much less south of Lafayette than on the more prosperous northern route. New Orleans and southern transportation was originally the focus of Wabash Valley trade, demonstrating the affect of northern-oriented canal trade from the 1830s to 1860.

This difference between trade north and south of Lafayette during the canal era led to a much less developed southern central place hierarchy, though the number of

farmsteads per section was similar to that found in the north. This fact makes logical sense, since central place hierarchies are developed in response to the in-filling of market niches in a market economy landscape. More economic strength appears to translate into more niche potential, especially for smaller central places found at key bulking nodes or along major transportation trunk routes.

A study of the railroad era demonstrated how, over time, central places within a region eventually fill in. Several small towns were formed between the 1860s and 1870s to exploit central locations along the railroad. Fewer central place structures were located along the railroad south of Lafayette than north of the city. This overall evolving settlement and transportation pattern matched closely the results found by Mitchell and Hofstra (1995), Vance (1970), Lewis (1984), and Earle (1975) for a developing central place system. Further study at later time periods would probably see additional in-filling as the central place system matured.

The analysis of canal data also dealt with settlement change from the 1860s to the 1870s by examining an equal area of land adjacent to the Wabash River, the Wabash and Erie Canal, and the Wabash Railroad. It was concluded that, though non-major transportation variables did not change much between time periods, the distance from farmsteads or individual structures to the major transportation systems changed greatly. Settlement shifted toward railroads, and railroad central place in-filling made railroad features – such as agricultural bulking warehouses, grain elevators, and passenger stations – more accessible to the regional population. Ironically, the distance between farmsteads between the 1860s and 1870s actually increased as local rural population increased. It was suggested that this event coincided with a mature ordering of the local

agricultural landscape, as suggested by Wood³ (1984). Later, as the landscape matured, distances between structures would decrease as land optimizing pushed settlement into more uniform patterns.

The last Central Place concept studied was the relationship between function and settlement size. It was concluded that, within the Wabash Valley, smaller settlements had fewer functions than larger settlements, and larger settlements within central Indiana contained all functions of smaller settlements plus new functions found only at higher orders. One interesting discovery was that different proportions of certain functions existed at different central place orders. Lower order settlements had many more agricultural service functions in proportion to their overall functions than did higher order centers. An increase in settlement size apparently did have an influence on proportional function loss, a fact that is not expressed by Central place theory.

Settlement within the Wabash Valley was next examined using the Kite Framework and political ecology modeling. It was important for this qualitative approach to settlement pattern analysis to place the Wabash Valley and the Wabash and Erie Canal, which was the focal transportation system within the study area, within a greater social, political, economic, and environmental context. It was from the interaction of local settlement with the environment, other scales of focus, and the construction and operation of the Wabash and Erie Canal that an understanding of settlement causality and temporal change within the Wabash Valley region can be understood.

³ Wood studied New England settlement formation within a market economy and concluded that his study area and time represented a *forming* central place pattern. For more information on this, see Chapter 4.

The Kite Framework proved to be very useful in explaining long periods of stability and short periods of stress in Central Indiana's canal history. An intuitive, qualitative approach to the relationship between the economic and environmental health of the canal and settlement within the Wabash Valley along the canal accurately explained why settlement expanded or oriented toward the canal at various scales of interaction, and why the railroad shifted populations at higher scales away from the canal. Dividing the existing canal and settlement data into four separate categories and three scales of study did allow for a more rational and manageable approach to dealing with the complexity of historic data available. Especially useful was the Kite Framework ideas of power and feedback between scales and variable categories. The dynamic relationship between settlement and the canal, and influential elements outside of the Wabash Valley, demonstrated that a holistic approach was necessary to accurately explain the causality and timing of canal and Central Indiana settlement events.

The Kite Framework was less reliable as a predictive tool. Data quality and depth were shown by this dissertation to be crucial to the successful use of the Kite Framework. When data was not available, was not detailed, or when unpredictable human values, beliefs, and actions were influential on certain event outcomes, the Kite Framework was less useful. Central place theory assumes rational behavior to function as a model; interpretation of data placed within a Kite Framework likewise assumes rational behavior. If individual behavior proves to be incomprehensible, self-destructive or abnormal it is difficult for either approach to settlement pattern analysis to be accurate. Overall, the Kite Framework was most useful for large-scale group interactions that were less affected by the decisions of a single person.

The Kite Framework concentration on the relationship of the environment and human behaviors was especially valuable. Many of the settlement models presented earlier in this work did not emphasize the role of the environment in settlement pattern development. The environment became a backdrop of resources to be exploited, terrain to be avoided, and regional ecozones that modified human behavior patterns. This dissertation has attempted to concentrate on the active relationship between the environment and human decision making.

The Wabash and Erie Canal was ideal for this purpose, since it is one of the only 19th Century structures that has extensive documented literature that deals with the affects of weather on the health of the system. Knowledge of the cycles of the weather became crucial to canal use and economic well being. A lack of knowledge of the weather and environment had a distinct, noticeable, and documented influence on the canal. This dissertation, therefore, was able to emphatically demonstrate the need for inclusion of the environment in historic and geographic research projects; which is one of the major goals of the Kite Framework.

This dissertation also refined the Kite Framework and added new insights into its structure. Unique to this study was the concept that the element of *Power* in the Kite Framework had to be taken one step further. The overall balance of an historic event had to be examined. A single variable category with influential *Power* assigned to it was influenced by lesser categories. These lesser categories could be benign, supportive, or antagonistic. Key decisions from a single scale or variable category could, therefore, be offset by antagonistic feedback from a number of less powerful scales or variables. This

feedback relationship should be kept in mind when any researcher is using the Kite Framework as an explanatory or predictive tool.

Another innovation for this dissertation was the graphic representation of the Kite Framework with power visually expressed. Such a representation could easily be added to the standard Kite Framework graphics for each research project, thus adding to the clarifying abilities of the tool.

Yet another concept that can further refine the Kite Framework was the notion of stress persistence. The longer a system under study is stressed, the more likely it is to be affected by that stress. This influence is intuitive, but often overlooked in static research projects. When dealing with time elements, duration is very important. A six year drought is much more devastating than six one-year droughts. This cumulative effect must be factored into the Kite Framework data for accurate conclusions to be drawn.

Archaeology proved to be extremely valuable in the refinement of the Kite Model. Archaeology, by its nature, deals with the interaction of human culture with the environment. In most cases, the archaeologist is constantly placing artifacts of human culture within their soil (environmental) context, drawing intuitive clues into the nature of artifact deposition, as well as interpretation from individual artifacts, artifact clusters, and cultural features. Archaeology in this study was also useful for checking the accuracy of historical documents that were crucial to developing settlement pattern analyses, both by using the Kite Framework and Central place theory.

Archaeological research was also able to refine historical data, mostly by identifying site function and by locating sites not found on historic maps or within the literature. New information was also generated that highlighted data variables not found

within the historic literature at all. Archaeology also added to a multi-disciplinary approach to Kite Framework analysis. Archaeology has a tradition of spatial and temporal analysis that merges well with geography, but adds a cultural component that contributed much to the refinement of using the Kite Framework and to the ordering and analysis of data.

One of the most intriguing discoveries of this dissertation was the ability of archaeology to identify micro-environmental changes. Several fields identify the need to study human cultural systems at the macro and micro levels. Economics, politics, and sociology deal with human cultural systems at larger scales and smaller scales, identifying the connections between each. The ability of archaeology to add to environmental issues is usually ignored, given the wealth of literature available after 1800 in the United States.

What this dissertation has demonstrated is that archaeology can give new and profound insights into the interactions of humans with their environment, even in the 19th or 20th Centuries. The ability of archaeology to identify micro-environmental water flow changes associated with the construction of the Wabash and Erie Canal illuminated a fundamental stress to the canal system that was not expressed in the historic literature. There is the potential, therefore, for archaeology to add a significant new group of data to regional and national environmental studies. This concept of the examination of micro-environments to gather regional insights can be profound for all archaeology conducted in the United States, especially that done in conjunction with Cultural Resource Management. Archaeological study of the micro-environment, while undertaking normal

CRM evaluation, could give insights into the micro-effects of national road systems or other structures on the environment.

It was the merger of Central place theory and the Kite Framework that truly differentiated this dissertation from other settlement pattern studies. This was the first major research project to apply the Kite Framework to a purely historical case study, and the first to use the Kite Framework in conjunction with classic central place theory modeling. Central place theory and the Kite Framework proved to be surprisingly complimentary. Central place theory accounted for the overall settlement patterning, the nature of hierarchical central place development, and the order of functions found within central places. Central place theory also explained the relationship between various scales of settlement and the local and trunk-line transportation systems found within the Wabash Valley. The Kite Framework explained why certain central place regional forms developed when they did and for what reasons, and how the economics of the Wabash and Erie Canal and the Wabash Railroad influenced settlement change through time.

Both approaches have the advantage of being replicable. The central place quantitative analysis of Wabash Valley can be repeated by other researchers given the same data sets. Likewise, the Kite framework, though qualitative, provides a means to systematically order and weigh the qualitative variables presented in the Wabash Valley data, therefore permitting a comparative analyses by different researchers.

The use of the Kite Framework, in this case, also paralleled attempts in geography to further refine central place theory to make it more applicable to real-life situations. By successfully adding a qualitative element to central place theory, this dissertation created

a holistic representation that is even more accurate than by applying only a single modeling approach to 19th Century Central Indiana settlement. This combining of central place theory and the Kite Framework can be applied to any regional case study that deals with settlement form, causality, and timing within a market economy. In addition, the process of qualitative and quantitative research presented here can be applied to any regional transportation system, either trunk-line or local grid, to analyze the relationship between transportation systems and regional settlement patterns.

The central place theory and Kite Framework model of merging qualitative and quantitative approaches to settlement pattern analysis would have greatly enhanced a number of classic historical, archaeological, and geographic case studies presented previously in Chapter 4. Regional studies, such as Hudson's (1969) eastern Iowa case, Mitchell and Hofstra's (1995) Virginia and Carolina frontier study, Skinner's (1964) Chinese rural analysis, Bowden and LaRose's (1971) Vermont frontier analysis, O'Brien's (1984) Salt River Missouri analysis, and Wood's (1984) New England case study focused on Central place theory as a spatial model, but were weak for explaining the organization and systematic analysis of their intuitive, qualitative data⁴.

The comparability of these studies to be compared could also only be conducted on the quantitative basis; their intuitive conclusions about the pattern of causality and event timing were not replicable. This stemmed from an absence of qualitative data given in their studies and the lack of discussion about how their qualitative conclusions were organized and generated. Another weakness in the above studies was not including information from other scales of interaction to the overall intuitive conclusions about

⁴ Chapter 4 gives a detailed account of each of these case studies, and gives several additional studies not mentioned here.

causality and event timing. Most case studies did not even take into account the role of the environment in determining central place settlement patterns, except for general ideas of soil type or selective crop exploitation.

By utilization of the Kite Framework, which approaches research problems from a fundamentally intuitive perspective, conclusions can be drawn about timing and causality that are constructed from a qualitative base. In this way, research following the Kite Framework approach produces intuitive results that begin independent of Central place theory and other spatial, quantitative modeling.

The research model presented here allows for the generation of intuitive results from both qualitative and quantitative approaches that then can be compared to create a holistic explanation of spatial relationships, the causality behind historic events, and the reasons of the timing of such events without the qualitative dependency on quantitative analysis that is found in many of the case studies mentioned above. This dissertation, by merging qualitative and quantitative approaches, can act as a guiding and comparative case study for archaeological, historical, or geographic projects dealing with regional settlement within a market economy.

As the data for this dissertation was analyzed and conclusions were drawn for Wabash Valley settlement during the 19th Century, it was apparent that settlement in the region was in the process of evolving. What pattern the mature regional settlement system might have eventually formed is unknown from the data acquired for this study. Two major questions emerged from this analysis; what might a fully mature settlement pattern look like, and when would a “mature” pattern be realized.

Christaller generally worked with mature systems. His European case studies assumed that regional settlement had achieved a mature status. A number of other case studies have also suggested a process of maturation for central place regional settlement. It is doubtful, given the continuous expansion of settlement across the landscape found in the 20th Century, that a final static “mature” settlement system would ever be achieved; human and environmental variables appear to dissuade perfectly patterned settlement forms. This does not mean, however, that a stable settlement system cannot be identified. By continuing the Wabash Valley analysis presented here into the late 19th Century and early 20th Century, a better understanding of the *process* of settlement pattern maturation could be achieved. Likewise, by continuing with the Kite Framework analysis, a better understanding of the causality behind settlement maturation may also be deduced. By advancing this study into modern times, an entire detailed history of settlement pattern formation could be presented.

In addition to expanding the research of this dissertation forward in time, comparing the 19th Century Wabash Valley region with other historic regions could also yield useful insights into the overall nature of settlement pattern formation. Also, the affects of a linear transportation system on regional settlement could be examined by comparing the Wabash Valley settlement pattern with a historic region that did not have a major trunk transportation system. In this way, comparisons of event timing and causality could also be produced.

In a broader context, the Wabash Valley study poses several questions about human interaction, which should be explored with more research. The discovery that settlement was taking different directions at different scales of study (the transportation-

oriented pattern of higher order central places versus the market-oriented pattern of farmsteads) implies that such a dual patterning exists in most historic and modern human societies. What this implies is that several models need to be applied to settlement pattern studies *at the same time* in order to accurately interpret settlement patterning and change in a region. Another area of future study is the examination of the interaction of settlement patterns found at different scales of study. How different settlement patterns influence each in the same region is a topic not dealt with in this dissertation, but one worthy of future research.

Another broad question deals with the nature of quantification analysis. After completing this dissertation, it was clear that many of the studies that primarily relied on quantified data to produce conclusions also used qualified interpretation in their case studies. This qualification approach was not systematic -- as was undertaken in this study -- and was not well-developed from a methodological or theoretical perspective. It is recommended that future quantification studies dealing with settlement pattern analysis, since the process of settlement itself is a cultural, political, and social process, should be coupled with strong qualified theory and methodology. This combination of quantifiable and qualifiable approaches would eliminate the critique most purely quantifiable research projects encounter and place culture back into scientific anthropological study, much as the Kite Framework attempted to place the environment back into regional geographic analysis.

Appendix I

General Data for this Study, Organized into Canal-Era and Railroad-Era.

Canal-Era data appears first, followed by Railroad-Era. This data is the primary data set for all hypothesis testing found in Chapter 5. When outliers or non-residential structures are taken out of the data set, specific criteria are given within the appropriate hypothesis section.

	A	B	C	D	E	F
1	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
2						Neighbor (in feet)
3	Canal-Era	Wayne	Section 1B	One	Individual Structure	
4	Canal-Era	Wayne	Section 3B	One	Farmstead\Homestead	1656
5	Canal-Era	Wayne	Section 3B	Two	Individual Structure	1794
6	Canal-Era	Wayne	Section 3B	Three	Individual Structure	1242
7	Canal-Era	Wayne	Section 3B	Four	Individual Structure	414
8	Canal-Era	Wayne	Section 3B	Five	Farmstead\Homestead	414
9	Canal-Era	Wayne	Section 3B	Six	Individual Structure	690
10	Canal-Era	Wayne	Section 3B	Seven	Individual Structure	552
11	Canal-Era	Wayne	Section 3B	Eight	Individual Structure	552
12	Canal-Era	Wayne	Section 3B	Nine	School	1518
13	Canal-Era	Wayne	Section 4B	One	Individual Structure	690
14	Canal-Era	Wayne	Section 4B	Two	Individual Structure	
15	Canal-Era	Wayne	Section 3	One	Individual Structure	1104
16	Canal-Era	Wayne	Section 3	Two	Individual Structure	1104
17	Canal-Era	Wayne	Section 11	One	Individual Structure	552
18	Canal-Era	Wayne	Section 11	Two	Farmstead\Homestead	690
19	Canal-Era	Wayne	Section 22	One	Farmstead\Homestead	1656
20	Canal-Era	Wayne	Section 25	One	Farmstead\Homestead	828
21	Canal-Era	Wayne	Section 25	Two	Individual Structure	414
22	Canal-Era	Wayne	Section 25	Three	Individual Structure	414
23	Canal-Era	Wayne	Section 25	Four	Farmstead\Homestead	690
24	Canal-Era	Wayne	Section 25	Five	Individual Structure	138
25	Canal-Era	Wayne	Section 29	One	Farmstead\Homestead	690
26	Canal-Era	Wayne	Section 29	Two	Farmstead\Homestead	690
27	Canal-Era	Wayne	Section 29	Three	Farmstead\Homestead	690
28	Canal-Era	Wayne	Section 29	Four	Farmstead\Homestead	552
29	Canal-Era	Wayne	Section 29	Five	Farmstead\Homestead	552
30	Canal-Era	Wayne	Section 29	Six	Farmstead\Homestead	1380
31	Canal-Era	Wayne	Section 29	Seven	Farmstead\Homestead	1380
32	Canal-Era	Wayne	Section 30	One	Farmstead\Homestead	1242
33	Canal-Era	Wayne	Section 31	One	Farmstead\Homestead	414
34	Canal-Era	Wayne	Section 31	Two	Farmstead\Homestead	1380
35	Canal-Era	Wayne	Section 31	Three	Farmstead\Homestead	
36	Canal-Era	Wayne	Section 32	One	Farmstead\Homestead	
37	Canal-Era	Wayne	Section 32	Two	Individual Structure	
38	Canal-Era	Wayne	Section 35	One	Farmstead\Homestead	966
39	Canal-Era	Wayne	Section 35	Two	Individual Structure	828
40	Canal-Era	Wayne	Section 35	Three	Individual Structure	4554
41	Canal-Era	Wayne	Section 36	One	Farmstead\Homestead	552
42	Canal-Era	Wayne	Section 36	Two	Farmstead\Homestead	414
43	Canal-Era	Wayne	Section 36	Three	Farmstead\Homestead	1380
44	Canal-Era	Wayne	Section 2	One	Farmstead\Homestead	690
45	Canal-Era	Wayne	Section 2	Two	Individual Structure	1242
46	Canal-Era	Wayne	Section 2	Three	Individual Structure	552
47	Canal-Era	Wayne	Section 2	Four	Individual Structure	276
48	Canal-Era	Wayne	Section 2	Five	Individual Structure	276
49	Canal-Era	Wayne	Section 2	Six	Farmstead\Homestead	828
50	Canal-Era	Union	Section 1	One	Farmstead\Homestead	828
51	Canal-Era	Union	Section 1	Two	Farmstead\Homestead	1932
52	Canal-Era	Union	Section 1	Three	Individual Structure	966
53	Canal-Era	Union	Section 1	Four	Farmstead\Homestead	966
54	Canal-Era	Union	Section 1	Five	Individual Structure	2070
55	Canal-Era	Union	Section 1	Six	Farmstead\Homestead	1104
56	Canal-Era	Union	Section 1	Seven	Individual Structure	276
57	Canal-Era	Union	Section 1	Eight	Individual Structure	276
58	Canal-Era	Union	Section 1	Nine	Individual Structure	276
59	Canal-Era	Union	Section 1	Ten	Individual Structure	414
60	Canal-Era	Union	Section 1	Eleven	Mill	276

	A	B	C	D	E	F
61	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
62						Neighbor (in feet)
63	Canal-Era	Union	Section 1	Twelve	School	1104
64	Canal-Era	Union	Section 3	One	Farmstead/Homestead	828
65	Canal-Era	Union	Section 3	Two	Individual Structure	828
66	Canal-Era	Union	Section 3	Three	Farmstead/Homestead	1932
67	Canal-Era	Union	Section 11	One	Individual Structure	
68	Canal-Era	Union	Section 11	Two	Individual Structure	3312
69	Canal-Era	Union	Section 12	One	Farmstead/Homestead	2208
70	Canal-Era	Union	Section 33	One	Farmstead/Homestead	2760
71	Canal-Era	Union	Section 33	Two	Farmstead/Homestead	2760
72	Canal-Era	Union	Section 33	Three	Farmstead/Homestead	2760
73	Canal-Era	Union	Section 33	Four	Individual Structure	1242
74	Canal-Era	Union	Section 34	Five	Farmstead/Homestead	1242
75	Canal-Era	Union	Section 34	Six	Farmstead/Homestead	2760
76	Canal-Era	Union	Section 35	One	Farmstead/Homestead	2484
77	Canal-Era	Union	Section 36	One	Individual Structure	828
78	Canal-Era	Union	Section 36	Two	Individual Structure	828
79	Canal-Era	Union	Section 36	Three	Watch House	2070
80	Canal-Era	Union	Section 4	One	Farmstead/Homestead	1242
81	Canal-Era	Union	Section 4	Two	Farmstead/Homestead	
82	Canal-Era	Union	Section 2	One	Individual Structure	276
83	Canal-Era	Union	Section 2	Two	Individual Structure	276
84	Canal-Era	Union	Section 2	Three	Individual Structure	828
85	Canal-Era	Union	Section 2	Four	Mill	138
86	Canal-Era	Union	Section 2	Five	Individual Structure	2070
87	Canal-Era	Union	Section 2	Six	Individual Structure	414
88	Canal-Era	Union	Section 2	Seven	Farmstead/Homestead	1104
89	Canal-Era	Union	Section 2	Eight	Individual Structure	414
90	Canal-Era	Washington	Section 1	One	Individual Structure	1656
91	Canal-Era	Washington	Section 1	Two	Individual Structure	1656
92	Canal-Era	Washington	Section 11	One	Individual Structure	1794
93	Canal-Era	Washington	Section 11	Two	Individual Structure	1794
94	Canal-Era	Washington	Section 11	Three	Individual Structure	1242
95	Canal-Era	Washington	Section 11	Four	Individual Structure	1242
96	Canal-Era	Washington	Section 11	Five	Individual Structure	2346
97	Canal-Era	Washington	Section 11	Six	Individual Structure	1656
98	Canal-Era	Washington	Section 11	Seven	Individual Structure	1104
99	Canal-Era	Washington	Section 12	One	Individual Structure	3036
100	Canal-Era	Washington	Section 12	Two	Individual Structure	1242
101	Canal-Era	Washington	Section 12	Three	Individual Structure	3864
102	Canal-Era	Washington	Section 22	One	Individual Structure	1794
103	Canal-Era	Washington	Section 22	Two	Individual Structure	414
104	Canal-Era	Washington	Section 22	Three	Individual Structure	414
105	Canal-Era	Washington	Section 22	Four	Individual Structure	690
106	Canal-Era	Washington	Section 22	Five	Individual Structure	690
107	Canal-Era	Washington	Section 22	Six	Individual Structure	1242
108	Canal-Era	Washington	Section 25	One	Individual Structure	276
109	Canal-Era	Washington	Section 25	Two	Individual Structure	276
110	Canal-Era	Washington	Section 25	Three	Individual Structure	276
111	Canal-Era	Washington	Section 25	Four	Individual Structure	414
112	Canal-Era	Washington	Section 25	Five	Farmstead/Homestead	552
113	Canal-Era	Washington	Section 25	Six	Farmstead/Homestead	1104
114	Canal-Era	Washington	Section 29	One	Individual Structure	2622
115	Canal-Era	Washington	Section 29	Two	Individual Structure	2760
116	Canal-Era	Washington	Section 29	Three	Individual Structure	1932
117	Canal-Era	Washington	Section 29	Four	Farmstead/Homestead	1380
118	Canal-Era	Washington	Section 29	Five	Farmstead/Homestead	1380
119	Canal-Era	Washington	Section 30	One	School	552
120	Canal-Era	Washington	Section 30	Two	Individual Structure	552

	A	B	C	D	E	F
121	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
122						<u>Neighbor (in feet)</u>
123	Canal-Era	Washington	Section 30	Three	Individual Structure	552
124	Canal-Era	Washington	Section 30	Four	Farmstead/Homestead	552
125	Canal-Era	Washington	Section 30	Five	Individual Structure	552
126	Canal-Era	Washington	Section 30	Six	Individual Structure	690
127	Canal-Era	Washington	Section 30	Seven	Mill	414
128	Canal-Era	Washington	Section 30	Eight	Individual Structure	414
129	Canal-Era	Washington	Section 30	Nine	Individual Structure	1242
130	Canal-Era	Washington	Section 30	Ten	Farmstead/Homestead	1104
131	Canal-Era	Washington	Section 31	One	Farmstead/Homestead	2208
132	Canal-Era	Washington	Section 31	Two	Farmstead/Homestead	2070
133	Canal-Era	Washington	Section 31	Three	Farmstead/Homestead	1242
134	Canal-Era	Washington	Section 31	Four	Farmstead/Homestead	
135	Canal-Era	Washington	Section 35	One	Individual Structure	828
136	Canal-Era	Washington	Section 35	Two	Farmstead/Homestead	2070
137	Canal-Era	Washington	Section 35	Three	Individual Structure	828
138	Canal-Era	Washington	Section 36	One	Individual Structure	276
139	Canal-Era	Washington	Section 36	Two	Farmstead/Homestead	276
140	Canal-Era	Washington	Section 36	Three	Farmstead/Homestead	552
141	Canal-Era	Washington	Section 36	Four	Individual Structure	552
142	Canal-Era	Washington	Section 36	Five	Farmstead/Homestead	1104
143	Canal-Era	Washington	Section 36	Six	Individual Structure	414
144	Canal-Era	Washington	Section 36	Seven	Farmstead/Homestead	3728
145	Canal-Era	Washington	Section 10	One	Individual Structure	1518
146	Canal-Era	Washington	Section 10	Two	Individual Structure	2898
147	Canal-Era	Washington	Section 28	One	Individual Structure	1932
148	Canal-Era	Washington	Section 28	Two	Farmstead/Homestead	828
149	Canal-Era	Washington	Section 28	Three	Individual Structure	828
150	Canal-Era	Washington	Section 21	One	Individual Structure	966
151	Canal-Era	Washington	Section 21	Two	Individual Structure	966
152	Canal-Era	Washington	Section 21	Three	Individual Structure	414
153	Canal-Era	Washington	Section 21	Four	Individual Structure	1242
154	Canal-Era	Washington	Section 21	Five	Individual Structure	2760
155	Canal-Era	Washington	Section 21	Six	Individual Structure	1104
156	Canal-Era	Washington	Section 21	Seven	Individual Structure	1104
157	Canal-Era	Washington	Section 21	Eight	Individual Structure	276
158	Canal-Era	Washington	Section 21	Nine	Mill	276
159	Canal-Era	Washington	Section 19	One	Farmstead/Homestead	1104
160	Canal-Era	Washington	Section 20	One	Individual Structure	552
161	Canal-Era	Washington	Section 20	Two	Individual Structure	552
162	Canal-Era	Washington	Section 20	Three	Individual Structure	828
163	Canal-Era	Washington	Section 20	Four	Individual Structure	1518
164	Canal-Era	Washington	Section 20	Five	Individual Structure	2346
165	Canal-Era	Washington	Section 20	Six	Individual Structure	414
166	Canal-Era	Washington	Section 20	Seven	Individual Structure	414
167	Canal-Era	Washington	Section 20	Eight	Individual Structure	414
168	Canal-Era	Washington	Section 13	One	Farmstead/Homestead	552
169	Canal-Era	Washington	Section 13	Two	Individual Structure	414
170	Canal-Era	Washington	Section 13	Three	Individual Structure	414
171	Canal-Era	Washington	Section 16	One	Individual Structure	2760
172	Canal-Era	Washington	Section 14	One	Farmstead/Homestead	1656
173	Canal-Era	Washington	Section 14	Two	Farmstead/Homestead	1656
174	Canal-Era	Washington	Section 14	Three	Farmstead/Homestead	
175	Canal-Era	Washington	Section 15	One	Farmstead/Homestead	1518
176	Canal-Era	Washington	Section 15	Two	Farmstead/Homestead	2622
177	Canal-Era	Fairfield	Section 1	One	Individual Structure	828
178	Canal-Era	Fairfield	Section 1	Two	Farmstead/Homestead	828
179	Canal-Era	Fairfield	Section 1	Three	Farmstead/Homestead	828
180	Canal-Era	Fairfield	Section 1	Four	Farmstead/Homestead	1932

	A	B	C	D	E	F
181	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
182						<u>Neighbor (in feet)</u>
183	Canal-Era	Fairfield	Section 3	One	Farmstead\Homestead	1518
184	Canal-Era	Fairfield	Section 3	Two	Individual Structure	5382
185	Canal-Era	Fairfield	Section 3	Three	Individual Structure	2484
186	Canal-Era	Fairfield	Section 11	One	Individual Structure	276
187	Canal-Era	Fairfield	Section 11	Two	Individual Structure	276
188	Canal-Era	Fairfield	Section 11	Three	Individual Structure	276
189	Canal-Era	Fairfield	Section 11	Four	Individual Structure	414
190	Canal-Era	Fairfield	Section 11	Five	Individual Structure	828
191	Canal-Era	Fairfield	Section 11	Six	Farmstead\Homestead	1104
192	Canal-Era	Fairfield	Section 11	Seven	Farmstead\Homestead	1242
193	Canal-Era	Fairfield	Section 11	Eight	Farmstead\Homestead	1104
194	Canal-Era	Fairfield	Section 11	Nine	Individual Structure	828
195	Canal-Era	Fairfield	Section 12	One	Individual Structure	
196	Canal-Era	Fairfield	Section 12	Two	Individual Structure	1932
197	Canal-Era	Fairfield	Section 4	One	Farmstead\Homestead	828
198	Canal-Era	Fairfield	Section 4	Two	Individual Structure	1518
199	Canal-Era	Fairfield	Section 2	One	Farmstead\Homestead	966
200	Canal-Era	Fairfield	Section 2	Two	Individual Structure	1518
201	Canal-Era	Fairfield	Section 2	Three	Farmstead\Homestead	1656
202	Canal-Era	Fairfield	Section 2	Four	Individual Structure	2622
203	Canal-Era	Fairfield	Section 2	Five	Individual Structure	2622
204	Canal-Era	Fairfield	Section 9	One	Individual Structure	828
205	Canal-Era	Fairfield	Section 9	Two	Farmstead\Homestead	1932
206	Canal-Era	Fairfield	Section 9	Three	Farmstead\Homestead	1380
207	Canal-Era	Fairfield	Section 9	Four	Individual Structure	966
208	Canal-Era	Fairfield	Section 9	Five	Individual Structure	966
209	Canal-Era	Fairfield	Section 9	Six	Farmstead\Homestead	1104
210	Canal-Era	Fairfield	Section 9	Seven	Individual Structure	966
211	Canal-Era	Fairfield	Section 9	Eight	School	966
212	Canal-Era	Fairfield	Section 9	Nine	Individual Structure	2208
213	Canal-Era	Fairfield	Section 10	One	Individual Structure	1518
214	Canal-Era	Fairfield	Section 10	Two	Individual Structure	1932
215	Canal-Era	Fairfield	Section 10	Three	Individual Structure	552
216	Canal-Era	Fairfield	Section 10	Four	Individual Structure	552
217	Canal-Era	Fairfield	Section 10	Five	Individual Structure	690
218	Canal-Era	Fairfield	Section 10	Six	Individual Structure	414
219	Canal-Era	Fairfield	Section 10	Seven	Individual Structure	276
220	Canal-Era	Fairfield	Section 10	Eight	Individual Structure	276
221	Canal-Era	Fairfield	Section 10	Nine	Individual Structure	552
222	Canal-Era	Fairfield	Section 10	Ten	Individual Structure	1104
223	Canal-Era	Fairfield	Section 10	Eleven	Individual Structure	552
224	Canal-Era	Fairfield	Section 10	Twelve	Farmstead\Homestead	552
225	Canal-Era	Fairfield	Section 10	Thirteen	Individual Structure	552
226	Canal-Era	Fairfield	Section 10	Fourteen	Individual Structure	552
227	Canal-Era	Fairfield	Section 14	One	Individual Structure	1104
228	Canal-Era	Fairfield	Section 14	Two	Individual Structure	1104
229	Canal-Era	Fairfield	Section 15	One	Individual Structure	2898
230	Canal-Era	Fairfield	Section 15	Two	Farmstead\Homestead	552
231	Canal-Era	Deer Creek	Section 5	One	Farmstead\Homestead	1380
232	Canal-Era	Deer Creek	Section 5	Two	Farmstead\Homestead	4002
233	Canal-Era	Deer Creek	Section 5	Three	Individual Structure	3174
234	Canal-Era	Deer Creek	Section 5	Four	Farmstead\Homestead	2346
235	Canal-Era	Deer Creek	Section 6	One	Individual Structure	1242
236	Canal-Era	Deer Creek	Section 6	Two	Individual Structure	1242
237	Canal-Era	Deer Creek	Section 6	Three	Individual Structure	1104
238	Canal-Era	Deer Creek	Section 6	Four	Farmstead\Homestead	3450
239	Canal-Era	Deer Creek	Section 6	Five	Farmstead\Homestead	3450
240	Canal-Era	Deer Creek	Section 6	Six	Farmstead\Homestead	1380

	A	B	C	D	E	F
241	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
242						<u>Neighbor (in feet)</u>
243	Canal-Era	Deer Creek	Section 6	Seven	School	552
244	Canal-Era	Deer Creek	Section 6	Eight	Farmstead/Homestead	552
245	Canal-Era	Deer Creek	Section 7	One	Farmstead/Homestead	2484
246	Canal-Era	Deer Creek	Section 7	Four	Farmstead/Homestead	2484
247	Canal-Era	Deer Creek	Section 7	Five	Farmstead/Homestead	966
248	Canal-Era	Deer Creek	Section 8	One	Individual Structure	2070
249	Canal-Era	Deer Creek	Section 30	Three	Individual Structure	1104
250	Canal-Era	Deer Creek	Section 31	One	Individual Structure	1104
251	Canal-Era	Deer Creek	Section 31	Two	Individual Structure	1104
252	Canal-Era	Deer Creek	Section 31	Three	Farmstead/Homestead	1104
253	Canal-Era	Deer Creek	Section 32	One	Farmstead/Homestead	2484
254	Canal-Era	Deer Creek	Section 32	Two	Farmstead/Homestead	3036
255	Canal-Era	Deer Creek	Section 32	Three	Farmstead/Homestead	828
256	Canal-Era	Deer Creek	Section 32	Four	Farmstead/Homestead	828
257	Canal-Era	Deer Creek	Section 33	One	Farmstead/Homestead	5244
258	Canal-Era	Deer Creek	Section 33	Five	Farmstead/Homestead	1242
259	Canal-Era	Deer Creek	Section 33	Six	School	1242

	G	H	I	J
1	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
2	Nearest Neighbor		Opposite Direction	River
3		414	2760	4140
4	1794	138	1518	7452
5	3036	138	1242	6072
6	1794	138	1794	7314
7	828	138	414	8556
8	690	138	276	9108
9	828	276	276	9246
10	1380	138	966	9660
11	690	138	414	9660
12	2760	690	2760	6486
13	1242	276	276	10074
14		138	3174	12834
15	3588	3864	5520	2898
16	3036	3174	5382	3726
17	690	138	552	6762
18	1104	138	552	7038
19	2484	138	6900	15594
20	1104	552	3726	1932
21	828	276	3174	1518
22	828	138	2898	966
23	966	138	2208	966
24	552	138	138	1518
25	1380	138	6210	1242
26	690	138	5658	2070
27	690	138	5106	1656
28	1518	138	4554	1656
29	1242	138	4002	1518
30	1380	138	2622	1104
31	2070	138	1380	552
32	1518	138	4002	4002
33	1794	138	2898	3864
34	3864	138	2760	7452
35		138	4278	10902
36		138	4830	9246
37		138	1794	6900
38	1518	138	1380	2346
39		138	276	3864
40	4968	138	2760	3312
41	5244	276	4278	9384
42	3036	138	3036	3864
43	3864	138	4140	6348
44	966	138	276	3174
45	1380	138	2484	5658
46	828	138	1242	6348
47	552	138	690	6624
48	552	138	414	6762
49	966	552	1242	7038
50	828	138	4554	3036
51	2208	138	276	3726
52	1794	138	2208	4692
53	1794	138	1380	5106
54	2484	138	2622	8280
55	2208	276	1932	8694
56	414	552	1242	6486
57	414	138	1242	6900
58	276	138	1104	6624
59	552	138	552	6762
60	966	414	966	6348

	G	H	I	J
61	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
62	Nearest Neighbor		Opposite Direction	River
63	1104	138	828	8418
64	1932	1104	7866	12282
65	1794	138	7590	13110
66	2070	138	9660	13386
67		138	5382	14628
68	4140	138	1242	10212
69	3036	414	3864	11040
70	2760	138	828	1518
71	2760	2898	6210	1380
72	5520	5520	5658	1380
73	2484	138	5658	6624
74	2484	138	8142	6486
75	4140	138	7452	7590
76	2898	414	1794	2622
77	828	414	6072	2346
78	828	276	5244	2346
79	3726	1656	2208	1518
80	1242	138	6900	6762
81		138	5658	13248
82	690	276	276	5796
83	552	138	414	5520
84	1242	276	1242	4830
85	552	276	1242	4830
86	2484	138	1380	7452
87	2484	2070	2760	5658
88	1932	1656	2346	8418
89	1932	1518	2208	5934
90	3036	138	1794	414
91	4278	138	1794	1794
92	2898	2070	2622	1794
93	2346	414	2484	414
94	2760	138	2346	4830
95	2346	138	1242	3726
96	2346	138	1242	1932
97	1932	1242	1794	5382
98	2898	414	1932	5106
99	3174	138	414	1656
100	3450	414	3588	4830
101	4002	1518	3726	4692
102	2070	276	3864	8418
103	1794	414	4140	10074
104	1794	414	3864	10212
105	1794	414	2484	9936
106	1242	138	2070	10488
107		1104	1242	11730
108	552	690	690	3588
109	276	414	414	3588
110	414	138	138	3588
111	414	138	552	4002
112	690	138	276	4278
113	1104	138	828	5382
114	3312	3036	3450	5796
115	3036	3174	3726	5796
116	3036	3588	1656	8004
117	3312	138	4002	9936
118		414	3174	10350
119	690	138	1656	4416
120	1242	414	1518	4002

	G	H	I	J
121	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
122	Nearest Neighbor		Opposite Direction	River
123	1380	138	414	3588
124	1794	138	276	3726
125	828	276	2208	5658
126	1104	276	1656	6210
127	828	138	1794	6072
128	1242	276	1518	5934
129	2070	552	552	7590
130	2622	276	5382	3726
131	2208	1242	1380	7038
132	2208	552	2346	8280
133	2622	276	414	8694
134		966	3450	12420
135	2622	828	4692	138
136	2208	138	5382	1794
137	1794	138	4692	1104
138	552	138	3036	2346
139	552	138	2760	2346
140	828	138	2346	2346
141	828	414	2760	2898
142	1242	552	1380	3588
143	1104	138	828	5382
144	4278	138	1380	7866
145	3174	1518	3588	2622
146	4002	138	1380	5106
147	2760	138	276	7176
148	2346	138	414	9384
149	1932	138	690	9660
150	1932	1656	3450	3450
151	1242	828	2070	4278
152	414	552	552	4554
153	1518	276	276	5106
154	3174	276	966	5106
155	2070	138	1794	8004
156	1242	690	1656	8694
157	414	276	552	4140
158	414	276	414	4002
159	2898	828	4416	2898
160	1242	138	5244	1242
161	828	138	4692	1104
162	1242	138	3864	828
163	1518	138	1380	966
164	2346	414	1518	1518
165	414	276	1518	2346
166	414	276	1794	2484
167	414	138	1932	2760
168	966	138	828	8004
169	552	138	1380	8556
170	138	138	1794	8970
171	3174	828	4140	552
172	1656	276	4416	6900
173	2208	552	2484	7176
174		2484	2760	10350
175	2760	138	2760	2898
176	2760	690	2760	3864
177	3312	3174	3312	6762
178	3450	3726	3864	6762
179		414	3864	11040
180		414	2898	10764

	G	H	I	J
181	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
182	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
183	2622	138	5244	5382
184	5658	3174	3312	138
185	2898	3036	3174	3726
186	552	138	1242	7452
187	276	138	1518	7314
188	414	138	1794	7038
189	690	138	2208	6624
190	2208	276	1242	6210
191	1380	2070	2760	8280
192	1380	2760	3312	9384
193	1242	3174	3450	9384
194	1242	138	690	11592
195		138	3312	10074
196		138	2760	10626
197	966	138	276	5244
198	2208	414	1656	3174
199	1518	414	966	5382
200	1656	138	1380	4830
201	2622	138	2070	5106
202	3312	138	3174	3588
203	2760	138	276	7728
204	1932	1104	6762	3864
205	2208	138	6072	5658
206	1656	1932	5382	3864
207	1380	2208	4692	3174
208	1242	1242	3864	4002
209	1656	138	3174	5106
210	1380	1932	2898	3312
211	1104	138	1518	5382
212	2898	2346	2760	8556
213	1932	552	4002	6486
214	2070	1104	2760	5658
215	828	138	690	6486
216	552	138	276	6624
217	828	138	552	6210
218	552	138	690	6900
219	414	138	414	7176
220	690	138	414	7314
221	690	138	138	7314
222	1242	138	1518	8418
223	1656	138	1242	10488
224	1794	138	1794	11040
225	1242	138	1242	10350
226	828	138	690	10902
227	1242	690	1518	12558
228	1242	690	1518	12558
229	4002	276	276	13800
230	1380	138	966	12834
231	3174	276	3864	9936
232	4002	690	3588	11454
233	3312	3588	3726	13386
234	2898	2898	4278	15318
235	2346	138	276	414
236	1104	138	1656	6762
237	2760	138	2760	7590
238	5106	276	1380	3036
239	4554	1242	2760	6348
240	1932	276	2760	10350

	G	H	I	J
241	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
242	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
243	1932	276	828	11592
244	2484	276	414	11592
245		966	2898	10212
246	2760	138	2760	10074
247	2760	552	3174	14766
248	2760	138	2346	14214
249	1380	138	1104	2622
250	1104	1104	1242	1518
251	1242	1104	1242	1242
252	1242	138	3450	2484
253	3036	828	1794	5382
254	3864	414	3450	5934
255		1104	3174	7590
256		276	2484	8004
257	5382	276	2208	14214
258	3450	414	1518	15870
259	1794	138	138	15594

	K	L	M	N
1	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
2	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
3			1518	1518
4			4416	4416
5			3726	4830
6			4692	4830
7			5796	1794
8			6210	6486
9			6210	6486
10			7038	7314
11			7314	7866
12			3174	3450
13			7038	8280
14			9798	9936
15	20148	Ford	138	414
16	20700	Ford	414	414
17	19458	Ford	4002	3726
18	19872	Ford	3864	3864
19			13524	13386
20	3312	Ford	828	4278
21	2484	Ford	414	3450
22	2208	Ford	138	3174
23	1794	Ford	276	2760
24	1518	Ford	414	414
25	8280	Ford	1104	7452
26	8694	Ford	1518	7728
27	9108	Ford	1380	8556
28	9798	Ford	1656	9108
29	10212	Ford	1656	9522
30	11592	Ford	828	10902
31	12834	Ford	552	9522
32	5382	Ford	2070	4278
33	4140	Ford	3036	3036
34	7728	Ford	6762	7176
35	11730	Ford	10488	9936
36	14076	Ford	8970	12834
37	16422	Ford	6900	8556
38	14214	Ford	1380	1380
39	13110	Ford	2484	2760
40	9384	Ford	414	5934
41	10488	Ford	5796	8418
42	3588	Ford	3036	3450
43	5658	Ford	5520	5796
44	13800	Ford	2070	2208
45	17250	Ford	3174	3864
46	18216	Ford	3726	3864
47	18768	Ford	4002	3864
48	19044	Ford	4140	4002
49	17802	Ford	4416	4554
50	22908	Bridge	3036	7452
51	18906	Bridge	3036	12558
52	21666	Bridge	4416	11040
53	22494	Bridge	4968	10764
54	24426	Bridge	8142	13248
55	26358	Bridge	8694	12144
56	24564	Bridge	6486	10350
57	24702	Bridge	6900	10764
58	24426	Bridge	6624	10764
59	24288	Bridge	6762	11178
60	24150	Bridge	6348	10626

	K	L	M	N
61	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
62	River Feature		and Erie Canal	and Erie Canal Feature
63	26772	Bridge	8418	11178
64	27600	Bridge	10764	10488
65	28290	Ford	11454	11454
66	29670	Ford	10764	11592
67	35190	Bridge	13524	13524
68	30360	Bridge	10074	10488
69	27876	Bridge	11040	13938
70	14490	Ford	1380	7590
71	17250	Ford	414	4830
72	20010	Ford	414	2070
73	22218	Ford	5796	5382
74	24564	Ford	5106	4830
75	24702	Ford	4002	4968
76	24150	Bridge	2208	4830
77	22494	Bridge	2208	7038
78	21942	Bridge	2208	7728
79	18078	Bridge	966	11178
80	23736	Ford	5658	5244
81	26358	Ford	12144	11730
82	27462	Bridge	4968	5382
83	27186	Bridge	4830	5244
84	26082	Bridge	4554	5796
85	27048	Bridge	4554	5796
86	28566	Bridge	6762	7176
87	28082	Bridge	6486	8556
88	26082	Bridge	8418	8832
89	27462	Bridge	5934	9936
90	9246	Ford	276	7176
91	8556	Ford	1656	8142
92	2346	Ford	138	828
93	414	Ford	414	828
94	4554	Ford	3036	3726
95	3726	Ford	2760	2760
96	2346	Ford	1656	2346
97	5382	Ford	4554	4554
98	5520	Ford	4830	5658
99	3726	Ford	1518	4968
100	5520	Ford	4692	5934
101	7728	Ford	4554	8832
102	8418	Ferry	8280	8280
103	10074	Ferry	9936	9936
104	10350	Ferry	10074	10212
105	10074	Ferry	9798	9936
106	10764	Ferry	10350	10626
107	12144	Ferry	11592	12006
108	3588	Ferry	138	15318
109	3588	Ferry	138	15042
110	3588	Ferry	138	14766
111	4002	Ferry	552	14766
112	4278	Ferry	828	15042
113	5382	Ferry	1518	14352
114	13248	Ferry	3450	6900
115	14490	Ferry	4002	4416
116	14490	Ferry	7176	7038
117	14904	Ferry	7038	10212
118	16284	Ferry	7728	9936
119	5520	Ferry	828	12282
120	5382	Ferry	414	12144

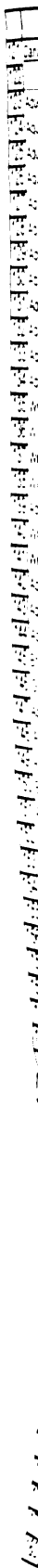
	K	L	M	N
121	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
122	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
123	6210	Ferry	138	10764
124	6900	Ferry	414	10350
125	8556	Ferry	1656	10350
126	8556	Ferry	2760	10902
127	9384	Ferry	2484	9936
128	9660	Ferry	2484	9522
129	11454	Ferry	4278	9936
130	11868	Ferry	1104	5382
131	7314	Ferry	3450	13524
132	9384	Ferry	4830	12696
133	11454	Ferry	5382	10902
134	12006	Ferry	8832	16974
135	6210	Ferry	1242	14490
136	8694	Ferry	414	12558
137	8418	Ferry	966	12696
138	8624	Ferry	828	15180
139	6486	Ferry	828	14490
140	5934	Ferry	690	15870
141	7176	Ferry	1380	14490
142	3174	Ferry	552	16146
143	5244	Ferry	1932	14490
144	9108	Ferry	5382	17802
145	4968	Ferry	414	4968
146	5934	Ford	1104	5934
147	12558	Ferry	2760	7038
148	12144	Ferry	9384	10350
149	11868	Ferry	9660	10902
150	7038	Ferry	3174	6762
151	7590	Ferry	4140	7452
152	9660	Ferry	4554	9522
153	8418	Ferry	5106	8280
154	5934	Ferry	4968	5796
155	9798	Ferry	7728	9660
156	9936	Ferry	8418	9798
157	9246	Ferry	4140	9108
158	9384	Ferry	4002	9246
159	16560	Ferry	414	4416
160	7314	Ferry	1242	5382
161	7866	Ferry	1104	4830
162	8418	Ferry	828	4002
163	10902	Ferry	552	1518
164	13800	Ferry	138	1380
165	12006	Ferry	1518	1656
166	11730	Ferry	1794	1932
167	12282	Ferry	1932	2070
168	8418	Ford	7728	8418
169	8832	Ford	8280	8832
170	9246	Ford	8694	9246
171	4692	Ferry	276	4692
172	7038	Ford	5520	6210
173	7314	Ford	6762	6762
174	10626	Ford	9108	10074
175	11040	Ferry	1656	4692
176	13662	Ferry	3588	4278
177	13110	Ferry	6072	11040
178	12282	Ferry	5934	11868
179	13662	Ferry	9522	16284
180	16008	Ferry	10074	12834

	K	L	M	N
181	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
182	River Feature		and Erie Canal	and Erie Canal Feature
183		5934 Ferry	4416	5382
184		3174 Ferry	2484	8694
185		8556 Ferry	276	3174
186		12006 Ferry	1154	1242
187		12006 Ferry	1242	1518
188		12006 Ferry	1380	1794
189		12144 Ferry	1518	2208
190		12558 Ferry	2898	4002
191		14214 Ferry	3588	4140
192		15594 Ferry	5106	5520
193		15042 Ferry	4278	4554
194		15870 Ferry	4968	4968
195		17802 Ferry	7866	8556
196		16560 Ferry	9522	10902
197		6486 Ferry	5796	8280
198		5244 Ferry	6762	9246
199		12144 Ferry	2898	4692
200		12282 Ferry	4140	5934
201		13386 Ferry	4968	7590
202		11868 Ferry	3450	8832
203		15870 Ferry	7590	8280
204		14352 Bridge	690	1242
205		12696 Ferry	690	690
206		11868 Ferry	2622	6762
207		10626 Ferry	4002	3726
208		10074 Ferry	3588	3588
209		10074 Ferry	2898	2898
210		8970 Ferry	4968	4968
211		8280 Ferry	4416	4968
212		12558 Ferry	552	2760
213		8142 Ferry	2760	4278
214		8556 Ferry	2346	2898
215		10350 Ferry	552	828
216		10764 Ferry	138	138
217		10764 Ferry	138	552
218		11592 Ferry	690	828
219		11730 Ferry	690	552
220		11730 Ferry	828	552
221		11316 Ferry	414	276
222		12834 Ferry	1794	1656
223		13938 Ferry	3036	3588
224		14352 Ferry	3588	4140
225		14490 Ferry	3588	3588
226		15042 Ferry	4140	4140
227		16836 Ferry	5934	5934
228		16836 Ferry	5934	5934
229		17112 Ferry	5658	7728
230		14076 Bridge	8556	8556
231		16974 Ford	10074	11040
232		15318 Ford	10626	10350
233		18630 Ford	12972	13248
234		19182 Ford	14628	14352
235		12834 Ford	4416	14214
236		14076 Ford	5520	15594
237		15180 Ford	7176	16698
238		12006 Ford	2622	6486
239		12696 Ford	5658	6762
240		17526 Ford	9936	11730

	K	L	M	N
241	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
242	River Feature		and Erie Canal	and Erie Canal Feature
243	19458	Ford	11040	13524
244	19872	Ford	11178	14076
245	14352	Ford	9108	16284
246	17802	Ford	9660	14076
247	21114	Ford	14076	22356
248	21252	Ford	13524	22356
249	2622	Ford	1380	1518
250	7176	Ford	966	1242
251	6486	Ford	828	966
252	7866	Ford	2070	1518
253	8418	Ford	5106	5244
254	9936	Ford	5520	5520
255	10212	Ford	7038	7038
256	10212	Ford	7176	7176
257	10698	Ford	13662	13662
258	18078	Ford	14766	14904
259	17802	Ford	14214	14352

	O	P	Q	R	S
1	Canal Feature	Distance to Nearest Railroad	Distance to Nearest Railroad Feature	Railroad Feature	Distance to Nearest Town
2	Basin	4554			
3	Basin	6900			23460
4	Basin	5520			26634
5	Basin	5520			25254
6	Basin	4968			24978
7	Basin	4692			25392
8	Basin	4416			24426
9	Basin	3450			26220
10	Basin	2898			26910
11	Basin	8556			22632
12	Basin	3036			27462
13	Basin	828			27600
14	Basin	13524	55614	Watch House	20676
15	Basin	12006	57132	Watch House	21390
16	Basin	10784	53268	Watch House	19182
17	Aqueduct	2136			
18	Bridge	24150	32568	Watch House	4002
19	Bridge	24840	29256	Watch House	3312
20	Bridge	24978	29118	Watch House	3036
21	Bridge	24978	42918	Watch House	2346
22	Bridge	25254	44160	Watch House	138
23	Bridge	23736	34086	Watch House	4140
24	Bridge	23184	33672	Watch House	7314
25	Bridge	23046	34362	Watch House	7590
26	Bridge	22494	32706	Watch House	8418
27	Bridge	22356	32292	Watch House	6210
28	Bridge	22218	30636	Watch House	7452
29	Basin	22080	29118	Watch House	8832
30	Bridge	24564	36432	Watch House	1104
31	Bridge	22632	40996	Watch House	2070
32	Basin	18492	39744	Watch House	5796
33	Bridge	15456	35880	Watch House	8280
34	Aqueduct	14904	32154	Watch House	10488
35	Basin	16008	27600	Watch House	12420
36	Bridge	18078			14490
37	Bridge	17664	35742	Watch House	13386
38	Bridge	22080	50232	Watch House	10212
39	Bridge	16836	45126	Watch House	9936
40	Bridge	22356	40434	Watch House	2484
41	Bridge	19734	40710	Watch House	4830
42	Bridge	17526	52440	Watch House	14076
43	Basin	13248	52302	Watch House	17112
44	Basin	12006	51888	Watch House	17940
45	Basin	11454	52164	Watch House	18452
46	Basin	11040	52026	Watch House	18630
47	Basin	12006	51198	Watch House	16698
48	Vvea AqueductLock System	1794	4830	Watch House	17250
49	Vvea AqueductLock System	1518	2070	Watch House	12834
50	Vvea AqueductLock System	138	3726	Watch House	15456
51	Vvea AqueductLock System	276	4554	Watch House	16560
52	Vvea AqueductLock System	276	6486	Watch House	18078
53	Vvea AqueductLock System	2622	8694	Watch House	20148
54	Vvea AqueductLock System	1380	6900	Watch House	18492
55	Vvea AqueductLock System	1656	6486	Watch House	18768
56	Vvea AqueductLock System	1794	7176	Watch House	18492
57	Vvea AqueductLock System	2208	6486	Watch House	18216
58	Vvea AqueductLock System	1518	6210	Watch House	18216
59					
60					

	O	P	Q	R	S
	Canal Feature	Distance to Nearest Railroad	Distance to Nearest Railroad Feature	Railroad Feature	Distance to Nearest Town
81	Canal Feature				
82	Canal Feature				
83	Wes AqueductLock System	2070	8832	Watch House	20700
84	Wes AqueductLock System	6210	21114	Watch House	23460
85	Basin	5520	20562	Watch House	23736
86	Basin	4278	19320	Watch House	25392
87	Wes AqueductLock System	276	17112	Watch House	29394
88	Wes AqueductLock System	138	12282	Watch House	24426
89	Wes AqueductLock System	4830	10626	Watch House	21804
90	Wes AqueductLock System	20286	27738	Watch House	11178
91	Basin	18734	24978	Watch House	14628
92	Wes AqueductLock System	18216	22080	Watch House	17526
93	Basin	12696	21528	Watch House	19734
94	Wes AqueductLock System	12144	16284	Watch House	22080
95	Wes AqueductLock System	10488	7314	Watch House	24564
96	Wes AqueductLock System	4416	7314	Watch House	19320
97	Wes AqueductLock System	2484	4830	Watch House	17112
98	Wes AqueductLock System	1794	4140	Watch House	16422
99	Wes AqueductLock System	138	0	Watch House	12282
80	Basin	12006	20286	Watch House	19596
81	Basin	5796	22908	Watch House	22494
82	Wes AqueductLock System	4140	9936	Watch House	22218
83	Wes AqueductLock System	4002	9660	Watch House	21804
84	Wes AqueductLock System	3174	8418	Watch House	20562
85	Wes AqueductLock System	3588	9384	Watch House	21666
86	Wes AqueductLock System	2760	10626	Watch House	23046
87	Wes AqueductLock System	690	8004	Watch House	20424
88	Wes AqueductLock System	276	9246	Watch House	20424
89	Wes AqueductLock System	1242	8142	Watch House	21804
90	Guardlock	1656	15456	Station	11868
91	Guardlock	1242	16284	Station	13524
92	Guardlock	10074	24012	Station	11040
93	Guardlock	8694	25116	Station	12834
94	Guardlock	8694	28428	Station	9384
95	Guardlock	8142	27186	Station	10626
96	Guardlock	6762	24840	Station	12972
97	Guardlock	7038	25116	Station	10350
98	Guardlock	4140	25392	Station	13662
99	Guardlock	4554	18768	Station	18768
100	Guardlock	3450	24150	Station	14766
101	Guardlock	690	20148	Station	17112
102	Bridge	8004	25944	Station	6486
103	Bridge	6210	41952		8142
104	Bridge	6072	41676		8418
105	Bridge	6486	39744	Station	8142
106	Bridge	5658	40020	Station	8832
107	Bridge	4554	40434		10074
108	Aqueduct	10626	46230	Station	26358
109	Aqueduct	10764	46920	Station	26082
110	Aqueduct	10764	47058	Station	25806
111	Aqueduct	10488	46782	Station	25668
112	Aqueduct	10074	46782	Station	25944
113	Aqueduct	10074	47472	Station	24978
114	Aqueduct	8556	55476	Station	16560
115	Aqueduct	9798	59064	Station	13110
116	Aqueduct	7314	59892	Station	12972
117	Aqueduct	4968	54096	Station	18492
118	Aqueduct	4692	52716	Station	17526
119	Aqueduct	10626	48990	Station	23598
120	Aqueduct	10902	49296	Station	23322



	O	P	Q	R	S
121	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
122		Railroad	Railroad Feature	Feature	Nearest Town
123	Aqueduct	11178	50508	Station	22080
124	Aqueduct	10902	51060	Station	21666
125	Aqueduct	8670	51336	Station	21114
126	Aqueduct	8418	50508	Station	23046
127	Aqueduct	8694	51336	Station	20562
128	Aqueduct	8694	52026	Station	20148
129	Aqueduct	7038	52440	Station	19872
130	Aqueduct	11178	55752	Station	16284
131	Aqueduct	7728	47610	Station	24564
132	Aqueduct	6624	48990	Station	23184
133	Aqueduct	6072	51612	Station	20976
134	Aqueduct	2346	45678	Station	26772
135	Wildcat Bridge and Locks	11316	41400	Station	27738
136	Wildcat Bridge and Locks	9108	38364	Station	25530
137	Wildcat Bridge and Locks	8694	39054	Station	26082
138	Wildcat Bridge and Locks	9384	41124	Station	27876
139	Aqueduct	9522	41678	Station	28428
140	Wildcat Bridge and Locks	9798	41952	Station	28704
141	Wildcat Bridge and Locks	8832	53130	Station	27600
142	Aqueduct	10764	45540	Station	27462
143	Aqueduct	9108	46782	Station	25806
144	Aqueduct	5796	43884	Station	31050
145	Bridge	13662	33672	Station	3174
146	Guardlock	10350	31188	Station	6624
147	Aqueduct	7866	61824	Station	11316
148	Aqueduct	5934	44160	Station	10626
149	Aqueduct	5796	43332	Station	10212
150	Bridge	12420	41952	Station	5106
151	Aqueduct	11454	45264	Station	5520
152	Aqueduct	10626	47334	Station	7728
153	Aqueduct	10488	45816	Station	6486
154	Bridge	11040	39468	Station	4002
155	Aqueduct	7866	44850	Station	8004
156	Bridge	7314	44850	Station	8142
157	Aqueduct	10902	44298	Station	7452
158	Aqueduct	11040	47334	Station	7452
159	Aqueduct	12282	56718	Station	15456
160	Aqueduct	14076	43332	Station	5934
161	Aqueduct	14076	43884	Station	6486
162	Aqueduct	14076	44850	Station	7176
163	Aqueduct	14076	47058	Station	9660
164	Aqueduct	13662	50232	Station	12696
165	Aqueduct	12834	48162	Station	10626
166	Aqueduct	12558	47886	Station	10350
167	Aqueduct	12420	48300	Station	11040
168	Guardlock	2760	27186	Station	13938
169	Guardlock	2484	24012	Station	13938
170	Guardlock	2346	25116	Station	13938
171	Bridge	15456	40710	Station	3312
172	Guardlock	7038	29256	Station	9522
173	Guardlock	5382	28566	Station	11178
174	Guardlock	4416	31188	Station	11454
175	Bridge	13110	35328	Station	2622
176	Bridge	12558	37674	Station	2622
177	Wildcat Bridge and Locks	3312	35880	Station	23598
178	Wildcat Bridge and Locks	3726	36708	Station	24426
179	Wildcat Bridge and Locks	1242	40434	Station	28428
180	Wildcat Bridge and Locks	414	36294	Station	24426

	O	P	Q	R	S
	Canal Feature	Distance to Nearest Railroad	Distance to Nearest Railroad Feature	Railroad Feature	Distance to Nearest Town
181	Wildcat Bridge and Locks	1656	24564	Station	12144
182	Wildcat Bridge and Locks	2208	24702	Station	17388
183	Wildcat Bridge and Locks	5934	27462	Station	14766
184	Wildcat Bridge and Locks	2346	25944	Station	13524
185	Wildcat Bridge and Locks	2346	26358	Station	13800
186	Wildcat Bridge and Locks	2484	26634	Station	14214
187	Wildcat Bridge and Locks	2484	27196	Station	14628
188	Wildcat Bridge and Locks	2760	28842	Station	16422
189	Wildcat Bridge and Locks	690	27600	Station	15456
190	Wildcat Bridge and Locks	414	28290	Station	16284
191	Wildcat Bridge and Locks	414	26910	Station	15042
192	Wildcat Bridge and Locks	1656	23046	Station	11316
193	Wildcat Bridge and Locks	1380	31464	Station	22494
194	Wildcat Bridge and Locks	138	34500	Station	19458
195	Wildcat Bridge and Locks	552	23322	Station	11316
196	Wildcat Bridge and Locks	1380	24564	Station	12834
197	Wildcat Bridge and Locks	3588	29532	Station	17112
198	Wildcat Bridge and Locks	4278	31050	Station	18630
199	Wildcat Bridge and Locks	4140	32430	Station	20148
200	Wildcat Bridge and Locks	6072	35052	Station	22356
201	Wildcat Bridge and Locks	1656	32706	Station	20562
202	Basin	1932	15456	Station	4830
203	Basin	276	16836	Station	5244
204	Basin	2070	17802	Station	7038
205	Basin	2208	19182	Station	8280
206	Basin	1380	19458	Station	8280
207	Basin	276	19596	Station	8004
208	Basin	2070	20562	Station	9660
209	Basin	138	21252	Station	9660
210	Basin	2622	18078	Station	5658
211	Wildcat Bridge and Locks	3174	23598	Station	10764
212	Wildcat Bridge and Locks	4830	24840	Station	12006
213	Wildcat Bridge and Locks	3726	24840	Station	12420
214	Wildcat Bridge and Locks	3450	24978	Station	12696
215	Wildcat Bridge and Locks	3450	21942	Station	13248
216	Wildcat Bridge and Locks	2622	25668	Station	13524
217	Wildcat Bridge and Locks	2484	25254	Station	13110
218	Wildcat Bridge and Locks	2484	24840	Station	12696
219	Wildcat Bridge and Locks	2898	24564	Station	12282
220	Wildcat Bridge and Locks	1380	24426	Station	12558
221	Wildcat Bridge and Locks	138	22080	Station	9798
222	Wildcat Bridge and Locks	138	21528	Station	9522
223	Wildcat Bridge and Locks	414	23184	Station	11316
224	Wildcat Bridge and Locks	966	22908	Station	11178
225	Wildcat Bridge and Locks	2760	23046	Station	11730
226	Wildcat Bridge and Locks	2760	24012	Station	12834
227	Wildcat Bridge and Locks	2208	18906	Station	7038
228	Basin	3588	15180	Station	5658
229	Guardlock	8280	18630	Station	14628
230	Guardlock	8556	15042	Station	11316
231	Guardlock	11040	19044	Station	15456
232	Guardlock	12420	18078	Station	14628
233	Guardlock	2070	23598	Station	20010
234	Guardlock	3312	23184	Station	19596
235	Guardlock	4416	22908	Station	19182
236	Guardlock	966	16422	Station	12972
237	Guardlock	3726	15456	Station	11868
238	Guardlock	8142	19596	Station	15732

	O	P	Q	R	S
241	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
242		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
243	Guardlock	9108	21528	Station	17684
244	Guardlock	9108	22218	Station	18354
245	Guardlock	4416	28704	Station	26910
246	Guardlock	7038	22908	Station	19044
247	Guardlock	10488	27324	Station	19182
248	Guardlock	10764	24840	Station	21114
249	Bridge	3726	4692	Station	1656
250	Guardlock	828	11316	Station	7728
251	Guardlock	828	10074	Station	6762
252	Guardlock	138	11040	Station	7452
253	Towpath Bridge	1932	7590	Station	3588
254	Guardlock	3450	10488	Station	6486
255	Lock	3588	7314	Station	4140
256	Lock	3864	6900	Station	3726
257	Towpath Bridge	10764	14352	Station	11454
258	Lock	11868	13110	Station	10764
259	Lock	11316	12420	Station	9798

	T	U	V	W	X	Y
1	Town	Distance to Nearest Body of Water	Body of Water	RR	WE	WA
2						
3			276 Flint Creek	Yes	Yes	Yes
4	Granville		5658 Flint Creek	Yes	Yes	Yes
5	Granville		3588 Flint Creek	Yes	Yes	Yes
6	Granville		4416 Flint Creek	Yes	Yes	Yes
7	Granville		4968 Flint Creek	Yes	Yes	Yes
8	Granville		4968 Flint Creek	Yes	Yes	Yes
9	Granville		5795 Flint Creek	Yes	Yes	Yes
10	Granville		4140 Flint Creek	Yes	Yes	Yes
11	Granville		3450 Flint Creek	Yes	Yes	Yes
12	Granville		6486 Wabash River	Yes	Yes	Yes
13	Granville		690 Flint Creek	Yes	Yes	Yes
14	Granville		3036 Flint Creek	Yes	Yes	No
15	Granville		2898 Wabash River	No	Yes	Yes
16	Granville		3726 Wabash River	No	Yes	Yes
17	Granville		6762 Wabash River	No	Yes	Yes
18	Granville		7038 Wabash River	Yes	Yes	Yes
19			690 Flint Creek	Yes	Yes	Yes
20	Granville		1932 Wabash River	No	Yes	Yes
21	Granville		1518 Wabash River	No	Yes	Yes
22	Granville		966 Wabash River	No	Yes	Yes
23	Granville		966 Wabash River	No	Yes	Yes
24	Granville		1518 Wabash River	No	Yes	Yes
25	Granville		1242 Wabash River	No	Yes	Yes
26	Granville		2070 Wabash River	No	Yes	Yes
27	Granville		1656 Wabash River	No	Yes	Yes
28	Granville		1656 Wabash River	No	Yes	Yes
29	Granville		1518 Wabash River	No	Yes	Yes
30	Granville		1104 Wabash River	No	Yes	Yes
31	Granville		552 Wabash River	No	Yes	Yes
32	Granville		4002 Wabash River	No	Yes	Yes
33	Granville		3864 Wabash River	No	Yes	Yes
34	Granville		7452 Wabash River	No	Yes	Yes
35	Granville		10902 Wabash River	No	Yes	Yes
36	Granville		9246 Wabash River	No	Yes	Yes
37	Granville		6900 Wabash River	No	Yes	Yes
38	Granville		2346 Wabash River	No	Yes	Yes
39	Granville		3864 Wabash River	No	Yes	Yes
40	Granville		3312 Wabash River	No	Yes	Yes
41	Granville		9384 Wabash River	No	Yes	Yes
42	Granville		3864 Wabash River	No	Yes	Yes
43	Granville		6348 Wabash River	No	Yes	Yes
44	Granville		3174 Wabash River	No	Yes	Yes
45	Granville		5658 Wabash River	No	Yes	Yes
46	Granville		6348 Wabash River	No	Yes	Yes
47	Granville		6624 Wabash River	No	Yes	Yes
48	Granville		6762 Wabash River	No	Yes	Yes
49	Granville		7038 Wabash River	No	Yes	Yes
50	Lafayette		828 Wea Creek	Yes	Yes	Yes
51	Lafayette		3726 Wea Creek	Yes	Yes	Yes
52	Lafayette		2070 Wea Creek	Yes	Yes	Yes
53	Lafayette		1242 Wea Creek	Yes	Yes	Yes
54	Lafayette		966 Wabash River	No	Yes	Yes
55	Lafayette		1104 Wea Creek	No	Yes	Yes
56	Lafayette		276 Wea Creek	No	Yes	Yes
57	Lafayette		690 Wea Creek	No	Yes	Yes
58	Lafayette		414 Wabash River	No	Yes	Yes
59	Lafayette		138 Mill Race	No	Yes	Yes
60	Lafayette		138 Mill Race	No	Yes	Yes

	T	U	V	W	X	Y
61	Town	Distance to Nearest	Body of	RR	WF	WA
62		Body of Water	Water			
63	Lafayette		2070 Wes Creek	No	Yes	Yes
64	Granville		8970 Wes Creek	Yes	Yes	No
65	Lafayette		9798 Wes Creek	Yes	Yes	Yes
66	Lafayette		8556 Wes Creek	Yes	Yes	Yes
67	Lafayette		9246 Wes Creek	No	No	No
68	Lafayette		4416 Wes Creek			
69	Lafayette		1656 Wes Creek	No	No	No
70	Granville		1518 Wabash River	No	Yes	Yes
71	Granville		1380 Wabash River	No	Yes	Yes
72	Granville		1380 Wabash River	No	Yes	Yes
73	Granville		6624 Wabash River	No	Yes	Yes
74	Granville		12144 Wes Creek	No	Yes	Yes
75	Lafayette		10488 Wes Creek	Yes	Yes	Yes
76	Lafayette		660 Wes Creek	Yes	Yes	Yes
77	Lafayette		1242 Wes Creek	Yes	Yes	Yes
78	Lafayette		1656 Wes Creek	Yes	Yes	Yes
79	Lafayette		1518 Wes Creek	Yes	Yes	Yes
80	Granville		6762 Wabash River	No	Yes	Yes
81	Granville		13248 Wabash River	Yes	Yes	Yes
82	Lafayette		138 Mill Race	Yes	Yes	Yes
83	Lafayette		138 Mill Race	Yes	Yes	Yes
84	Lafayette		414 Mill Race	Yes	Yes	Yes
85	Lafayette		414 Mill Race	Yes	Yes	Yes
86	Lafayette		1932 Mill Race	Yes	Yes	Yes
87	Lafayette		276 Wabash River	Yes	Yes	Yes
88	Lafayette		414 Wes Creek	No	Yes	Yes
89	Lafayette		2070 Wabash River	Yes	Yes	Yes
90	Delphi		414 Wabash River	Yes	Yes	Yes
91	Delphi		1794 Wabash River	Yes	Yes	Yes
92	Americus		1794 Wabash River	Yes	Yes	Yes
93	Americus		414 Wabash River	Yes	Yes	Yes
94	Americus		4830 Wabash River	Yes	Yes	Yes
95	Americus		3726 Wabash River	Yes	Yes	Yes
96	Americus		1932 Wabash River	Yes	Yes	Yes
97	Americus		5382 Wabash River	Yes	Yes	Yes
98	Americus		5106 Wabash River	Yes	Yes	Yes
99	Delphi		1656 Wabash River	Yes	Yes	Yes
100	Americus		4830 Wabash River	Yes	Yes	Yes
101	Delphi		4692 Wabash River	Yes	Yes	Yes
102	Americus		552 Sugar Creek	Yes	Yes	Yes
103	Americus		276 Sugar Creek	Yes	Yes	Yes
104	Americus		278 Sugar Creek	Yes	Yes	Yes
105	Americus		966 Sugar Creek	Yes	Yes	Yes
106	Americus		414 Sugar Creek	Yes	Yes	Yes
107	Americus		552 Sugar Creek	Yes	Yes	Yes
108	Americus		3588 Wabash River	No	Yes	Yes
109	Americus		3588 Wabash River	No	Yes	Yes
110	Americus		3588 Wabash River	No	Yes	Yes
111	Americus		4002 Wabash River	Yes	Yes	Yes
112	Americus		4278 Wabash River	Yes	Yes	Yes
113	Americus		3036 Buck Creek	Yes	Yes	Yes
114	Americus		3036 Buck Creek	Yes	Yes	Yes
115	Americus		1932 Sugar Creek	Yes	Yes	Yes
116	Americus		3312 Sugar Creek	Yes	Yes	Yes
117	Americus		552 Buck Creek	Yes	Yes	Yes
118	Americus		552 Buck Creek	Yes	Yes	Yes
119	Americus		1518 Buck Creek	Yes	Yes	Yes
120	Americus		1380 Buck Creek	Yes	Yes	Yes

	T	U	V	W	X	Y
	Town	Distance to Nearest Body of Water	Body of Water	RR	WE	WA
121						
122						
123	Americus	138	Buck Creek	Yes	Yes	Yes
124	Americus	414	Buck Creek	Yes	Yes	Yes
125	Americus	138	Buck Creek	Yes	Yes	Yes
126	Americus	414	Buck Creek	Yes	Yes	Yes
127	Americus	138	Buck Creek	Yes	Yes	Yes
128	Americus	414	Buck Creek	Yes	Yes	Yes
129	Americus	138	Buck Creek	No	Yes	Yes
130	Americus	3726	Wabash River	No	Yes	Yes
131	Americus	2622	Buck Creek	Yes	Yes	Yes
132	Americus	2622	Buck Creek	Yes	Yes	Yes
133	Americus	276	Buck Creek	Yes	Yes	Yes
134	Americus	6210	Buck Creek	Yes	Yes	No
135	Linwood	138	Wabash River	Yes	Yes	Yes
136	Lafayette	1794	Wabash River	Yes	Yes	Yes
137	Linwood	2484	Wabash River	Yes	Yes	Yes
138	Lafayette	2346	Wabash River	Yes	Yes	Yes
139	Linwood	2346	Wabash River	Yes	Yes	Yes
140	Lafayette	2346	Wabash River	Yes	Yes	Yes
141	Linwood	2898	Wabash River	Yes	Yes	Yes
142	Americus	3588	Wabash River	Yes	Yes	Yes
143	Americus	5382	Wabash River	Yes	Yes	Yes
144	Lafayette	6762	Buck Creek	Yes	Yes	Yes
145	Americus	2622	Wabash River	No	Yes	Yes
146	Americus	5106	Wabash River	Yes	Yes	Yes
147	Americus	2760	Sugar Creek	Yes	Yes	Yes
148	Americus	2208	Sugar Creek	Yes	Yes	Yes
149	Americus	2208	Sugar Creek	Yes	Yes	Yes
150	Americus	1794	Sugar Creek	No	Yes	Yes
151	Americus	966	Sugar Creek	No	Yes	Yes
152	Americus	276	Sugar Creek	Yes	Yes	Yes
153	Americus	138	Sugar Creek	Yes	Yes	Yes
154	Americus	966	Sugar Creek	No	Yes	Yes
155	Americus	1518	Sugar Creek	Yes	Yes	Yes
156	Americus	2346	Sugar Creek	Yes	Yes	Yes
157	Americus	138	Sugar Creek	No	Yes	Yes
158	Americus	138	Sugar Creek	No	Yes	Yes
159	Americus	2898	Wabash River	No	Yes	Yes
160	Americus	1242	Wabash River	No	Yes	Yes
161	Americus	1104	Wabash River	No	Yes	Yes
162	Americus	828	Wabash River	No	Yes	Yes
163	Americus	966	Wabash River	No	Yes	Yes
164	Americus	1380	Sugar Creek	No	Yes	Yes
165	Americus	690	Sugar Creek	No	Yes	Yes
166	Americus	690	Sugar Creek	No	Yes	Yes
167	Americus	138	Sugar Creek	No	Yes	Yes
168	Americus	8004	Wabash River	Yes	Yes	Yes
169	Americus	8556	Wabash River	Yes	Yes	Yes
170	Americus	8970	Wabash River	Yes	Yes	Yes
171	Americus	552	Wabash River	No	Yes	Yes
172	Americus	6900	Wabash River	Yes	Yes	Yes
173	Americus	6762	Wabash River	Yes	Yes	Yes
174	Americus	5382	Sugar Creek	No	Yes	Yes
175	Americus	2898	Wabash River	No	Yes	Yes
176	Americus	3864	Wabash River	Yes	Yes	Yes
177	Linwood	6762	Wabash River	Yes	Yes	Yes
178	Linwood	6762	Wabash River	Yes	Yes	Yes
179	Linwood	11040	Wabash River	Yes	Yes	Yes
180	Linwood	10764	Wabash River	Yes	Yes	Yes

	T	U	V	W	X	Y
	Town	Distance to Nearest Body of Water	Body of Water	RR	WE	WA
181						
182						
183	Linwood	690	Wildcat Creek	Yes	Yes	Yes
184	Linwood	138	Wabash River	No	Yes	Yes
185	Linwood	2208	Wildcat Creek	Yes	Yes	Yes
186	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
187	Linwood	1656	Wildcat Creek	Yes	Yes	Yes
188	Linwood	1932	Wildcat Creek	Yes	Yes	Yes
189	Linwood	2348	Wildcat Creek	Yes	Yes	Yes
190	Linwood	4140	Wildcat Creek	Yes	Yes	Yes
191	Linwood	3726	Wildcat Creek	Yes	Yes	Yes
192	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
193	Linwood	4002	Wildcat Creek	Yes	Yes	Yes
194	Linwood	1794	Wildcat Creek	No	Yes	No
195	Linwood	8280	Wildcat Creek	Yes	Yes	Yes
196	Linwood	10626	Wabash River	Yes	Yes	Yes
197	Linwood	3036	Wildcat Creek	Yes	Yes	Yes
198	Linwood	3174	Wabash River	No	Yes	Yes
199	Linwood	4278	Wildcat Creek	Yes	Yes	Yes
200	Linwood	4830	Wabash River	Yes	Yes	Yes
201	Linwood	5106	Wabash River	Yes	Yes	Yes
202	Linwood	3588	Wabash River	Yes	Yes	Yes
203	Linwood	7728	Wabash River	Yes	Yes	Yes
204	Linwood	3864	Wabash River	Yes	Yes	Yes
205	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
206	Linwood	3588	Wabash River	Yes	Yes	Yes
207	Linwood	3174	Wabash River	Yes	Yes	Yes
208	Linwood	4002	Wabash River	Yes	Yes	Yes
209	Linwood	5244	Wabash River	Yes	Yes	Yes
210	Linwood	3312	Wabash River	Yes	Yes	Yes
211	Linwood	4416	Wildcat Creek	Yes	Yes	Yes
212	Linwood	5658	Wildcat Creek	Yes	Yes	Yes
213	Linwood	690	Wildcat Creek	Yes	Yes	Yes
214	Linwood	690	Wildcat Creek	Yes	Yes	Yes
215	Linwood	690	Wildcat Creek	Yes	Yes	Yes
216	Linwood	138	Wildcat Creek	Yes	Yes	Yes
217	Linwood	276	Wildcat Creek	Yes	Yes	Yes
218	Linwood	828	Wildcat Creek	Yes	Yes	Yes
219	Linwood	414	Wildcat Creek	Yes	Yes	Yes
220	Linwood	138	Wildcat Creek	Yes	Yes	Yes
221	Linwood	276	Wildcat Creek	No	Yes	No
222	Linwood	414	Wildcat Creek	Yes	Yes	Yes
223	Linwood	138	Wildcat Creek	Yes	Yes	Yes
224	Linwood	276	Wildcat Creek	No	Yes	No
225	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
226	Linwood	1242	Wildcat Creek	No	Yes	No
227	Linwood	828	Wildcat Creek	No	Yes	No
228	Linwood	1656	Wildcat Creek	No	Yes	No
229	Linwood	2760	Wildcat Creek	No	Yes	No
230	Linwood	5796	Wildcat Creek	No	Yes	No
231	Delphi	9936	Wabash River	Yes	Yes	Yes
232	Delphi	9936	Deer Creek	Yes	Yes	Yes
233	Delphi	13248	Deer Creek	Yes	No	No
234	Delphi	13800	Deer Creek	Yes	No	No
235	Delphi	5934	Wabash River	Yes	Yes	Yes
236	Delphi	6762	Wabash River	Yes	Yes	Yes
237	Delphi	7590	Wabash River	Yes	Yes	Yes
238	Delphi	3036	Wabash River	Yes	Yes	Yes
239	Delphi	5934	Wabash River	Yes	Yes	Yes
240	Delphi	10350	Wabash River	Yes	Yes	Yes

	T	U	V	W	X	Y
241	Town	Distance to Nearest	Body of	RR	WE	WA
242		Body of Water	Water			
243	Delphi	11592	Wabash River	Yes	Yes	Yes
244	Delphi	11592	Wabash River	Yes	Yes	Yes
245	Americus	10212	Wabash River	Yes	Yes	Yes
246	Delphi	10074	Wabash River	Yes	Yes	Yes
247	Delphi	14766	Wabash River	Yes	No	No
248	Delphi	14076	Wabash River	Yes	No	No
249	Delphi	2622	Wabash River	No	No	No
250	Delphi	8004	Wabash River	No	Yes	Yes
251	Delphi	1518	Deer Creek	No	Yes	Yes
252	Delphi	2346	Deer Creek	No	Yes	Yes
253	Delphi	2484	Deer Creek	Yes	Yes	Yes
254	Delphi	4554	Deer Creek	Yes	Yes	Yes
255	Delphi	3588	Deer Creek	Yes	Yes	Yes
256	Delphi	3312	Deer Creek	Yes	Yes	Yes
257	Delphi	11040	Deer Creek	Yes	No	No
258	Delphi	7728	Deer Creek	Yes	No	No
259	Delphi	8280	Deer Creek	Yes	No	No

	A	B	C	D	E	F
	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest Neighbor (in feet)
1						
2						
3	Railroad-Era	Wayne	Section 1B	Two	Individual Structure	4278
4	Railroad-Era	Wayne	Section 2B	One	Individual Structure	4278
5	Railroad-Era	Wayne	Section 3B	One	Farmstead/Homestead	1656
6	Railroad-Era	Wayne	Section 3B	Three	Individual Structure	1656
7	Railroad-Era	Wayne	Section 3B	Five	Farmstead/Homestead	1242
8	Railroad-Era	Wayne	Section 3B	Seven	Individual Structure	552
9	Railroad-Era	Wayne	Section 3B	Eight	Individual Structure	552
10	Railroad-Era	Wayne	Section 3B	Nine	School	1518
11	Railroad-Era	Wayne	Section 1	One	Farmstead/Homestead	552
12	Railroad-Era	Wayne	Section 1	Two	Farmstead/Homestead	2070
13	Railroad-Era	Wayne	Section 1	Three	Farmstead/Homestead	4416
14	Railroad-Era	Wayne	Section 3	One	Individual Structure	1104
15	Railroad-Era	Wayne	Section 5	One	Farmstead/Homestead	1242
16	Railroad-Era	Wayne	Section 5	Two	Farmstead/Homestead	3864
17	Railroad-Era	Wayne	Section 5	Three	School	690
18	Railroad-Era	Wayne	Section 5	Four	Farmstead/Homestead	414
19	Railroad-Era	Wayne	Section 5	Five	Farmstead/Homestead	690
20	Railroad-Era	Wayne	Section 5	Six	Individual Structure	2622
21	Railroad-Era	Wayne	Section 6	One	Farmstead/Homestead	690
22	Railroad-Era	Wayne	Section 6	Two	Individual Structure	1518
23	Railroad-Era	Wayne	Section 7	One	Farmstead/Homestead	1518
24	Railroad-Era	Wayne	Section 7	Two	Individual Structure	690
25	Railroad-Era	Wayne	Section 7	Three	Farmstead/Homestead	690
26	Railroad-Era	Wayne	Section 8	One	Individual Structure	552
27	Railroad-Era	Wayne	Section 8	Two	Farmstead/Homestead	1242
28	Railroad-Era	Wayne	Section 8	Three	Individual Structure	690
29	Railroad-Era	Wayne	Section 11	One	Individual Structure	552
30	Railroad-Era	Wayne	Section 11	Three	Farmstead/Homestead	1242
31	Railroad-Era	Wayne	Section 12	One	Individual Structure	2070
32	Railroad-Era	Wayne	Section 12	Two	Individual Structure	2208
33	Railroad-Era	Wayne	Section 12	Three	Farmstead/Homestead	2760
34	Railroad-Era	Wayne	Section 22	One	Farmstead/Homestead	1518
35	Railroad-Era	Wayne	Section 22	Two	Individual Structure	1932
36	Railroad-Era	Wayne	Section 22	Three	Farmstead/Homestead	1932
37	Railroad-Era	Wayne	Section 25	One	Farmstead/Homestead	1656
38	Railroad-Era	Wayne	Section 25	Four	Farmstead/Homestead	690
39	Railroad-Era	Wayne	Section 25	Five	Individual Structure	138
40	Railroad-Era	Wayne	Section 29	One	Farmstead/Homestead	1242
41	Railroad-Era	Wayne	Section 29	Five	Farmstead/Homestead	1104
42	Railroad-Era	Wayne	Section 29	Six	Farmstead/Homestead	1380
43	Railroad-Era	Wayne	Section 29	Seven	Farmstead/Homestead	1380
44	Railroad-Era	Wayne	Section 29	Eight	Farmstead/Homestead	1104
45	Railroad-Era	Wayne	Section 29	Nine	School	690
46	Railroad-Era	Wayne	Section 30	Two	Farmstead/Homestead	2484
47	Railroad-Era	Wayne	Section 31	One	Farmstead/Homestead	414
48	Railroad-Era	Wayne	Section 31	Two	Farmstead/Homestead	1380
49	Railroad-Era	Wayne	Section 31	Four	Farmstead/Homestead	828
50	Railroad-Era	Wayne	Section 32	One	Farmstead/Homestead	690
51	Railroad-Era	Wayne	Section 35	One	Farmstead/Homestead	996
52	Railroad-Era	Wayne	Section 35	Three	Individual Structure	4554
53	Railroad-Era	Wayne	Section 35	Four	Farmstead/Homestead	828
54	Railroad-Era	Wayne	Section 36	One	Farmstead/Homestead	552
55	Railroad-Era	Wayne	Section 36	Two	Farmstead/Homestead	414
56	Railroad-Era	Wayne	Section 36	Three	Farmstead/Homestead	1380
57	Railroad-Era	Wayne	Section 6B	One	Farmstead/Homestead	3312
58	Railroad-Era	Wayne	Section 6B	Two	Farmstead/Homestead	690
59	Railroad-Era	Wayne	Section 6B	Three	School	690
60	Railroad-Era	Wayne	Section 2	One	Farmstead/Homestead	690

	A	B	C	D	E	F
	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest Neighbor (in feet)
61						
62						
63	Railroad-Era	Wayne	Section 2	Three	Individual Structure	828
64	Railroad-Era	Wayne	Section 2	Five	Individual Structure	552
65	Railroad-Era	Wayne	Section 2	Six	Farmstead/Homestead	828
66	Railroad-Era	Wayne	Section 2	Seven	Individual Structure	1932
67	Railroad-Era	Union	Section 1	One	Individual Structure	1932
68	Railroad-Era	Union	Section 1	Two	Individual Structure	552
69	Railroad-Era	Union	Section 1	Three	Individual Structure	966
70	Railroad-Era	Union	Section 1	Four	Individual Structure	966
71	Railroad-Era	Union	Section 1	Six	Individual Structure	1104
72	Railroad-Era	Union	Section 1	Seven	Individual Structure	414
73	Railroad-Era	Union	Section 1	Eight	Individual Structure	414
74	Railroad-Era	Union	Section 1	Eleven	Mill	414
75	Railroad-Era	Union	Section 1	Twelve	School	1104
76	Railroad-Era	Union	Section 1	Thirteen	Individual Structure	414
77	Railroad-Era	Union	Section 1	Fourteen	Farmstead/Homestead	1380
78	Railroad-Era	Union	Section 1	Fifteen	Individual Structure	1518
79	Railroad-Era	Union	Section 1	Sixteen	Individual Structure	966
80	Railroad-Era	Union	Section 1	Seventeen	Individual Structure	
81	Railroad-Era	Union	Section 3	Two	Individual Structure	1794
82	Railroad-Era	Union	Section 3	Three	Farmstead/Homestead	2070
83	Railroad-Era	Union	Section 3	Four	School	1656
84	Railroad-Era	Union	Section 3	Five	Farmstead/Homestead	1932
85	Railroad-Era	Union	Section 11	Two	Individual Structure	1104
86	Railroad-Era	Union	Section 11	Three	Church	1242
87	Railroad-Era	Union	Section 12	One	Individual Structure	414
88	Railroad-Era	Union	Section 12	Two	Farmstead/Homestead	414
89	Railroad-Era	Union	Section 12	Three	Farmstead/Homestead	1380
90	Railroad-Era	Union	Section 12	Four	Farmstead/Homestead	1104
91	Railroad-Era	Union	Section 12	Five	Individual Structure	1104
92	Railroad-Era	Union	Section 12	Six	Individual Structure	1932
93	Railroad-Era	Union	Section 29	One	Farmstead/Homestead	1794
94	Railroad-Era	Union	Section 33	One	Farmstead/Homestead	2760
95	Railroad-Era	Union	Section 33	Three	Farmstead/Homestead	1380
96	Railroad-Era	Union	Section 33	Five	Farmstead/Homestead	1932
97	Railroad-Era	Union	Section 33	Six	Farmstead/Homestead	2484
98	Railroad-Era	Union	Section 33	Seven	Farmstead/Homestead	2208
99	Railroad-Era	Union	Section 34	Three	X Ice house	2622
100	Railroad-Era	Union	Section 34	Five	Farmstead/Homestead	1242
101	Railroad-Era	Union	Section 34	Six	Farmstead/Homestead	1794
102	Railroad-Era	Union	Section 35	Two	Farmstead/Homestead	552
103	Railroad-Era	Union	Section 35	Three	Individual Structure	552
104	Railroad-Era	Union	Section 36	Four	Individual Structure	1932
105	Railroad-Era	Union	Section 4	One	Farmstead/Homestead	1242
106	Railroad-Era	Union	Section 4	Two	Farmstead/Homestead	860
107	Railroad-Era	Union	Section 4	Three	Individual Structure	1656
108	Railroad-Era	Union	Section 4	Four	Individual Structure	1104
109	Railroad-Era	Union	Section 4	Five	Farmstead/Homestead	414
110	Railroad-Era	Union	Section 4	Six	Church	414
111	Railroad-Era	Union	Section 2	Four	Mill	1656
112	Railroad-Era	Union	Section 2	Seven	Farmstead/Homestead	1104
113	Railroad-Era	Union	Section 2	Nine	Individual Structure	3864
114	Railroad-Era	Union	Section 2	Ten	Farmstead/Homestead	2688
115	Railroad-Era	Union	Section 2	Eleven	Individual Structure	2760
116	Railroad-Era	Union	Section 2	Twelve	Farmstead/Homestead	1104
117	Railroad-Era	Union	Section 9	One	School	1242
118	Railroad-Era	Union	Section 9	Two	Individual Structure	860
119	Railroad-Era	Union	Section 9	Three	Farmstead/Homestead	1794
120	Railroad-Era	Union	Section 10	One	Farmstead/Homestead	552

	A	B	C	D	E	F
	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest Neighbor (in feet)
121						
122						
123	Railroad-Era	Union	Section 10	Two	Farmstead/Homestead	552
124	Railroad-Era	Washington	Section 1	One	Individual Structure	1656
125	Railroad-Era	Washington	Section 1	Two	Individual Structure	1656
126	Railroad-Era	Washington	Section 11	Two	Individual Structure	1518
127	Railroad-Era	Washington	Section 11	Three	Individual Structure	276
128	Railroad-Era	Washington	Section 11	Four	Individual Structure	690
129	Railroad-Era	Washington	Section 11	Five	Individual Structure	1656
130	Railroad-Era	Washington	Section 11	Seven	Individual Structure	1104
131	Railroad-Era	Washington	Section 11	Eight	Individual Structure	1518
132	Railroad-Era	Washington	Section 11	Nine	Farmstead/Homestead	552
133	Railroad-Era	Washington	Section 11	Ten	School	552
134	Railroad-Era	Washington	Section 11	Eleven	Farmstead/Homestead	276
135	Railroad-Era	Washington	Section 11	Twelve	Farmstead/Homestead	828
136	Railroad-Era	Washington	Section 12	Two	Individual Structure	1242
137	Railroad-Era	Washington	Section 12	Three	Individual Structure	2898
138	Railroad-Era	Washington	Section 12	Four	Farmstead/Homestead	3450
139	Railroad-Era	Washington	Section 12	Five	Individual Structure	1656
140	Railroad-Era	Washington	Section 22	One	Individual Structure	2760
141	Railroad-Era	Washington	Section 22	Four	Individual Structure	690
142	Railroad-Era	Washington	Section 22	Five	Individual Structure	690
143	Railroad-Era	Washington	Section 22		Farmstead/Homestead	1242
144	Railroad-Era	Washington	Section 22		Individual Structure	1242
145	Railroad-Era	Washington	Section 22		Farmstead/Homestead	1794
146	Railroad-Era	Washington	Section 25	Two	Individual Structure	276
147	Railroad-Era	Washington	Section 25	Three	Individual Structure	276
148	Railroad-Era	Washington	Section 25	Five	Farmstead/Homestead	690
149	Railroad-Era	Washington	Section 25	Six	Farmstead/Homestead	1104
150	Railroad-Era	Washington	Section 25		Individual Structure	3450
151	Railroad-Era	Washington	Section 29	Four	Farmstead/Homestead	1380
152	Railroad-Era	Washington	Section 29	Five	Farmstead/Homestead	1242
153	Railroad-Era	Washington	Section 29	Six	Individual Structure	1380
154	Railroad-Era	Washington	Section 29	Seven	Individual Structure	1380
155	Railroad-Era	Washington	Section 29	Eight	Individual Structure	1380
156	Railroad-Era	Washington	Section 29	Nine	Individual Structure	1104
157	Railroad-Era	Washington	Section 29	Ten	Individual Structure	1104
158	Railroad-Era	Washington	Section 30	One	School	690
159	Railroad-Era	Washington	Section 30	Five	Individual Structure	2346
160	Railroad-Era	Washington	Section 30	Ten	Farmstead/Homestead	828
161	Railroad-Era	Washington	Section 30		Farmstead/Homestead	828
162	Railroad-Era	Washington	Section 30		Farmstead/Homestead	1932
163	Railroad-Era	Washington	Section 30		Individual Structure	552
164	Railroad-Era	Washington	Section 30		Farmstead/Homestead	1380
165	Railroad-Era	Washington	Section 31	One	Farmstead/Homestead	1656
166	Railroad-Era	Washington	Section 31	Three	Farmstead/Homestead	552
167	Railroad-Era	Washington	Section 31	Four	Farmstead/Homestead	
168	Railroad-Era	Washington	Section 31		Farmstead/Homestead	2484
169	Railroad-Era	Washington	Section 32	One	Individual Structure	552
170	Railroad-Era	Washington	Section 32	Two	Individual Structure	552
171	Railroad-Era	Washington	Section 32	Three	Farmstead/Homestead	1380
172	Railroad-Era	Washington	Section 32	Four	Individual Structure	1242
173	Railroad-Era	Washington	Section 32	Five	Farmstead/Homestead	1380
174	Railroad-Era	Washington	Section 32	Six	Farmstead/Homestead	1656
175	Railroad-Era	Washington	Section 33	One	Farmstead/Homestead	690
176	Railroad-Era	Washington	Section 33	Two	Individual Structure	1380
177	Railroad-Era	Washington	Section 33	Three	Farmstead/Homestead	414
178	Railroad-Era	Washington	Section 35	Two	Farmstead/Homestead	1794
179	Railroad-Era	Washington	Section 35		Individual Structure	828
180	Railroad-Era	Washington	Section 36	One	Individual Structure	828

	A	B	C	D	E	F
	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest Neighbor (in feet)
181						
182						
183	Railroad-Era	Washington	Section 36	Three	Farmstead/Homestead	828
184	Railroad-Era	Washington	Section 36	Five	Farmstead/Homestead	1242
185	Railroad-Era	Washington	Section 36	Seven	Farmstead/Homestead	3036
186	Railroad-Era	Washington	Section 10	One	Individual Structure	1518
187	Railroad-Era	Washington	Section 10	Two	Individual Structure	2208
188	Railroad-Era	Washington	Section 28	Two	Farmstead/Homestead	966
189	Railroad-Era	Washington	Section 28	Three	Individual Structure	966
190	Railroad-Era	Washington	Section 28	Four	Farmstead/Homestead	2484
191	Railroad-Era	Washington	Section 21	Two	Individual Structure	1242
192	Railroad-Era	Washington	Section 21	Three	Individual Structure	414
193	Railroad-Era	Washington	Section 21	Four	Individual Structure	1242
194	Railroad-Era	Washington	Section 21	Six	Individual Structure	1104
195	Railroad-Era	Washington	Section 21	Seven	Individual Structure	1104
196	Railroad-Era	Washington	Section 21	Eight	Farmstead/Homestead	1794
197	Railroad-Era	Washington	Section 21	Nine	School	1932
198	Railroad-Era	Washington	Section 21	Nine	Mill	414
199	Railroad-Era	Washington	Section 19	One	Farmstead/Homestead	828
200	Railroad-Era	Washington	Section 19	One	Farmstead/Homestead	3450
201	Railroad-Era	Washington	Section 20	One	Farmstead/Homestead	1104
202	Railroad-Era	Washington	Section 20	One	Individual Structure	828
203	Railroad-Era	Washington	Section 20	One	Farmstead/Homestead	1518
204	Railroad-Era	Washington	Section 20	One	Individual Structure	828
205	Railroad-Era	Washington	Section 13	One	Farmstead/Homestead	2346
206	Railroad-Era	Washington	Section 14	One	Farmstead/Homestead	828
207	Railroad-Era	Washington	Section 14	Two	Farmstead/Homestead	1656
208	Railroad-Era	Washington	Section 14	Three	Individual Structure	1380
209	Railroad-Era	Washington	Section 14	Three	Farmstead/Homestead	1794
210	Railroad-Era	Washington	Section 14	Six	Farmstead/Homestead	1104
211	Railroad-Era	Washington	Section 14	Seven	Individual Structure	1380
212	Railroad-Era	Washington	Section 14	One	Individual Structure	1794
213	Railroad-Era	Washington	Section 15	One	Farmstead/Homestead	1518
214	Railroad-Era	Washington	Section 15	Two	Farmstead/Homestead	2622
215	Railroad-Era	Washington	Section 15	One	Individual Structure	828
216	Railroad-Era	Washington	Section 27	One	Individual Structure	1380
217	Railroad-Era	Washington	Section 27	Two	Farmstead/Homestead	966
218	Railroad-Era	Washington	Section 27	Three	Individual Structure	1380
219	Railroad-Era	Washington	Section 27	Four	Farmstead/Homestead	1380
220	Railroad-Era	Washington	Section 27	Five	Farmstead/Homestead	1242
221	Railroad-Era	Washington	Section 27	Six	Farmstead/Homestead	1242
222	Railroad-Era	Washington	Section 27	Seven	School	414
223	Railroad-Era	Washington	Section 23	One	Individual Structure	1242
224	Railroad-Era	Washington	Section 23	Two	Farmstead/Homestead	1932
225	Railroad-Era	Washington	Section 23	Three	Farmstead/Homestead	1656
226	Railroad-Era	Washington	Section 23	Four	Individual Structure	1656
227	Railroad-Era	Washington	Section 23	Five	Farmstead/Homestead	1518
228	Railroad-Era	Washington	Section 23	Six	Farmstead/Homestead	966
229	Railroad-Era	Washington	Section 23	Seven	Church	690
230	Railroad-Era	Washington	Section 23	Eight	Farmstead/Homestead	1932
231	Railroad-Era	Washington	Section 23	Nine	Individual Structure	828
232	Railroad-Era	Washington	Section 23	Ten	Individual Structure	552
233	Railroad-Era	Washington	Section 23	Eleven	Individual Structure	414
234	Railroad-Era	Washington	Section 26	One	Farmstead/Homestead	1380
235	Railroad-Era	Fairfield	Section 1	Four	Farmstead/Homestead	1242
236	Railroad-Era	Fairfield	Section 1	One	School	
237	Railroad-Era	Fairfield	Section 1	One	Farmstead/Homestead	828
238	Railroad-Era	Fairfield	Section 1	One	Individual Structure	828
239	Railroad-Era	Fairfield	Section 1	One	Farmstead/Homestead	2622
240	Railroad-Era	Fairfield	Section 3	One	Farmstead/Homestead	3036

	A	B	C	D	E	F
	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest Neighbor (in feet)
241						
242						
243	Railroad-Era	Fairfield	Section 3		Individual Structure	1380
244	Railroad-Era	Fairfield	Section 3		Individual Structure	1380
245	Railroad-Era	Fairfield	Section 11	Six	Farmstead/Homestead	1104
246	Railroad-Era	Fairfield	Section 11	Seven	Farmstead/Homestead	1242
247	Railroad-Era	Fairfield	Section 11	Eight	Farmstead/Homestead	1104
248	Railroad-Era	Fairfield	Section 11		Farmstead/Homestead	690
249	Railroad-Era	Fairfield	Section 11		School	528
250	Railroad-Era	Fairfield	Section 12		Individual Structure	2760
251	Railroad-Era	Fairfield	Section 12		Individual Structure	1242
252	Railroad-Era	Fairfield	Section 4	One	Farmstead/Homestead	2760
253	Railroad-Era	Fairfield	Section 4	Three	Individual Structure	4416
254	Railroad-Era	Fairfield	Section 2	Two	Individual Structure	414
255	Railroad-Era	Fairfield	Section 2		Farmstead/Homestead	276
256	Railroad-Era	Fairfield	Section 2		Individual Structure	414
257	Railroad-Era	Fairfield	Section 2		Farmstead/Homestead	2346
258	Railroad-Era	Fairfield	Section 2		Farmstead/Homestead	966
259	Railroad-Era	Fairfield	Section 2		Black Smith	690
260	Railroad-Era	Fairfield	Section 2		Individual Structure	276
261	Railroad-Era	Fairfield	Section 9	One	Individual Structure	628
262	Railroad-Era	Fairfield	Section 9	Two	Individual Structure	690
263	Railroad-Era	Fairfield	Section 9	Three	Individual Structure	414
264	Railroad-Era	Fairfield	Section 9	Three	Farmstead/Homestead	1242
265	Railroad-Era	Fairfield	Section 9	Four	Individual Structure	1242
266	Railroad-Era	Fairfield	Section 9	Four	Individual Structure	414
267	Railroad-Era	Fairfield	Section 9	Six	Farmstead/Homestead	552
268	Railroad-Era	Fairfield	Section 9	Eight	School	1242
269	Railroad-Era	Fairfield	Section 9		Individual Structure	1794
270	Railroad-Era	Fairfield	Section 9		Farmstead/Homestead	552
271	Railroad-Era	Fairfield	Section 10	Ten	Individual Structure	2208
272	Railroad-Era	Fairfield	Section 10	Thirteen	Individual Structure	2346
273	Railroad-Era	Fairfield	Section 10		Individual Structure	414
274	Railroad-Era	Fairfield	Section 10		Farmstead/Homestead	1656
275	Railroad-Era	Fairfield	Section 10		Individual Structure	414
276	Railroad-Era	Fairfield	Section 10		Individual Structure	1656
277	Railroad-Era	Fairfield	Section 14	Two	Individual Structure	1104
278	Railroad-Era	Fairfield	Section 14		Farmstead/Homestead	1794
279	Railroad-Era	Fairfield	Section 15		School	414
280	Railroad-Era	Fairfield	Section 15		Farmstead/Homestead	276
281	Railroad-Era	Fairfield	Section 15		Individual Structure	414
282	Railroad-Era	Deer Creek	Section 5	One	Farmstead/Homestead	1380
283	Railroad-Era	Deer Creek	Section 5	Two	Farmstead/Homestead	4002
284	Railroad-Era	Deer Creek	Section 5	Four	Farmstead/Homestead	2346
285	Railroad-Era	Deer Creek	Section 6	Four	Farmstead/Homestead	3450
286	Railroad-Era	Deer Creek	Section 6	Five	Farmstead/Homestead	3450
287	Railroad-Era	Deer Creek	Section 6	Six	Farmstead/Homestead	1380
288	Railroad-Era	Deer Creek	Section 6	Seven	School	552
289	Railroad-Era	Deer Creek	Section 6	Eight	Farmstead/Homestead	552
290	Railroad-Era	Deer Creek	Section 7	One	Farmstead/Homestead	2484
291	Railroad-Era	Deer Creek	Section 7	Two	Individual Structure	2070
292	Railroad-Era	Deer Creek	Section 7	Three	Farmstead/Homestead	2484
293	Railroad-Era	Deer Creek	Section 7	Four	Farmstead/Homestead	2484
294	Railroad-Era	Deer Creek	Section 7	Five	Farmstead/Homestead	966
295	Railroad-Era	Deer Creek	Section 30	One	Individual Structure	3312
296	Railroad-Era	Deer Creek	Section 30	Two	Individual Structure	
297	Railroad-Era	Deer Creek	Section 31	Three	Farmstead/Homestead	1932
298	Railroad-Era	Deer Creek	Section 31	Four	Individual Structure	414
299	Railroad-Era	Deer Creek	Section 31	Five	Individual Structure	414
300	Railroad-Era	Deer Creek	Section 31	Six	Individual Structure	690

	A	B	C	D	E	F
301	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
302						<u>Neighbor (in feet)</u>
303	Railroad-Era	Deer Creek	Section 31	Seven	Farmstead/Homestead	1104
304	Railroad-Era	Deer Creek	Section 31	Eight	Individual Structure	1242
305	Railroad-Era	Deer Creek	Section 32	One	Farmstead/Homestead	966
306	Railroad-Era	Deer Creek	Section 32	Two	Farmstead/Homestead	3036
307	Railroad-Era	Deer Creek	Section 32	Three	Farmstead/Homestead	828
308	Railroad-Era	Deer Creek	Section 32	Four	Farmstead/Homestead	828
309	Railroad-Era	Deer Creek	Section 32	Five	Farmstead/Homestead	2898
310	Railroad-Era	Deer Creek	Section 32	Six	Brickyard	1932
311	Railroad-Era	Deer Creek	Section 33	One	Farmstead/Homestead	2070
312	Railroad-Era	Deer Creek	Section 33	Two	Individual Structure	2070
313	Railroad-Era	Deer Creek	Section 33	Three	Farmstead/Homestead	1656
314	Railroad-Era	Deer Creek	Section 33	Four	Individual Structure	1518
315	Railroad-Era	Deer Creek	Section 33	Five	Farmstead/Homestead	1242

	G	H	I	J
1	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
2	Nearest Neighbor		Opposite Direction	River
3	4416	3174	4416	4554
4	4692	138	552	4416
5	1794	138	1518	7452
6	1794	138	1794	7314
7	1656	138	276	9108
8	1242	138	966	9660
9	1932	138	414	9660
10	1656	690	2760	6486
11	5520	138	4278	9384
12	2208	138	2070	13386
13	4830	138	2622	12696
14	3588	3864	5520	2898
15	1794	138	5796	9696
16	4554	138	1104	8670
17	1794	138	966	15870
18	1794	138	276	15456
19	1242	276	1242	14904
20	3726	2898	4416	12972
21	1656	138	9658	9798
22	2622	138	2346	16974
23	2346	138	3726	16146
24	2346	138	2070	17250
25		138	1794	22770
26	1794	138	138	15870
27	1794	138	2484	15456
28	1104	138	828	15456
29	1242	138	552	6762
30	1656	138	1242	7038
31	4140	276	4416	12006
32	2622	138	138	15456
33	3864	276	2898	16974
34		138	6900	15594
35	2208	138	3864	11454
36		138	2070	12834
37	3864	552	3726	1932
38	966	138	2208	966
39	552	138	138	1518
40	1518	138	6210	1242
41	1380	138	4002	1518
42	1380	138	2622	1104
43	2070	138	1380	552
44		138	4554	1932
45	1380	138	276	1380
46	3174	138	966	3864
47	1794	138	2898	3864
48	3864	138	2760	7452
49	2346	552	5106	10902
50		138	4830	9246
51	1518	138	1380	2346
52	4968	138	2760	3312
53	1794	552	2208	1380
54	5244	276	4278	9384
55	3036	138	3036	3864
56	3864	138	4140	6348
57	3588	138	138	15732
58	1380	138	276	18078
59		138	828	18078
60	966	138	276	3174

	G	H	I	J
	Distance to Second	Nearest Road	Nearest Road In	Distance to Wabash
	Nearest Neighbor		Opposite Direction	River
61				
62				
63		828	138	1242
64		966	138	414
65		1242	552	1242
66		2484	414	2070
67		1932	138	4554
68		1518	138	276
69		1380	138	2208
70		1794	138	1380
71		2208	276	1932
72		552	552	1242
73		414	138	1242
74		552	414	966
75		1104	138	828
76		552	138	138
77		1656	414	1242
78		2346	552	2622
79		1242	138	414
80			2760	5382
81		2070	138	7590
82		4002	138	9660
83		4002	138	5934
84		4692	276	4002
85		1932	138	1242
86		10350	414	552
87		1656	414	3864
88		2622	138	2208
89		1380	966	1104
90		1380	1518	2346
91		1380	414	2208
92		2346	2760	3036
93		2484	138	1932
94		2760	138	828
95		2622	5520	5658
96		2484	2070	2070
97		4002	4278	4278
98		3588	1380	3864
99		4002	4830	8004
100		2484	138	8142
101		2898	138	7452
102		1794	138	4140
103		1932	138	4692
104		2622	138	2208
105		1656	138	6900
106		1794	138	5658
107		2208	138	5382
108		1242	138	3864
109		1794	276	690
110		1380	138	138
111		2898	276	1242
112		1518	1656	2346
113		6004	1932	3036
114		7668	276	1794
115		3450	414	1656
116		9384	138	1242
117		2070	138	3036
118		1242	138	4416
119		2484	276	1932
120		1932	138	1656

	G	H	I	J
<u>121</u>	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
<u>122</u>	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
123	2484	138	2346	19596
124	2898	138	1794	414
125	4416	138	1794	1794
126	2346	414	2484	414
127	1242	138	2346	4830
128	828	138	1242	3726
129	2346	138	1242	1932
130	2898	414	1932	5106
131	2208	1518	2208	1794
132	690	138	552	3036
133	828	276	276	3174
134	1518	138	2760	4968
135	1242	414	2070	6210
136	3450	414	3588	4830
137	3312	1518	3726	4692
138	3864	138	414	1794
139	2898	138	138	4692
140	3174	276	3864	8418
141	2208	414	2484	9936
142	1242	138	2070	10488
143	1932	966	1104	11592
144	3726	138	3864	12144
145	2346	414	1656	10074
146	690	414	414	3588
147	690	138	138	3588
148	690	138	276	4278
149	1104	138	828	5382
150	3450	276	3312	138
151	1380	138	4002	9936
152	1380	414	3174	10350
153	1380	138	2484	9384
154	2208	2622	3450	6348
155	2760	3036	4416	7176
156	4140	1380	3450	7728
157	3174	414	1656	8142
158	1104	138	1656	4416
159	2622	276	2208	5658
160	1104	276	5382	3726
161	828	138	5244	3036
162	2484	138	276	3036
163	1932	138	414	7452
164	1794	1104	1518	7314
165	2346	1242	1380	7038
166	1932	276	414	8694
167		966	3450	12420
168	2760	138	414	11178
169	1794	138	1932	12006
170	1380	138	2484	12420
171	1518	138	3864	13110
172	1656	828	2898	11454
173	2070	690	1242	13110
174	3036	138	3036	14076
175	1656	138	828	13386
176	1656	276	552	14904
177	414	138	966	13938
178	2622	138	5382	1794
179	1656	138	1518	2208
180	828	138	3036	2346

	G	H	I	J
181	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
182	Nearest Neighbor		Opposite Direction	River
183	2346	138	2346	2346
184	1380	552	1380	3588
185	3726	138	1380	7866
186	3174	1518	3588	2622
187	2622	138	1380	5106
188	2346	138	414	9384
189	2070	138	690	9660
190	2622	1104	1518	11316
191	2208	828	2070	4278
192	1518	552	552	4554
193	1518	276	276	5106
194	1932	138	1794	8004
195	1932	690	1656	8694
196	2346	1656	1656	6348
197	2208	138	414	6624
198	1794	276	414	4002
199	1104	828	4416	2898
200	4002	3036	4416	138
201	1932	138	3174	966
202	1518	138	3450	828
203	1932	1380	1380	2208
204	1104	138	2622	1104
205	2760	138	828	8004
206	1104	276	4416	6900
207	1932	552	2484	7176
208	1794	1380	1518	8556
209	3450	2484	2760	10350
210	1242	138	3312	7314
211	3174	2622	2898	8142
212	2760	3174	3174	12834
213	2760	138	2760	2898
214	2760	690	2760	3864
215	1794	552	690	8832
216	3726	828	4692	12696
217	1380	138	276	14628
218	3036	1794	3312	16284
219	1518	828	828	15456
220	1380	966	3174	17388
221	1380	552	1518	18768
222	552	138	138	19872
223	1380	276	414	14214
224	2346	1518	2484	13248
225	1794	1242	2484	12144
226	1794	2760	2898	13386
227	1656	1656	2484	13662
228	1380	1104	1242	14628
229	828	138	1518	15042
230	2208	1518	2346	15870
231	1242	138	1932	17388
232	828	138	966	17940
233	828	138	1242	17802
234	1380	690	966	15594
235	2760	414	2898	10764
236		138	138	12972
237		138	5382	10764
238		414	4554	9936
239	4554	1932	2622	5382
240	4002	138	5244	5382

	G	H	I	J
	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
	Nearest Neighbor		Opposite Direction	River
241		1518	3726	4002
242		1932	3450	4416
243		1380	138	690
244		1380	138	966
245		1242	138	414
246		828	276	276
247		1518	138	552
248		3036	1242	2208
249		3036	138	3312
250		3036	138	276
251		4692	138	4278
252		1380	138	1380
253		1656	2346	2484
254		1242	138	1242
255		2484	138	414
256		1380	138	1104
257		966	138	138
258		1380	2484	2484
259		1242	1104	1932
260		828	966	1242
261		690	138	690
262		1656	1932	5382
263		2070	2208	4692
264		828	138	690
265		1656	138	3174
266		1794	138	1518
267		1794	138	1518
268		1242	138	2760
269		2484	138	1518
270		2346	138	1242
271		1656	138	138
272		1932	138	1932
273		1656	138	414
274		2070	828	1242
275		1380	690	1518
276		1932	690	966
277		966	276	3174
278		1242	552	1380
279		1104	138	3450
280		3174	276	3864
281		4002	690	3588
282		2898	2898	4278
283		5106	276	1380
284		4554	1242	2760
285		1932	276	2760
286		1932	276	828
287		2484	276	414
288			966	2898
289		2622	138	2208
290		2622	414	2070
291		2760	138	2760
292			552	3174
293		3450	414	2760
294			690	276
295		2346	138	3450
296		1104	414	2484
297		690	414	2070
298			2070	2346
299		1242	414	1794
300				2622

	G	H	I	J
301	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
302	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
303	1380	138	414	4416
304	1380	690	1104	4554
305	2208	828	1794	5382
306	3864	414	3450	5934
307		1104	3174	7590
308		276	2484	8004
309	3864	3312	3864	9384
310	3312	138	2760	11454
311	3588	276	2208	14214
312	4416	138	966	16008
313	1794	1104	2070	14076
314	1794	414	414	14490
315	3450	414	1518	15870

	K	L	M	N
1	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
2	River Feature		and Erie Canal	and Erie Canal Feature
3			5106	5106
4			2346	5934
5			4416	4416
6			4692	4830
7			6210	6486
8			7038	7314
9			7314	7866
10			3174	3450
11			7176	8280
12	10764	Ford	12006	12006
13	16974	Ford	11730	12696
14	12972	Ford	138	414
15	20148	Ford	9798	12696
16	13662	Ford	8832	10212
17	16836	Ford	15318	16974
18	18906	Ford	15732	18630
19	19596	Ford	14766	14628
20	21114	Ford	12696	16284
21	17526	Ford	9798	11592
22	12972	Ford	16284	16422
23	16974	Ford	16008	17112
24	18078	Ford	17112	17802
25	18906	Ford	22632	21942
26	25392	Ford	15732	19044
27	20148	Ford	15318	20010
28	21114	Ford	15318	21114
29	22080	Ford	4002	3726
30	19458	Ford	3726	3726
31	20424	Ford	10074	10074
32	17526	Ford	14076	14214
33	17250	Ford	14490	14490
34	20010	Ford	13524	13386
35			8832	9246
36			10488	10626
37			828	4278
38	3312	Ford	276	2760
39	1794	Ford	414	414
40	1518	Ford	1104	7452
41	8280	Ford	1656	9522
42	10212	Ford	828	10902
43	11592	Ford	552	9522
44	12834	Ford	1518	8556
45	8970	Ford	1242	13524
46	13938	Ford	2070	4416
47	5106	Ford	3036	3036
48	7728	Ford	6762	7176
49	12144	Ford	10488	10902
50	14076	Ford	8970	12834
51	14214	Ford	1380	1380
52	9384	Ford	414	5934
53	14904	Ford	276	6348
54	10488	Ford	5796	8418
55	3588	Ford	3036	3450
56	5658	Ford	5520	5796
57	24012	Ford	12144	12144
58	24150	Ford	15456	15456
59	25254	Ford	15456	15456
60	13800	Ford	2070	2208

	K	L	M	N
61	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
62	River Feature		and Erie Canal	and Erie Canal Feature
63		18216 Ford	3726	3864
64		19044 Ford	4140	4002
65		17802 Ford	4416	4554
66		15180 Ford	2346	2898
67		22908 Bridge	3036	7452
68		18906 Bridge	3036	12558
69		21666 Bridge	4416	11040
70		22494 Bridge	4968	10764
71		26358 Bridge	8694	12144
72		24564 Bridge	6486	10350
73		24702 Bridge	6900	10764
74		24150 Bridge	6348	10626
75		26772 Bridge	8418	11178
76		18630 Bridge	2898	12972
77		20562 Bridge	4278	12282
78		19872 Bridge	8418	13938
79		25944 Bridge	7452	10488
80		24012 Bridge	9660	16146
81		28290 Ford	11454	11454
82		29670 Ford	10764	11592
83		28704 Ford	4002	4830
84		30636 Ford	4692	4830
85		30360 Bridge	10074	10488
86		29946 Ford	10350	11316
87		27876 Bridge	11040	13938
88		28428 Bridge	11454	14214
89		31878 Bridge	15870	18630
90		30774 Bridge	15594	18906
91		32154 Bridge	16698	19734
92		25806 Bridge	10626	15870
93		15732 Ford	552	5934
94		14490 Ford	1380	7590
95		20010 Ford	414	2070
96		16422 Ford	552	5934
97		18906 Ford	690	3450
98		20562 Ford	5106	5382
99		22632 Ford	276	276
100		24564 Ford	5106	4830
101		24702 Ford	4002	4968
102		23184 Bridge	1794	5658
103		22770 Bridge	1380	5796
104		19872 Bridge	2622	10626
105		23736 Ford	5658	5244
106		26358 Ford	12144	11730
107		18354 Ford	5796	5796
108		25254 Ford	12144	12144
109		22770 Ford	13386	13386
110		22494 Ford	13524	13662
111		27048 Bridge	4554	5796
112		26082 Bridge	8418	8832
113		31602 Bridge	8004	8142
114		28980 Bridge	7866	8418
115		26082 Bridge	3450	4554
116		28842 Bridge	9364	10626
117		24840 Ford	13110	13110
118		26082 Ford	12144	12144
119		32568 Ford	18906	18906
120		34914 Ford	17802	17940

	K	L	M	N
121	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
122	River Feature		and Erie Canal	and Erie Canal Feature
123	35052	Ford	17250	17388
124	9245	Ford	276	7176
125	8556	Ford	1656	8142
126	414	Ford	414	828
127	4554	Ford	3036	3726
128	3726	Ford	2760	2760
129	2346	Ford	1656	2346
130	5520	Ford	4830	5658
131	1794	Ferry	138	552
132	3036	Ferry	2208	2208
133	3174	Ferry	2484	2622
134	4416	Ferry	3174	3864
135	6348	Ferry	4968	5382
136	5520	Ford	4692	5934
137	7728	Ford	4554	8832
138	4554	Ford	1656	5658
139	9936	Ford	4554	11178
140	8418	Ferry	8280	8280
141	10074	Ferry	9798	9936
142	10764	Ferry	10350	10626
143	12144	Ferry	11592	12006
144	12420	Ferry	12144	12282
145	10626	Ferry	9522	10488
146	3588	Ferry	138	15042
147	3588	Ferry	138	14796
148	4278	Ferry	828	15042
149	5382	Ferry	1518	14352
150	276	Ferry	3036	15456
151	14904	Ferry	7038	10212
152	16284	Ferry	7728	9936
153	13386	Ferry	6072	10074
154	12420	Ferry	3450	7176
155	13800	Ferry	4554	7176
156	17802	Ferry	6762	6762
157	18906	Ferry	7590	7452
158	5520	Ferry	828	12282
159	8556	Ferry	1656	10350
160	11868	Ferry	1104	5382
161	11454	Ferry	138	5244
162	6624	Ferry	138	10764
163	10902	Ferry	4692	10902
164	12420	Ferry	4692	9384
165	7314	Ferry	3450	13524
166	11454	Ferry	5382	10902
167	12006	Ferry	8832	16974
168	12144	Ferry	7866	13800
169	15042	Ferry	8556	13800
170	14628	Ferry	9108	14076
171	15870	Ferry	9798	14076
172	16422	Ferry	8694	11040
173	18630	Ferry	10626	12144
174	17388	Ferry	10902	14214
175	20562	Ferry	13938	13938
176	18906	Ferry	12420	12420
177	18492	Ferry	13248	13248
178	8694	Ferry	414	12558
179	23598	Ferry	828	14214
180	6624	Ferry	828	15180

	K	L	M	N
181	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
182	River Feature		and Erie Canal	and Erie Canal Feature
183		5934 Ferry	690	15870
184		3174 Ferry	552	16146
185		9108 Ferry	5382	17802
186		4968 Ferry	414	4968
187		5934 Ford	1104	5934
188		12144 Ferry	9384	10350
189		11868 Ferry	9660	10902
190		16560 Ferry	10626	9936
191		7590 Ferry	4140	7452
192		9660 Ferry	4554	9522
193		8418 Ferry	5106	8280
194		9798 Ferry	7728	9660
195		9636 Ferry	8418	9798
196		10350 Ferry	6210	7314
197		8004 Ferry	6348	7866
198		9384 Ferry	4002	9246
199		16560 Ferry	414	4416
200		8970 Ferry	2898	7038
201		7038 Ferry	966	5520
202		8832 Ferry	828	3588
203		9660 Ferry	2070	3312
204		8004 Ferry	1104	4416
205		8418 Ford	7728	8418
206		7038 Ford	5520	6210
207		7314 Ford	6762	6762
208		9660 Ford	7176	10902
209		10626 Ford	9108	10074
210		7038 Ford	4554	6072
211		9522 Ford	6348	9384
212		9798 Ferry	10074	10074
213		11040 Ferry	1656	4692
214		13662 Ferry	3588	4278
215		9522 Ferry	7866	9384
216		12972 Ferry	12420	12634
217		14628 Ferry	14766	14490
218		16698 Ferry	15870	16560
219		17664 Ferry	15456	15732
220		18078 Ferry	16974	17940
221		18768 Ferry	18630	18630
222		20010 Ferry	19596	19872
223		14490 Ferry	13800	14352
224		13662 Ferry	12558	13524
225		12634 Ferry	10902	12696
226		13800 Ferry	12282	13662
227		14490 Ferry	12282	12972
228		14904 Ford	12972	14214
229		15180 Ford	13800	14628
230		16560 Ferry	14904	16836
231		17802 Ferry	16422	17664
232		18354 Ferry	16974	18216
233		18492 Ferry	16698	18354
234		15594 Ferry	15318	15732
235		16008 Ferry	10074	12634
236		16974 Ferry	12282	15456
237		12634 Ferry	8970	17112
238		12006 Ferry	8280	16836
239		12282 Ferry	5244	10626
240		5934 Ferry	4416	5382

	K	L	M	N
241	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
242	River Feature		and Erie Canal	and Erie Canal Feature
243		8556 Ferry	1794	4968
244		8694 Ferry	552	3036
245		14214 Ferry	3588	4140
246		15594 Ferry	5106	5520
247		15042 Ferry	4278	4554
248		12834 Ferry	3312	4692
249		12144 Ferry	2484	
250		18354 Ferry	10764	9522
251		18698 Ferry	9798	12006
252		6486 Ferry	5796	8280
253		1518 Ferry	5244	9246
254		12282 Ferry	4140	5934
255		10074 Ferry	2208	4692
256		12696 Ferry	4278	6072
257		13110 Ferry	4140	8280
258		13938 Ferry	4968	6210
259		13110 Ferry	4002	5382
260		9936 Ferry	2346	4830
261		8280 Ferry	4968	9522
262		7452 Ferry	5658	9108
263		7314 Ferry	5382	8418
264		11868 Ferry	2622	6762
265		10626 Ferry	4002	3726
266		7314 Ferry	5244	8004
267		10074 Ferry	2898	2898
268		8280 Ferry	4416	4968
269		8556 Ferry	5382	9798
270		10074 Ferry	3588	3864
271		12834 Ferry	1794	1656
272		14490 Ferry	3588	3588
273		12972 Ferry	2208	2760
274		14214 Ferry	3450	4416
275		12558 Ferry	1932	2622
276		10902 Ferry	138	1656
277		16836 Ferry	5934	5934
278		16422 Ferry	5658	5658
279		15042 Ferry	3174	7866
280		13524 Bridge	9246	8832
281		14766 Ferry	2898	7452
282		16974 Ford	10074	11040
283		15318 Ford	10626	10350
284		19182 Ford	14628	14352
285		12006 Ford	2622	6486
286		12696 Ford	5658	6762
287		17526 Ford	9936	11730
288		19458 Ford	11040	13524
289		19872 Ford	11178	14076
290		14352 Ford	9108	16284
291		12558 Ford	6624	14490
292		14490 Ford	7038	16008
293		17802 Ford	9660	14076
294		21114 Ford	14076	22356
295		2898 Ford	414	2208
296		5658 Ford	966	2346
297		7866 Ford	2070	1518
298		6486 Ford	1794	1932
299		6486 Ford	1932	2070
300		6486 Ford	2346	2484

	K	L	M	N
301	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
302	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
303	7452	Ford	3864	4140
304	5658	Ford	3036	3312
305	8418	Ford	5106	5244
306	9936	Ford	5520	5520
307	10212	Ford	7038	7038
308	10212	Ford	7176	7176
309	12834	Ford	8832	8832
310	14076	Ford	11868	12006
311	16698	Ford	13662	13662
312	19320	Ford	15456	15456
313	16560	Ford	13524	13938
314	16836	Ford	13386	13524
315	18078	Ford	14766	14904

	O	P	Q	R	S
1	Canal Feature	Distance to Nearest Railroad	Distance to Nearest Railroad Feature	Railroad Feature	Distance to Nearest Town
2	Aqueduct	1380			
3	Basin	5382			
4	Basin	6900			23460
5	Basin	5520			25254
6	Basin	4692			25392
7	Basin	3450			26082
8	Basin	2898			26358
9	Basin	8556			22632
10	Bridge	2898	18354	Station	9936
11	Basin	9384	18768	Station	15180
12	Bridge	138	23322	Station	11316
13	Basin	13524			20976
14	Bridge	13800	14904	Station	10350
15	Basin	12696	12834	Station	12972
16	Bridge	7866	10350	Station	10350
17	Bridge	7452	9108	Station	9108
18	Basin	6900	7038	Station	7038
19	Bridge	6072	10902	Station	14076
20	Bridge	14214	15870	Station	9522
21	Bridge	8418	14490	Station	14214
22	Bridge	7728	12696	Station	12696
23	Bridge	7452	10626	Station	10626
24	Basin	966	8556	Station	8556
25	Bridge	7038	8694	Station	8694
26	Bridge	6624	7314	Station	7314
27	Bridge	6348	6486	Station	6486
28	Basin	10764	26496	Station	19182
29	Basin	9522	26496	Station	20148
30	Basin	9384	20286	Station	16284
31	Basin	8556	16284	Station	15732
32	Basin	5658	15456	Station	15456
33	Aqueduct	138	30360	Station	29808
34	Aqueduct	3174			
35	Aqueduct	4140			
36	Bridge	24150	28290	Station	4002
37	Bridge	24978	28152	Station	2346
38	Bridge	25254	27324	Station	138
39	Bridge	23736	23598	Station	4140
40	Bridge	22356	22080	Station	6210
41	Bridge	22218	21804	Station	7452
42	Basin	22080	21528	Station	8832
43	Bridge	22770	22632	Station	5382
44	Basin	21114	20562	Station	10212
45	Bridge	23736	24426	Station	1104
46	Bridge	22632	15042	Station	2070
47	Basin	18492			5796
48	Bridge	15042	16836	Station	8418
49	Aqueduct	14904			10488
50	Bridge	18078	29946	Station	14490
51	Bridge	22080	28566	Station	10212
52	Basin	18216	30774	Station	15180
53	Bridge	16836	23874	Station	9936
54	Bridge	22356	24978	Station	2484
55	Bridge	19734	21804	Station	4830
56	Basin	2484	19320	Station	19596
57	Basin	1380	15732	Station	15318
58	Basin	828	16008	Station	16284
59	Bridge	17526	26634	Station	14076

	O	P	Q	R	S
61	Canal Feature	Distance to Nearest Railroad	Distance to Nearest Railroad Feature	Railroad Feature	Distance to Nearest Town
62	Basin	12006	26634	Station	17940
63	Basin	11040	26358	Station	18630
64	Basin	12006	25944	Station	16698
65	Bridge	15594	27738	Station	15318
66	Wea Aqueduct/Lock System	1794	11730	Railroad Yard	6210
67	Wea Aqueduct/Lock System	1518	7176	Railroad Yard	828
68	Wea Aqueduct/Lock System	138	9936	Railroad Yard	3450
69	Wea Aqueduct/Lock System	276	10764	Railroad Yard	4416
70	Wea Aqueduct/Lock System	2622	13938	Railroad Yard	8004
71	Wea Aqueduct/Lock System	1380	13248	Railroad Yard	6524
72	Wea Aqueduct/Lock System	1656	12972	Railroad Yard	6486
73	Wea Aqueduct/Lock System	1518	12696	Railroad Yard	6072
74	Wea Aqueduct/Lock System	2070	15180	Railroad Yard	8556
75	Wea Aqueduct/Lock System	1242	6900	Railroad Yard	414
76	Wea Aqueduct/Lock System	1242	8970	Railroad Yard	2484
77	Wea Aqueduct/Lock System	966	12282	Railroad Yard	5934
78	Wea Aqueduct/Lock System	1518	14214	Railroad Yard	7728
79	Wea Aqueduct/Lock System	2484	12420	Railroad Yard	6624
80	Basin	5520	9108	Station	23736
81	Basin	4278	9936	Station	25392
82	Wea Aqueduct/Lock System	9108	16422	Station	16422
83	Wea Aqueduct/Lock System	7176	16836	Station	14214
84	Wea Aqueduct/Lock System	138	18078	Station	12696
85	Wea Aqueduct/Lock System	966	18492	Railroad Yard	24012
86	Wea Aqueduct/Lock System	4830	16284	Railroad Yard	9798
87	Wea Aqueduct/Lock System	3174	16836	Railroad Yard	10074
88	Wea Aqueduct/Lock System	1794	20286	Railroad Yard	14076
89	Wea Aqueduct/Lock System	138	19320	Railroad Yard	13110
90	Wea Aqueduct/Lock System	138	20286	Railroad Yard	14214
91	Wea Aqueduct/Lock System	690	14076	Railroad Yard	8004
92	Basin	20148	20562	Station	12558
93	Wea Aqueduct/Lock System	20286	20286	Station	11178
94	Wea Aqueduct/Lock System	18216	19320	Station	17526
95	Basin	20424	20286	Station	12420
96	Basin	18216	19182	Station	14904
97	Basin	14214	14490	Station	16284
98	Basin	16146	18630	Station	18906
99	Wea Aqueduct/Lock System	12144	14490	Station	22080
100	Wea Aqueduct/Lock System	10488	16008	Station	18078
101	Wea Aqueduct/Lock System	3588	12558	Railroad Yard	7868
102	Wea Aqueduct/Lock System	3726	12144	Railroad Yard	7590
103	Wea Aqueduct/Lock System	414	8556	Railroad Yard	2898
104	Basin	12006	14076	Station	19596
105	Basin	5796	8004	Station	22494
106	Basin	12006	13110	Station	18492
107	Basin	6210	6762	Station	6762
108	Basin	6762	6486	Station	6486
109	Basin	6762	6762	Station	6762
110	Wea Aqueduct/Lock System	3588	16146	Railroad Yard	10764
111	Wea Aqueduct/Lock System	276	15732	Railroad Yard	9522
112	Wea Aqueduct/Lock System	4140	16008	Railroad Yard	14076
113	Wea Aqueduct/Lock System	1656	17664	Railroad Yard	11592
114	Wea Aqueduct/Lock System	4554	15456	Railroad Yard	10212
115	Wea Aqueduct/Lock System	1380	17388	Railroad Yard	11040
116	Basin	5796	5934	Station	5934
117	Basin	5520	6900	Station	6900
118	Basin	1518	4554	Station	1518
119	Wea Aqueduct/Lock System	2346	8280	Station	2346

	O	P	Q	R	S
121	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
122		Railroad	Railroad Feature	Feature	Nearest Town
123	Wea Aqueduct/Lock System	2070	8832	Station	2070
124	Guardlock	1656	15456	Station	17250
125	Guardlock	1242	16284	Station	15870
126	Guardlock	8694	14214	Station	12634
127	Guardlock	8694	11040	Station	9384
128	Guardlock	8142	11316	Station	10212
129	Guardlock	6762	12006	Station	11040
130	Guardlock	4140	8832	Station	8004
131	Guardlock	9522	13800	Station	11316
132	Guardlock	8004	11730	Station	11040
133	Guardlock	7590	11178	Station	11454
134	Guardlock	8694	10902	Station	9246
135	Guardlock	7314	8418	Station	9660
136	Guardlock	3450	9384	Station	8694
137	Guardlock	690	12144	Station	11316
138	Guardlock	4002	13248	Station	12558
139	Guardlock	1242	14214	Station	12696
140	Bridge	8004	5658	Station	6486
141	Bridge	6486	10764	Station	8142
142	Bridge	5658	10764	Station	8832
143	Bridge	4554	9798	Station	276
144	Bridge	4002	9660	Station	2346
145	Bridge	6762	8556	Station	828
146	Aqueduct	10764	19734	Stockyard	18906
147	Aqueduct	10764	20010	Stockyard	18768
148	Aqueduct	10074	19596	Stockyard	18492
149	Aqueduct	10074	20010	Stockyard	17388
150	Aqueduct	12696	20148	Stockyard	21666
151	Aqueduct	4968	7590	Station	7314
152	Aqueduct	4692	7038	Station	6072
153	Aqueduct	5520	9384	Station	4830
154	Aqueduct	8556	10902	Station	7866
155	Aqueduct	7866	9660	Station	7176
156	Aqueduct	7452	7728	Station	6762
157	Aqueduct	7038	7038	Station	6348
158	Aqueduct	10626	17526	Station	16698
159	Aqueduct	8970	14490	Station	13662
160	Aqueduct	11178	13800	Station	12558
161	Aqueduct	12006	13800	Station	13110
162	Aqueduct	11178	16422	Station	15318
163	Aqueduct	6624	11868	Station	11316
164	Aqueduct	6762	10488	Station	9108
165	Aqueduct	7728	16146	Station	15456
166	Aqueduct	6072	11454	Station	10764
167	Aqueduct	2346	14628	Station	13938
168	Aqueduct	3450	12282	Station	11592
169	Aqueduct	2622	10074	Station	9246
170	Aqueduct	2208	9522	Station	8832
171	Aqueduct	1518	8142	Station	7590
172	Aqueduct	3588	6210	Station	5658
173	Aqueduct	2070	4002	Station	3312
174	Aqueduct	828	6762	Station	5934
175	Aqueduct	276	2622	Station	1932
176	Aqueduct	1794	2898	Station	2070
177	Aqueduct	1104	1242	Station	552
178	Wildcat Bridge and Locks	9108	12144	Stockyard	23598
179	Wildcat Bridge and Locks	9384	12558	Stockyard	2622
180	Wildcat Bridge and Locks	9384	14214	Stockyard	22908

	O	P	Q	R	S
181	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
182		Railroad	Railroad Feature	Feature	Nearest Town
183	Wildcat Bridge and Locks	9798	15042	Stockyard	22356
184	Aqueduct	10764	18630	Stockyard	19596
185	Aqueduct	5796	17112	Stockyard	17112
186	Bridge	13662	14076	Station	3174
187	Guardlock	10350	11316	Station	6624
188	Aqueduct	5934	7176	Station	6486
189	Aqueduct	5796	7590	Station	6762
190	Aqueduct	3726	3864	Station	3174
191	Aqueduct	11454	12282	Station	5520
192	Aqueduct	10626	11178	Station	7728
193	Aqueduct	10488	11316	Station	6486
194	Aqueduct	7866	9522	Station	8004
195	Bridge	7314	9522	Station	8142
196	Aqueduct	8970	9384	Station	8556
197	Bridge	9384	11454	Station	6210
198	Aqueduct	11040	11454	Station	7452
199	Aqueduct	12282	15318	Station	12834
200	Aqueduct	14490	17250	Station	16560
201	Aqueduct	14490	14904	Station	5796
202	Aqueduct	14214	14352	Station	7866
203	Aqueduct	12634	12634	Station	8556
204	Aqueduct	14214	14352	Station	7038
205	Guardlock	2760	5934	Station	5244
206	Guardlock	7038	8418	Station	7314
207	Guardlock	5382	7176	Station	5934
208	Guardlock	7728	7590	Station	4830
209	Guardlock	4416	4830	Station	3588
210	Guardlock	8004	9246	Station	7038
211	Guardlock	7866	7866	Station	6072
212	Guardlock	2898	3864	Station	4416
213	Bridge	13110	13110	Station	2622
214	Bridge	12558	13248	Station	2622
215	Bridge	8280	8418	Station	3864
216	Bridge	17388	8280	Station	7452
217	Bridge	1794	10902	Station	9384
218	Bridge	138	7176	Station	6486
219	Aqueduct	138	3864	Station	3174
220	Bridge	1380	6762	Station	6348
221	Bridge	2484	9522	Station	8970
222	Bridge	3726	9660	Station	9108
223	Bridge	2208	9522	Station	8418
224	Bridge	3312	7590	Station	6348
225	Bridge	5244	5382	Station	4416
226	Bridge	3174	5520	Station	4554
227	Bridge	3174	4002	Station	2898
228	Guardlock	1932	2484	Station	1518
229	Guardlock	966	1932	Station	552
230	Bridge	1242	5106	Station	3726
231	Bridge	138	7038	Station	5934
232	Bridge	690	6624	Station	9936
233	Bridge	552	5382	Station	4416
234	Bridge	828	9660	Station	8556
235	Wildcat Bridge and Locks	414	8418	Stockyard	22218
236	Wildcat Bridge and Locks	1932	11868	Stockyard	20562
237	Wildcat Bridge and Locks	1932	13800	Stockyard	18216
238	Wildcat Bridge and Locks	2898	14214	Stockyard	18216
239	Wildcat Bridge and Locks	4692	8694	Stockyard	21114
240	Wildcat Bridge and Locks	1656	7866	Stockyard	10212

	O	P	Q	R	S
	Canal Feature	Distance to Nearest Railroad	Distance to Nearest Railroad Feature	Railroad Feature	Distance to Nearest Town
241	Wildcat Bridge and Locks	6900	6900	Stockyard	15180
242	Wildcat Bridge and Locks	6210	6072	Stockyard	13938
243	Wildcat Bridge and Locks	690	690	Stockyard	12696
244	Wildcat Bridge and Locks	414	1104	Stockyard	14076
245	Wildcat Bridge and Locks	414	276	Stockyard	12834
246	Wildcat Bridge and Locks	2898	3174	Stockyard	15180
247	Wildcat Bridge and Locks	3312	3312	Stockyard	14490
248	Wildcat Bridge and Locks	1380	5382	Stockyard	17940
249	Wildcat Bridge and Locks	552	8142	Stockyard	20976
250	Wildcat Bridge and Locks	552	10212	Stockyard	9522
251	Wildcat Bridge and Locks	1794	12420	Stockyard	13938
252	Wildcat Bridge and Locks	4278	4968	Stockyard	16698
253	Wildcat Bridge and Locks	5520	5382	Stockyard	15180
254	Wildcat Bridge and Locks	3864	4692	Stockyard	16560
255	Wildcat Bridge and Locks	5106	7038	Stockyard	18906
256	Wildcat Bridge and Locks	2484	4002	Stockyard	16422
257	Wildcat Bridge and Locks	2898	3036	Stockyard	15732
258	Wildcat Bridge and Locks	5658	5658	Stockyard	15456
259	Wildcat Bridge and Locks	1380	21252	Station	9936
260	Wildcat Bridge and Locks	1380	22080	Station	10626
261	Wildcat Bridge and Locks	690	22218	Station	10626
262	Basin	2070	11730	Stockyard	4968
263	Basin	2208	12006	Stockyard	6348
264	Wildcat Bridge and Locks	276	22356	Station	10626
265	Basin	276	10074	Stockyard	6348
266	Basin	138	9936	Stockyard	7866
267	Wildcat Bridge and Locks	690	11592	Stockyard	8280
268	Basin	276	10074	Stockyard	6762
269	Wildcat Bridge and Locks	1380	1242	Stockyard	10212
270	Wildcat Bridge and Locks	414	414	Stockyard	8970
271	Wildcat Bridge and Locks	1104	1380	Stockyard	9522
272	Wildcat Bridge and Locks	138	1932	Stockyard	6624
273	Wildcat Bridge and Locks	1380	1656	Stockyard	8142
274	Wildcat Bridge and Locks	3174	3174	Stockyard	9108
275	Wildcat Bridge and Locks	2760	2484	Stockyard	9936
276	Wildcat Bridge and Locks	2346	2346	Stockyard	8280
277	Wildcat Bridge and Locks	1242	6486	Stockyard	2622
278	Basin	3174	9246	Stockyard	276
279	Basin	1242	6072	Stockyard	3036
280	Guardlock	8280	18630	Station	14628
281	Guardlock	8556	15042	Station	12144
282	Guardlock	12420	18078	Station	14628
283	Guardlock	966	16422	Station	12972
284	Guardlock	3726	15456	Station	11868
285	Guardlock	8142	19596	Station	15732
286	Guardlock	9108	21528	Station	17664
287	Guardlock	9108	22218	Station	18354
288	Guardlock	4416	14628	Station	14628
289	Guardlock	2760	16698	Station	16836
290	Guardlock	3864	19320	Station	19320
291	Guardlock	7038	21114	Station	19044
292	Guardlock	10488	18354	Station	19182
293	Lock	3726	7038	Station	4140
294	Lock	414	4140	Station	966
295	Guardlock	138	11040	Station	7452
296	Towpath Bridge	276	9108	Station	5382
297	Towpath Bridge	138	8694	Station	5106
298	Towpath Bridge	138	8004	Station	4416

	O	P	Q	R	S
301	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
302		Railroad	Railroad Feature	Feature	Nearest Town
303	Towpath Bridge	966	7590	Station	3726
304	Towpath Bridge	276	6900	Station	3036
305	Towpath Bridge	1932	7590	Station	3588
306	Guardlock	3450	10488	Station	6486
307	Lock	3588	7314	Station	4140
308	Lock	3864	6900	Station	3726
309	Towpath Bridge	5520	11178	Station	7728
310	Towpath Bridge	8142	11040	Station	8418
311	Towpath Bridge	10764	14352	Station	11454
312	Towpath Bridge	12696	16284	Station	13662
313	Towpath Bridge	10212	12144	Station	9936
314	Lock	10626	11730	Station	8970
315	Lock	11868	13110	Station	10764

	T	U	V	W	X	Y
1	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
2		<u>Body of Water</u>	<u>Water</u>			
3		690	Wabash River	Yes	Yes	Yes
4		4416	Wabash River	Yes	Yes	Yes
5	Granville	5658	Flint Creek	Yes	Yes	Yes
6	Granville	4416	Flint Creek	Yes	Yes	Yes
7	Granville	4968	Flint Creek	Yes	Yes	Yes
8	Wea Station	4140	Flint Creek	Yes	Yes	Yes
9	Wea Station	3450	Flint Creek	Yes	Yes	Yes
10	Granville	6486	Wabash River	Yes	Yes	Yes
11	Granville	9246	Wabash River	No	Yes	Yes
12	Granville	13386	Wabash River	Yes	No	No
13	Granville	12696	Wabash River	No	No	No
14	Granville	2898	Wabash River	No	Yes	Yes
15	Granville	9936	Wabash River	No	Yes	Yes
16	Granville	8970	Wabash River	No	Yes	Yes
17	Wea Station	15870	Wabash River	Yes	No	No
18	Wea Station	15456	Wabash River	Yes	No	No
19	Wea Station	14904	Wabash River	Yes	No	No
20	Granville	12834	Wabash River	No	No	No
21	Granville	9798	Wabash River	No	Yes	No
22	Wea Station	16974	Wabash River	Yes	No	No
23	Wea Station	16146	Wabash River	Yes	No	No
24	Wea Station	17250	Wabash River	Yes	No	No
25	Wea Station	22770	Wabash River	Yes	No	No
26	Wea Station	15870	Wabash River	Yes	No	No
27	Wea Station	15456	Wabash River	Yes	No	No
28	Wea Station	15456	Wabash River	Yes	No	No
29	Granville	6762	Wabash River	No	Yes	Yes
30	Granville	7038	Wabash River	Yes	Yes	No
31	Granville	12006	Wabash River	Yes	Yes	No
32	Granville	15456	Wabash River	Yes	No	No
33	Wea Station	16974	Wabash River	Yes	No	No
34	Wea Station	690	Flint Creek	Yes	Yes	Yes
35		3726	Wabash River	Yes	Yes	Yes
36		3450	Wabash River	Yes	Yes	No
37	Granville	1932	Wabash River	No	Yes	Yes
38	Granville	966	Wabash River	No	Yes	Yes
39	Granville	1518	Wabash River	No	Yes	Yes
40	Granville	1242	Wabash River	No	Yes	Yes
41	Granville	1518	Wabash River	No	Yes	Yes
42	Granville	1104	Wabash River	No	Yes	Yes
43	Granville	552	Wabash River	No	Yes	Yes
44	Granville	1932	Wabash River	No	Yes	Yes
45	Granville	1380	Wabash River	No	Yes	Yes
46	Granville	3864	Wabash River	No	Yes	Yes
47	Granville	3864	Wabash River	No	Yes	Yes
48	Granville	7452	Wabash River	No	Yes	Yes
49	Granville	10902	Wabash River	No	Yes	Yes
50	Granville	9246	Wabash River	No	Yes	Yes
51	Granville	2346	Wabash River	No	Yes	Yes
52	Granville	3312	Wabash River	No	Yes	Yes
53	Granville	1380	Wabash River	No	Yes	Yes
54	Granville	9384	Wabash River	No	Yes	Yes
55	Granville	3864	Wabash River	No	Yes	Yes
56	Granville	6348	Wabash River	No	Yes	Yes
57	Wea Station	9660	Flint Creek	Yes	No	No
58	Wea Station	12420	Flint Creek	Yes	No	No
59	Wea Station	12006	Flint Creek	Yes	No	No
60	Granville	3174	Wabash River	No	Yes	Yes

	T	U	V	W	X	Y
61	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
62		<u>Body of Water</u>	<u>Water</u>			
63	Granville	6348	Wabash River	No	Yes	Yes
64	Granville	6762	Wabash River	No	Yes	Yes
65	Granville	7038	Wabash River	No	Yes	Yes
66	Granville	3864	Wabash River	No	Yes	Yes
67	Elston	828	Wea Creek	Yes	Yes	Yes
68	Elston	3726	Wea Creek	Yes	Yes	Yes
69	Elston	2070	Wea Creek	Yes	Yes	Yes
70	Elston	1242	Wea Creek	Yes	Yes	Yes
71	Elston	1104	Wea Creek	No	Yes	Yes
72	Elston	276	Wea Creek	No	Yes	Yes
73	Elston	690	Wea Creek	No	Yes	Yes
74	Elston	138	Mill Race	No	Yes	Yes
75	Elston	2070	Wea Creek	No	Yes	Yes
76	Elston	3174	Wabash River	Yes	Yes	Yes
77	Elston	3312	Wea Creek	Yes	Yes	Yes
78	Elston	1794	Wea Creek	No	Yes	Yes
79	Elston	1104	Wea Creek	No	Yes	Yes
80	Elston	1380	Wea Creek	No	Yes	Yes
81	Lafayette	9798	Wea Creek	Yes	Yes	Yes
82	Lafayette	8556	Wea Creek	Yes	Yes	Yes
83	Wea Station	2208	Wea Creek	Yes	Yes	Yes
84	Elston	1656	Wea Creek	Yes	Yes	Yes
85	Elston	4416	Wea Creek			
86	Elston	4416	Wea Creek	No	Yes	Yes
87	Elston	1656	Wea Creek	No	No	No
88	Elston	2070	Wea Creek	No	No	No
89	Elston	5520	Wea Creek	No	No	No
90	Elston	4554	Wea Creek	No	No	No
91	Elston	5658	Wea Creek	No	No	No
92	Elston	276	Wea Creek	No	Yes	No
93	Granville	1242	Wabash River	No	Yes	Yes
94	Granville	1518	Wabash River	No	Yes	Yes
95	Granville	1380	Wabash River	No	Yes	Yes
96	Granville	1242	Wabash River	No	Yes	Yes
97	Granville	1518	Wabash River	No	Yes	Yes
98	Granville	6072	Wabash River	No	Yes	Yes
99	Granville	1794	Wabash River	No	Yes	Yes
100	Granville	12144	Wea Creek	No	Yes	Yes
101	Elston	10488	Wea Creek	Yes	Yes	Yes
102	Elston	1104	Wea Creek	Yes	Yes	Yes
103	Elston	1518	Wea Creek	Yes	Yes	Yes
104	Elston	2898	Wabash River	Yes	Yes	Yes
105	Granville	6762	Wabash River	No	Yes	Yes
106	Granville	13248	Wabash River	Yes	Yes	Yes
107	Granville	7038	Wabash River	No	Yes	Yes
108	Wea Station	12558	Wea Creek	Yes	No	No
109	Wea Station	14076	Wabash River	Yes	No	No
110	Wea Station	14214	Wabash River	Yes	No	No
111	Elston	414	Mill Race	Yes	Yes	Yes
112	Elston	414	Wea Creek	No	Yes	Yes
113	Elston	4278	Mill Race	Yes	Yes	Yes
114	Elston	2622	Mill Race	Yes	Yes	Yes
115	Elston	414	Mill Race	Yes	Yes	Yes
116	Elston	2070	Mill Race	No	Yes	Yes
117	Wea Station	13800	Wea Creek	Yes	No	No
118	Wea Station	12006	Wea Creek	Yes	No	No
119	Wea Station	16284	Wea Creek	No	No	No
120	Wea Station	14904	Wea Creek	No	No	No

	T	U	V	W	X	Y
121	Town	Distance to Nearest	Body of	RR	WE	WA
122		Body of Water	Water			
123	Wea Station	14214	Wea Creek	No	No	No
124	Chapmanvi	414	Wabash River	Yes	Yes	Yes
125	Chapmanvi	1794	Wabash River	Yes	Yes	Yes
126	Americus	414	Wabash River	Yes	Yes	Yes
127	Americus	4830	Wabash River	Yes	Yes	Yes
128	Chapmanvi	3726	Wabash River	Yes	Yes	Yes
129	Chapmanvi	1932	Wabash River	Yes	Yes	Yes
130	Chapmanvi	5106	Wabash River	Yes	Yes	Yes
131	Americus	1794	Wabash River	Yes	Yes	Yes
132	Americus	3036	Wabash River	Yes	Yes	Yes
133	Americus	3174	Wabash River	Yes	Yes	Yes
134	Americus	4968	Wabash River	Yes	Yes	Yes
135	Americus	6210	Wabash River	Yes	Yes	Yes
136	Chapmanvi	4830	Wabash River	Yes	Yes	Yes
137	Chapmanvi	4692	Wabash River	Yes	Yes	Yes
138	Chapmanvi	1794	Wabash River	Yes	Yes	Yes
139	Chapmanvi	4692	Wabash River	Yes	Yes	Yes
140	Americus	552	Sugar Creek	Yes	Yes	Yes
141	Americus	966	Sugar Creek	No	Yes	Yes
142	Americus	414	Sugar Creek	No	Yes	Yes
143	Chapmanvi	276	Sugar Creek	Yes	No	No
144	Transitville	2348	Sugar Creek	Yes	No	No
145	Chapmanvi	828	Sugar Creek	Yes	Yes	Yes
146	Transitville	3588	Wabash River	No	Yes	Yes
147	Transitville	3588	Wabash River	No	Yes	Yes
148	Transitville	4278	Wabash River	Yes	Yes	Yes
149	Transitville	3036	Buck Creek	Yes	Yes	Yes
150	Transitville	138	Wabash River	No	No	Yes
151	Transitville	552	Buck Creek	Yes	Yes	Yes
152	Transitville	552	Buck Creek	Yes	Yes	Yes
153	Transitville	966	Buck Creek	Yes	Yes	Yes
154	Transitville	2346	Buck Creek	Yes	Yes	Yes
155	Transitville	3036	Buck Creek	Yes	Yes	Yes
156	Transitville	3174	Sugar Creek	Yes	Yes	Yes
157	Transitville	3450	Sugar Creek	Yes	Yes	Yes
158	Transitville	1518	Buck Creek	Yes	Yes	Yes
159	Transitville	138	Buck Creek	Yes	Yes	Yes
160	Transitville	3726	Wabash River	No	Yes	Yes
161	Transitville	3036	Wabash River	No	Yes	Yes
162	Transitville	276	Buck Creek	No	Yes	Yes
163	Transitville	552	Buck Creek	No	Yes	Yes
164	Transitville	1104	Buck Creek	No	Yes	Yes
165	Transitville	2622	Buck Creek	Yes	Yes	Yes
166	Transitville	276	Buck Creek	Yes	Yes	Yes
167	Transitville	6210	Buck Creek	Yes	Yes	No
168	Transitville	3588	Buck Creek	Yes	Yes	No
169	Transitville	3174	Buck Creek	Yes	Yes	No
170	Transitville	3450	Buck Creek	Yes	Yes	No
171	Transitville	3174	Buck Creek	Yes	No	No
172	Transitville	552	Buck Creek	Yes	Yes	No
173	Transitville	966	Buck Creek	Yes	No	No
174	Transitville	3588	Buck Creek	Yes	No	No
175	Transitville	1932	Buck Creek	Yes	No	No
176	Transitville	690	Buck Creek	Yes	No	No
177	Transitville	276	Buck Creek	Yes	No	No
178	Linwood	1794	Wabash River	Yes	Yes	Yes
179	Linwood	2208	Wabash River	Yes	Yes	Yes
180	Transitville	2346	Wabash River	Yes	Yes	Yes

	T	U	V	W	X	Y
181	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
182		<u>Body of Water</u>	<u>Water</u>			
183	Transitville	2346	Wabash River	Yes	Yes	Yes
184	Transitville	3588	Wabash River	Yes	Yes	Yes
185	Transitville	6762	Buck Creek	Yes	Yes	Yes
186	Americus	2622	Wabash River	Yes	Yes	Yes
187	Americus	5106	Wabash River	Yes	Yes	Yes
188	Transitville	2208	Sugar Creek	Yes	Yes	Yes
189	Transitville	2208	Sugar Creek	Yes	Yes	Yes
190	Transitville	1656	Buck Creek	Yes	Yes	No
191	Americus	966	Sugar Creek	Yes	Yes	Yes
192	Americus	276	Sugar Creek	Yes	Yes	Yes
193	Americus	138	Sugar Creek	Yes	Yes	Yes
194	Americus	1518	Sugar Creek	Yes	Yes	Yes
195	Americus	2346	Sugar Creek	Yes	Yes	Yes
196	Transitville	1518	Sugar Creek	Yes	Yes	Yes
197	Americus	552	Sugar Creek	Yes	Yes	Yes
198	Americus	138	Sugar Creek	No	Yes	Yes
199	Transitville	2898	Wabash River	No	Yes	Yes
200	Transitville	138	Wabash River	No	No	Yes
201	Americus	966	Wabash River	No	Yes	Yes
202	Americus	828	Wabash River	No	Yes	Yes
203	Americus	1656	Sugar Creek	No	Yes	Yes
204	Americus	1104	Wabash River	No	Yes	Yes
205	Chapmanvi	8004	Wabash River	Yes	Yes	Yes
206	Chapmanvi	6900	Wabash River	Yes	Yes	Yes
207	Chapmanvi	6762	Wabash River	Yes	Yes	Yes
208	Chapmanvi	4830	Sugar Creek	Yes	Yes	Yes
209	Chapmanvi	5382	Sugar Creek	Yes	Yes	Yes
210	Chapmanvi	7038	Wabash River	Yes	Yes	Yes
211	Chapmanvi	6072	Sugar Creek	Yes	Yes	Yes
212	Chapmanvi	4416	Sugar Creek	Yes	Yes	Yes
213	Americus	2898	Wabash River	No	Yes	Yes
214	Americus	3864	Wabash River	No	Yes	Yes
215	Chapmanvi	3864	Sugar Creek	Yes	Yes	Yes
216	Transitville	3588	Sugar Creek	Yes	No	No
217	Transitville	2760	Sugar Creek	Yes	No	No
218	Transitville	6624	Sugar Creek	No	No	No
219	Chapmanvi	8970	Sugar Creek	No	Yes	Yes
220	Transitville	8142	Sugar Creek	No	Yes	Yes
221	Transitville	7728	Sugar Creek	No	Yes	Yes
222	Transitville	8832	Sugar Creek	No	Yes	Yes
223	Chapmanvi	1656	Sugar Creek	Yes	No	No
224	Chapmanvi	138	Sugar Creek	Yes	No	No
225	Chapmanvi	1380	Sugar Creek	Yes	No	No
226	Chapmanvi	138	Sugar Creek	Yes	No	No
227	Chapmanvi	828	Sugar Creek	Yes	No	No
228	Chapmanvi	552	Sugar Creek	Yes	No	No
229	Chapmanvi	276	Sugar Creek	Yes	No	No
230	Chapmanvi	1656	Sugar Creek	Yes	No	No
231	Chapmanvi	3864	Sugar Creek	No	No	No
232	Chapmanvi	4002	Sugar Creek	No	No	No
233	Chapmanvi	3174	Sugar Creek	No	No	No
234	Chapmanvi	2898	Sugar Creek	Yes	No	No
235	Linwood	10764	Wabash River	Yes	Yes	Yes
236	Transitville	11454	Wildcat Creek	No	No	No
237	Transitville	10764	Wabash River	Yes	Yes	Yes
238	Transitville	9936	Wabash River	Yes	Yes	Yes
239	Transitville	5382	Wabash River	Yes	Yes	Yes
240	Linwood	690	Wildcat Creek	Yes	Yes	Yes

	T	U	V	W	X	Y
241	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
242		<u>Body of Water</u>	<u>Water</u>			
243	Linwood	2208	Wabash River	Yes	Yes	Yes
244	Linwood	2208	Wildcat Creek	Yes	Yes	Yes
245	Linwood	3726	Wildcat Creek	Yes	Yes	Yes
246	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
247	Linwood	4002	Wildcat Creek	Yes	Yes	Yes
248	Linwood	4692	Wildcat Creek	Yes	Yes	Yes
249	Linwood	3864	Wildcat Creek	Yes	Yes	Yes
250	Linwood	6486	Wildcat Creek	Yes	Yes	Yes
251	Linwood	8418	Wildcat Creek	Yes	Yes	Yes
252	Linwood	3036	Wildcat Creek	Yes	Yes	Yes
253	Linwood	1794	Wabash River	No	Yes	Yes
254	Linwood	4830	Wabash River	Yes	Yes	Yes
255	Linwood	3450	Wabash River	Yes	Yes	Yes
256	Linwood	4554	Wabash River	Yes	Yes	Yes
257	Linwood	4278	Wabash River	Yes	Yes	Yes
258	Linwood	6210	Wildcat Creek	Yes	Yes	Yes
259	Linwood	5382	Wildcat Creek	Yes	Yes	Yes
260	Linwood	3174	Wabash River	Yes	Yes	Yes
261	Linwood	4140	Wabash River	Yes	Yes	Yes
262	Linwood	4278	Wabash River	Yes	Yes	Yes
263	Linwood	4416	Wabash River	Yes	Yes	Yes
264	Linwood	3588	Wabash River	Yes	Yes	Yes
265	Linwood	3174	Wabash River	Yes	Yes	Yes
266	Linwood	4002	Wabash River	Yes	Yes	Yes
267	Linwood	5244	Wabash River	Yes	Yes	Yes
268	Linwood	4416	Wildcat Creek	Yes	Yes	Yes
269	Linwood	3036	Wabash River	Yes	Yes	Yes
270	Linwood	4968	Wildcat Creek	Yes	Yes	Yes
271	Linwood	414	Wildcat Creek	Yes	Yes	Yes
272	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
273	Linwood	690	Wildcat Creek	Yes	Yes	Yes
274	Linwood	690	Wildcat Creek	No	Yes	No
275	Linwood	1104	Wildcat Creek	Yes	Yes	Yes
276	Linwood	1380	Wildcat Creek	Yes	Yes	Yes
277	Linwood	1656	Wildcat Creek	No	Yes	No
278	Linwood	828	Wildcat Creek	No	Yes	No
279	Linwood	4968	Wildcat Creek	Yes	Yes	Yes
280	Lafayette	6900	Wildcat Creek	No	Yes	No
281	Linwood	4554	Wildcat Creek	Yes	Yes	Yes
282	Delphi	9936	Wabash River	Yes	Yes	Yes
283	Delphi	9936	Deer Creek	Yes	Yes	Yes
284	Delphi	13800	Deer Creek	Yes	No	No
285	Delphi	3036	Wabash River	Yes	Yes	Yes
286	Delphi	5934	Wabash River	Yes	Yes	Yes
287	Delphi	10350	Wabash River	Yes	Yes	Yes
288	Delphi	11592	Wabash River	Yes	Yes	Yes
289	Delphi	11592	Wabash River	Yes	Yes	Yes
290	Chapmanvi	10212	Wabash River	Yes	Yes	Yes
291	Chapmanvi	7590	Wabash River	Yes	Yes	Yes
292	Chapmanvi	7728	Wabash River	Yes	Yes	Yes
293	Delphi	10074	Wabash River	Yes	Yes	Yes
294	Chapmanvi	14766	Wabash River	Yes	No	No
295	Delphi	276	Wabash River	No	No	No
296	Delphi	828	Deer Creek	No	Yes	Yes
297	Delphi	2346	Deer Creek	No	Yes	Yes
298	Delphi	966	Deer Creek	No	Yes	Yes
299	Delphi	966	Deer Creek	No	Yes	Yes
300	Delphi	828	Deer Creek	No	Yes	Yes

	T	U	V	W	X	Y
301	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
302		<u>Body of Water</u>	<u>Water</u>			
303	Delphi	1794	Deer Creek	Yes	Yes	Yes
304	Delphi	552	Deer Creek	No	Yes	Yes
305	Delphi	2484	Deer Creek	Yes	Yes	Yes
306	Delphi	4554	Deer Creek	Yes	Yes	Yes
307	Delphi	3588	Deer Creek	Yes	Yes	Yes
308	Delphi	3312	Deer Creek	Yes	Yes	Yes
309	Delphi	6900	Deer Creek	Yes	Yes	Yes
310	Delphi	8004	Deer Creek	Yes	Yes	Yes
311	Delphi	11040	Deer Creek	Yes	No	No
312	Delphi	12972	Deer Creek	Yes	No	No
313	Delphi	9246	Deer Creek	Yes	No	No
314	Delphi	7728	Deer Creek	Yes	No	No
315	Delphi	7728	Deer Creek	Yes	No	No

Appendix II

**Data Used for the Comparison of Transportation Band Areas,
Organized into Canal-Era and Railroad-Era. Canal Band is First,
Followed by Railroad and River Band Data.**

The data presented in this appendix is for the testing of Chapter 5, Hypothesis 8. Canal-Era data appears first, followed by Railroad-Era. Outliers and non-residential structures have not been removed from these data sets.

	A	B	C	D	E	F
1	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
2						Neighbor (In feet)
3	Canal-Era	Wayne	Section 1B	One	Individual Structure	
4	Canal-Era	Wayne	Section 3B	One	Farmstead/Homestead	1656
5	Canal-Era	Wayne	Section 3B	Two	Individual Structure	1794
6	Canal-Era	Wayne	Section 3B	Three	Individual Structure	1242
7	Canal-Era	Wayne	Section 3B	Four	Individual Structure	414
8	Canal-Era	Wayne	Section 3B	Five	Farmstead/Homestead	414
9	Canal-Era	Wayne	Section 3B	Six	Individual Structure	690
10	Canal-Era	Wayne	Section 3B	Seven	Individual Structure	552
11	Canal-Era	Wayne	Section 3B	Eight	Individual Structure	552
12	Canal-Era	Wayne	Section 3B	Nine	School	1518
13	Canal-Era	Wayne	Section 4B	One	Individual Structure	690
14	Canal-Era	Wayne	Section 4B	Two	Individual Structure	
15	Canal-Era	Wayne	Section 3	One	Individual Structure	1104
16	Canal-Era	Wayne	Section 3	Two	Individual Structure	1104
17	Canal-Era	Wayne	Section 11	One	Individual Structure	552
18	Canal-Era	Wayne	Section 11	Two	Farmstead/Homestead	690
19	Canal-Era	Wayne	Section 22	One	Farmstead/Homestead	1656
20	Canal-Era	Wayne	Section 25	One	Farmstead/Homestead	828
21	Canal-Era	Wayne	Section 25	Two	Individual Structure	414
22	Canal-Era	Wayne	Section 25	Three	Individual Structure	414
23	Canal-Era	Wayne	Section 25	Four	Farmstead/Homestead	690
24	Canal-Era	Wayne	Section 25	Five	Individual Structure	138
25	Canal-Era	Wayne	Section 29	One	Farmstead/Homestead	690
26	Canal-Era	Wayne	Section 29	Two	Farmstead/Homestead	690
27	Canal-Era	Wayne	Section 29	Three	Farmstead/Homestead	690
28	Canal-Era	Wayne	Section 29	Four	Farmstead/Homestead	552
29	Canal-Era	Wayne	Section 29	Five	Farmstead/Homestead	552
30	Canal-Era	Wayne	Section 29	Six	Farmstead/Homestead	1380
31	Canal-Era	Wayne	Section 29	Seven	Farmstead/Homestead	1380
32	Canal-Era	Wayne	Section 30	One	Farmstead/Homestead	1242
33	Canal-Era	Wayne	Section 31	One	Farmstead/Homestead	414
34	Canal-Era	Wayne	Section 31	Two	Farmstead/Homestead	1380
35	Canal-Era	Wayne	Section 31	Three	Farmstead/Homestead	
36	Canal-Era	Wayne	Section 32	One	Farmstead/Homestead	
37	Canal-Era	Wayne	Section 32	Two	Individual Structure	
38	Canal-Era	Wayne	Section 35	One	Farmstead/Homestead	966
39	Canal-Era	Wayne	Section 35	Two	Individual Structure	828
40	Canal-Era	Wayne	Section 35	Three	Individual Structure	4554
41	Canal-Era	Wayne	Section 36	One	Farmstead/Homestead	552
42	Canal-Era	Wayne	Section 36	Two	Farmstead/Homestead	414
43	Canal-Era	Wayne	Section 36	Three	Farmstead/Homestead	1380
44	Canal-Era	Wayne	Section 2	One	Farmstead/Homestead	690
45	Canal-Era	Wayne	Section 2	Two	Individual Structure	1242
46	Canal-Era	Wayne	Section 2	Three	Individual Structure	552
47	Canal-Era	Wayne	Section 2	Four	Individual Structure	276
48	Canal-Era	Wayne	Section 2	Five	Individual Structure	276
49	Canal-Era	Wayne	Section 2	Six	Farmstead/Homestead	828
50	Canal-Era	Union	Section 1	One	Farmstead/Homestead	828
51	Canal-Era	Union	Section 1	Two	Farmstead/Homestead	1932
52	Canal-Era	Union	Section 1	Three	Individual Structure	966
53	Canal-Era	Union	Section 1	Four	Farmstead/Homestead	966
54	Canal-Era	Union	Section 1	Five	Individual Structure	2070
55	Canal-Era	Union	Section 1	Six	Farmstead/Homestead	1104
56	Canal-Era	Union	Section 1	Seven	Individual Structure	276
57	Canal-Era	Union	Section 1	Eight	Individual Structure	276
58	Canal-Era	Union	Section 1	Nine	Individual Structure	276
59	Canal-Era	Union	Section 1	Ten	Individual Structure	414
60	Canal-Era	Union	Section 1	Eleven	Mill	276

	A	B	C	D	E	F
61	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
62						<u>Neighbor (in feet)</u>
63	Canal-Era	Union	Section 1	Twelve	School	1104
64	Canal-Era	Union	Section 3	One	Farmstead\Homestead	828
65	Canal-Era	Union	Section 3	Two	Individual Structure	828
66	Canal-Era	Union	Section 3	Three	Farmstead\Homestead	1932
67	Canal-Era	Union	Section 33	One	Farmstead\Homestead	2760
68	Canal-Era	Union	Section 33	Two	Farmstead\Homestead	2760
69	Canal-Era	Union	Section 33	Three	Farmstead\Homestead	2760
70	Canal-Era	Union	Section 33	Four	Individual Structure	1242
71	Canal-Era	Union	Section 34	Five	Farmstead\Homestead	1242
72	Canal-Era	Union	Section 34	Six	Farmstead\Homestead	2760
73	Canal-Era	Union	Section 35	One	Farmstead\Homestead	2484
74	Canal-Era	Union	Section 36	One	Individual Structure	828
75	Canal-Era	Union	Section 36	Two	Individual Structure	828
76	Canal-Era	Union	Section 36	Three	Watch House	2070
77	Canal-Era	Union	Section 4	One	Farmstead\Homestead	1242
78	Canal-Era	Union	Section 4	Two	Farmstead\Homestead	
79	Canal-Era	Union	Section 2	One	Individual Structure	276
80	Canal-Era	Union	Section 2	Two	Individual Structure	276
81	Canal-Era	Union	Section 2	Three	Individual Structure	828
82	Canal-Era	Union	Section 2	Four	Mill	138
83	Canal-Era	Union	Section 2	Five	Individual Structure	2070
84	Canal-Era	Union	Section 2	Six	Individual Structure	414
85	Canal-Era	Union	Section 2	Seven	Farmstead\Homestead	1104
86	Canal-Era	Union	Section 2	Eight	Individual Structure	414
87	Canal-Era	Washington	Section 1	One	Individual Structure	1656
88	Canal-Era	Washington	Section 1	Two	Individual Structure	1656
89	Canal-Era	Washington	Section 11	One	Individual Structure	1794
90	Canal-Era	Washington	Section 11	Two	Individual Structure	1794
91	Canal-Era	Washington	Section 11	Three	Individual Structure	1242
92	Canal-Era	Washington	Section 11	Four	Individual Structure	1242
93	Canal-Era	Washington	Section 11	Five	Individual Structure	2346
94	Canal-Era	Washington	Section 11	Six	Individual Structure	1656
95	Canal-Era	Washington	Section 11	Seven	Individual Structure	1104
96	Canal-Era	Washington	Section 12	One	Individual Structure	3036
97	Canal-Era	Washington	Section 12	Two	Individual Structure	1242
98	Canal-Era	Washington	Section 12	Three	Individual Structure	3864
99	Canal-Era	Washington	Section 22	One	Individual Structure	1794
100	Canal-Era	Washington	Section 22	Two	Individual Structure	414
101	Canal-Era	Washington	Section 22	Three	Individual Structure	414
102	Canal-Era	Washington	Section 22	Four	Individual Structure	690
103	Canal-Era	Washington	Section 22	Five	Individual Structure	690
104	Canal-Era	Washington	Section 22	Six	Individual Structure	1242
105	Canal-Era	Washington	Section 25	One	Individual Structure	276
106	Canal-Era	Washington	Section 25	Two	Individual Structure	276
107	Canal-Era	Washington	Section 25	Three	Individual Structure	276
108	Canal-Era	Washington	Section 25	Four	Individual Structure	414
109	Canal-Era	Washington	Section 25	Five	Farmstead\Homestead	552
110	Canal-Era	Washington	Section 25	Six	Farmstead\Homestead	1104
111	Canal-Era	Washington	Section 29	One	Individual Structure	2622
112	Canal-Era	Washington	Section 29	Two	Individual Structure	2760
113	Canal-Era	Washington	Section 29	Three	Individual Structure	1932
114	Canal-Era	Washington	Section 29	Four	Farmstead\Homestead	1380
115	Canal-Era	Washington	Section 29	Five	Farmstead\Homestead	1380
116	Canal-Era	Washington	Section 30	One	School	552
117	Canal-Era	Washington	Section 30	Two	Individual Structure	552
118	Canal-Era	Washington	Section 30	Three	Individual Structure	552
119	Canal-Era	Washington	Section 30	Four	Farmstead\Homestead	552
120	Canal-Era	Washington	Section 30	Five	Individual Structure	552

	A	B	C	D	E	F
121	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
122						Neighbor (in feet)
123	Canal-Era	Washington	Section 30	Six	Individual Structure	690
124	Canal-Era	Washington	Section 30	Seven	Mill	414
125	Canal-Era	Washington	Section 30	Eight	Individual Structure	414
126	Canal-Era	Washington	Section 30	Nine	Individual Structure	1242
127	Canal-Era	Washington	Section 30	Ten	Farmstead/Homestead	1104
128	Canal-Era	Washington	Section 31	One	Farmstead/Homestead	2208
129	Canal-Era	Washington	Section 31	Two	Farmstead/Homestead	2070
130	Canal-Era	Washington	Section 31	Three	Farmstead/Homestead	1242
131	Canal-Era	Washington	Section 31	Four	Farmstead/Homestead	
132	Canal-Era	Washington	Section 35	One	Individual Structure	828
133	Canal-Era	Washington	Section 35	Two	Farmstead/Homestead	2070
134	Canal-Era	Washington	Section 35	Three	Individual Structure	828
135	Canal-Era	Washington	Section 36	One	Individual Structure	276
136	Canal-Era	Washington	Section 36	Two	Farmstead/Homestead	276
137	Canal-Era	Washington	Section 36	Three	Farmstead/Homestead	552
138	Canal-Era	Washington	Section 36	Four	Individual Structure	552
139	Canal-Era	Washington	Section 36	Five	Farmstead/Homestead	1104
140	Canal-Era	Washington	Section 36	Six	Individual Structure	414
141	Canal-Era	Washington	Section 36	Seven	Farmstead/Homestead	3726
142	Canal-Era	Washington	Section 10	One	Individual Structure	1518
143	Canal-Era	Washington	Section 10	Two	Individual Structure	2898
144	Canal-Era	Washington	Section 28	One	Individual Structure	1932
145	Canal-Era	Washington	Section 28	Two	Farmstead/Homestead	828
146	Canal-Era	Washington	Section 28	Three	Individual Structure	828
147	Canal-Era	Washington	Section 21	One	Individual Structure	966
148	Canal-Era	Washington	Section 21	Two	Individual Structure	966
149	Canal-Era	Washington	Section 21	Three	Individual Structure	414
150	Canal-Era	Washington	Section 21	Four	Individual Structure	1242
151	Canal-Era	Washington	Section 21	Five	Individual Structure	2760
152	Canal-Era	Washington	Section 21	Six	Individual Structure	1104
153	Canal-Era	Washington	Section 21	Seven	Individual Structure	1104
154	Canal-Era	Washington	Section 21	Eight	Individual Structure	276
155	Canal-Era	Washington	Section 21	Nine	Mill	276
156	Canal-Era	Washington	Section 19	One	Farmstead/Homestead	1104
157	Canal-Era	Washington	Section 20	One	Individual Structure	552
158	Canal-Era	Washington	Section 20	Two	Individual Structure	552
159	Canal-Era	Washington	Section 20	Three	Individual Structure	828
160	Canal-Era	Washington	Section 20	Four	Individual Structure	1518
161	Canal-Era	Washington	Section 20	Five	Individual Structure	2346
162	Canal-Era	Washington	Section 20	Six	Individual Structure	414
163	Canal-Era	Washington	Section 20	Seven	Individual Structure	414
164	Canal-Era	Washington	Section 20	Eight	Individual Structure	414
165	Canal-Era	Washington	Section 13	One	Farmstead/Homestead	552
166	Canal-Era	Washington	Section 13	Two	Individual Structure	414
167	Canal-Era	Washington	Section 13	Three	Individual Structure	414
168	Canal-Era	Washington	Section 16	One	Individual Structure	2760
169	Canal-Era	Washington	Section 14	One	Farmstead/Homestead	1656
170	Canal-Era	Washington	Section 14	Two	Farmstead/Homestead	1656
171	Canal-Era	Washington	Section 14	Three	Farmstead/Homestead	
172	Canal-Era	Washington	Section 15	One	Farmstead/Homestead	1518
173	Canal-Era	Washington	Section 15	Two	Farmstead/Homestead	2622
174	Canal-Era	Fairfield	Section 1	One	Individual Structure	828
175	Canal-Era	Fairfield	Section 1	Two	Farmstead/Homestead	828
176	Canal-Era	Fairfield	Section 1	Three	Farmstead/Homestead	828
177	Canal-Era	Fairfield	Section 1	Four	Farmstead/Homestead	1932
178	Canal-Era	Fairfield	Section 3	One	Farmstead/Homestead	1518
179	Canal-Era	Fairfield	Section 3	Two	Individual Structure	5382
180	Canal-Era	Fairfield	Section 3	Three	Individual Structure	2484

	A	B	C	D	E	F
181	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
182						Neighbor (in feet)
183	Canal-Era	Fairfield	Section 11	One	Individual Structure	276
184	Canal-Era	Fairfield	Section 11	Two	Individual Structure	276
185	Canal-Era	Fairfield	Section 11	Three	Individual Structure	276
186	Canal-Era	Fairfield	Section 11	Four	Individual Structure	414
187	Canal-Era	Fairfield	Section 11	Five	Individual Structure	828
188	Canal-Era	Fairfield	Section 11	Six	Farmstead\Homestead	1104
189	Canal-Era	Fairfield	Section 11	Seven	Farmstead\Homestead	1242
190	Canal-Era	Fairfield	Section 11	Eight	Farmstead\Homestead	1104
191	Canal-Era	Fairfield	Section 11	Nine	Individual Structure	828
192	Canal-Era	Fairfield	Section 12	One	Individual Structure	
193	Canal-Era	Fairfield	Section 12	Two	Individual Structure	1932
194	Canal-Era	Fairfield	Section 4	One	Farmstead\Homestead	828
195	Canal-Era	Fairfield	Section 4	Two	Individual Structure	1518
196	Canal-Era	Fairfield	Section 2	One	Farmstead\Homestead	966
197	Canal-Era	Fairfield	Section 2	Two	Individual Structure	1518
198	Canal-Era	Fairfield	Section 2	Three	Farmstead\Homestead	1656
199	Canal-Era	Fairfield	Section 2	Four	Individual Structure	2622
200	Canal-Era	Fairfield	Section 2	Five	Individual Structure	2622
201	Canal-Era	Fairfield	Section 9	One	Individual Structure	828
202	Canal-Era	Fairfield	Section 9	Two	Farmstead\Homestead	1932
203	Canal-Era	Fairfield	Section 9	Three	Farmstead\Homestead	1380
204	Canal-Era	Fairfield	Section 9	Four	Individual Structure	966
205	Canal-Era	Fairfield	Section 9	Five	Individual Structure	966
206	Canal-Era	Fairfield	Section 9	Six	Farmstead\Homestead	1104
207	Canal-Era	Fairfield	Section 9	Seven	Individual Structure	966
208	Canal-Era	Fairfield	Section 9	Eight	School	966
209	Canal-Era	Fairfield	Section 9	Nine	Individual Structure	2208
210	Canal-Era	Fairfield	Section 10	One	Individual Structure	1518
211	Canal-Era	Fairfield	Section 10	Two	Individual Structure	1932
212	Canal-Era	Fairfield	Section 10	Three	Individual Structure	552
213	Canal-Era	Fairfield	Section 10	Four	Individual Structure	552
214	Canal-Era	Fairfield	Section 10	Five	Individual Structure	690
215	Canal-Era	Fairfield	Section 10	Six	Individual Structure	414
216	Canal-Era	Fairfield	Section 10	Seven	Individual Structure	276
217	Canal-Era	Fairfield	Section 10	Eight	Individual Structure	276
218	Canal-Era	Fairfield	Section 10	Nine	Individual Structure	552
219	Canal-Era	Fairfield	Section 10	Ten	Individual Structure	1104
220	Canal-Era	Fairfield	Section 10	Eleven	Individual Structure	552
221	Canal-Era	Fairfield	Section 10	Twelve	Farmstead\Homestead	552
222	Canal-Era	Fairfield	Section 10	Thirteen	Individual Structure	552
223	Canal-Era	Fairfield	Section 10	Fourteen	Individual Structure	552
224	Canal-Era	Fairfield	Section 14	One	Individual Structure	1104
225	Canal-Era	Fairfield	Section 14	Two	Individual Structure	1104
226	Canal-Era	Fairfield	Section 15	One	Individual Structure	2898
227	Canal-Era	Fairfield	Section 15	Two	Farmstead\Homestead	552
228	Canal-Era	Deer Creek	Section 5	One	Farmstead\Homestead	1380
229	Canal-Era	Deer Creek	Section 5	Two	Farmstead\Homestead	4002
230	Canal-Era	Deer Creek	Section 6	One	Individual Structure	1242
231	Canal-Era	Deer Creek	Section 6	Two	Individual Structure	1242
232	Canal-Era	Deer Creek	Section 6	Three	Individual Structure	1104
233	Canal-Era	Deer Creek	Section 6	Four	Farmstead\Homestead	3450
234	Canal-Era	Deer Creek	Section 6	Five	Farmstead\Homestead	3450
235	Canal-Era	Deer Creek	Section 6	Six	Farmstead\Homestead	1380
236	Canal-Era	Deer Creek	Section 6	Seven	School	552
237	Canal-Era	Deer Creek	Section 6	Eight	Farmstead\Homestead	552
238	Canal-Era	Deer Creek	Section 7	One	Farmstead\Homestead	2484
239	Canal-Era	Deer Creek	Section 7	Four	Farmstead\Homestead	2484
240	Canal-Era	Deer Creek	Section 31	One	Individual Structure	1104

	A	B	C	D	E	F
241	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
242						Neighbor (in feet)
243	Canal-Era	Deer Creek	Section 31	Two	Individual Structure	1104
244	Canal-Era	Deer Creek	Section 31	Three	Farmstead/Homestead	1104
245	Canal-Era	Deer Creek	Section 32	One	Farmstead/Homestead	2484
246	Canal-Era	Deer Creek	Section 32	Two	Farmstead/Homestead	3036
247	Canal-Era	Deer Creek	Section 32	Three	Farmstead/Homestead	828
248	Canal-Era	Deer Creek	Section 32	Four	Farmstead/Homestead	828

	G	H	I	J
1	Distance to Second	Nearest Road	Nearest Road In	Distance to Wabash
2	Nearest Neighbor		Opposite Direction	River
3		414	2760	4140
4	1794	138	1518	7452
5	3036	138	1242	6072
6	1794	138	1794	7314
7	828	138	414	8556
8	690	138	276	9108
9	828	276	276	9246
10	1380	138	966	9660
11	690	138	414	9660
12	2760	690	2760	6486
13	1242	276	276	10074
14		138	3174	12834
15	3588	3864	5520	2898
16	3036	3174	5382	3726
17	690	138	552	6762
18	1104	138	552	7038
19	2484	138	6900	15594
20	1104	552	3726	1932
21	828	276	3174	1518
22	828	138	2898	966
23	966	138	2208	966
24	552	138	138	1518
25	1380	138	6210	1242
26	690	138	5658	2070
27	690	138	5106	1656
28	1518	138	4554	1656
29	1242	138	4002	1518
30	1380	138	2622	1104
31	2070	138	1380	552
32	1518	138	4002	4002
33	1794	138	2898	3864
34	3864	138	2760	7452
35		138	4278	10902
36		138	4830	9248
37		138	1794	6900
38	1518	138	1380	2346
39		138	276	3864
40	4968	138	2760	3312
41	5244	276	4278	9384
42	3036	138	3036	3864
43	3864	138	4140	6348
44	966	138	276	3174
45	1380	138	2484	5658
46	828	138	1242	6348
47	552	138	690	8624
48	552	138	414	6762
49	966	552	1242	7038
50	828	138	4554	3036
51	2208	138	276	3726
52	1794	138	2208	4692
53	1794	138	1380	5106
54	2484	138	2622	8280
55	2208	276	1932	8694
56	414	552	1242	6486
57	414	138	1242	6900
58	276	138	1104	6624
59	552	138	552	6762
60	966	414	966	6348

	G	H	I	J
61	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
62	Nearest Neighbor		Opposite Direction	River
63	1104	138	828	8418
64	1932	1104	7866	12282
65	1794	138	7590	13110
66	2070	138	9660	13386
67	2760	138	828	1518
68	2760	2898	6210	1380
69	5520	5520	5658	1380
70	2484	138	5658	6624
71	2484	138	8142	6486
72	4140	138	7452	7590
73	2898	414	1794	2622
74	828	414	6072	2346
75	828	276	5244	2346
76	3726	1656	2208	1518
77	1242	138	6900	6762
78		138	5658	13248
79	690	276	276	5796
80	552	138	414	5520
81	1242	276	1242	4830
82	552	276	1242	4830
83	2484	138	1380	7452
84	2484	2070	2760	5658
85	1932	1656	2346	8418
86	1932	1518	2208	5934
87	3036	138	1794	414
88	4278	138	1794	1794
89	2898	2070	2622	1794
90	2346	414	2484	414
91	2760	138	2346	4830
92	2346	138	1242	3726
93	2346	138	1242	1932
94	1932	1242	1794	5382
95	2898	414	1932	5106
96	3174	138	414	1656
97	3450	414	3588	4830
98	4002	1518	3726	4692
99	2070	276	3864	8418
100	1794	414	4140	10074
101	1794	414	3864	10212
102	1794	414	2484	9936
103	1242	138	2070	10488
104		1104	1242	11730
105	552	690	690	3588
106	276	414	414	3588
107	414	138	138	3588
108	414	138	552	4002
109	690	138	276	4278
110	1104	138	828	5382
111	3312	3036	3450	5796
112	3036	3174	3726	5796
113	3036	3588	1656	8004
114	3312	138	4002	9936
115		414	3174	10350
116	690	138	1656	4416
117	1242	414	1518	4002
118	1380	138	414	3588
119	1794	138	276	3726
120	828	276	2208	5658

	G	H	I	J
121	Distance to Second	Nearest Road	Nearest Road In	Distance to Wabash
122	Nearest Neighbor		Opposite Direction	River
123	1104	276	1656	6210
124	828	138	1794	6072
125	1242	276	1518	5934
126	2070	552	552	7590
127	2622	276	5382	3726
128	2208	1242	1380	7038
129	2208	552	2346	8280
130	2622	276	414	8694
131		966	3450	12420
132	2622	828	4692	138
133	2208	138	5382	1794
134	1794	138	4692	1104
135	552	138	3036	2346
136	552	138	2760	2346
137	828	138	2346	2346
138	828	414	2760	2898
139	1242	552	1380	3588
140	1104	138	828	5382
141	4278	138	1380	7866
142	3174	1518	3588	2622
143	4002	138	1380	5106
144	2760	138	276	7176
145	2346	138	414	9384
146	1932	138	690	9660
147	1932	1656	3450	3450
148	1242	828	2070	4278
149	414	552	552	4554
150	1518	276	276	5106
151	3174	276	966	5106
152	2070	138	1794	8004
153	1242	690	1656	8694
154	414	276	552	4140
155	414	276	414	4002
156	2898	828	4416	2898
157	1242	138	5244	1242
158	828	138	4692	1104
159	1242	138	3864	828
160	1518	138	1380	966
161	2346	414	1518	1518
162	414	276	1518	2346
163	414	276	1794	2484
164	414	138	1932	2760
165	966	138	828	8004
166	552	138	1380	8556
167	138	138	1794	8970
168	3174	828	4140	552
169	1656	276	4416	6900
170	2208	552	2484	7176
171		2484	2760	10350
172	2760	138	2760	2898
173	2760	690	2760	3864
174	3312	3174	3312	6762
175	3450	3726	3864	6762
176		414	3864	11040
177		414	2898	10764
178	2622	138	5244	5382
179	5658	3174	3312	138
180	2898	3036	3174	3728

	G	H	I	J
181	Distance to Second	Nearest Road	Nearest Road In	Distance to Wabash
182	Nearest Neighbor		Opposite Direction	River
183	552	138	1242	7452
184	276	138	1518	7314
185	414	138	1794	7038
186	690	138	2208	6624
187	2208	276	1242	6210
188	1380	2070	2760	8280
189	1380	2760	3312	9384
190	1242	3174	3450	9384
191	1242	138	690	11592
192		138	3312	10074
193		138	2760	10626
194	966	138	276	5244
195	2208	414	1656	3174
196	1518	414	966	5382
197	1656	138	1380	4830
198	2622	138	2070	5106
199	3312	138	3174	3588
200	2760	138	276	7728
201	1932	1104	6762	3864
202	2208	138	6072	5658
203	1656	1932	5382	3864
204	1380	2208	4692	3174
205	1242	1242	3864	4002
206	1656	138	3174	5106
207	1380	1932	2898	3312
208	1104	138	1518	5382
209	2898	2346	2760	8556
210	1932	552	4002	6486
211	2070	1104	2760	5658
212	828	138	690	6486
213	552	138	276	6624
214	828	138	552	6210
215	552	138	690	6900
216	414	138	414	7176
217	690	138	414	7314
218	690	138	138	7314
219	1242	138	1518	8418
220	1656	138	1242	10488
221	1794	138	1794	11040
222	1242	138	1242	10350
223	828	138	690	10902
224	1242	690	1518	12558
225	1242	690	1518	12558
226	4002	276	276	13800
227	1380	138	966	12834
228	3174	276	3864	9936
229	4002	690	3588	11454
230	2346	138	276	414
231	1104	138	1656	6762
232	2760	138	2760	7590
233	5106	276	1380	3036
234	4554	1242	2760	6348
235	1932	276	2760	10350
236	1932	276	828	11592
237	2484	276	414	11592
238		966	2898	10212
239	2760	138	2760	10074
240	1104	1104	1242	1518

	G	H	I	J
241	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road In</u>	<u>Distance to Wabash</u>
242	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
243	1242	1104	1242	1242
244	1242	138	3450	2484
245	3036	828	1794	5382
246	3864	414	3450	5934
247		1104	3174	7590
248		276	2484	8004

	K	L	M	N
1	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
2	River Feature		and Erie Canal	and Erie Canal Feature
3			1518	1518
4			4416	4416
5			3726	4830
6			4692	4830
7			5796	1794
8			6210	6486
9			6210	6486
10			7038	7314
11			7314	7866
12			3174	3450
13			7038	8280
14			9798	9936
15	20148	Ford	138	414
16	20700	Ford	414	414
17	19458	Ford	4002	3726
18	19872	Ford	3864	3864
19			13524	13386
20	3312	Ford	828	4278
21	2484	Ford	414	3450
22	2208	Ford	138	3174
23	1794	Ford	276	2760
24	1518	Ford	414	414
25	8280	Ford	1104	7452
26	8694	Ford	1518	7728
27	9108	Ford	1380	8556
28	9798	Ford	1656	9108
29	10212	Ford	1656	9522
30	11592	Ford	828	10902
31	12834	Ford	552	9522
32	5382	Ford	2070	4278
33	4140	Ford	3036	3036
34	7728	Ford	6762	7176
35	11730	Ford	10488	9936
36	14076	Ford	8970	12834
37	16422	Ford	6900	8556
38	14214	Ford	1380	1380
39	13110	Ford	2484	2760
40	9384	Ford	414	5934
41	10488	Ford	5796	8418
42	3588	Ford	3036	3450
43	5658	Ford	5520	5796
44	13800	Ford	2070	2208
45	17250	Ford	3174	3864
46	18216	Ford	3726	3864
47	18768	Ford	4002	3864
48	19044	Ford	4140	4002
49	17802	Ford	4416	4554
50	22908	Bridge	3036	7452
51	18906	Bridge	3036	12558
52	21666	Bridge	4416	11040
53	22494	Bridge	4968	10764
54	24426	Bridge	8142	13248
55	26358	Bridge	8694	12144
56	24564	Bridge	6486	10350
57	24702	Bridge	6900	10764
58	24426	Bridge	6624	10764
59	24288	Bridge	6762	11178
60	24150	Bridge	6348	10626

	K	L	M	N
61	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
62	River Feature		and Erie Canal	and Erie Canal Feature
63	26772	Bridge	8418	11178
64	27600	Bridge	10764	10488
65	28290	Ford	11454	11454
66	29670	Ford	10764	11592
67	14490	Ford	1380	7590
68	17250	Ford	414	4830
69	20010	Ford	414	2070
70	22218	Ford	5796	5382
71	24564	Ford	5106	4830
72	24702	Ford	4002	4968
73	24150	Bridge	2208	4830
74	22494	Bridge	2208	7038
75	21942	Bridge	2208	7728
76	18078	Bridge	966	11178
77	23736	Ford	5658	5244
78	26358	Ford	12144	11730
79	27462	Bridge	4968	5382
80	27186	Bridge	4830	5244
81	26082	Bridge	4554	5796
82	27048	Bridge	4554	5796
83	28566	Bridge	6762	7176
84	26082	Bridge	6486	8556
85	26082	Bridge	8418	8832
86	27462	Bridge	5934	9936
87	9246	Ford	276	7176
88	8556	Ford	1656	8142
89	2346	Ford	138	828
90	414	Ford	414	828
91	4554	Ford	3036	3726
92	3726	Ford	2760	2760
93	2346	Ford	1656	2346
94	5382	Ford	4554	4554
95	5520	Ford	4830	5658
96	3726	Ford	1518	4968
97	5520	Ford	4692	5934
98	7728	Ford	4554	8832
99	8418	Ferry	8280	8280
100	10074	Ferry	9936	9936
101	10350	Ferry	10074	10212
102	10074	Ferry	9798	9936
103	10764	Ferry	10350	10626
104	12144	Ferry	11592	12006
105	3588	Ferry	138	15318
106	3588	Ferry	138	15042
107	3588	Ferry	138	14766
108	4002	Ferry	552	14766
109	4278	Ferry	828	15042
110	5382	Ferry	1518	14352
111	13248	Ferry	3450	6900
112	14490	Ferry	4002	4416
113	14490	Ferry	7176	7038
114	14904	Ferry	7038	10212
115	16284	Ferry	7728	9936
116	5520	Ferry	828	12282
117	5382	Ferry	414	12144
118	6210	Ferry	138	10764
119	6900	Ferry	414	10350
120	8556	Ferry	1656	10350

	K	L	M	N
121	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
122	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
123	8556	Ferry	2760	10902
124	9384	Ferry	2484	9936
125	9660	Ferry	2484	9522
126	11454	Ferry	4278	9936
127	11868	Ferry	1104	5382
128	7314	Ferry	3450	13524
129	9384	Ferry	4830	12696
130	11454	Ferry	5382	10902
131	12006	Ferry	8832	16974
132	6210	Ferry	1242	14490
133	8694	Ferry	414	12558
134	8418	Ferry	966	12696
135	6624	Ferry	828	15180
136	6486	Ferry	828	14490
137	5934	Ferry	690	15870
138	7176	Ferry	1380	14490
139	3174	Ferry	552	16146
140	5244	Ferry	1932	14490
141	9108	Ferry	5382	17802
142	4968	Ferry	414	4968
143	5934	Ford	1104	5934
144	12558	Ferry	2760	7038
145	12144	Ferry	9384	10350
146	11868	Ferry	9660	10902
147	7038	Ferry	3174	6762
148	7590	Ferry	4140	7452
149	9660	Ferry	4554	9522
150	8418	Ferry	5106	8280
151	5934	Ferry	4968	5796
152	9798	Ferry	7728	9660
153	9936	Ferry	8418	9798
154	9246	Ferry	4140	9108
155	9384	Ferry	4002	9246
156	16560	Ferry	414	4416
157	7314	Ferry	1242	5382
158	7866	Ferry	1104	4830
159	8418	Ferry	828	4002
160	10902	Ferry	552	1518
161	13800	Ferry	138	1380
162	12006	Ferry	1518	1656
163	11730	Ferry	1794	1932
164	12282	Ferry	1932	2070
165	8418	Ford	7728	8418
166	8832	Ford	8280	8832
167	9246	Ford	8694	9246
168	4692	Ferry	276	4692
169	7038	Ford	5520	6210
170	7314	Ford	6762	6762
171	10626	Ford	9108	10074
172	11040	Ferry	1656	4692
173	13662	Ferry	3588	4278
174	13110	Ferry	6072	11040
175	12282	Ferry	5934	11868
176	13662	Ferry	9522	16284
177	18008	Ferry	10074	12834
178	5934	Ferry	4416	5382
179	3174	Ferry	2484	8694
180	8556	Ferry	276	3174

	K	L	M	N
181	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
182	River Feature		and Erie Canal	and Erie Canal Feature
183	12006	Ferry	1104	1242
184	12006	Ferry	1242	1518
185	12006	Ferry	1380	1794
186	12144	Ferry	1518	2208
187	12558	Ferry	2898	4002
188	14214	Ferry	3588	4140
189	15594	Ferry	5106	5520
190	15042	Ferry	4278	4554
191	15870	Ferry	4968	4968
192	17802	Ferry	7866	8556
193	16560	Ferry	9522	10902
194	6486	Ferry	5796	8280
195	5244	Ferry	6762	9246
196	12144	Ferry	2898	4692
197	12282	Ferry	4140	5934
198	13386	Ferry	4968	7590
199	11868	Ferry	3450	8832
200	15870	Ferry	7590	8280
201	14352	Bridge	690	1242
202	12696	Ferry	690	690
203	11868	Ferry	2622	6762
204	10626	Ferry	4002	3726
205	10074	Ferry	3588	3588
206	10074	Ferry	2898	2898
207	8970	Ferry	4968	4968
208	8280	Ferry	4416	4968
209	12558	Ferry	552	2760
210	8142	Ferry	2760	4278
211	8556	Ferry	2346	2898
212	10350	Ferry	552	828
213	10764	Ferry	138	138
214	10764	Ferry	138	552
215	11592	Ferry	690	828
216	11730	Ferry	690	552
217	11730	Ferry	828	552
218	11316	Ferry	414	276
219	12834	Ferry	1794	1656
220	13938	Ferry	3036	3588
221	14352	Ferry	3588	4140
222	14490	Ferry	3588	3588
223	15042	Ferry	4140	4140
224	16836	Ferry	5934	5934
225	16836	Ferry	5934	5934
226	17112	Ferry	5658	7728
227	14076	Bridge	8556	8556
228	16974	Ford	10074	11040
229	15318	Ford	10626	10350
230	12834	Ford	4416	14214
231	14076	Ford	5520	15594
232	15180	Ford	7176	16698
233	12006	Ford	2622	6486
234	12696	Ford	5658	6762
235	17526	Ford	9936	11730
236	19458	Ford	11040	13524
237	19872	Ford	11178	14076
238	14352	Ford	9108	16284
239	17802	Ford	9660	14076
240	7176	Ford	966	1242

	K	L	M	N
241	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
242	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
243	6486 Ford		828	966
244	7866 Ford		2070	1518
245	8418 Ford		5106	5244
246	9936 Ford		5520	5520
247	10212 Ford		7038	7038
248	10212 Ford		7176	7176

	O	P	Q	R	S
1	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
2		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
3	Basin	4554			
4	Basin	6900			23460
5	Basin	5520			26634
6	Basin	5520			25254
7	Basin	4968			24978
8	Basin	4692			25392
9	Basin	4416			24426
10	Basin	3450			26220
11	Basin	2898			26910
12	Basin	8556			22632
13	Basin	3036			27462
14	Basin	828			27600
15	Basin	13524	55614	Watch House	20976
16	Basin	12006	57132	Watch House	21390
17	Basin	10764	53268	Watch House	19182
18	Basin	10074	52854	Watch House	19598
19	Aqueduct	138			
20	Bridge	24150	32568	Watch House	4002
21	Bridge	24840	29256	Watch House	3312
22	Bridge	24978	29118	Watch House	3036
23	Bridge	24978	42918	Watch House	2346
24	Bridge	25254	44160	Watch House	138
25	Bridge	23736	34086	Watch House	4140
26	Bridge	23184	33672	Watch House	7314
27	Bridge	23046	34362	Watch House	7590
28	Bridge	22494	32706	Watch House	8418
29	Bridge	22356	32292	Watch House	6210
30	Bridge	22218	30636	Watch House	7452
31	Basin	22080	29118	Watch House	8832
32	Bridge	24564	36432	Watch House	1104
33	Bridge	22632	40986	Watch House	2070
34	Basin	18492	39744	Watch House	5796
35	Bridge	15456	35880	Watch House	8280
36	Aqueduct	14904	32154	Watch House	10488
37	Basin	16008	27600	Watch House	12420
38	Bridge	18078			14490
39	Bridge	17664	35742	Watch House	13386
40	Bridge	22080	50232	Watch House	10212
41	Bridge	16836	45126	Watch House	9936
42	Bridge	22356	40434	Watch House	2484
43	Bridge	19734	40710	Watch House	4830
44	Bridge	17526	52440	Watch House	14076
45	Basin	13248	52302	Watch House	17112
46	Basin	12006	51888	Watch House	17940
47	Basin	11454	52164	Watch House	18492
48	Basin	11040	52026	Watch House	18630
49	Basin	12006	51198	Watch House	16698
50	Wea Aqueduct\Lock System	1794	4830	Watch House	17250
51	Wea Aqueduct\Lock System	1518	2070	Watch House	12834
52	Wea Aqueduct\Lock System	138	3726	Watch House	15456
53	Wea Aqueduct\Lock System	276	4554	Watch House	16560
54	Wea Aqueduct\Lock System	276	6486	Watch House	18078
55	Wea Aqueduct\Lock System	2622	8694	Watch House	20148
56	Wea Aqueduct\Lock System	1380	6900	Watch House	18492
57	Wea Aqueduct\Lock System	1656	6486	Watch House	18768
58	Wea Aqueduct\Lock System	1794	7176	Watch House	18492
59	Wea Aqueduct\Lock System	2208	6486	Watch House	18216
60	Wea Aqueduct\Lock System	1518	6210	Watch House	18216

	O	P	Q	R	S
61	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
62		Railroad	Railroad Feature	Feature	Nearest Town
63	Wea Aqueduct\Lock System	2070	8832	Watch House	20700
64	Wea Aqueduct\Lock System	6210	21114	Watch House	23460
65	Basin	5520	20562	Watch House	23736
66	Basin	4278	19320	Watch House	25392
67	Wea Aqueduct\Lock System	20286	27738	Watch House	11178
68	Basin	19734	24978	Watch House	14628
69	Wea Aqueduct\Lock System	18216	22080	Watch House	17526
70	Basin	12696	21528	Watch House	19734
71	Wea Aqueduct\Lock System	12144	16284	Watch House	22080
72	Wea Aqueduct\Lock System	10488	7314	Watch House	24564
73	Wea Aqueduct\Lock System	4416	7314	Watch House	19320
74	Wea Aqueduct\Lock System	2484	4830	Watch House	17112
75	Wea Aqueduct\Lock System	1794	4140	Watch House	16422
76	Wea Aqueduct\Lock System	138	0	Watch House	12282
77	Basin	12006	20286	Watch House	19596
78	Basin	5796	22908	Watch House	22494
79	Wea Aqueduct\Lock System	4140	9936	Watch House	22218
80	Wea Aqueduct\Lock System	4002	9660	Watch House	21804
81	Wea Aqueduct\Lock System	3174	8418	Watch House	20562
82	Wea Aqueduct\Lock System	3588	9384	Watch House	21666
83	Wea Aqueduct\Lock System	2760	10626	Watch House	23046
84	Wea Aqueduct\Lock System	690	8004	Watch House	20424
85	Wea Aqueduct\Lock System	276	9246	Watch House	20424
86	Wea Aqueduct\Lock System	1242	8142	Watch House	21804
87	Guardlock	1656	15456	Station	11868
88	Guardlock	1242	16284	Station	13524
89	Guardlock	10074	24012	Station	11040
90	Guardlock	8694	25116	Station	12834
91	Guardlock	8694	28428	Station	9384
92	Guardlock	8142	27186	Station	10626
93	Guardlock	6762	24840	Station	12972
94	Guardlock	7038	25116	Station	10350
95	Guardlock	4140	25392	Station	13662
96	Guardlock	4554	18768	Station	18768
97	Guardlock	3450	24150	Station	14766
98	Guardlock	690	20148	Station	17112
99	Bridge	8004	25944	Station	6486
100	Bridge	6210	41952		8142
101	Bridge	6072	41676		8418
102	Bridge	6486	39744	Station	8142
103	Bridge	5658	40020	Station	8832
104	Bridge	4554	40434		10074
105	Aqueduct	10626	46230	Station	26358
106	Aqueduct	10764	46920	Station	26082
107	Aqueduct	10764	47058	Station	25806
108	Aqueduct	10488	48782	Station	25668
109	Aqueduct	10074	46782	Station	25944
110	Aqueduct	10074	47472	Station	24978
111	Aqueduct	8556	55476	Station	16560
112	Aqueduct	9798	59064	Station	13110
113	Aqueduct	7314	59892	Station	12972
114	Aqueduct	4968	54096	Station	18492
115	Aqueduct	4692	52716	Station	17526
116	Aqueduct	10626	48990	Station	23598
117	Aqueduct	10902	49266	Station	23322
118	Aqueduct	11178	50508	Station	22080
119	Aqueduct	10902	51060	Station	21666
120	Aqueduct	8970	51336	Station	21114

	O	P	Q	R	S
121	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
122		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
123	Aqueduct	8418	50508	Station	23046
124	Aqueduct	8694	51336	Station	20562
125	Aqueduct	8694	52026	Station	20148
126	Aqueduct	7038	52440	Station	19872
127	Aqueduct	11178	55752	Station	16284
128	Aqueduct	7728	47610	Station	24564
129	Aqueduct	6624	48990	Station	23184
130	Aqueduct	6072	51612	Station	20976
131	Aqueduct	2346	45678	Station	26772
132	Wildcat Bridge and Locks	11316	41400	Station	27738
133	Wildcat Bridge and Locks	9108	38364	Station	25530
134	Wildcat Bridge and Locks	8694	39054	Station	26082
135	Wildcat Bridge and Locks	9384	41124	Station	27876
136	Aqueduct	9522	41676	Station	28428
137	Wildcat Bridge and Locks	9798	41952	Station	28704
138	Wildcat Bridge and Locks	8832	53130	Station	27600
139	Aqueduct	10764	45540	Station	27462
140	Aqueduct	9108	46782	Station	25806
141	Aqueduct	5796	43884	Station	31050
142	Bridge	13662	33672	Station	3174
143	Guardlock	10350	31188	Station	6624
144	Aqueduct	7866	61824	Station	11318
145	Aqueduct	5934	44160	Station	10626
146	Aqueduct	5796	43332	Station	10212
147	Bridge	12420	41952	Station	5106
148	Aqueduct	11454	45264	Station	5520
149	Aqueduct	10626	47334	Station	7728
150	Aqueduct	10488	45816	Station	6486
151	Bridge	11040	39468	Station	4002
152	Aqueduct	7866	44850	Station	8004
153	Bridge	7314	44850	Station	8142
154	Aqueduct	10902	44298	Station	7452
155	Aqueduct	11040	47334	Station	7452
156	Aqueduct	12282	56718	Station	15456
157	Aqueduct	14076	43332	Station	5934
158	Aqueduct	14076	43884	Station	6486
159	Aqueduct	14076	44850	Station	7176
160	Aqueduct	14076	47058	Station	9660
161	Aqueduct	13662	50232	Station	12698
162	Aqueduct	12834	48162	Station	10626
163	Aqueduct	12558	47886	Station	10350
164	Aqueduct	12420	48300	Station	11040
165	Guardlock	2760	27186	Station	13938
166	Guardlock	2484	24012	Station	13938
167	Guardlock	2346	25116	Station	13938
168	Bridge	15456	40710	Station	3312
169	Guardlock	7038	29256	Station	9522
170	Guardlock	5382	28566	Station	11178
171	Guardlock	4416	31188	Station	11454
172	Bridge	13110	35328	Station	2622
173	Bridge	12558	37674	Station	2622
174	Wildcat Bridge and Locks	3312	35880	Station	23598
175	Wildcat Bridge and Locks	3726	36708	Station	24426
176	Wildcat Bridge and Locks	1242	40434	Station	28428
177	Wildcat Bridge and Locks	414	36294	Station	24426
178	Wildcat Bridge and Locks	1656	24564	Station	12144
179	Wildcat Bridge and Locks	2208	24702	Station	17388
180	Wildcat Bridge and Locks	5934	27462	Station	14766

	O	P	Q	R	S
181	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
182		Railroad	Railroad Feature	Feature	Nearest Town
183	Wildcat Bridge and Locks	2346	25944	Station	13524
184	Wildcat Bridge and Locks	2346	26358	Station	13800
185	Wildcat Bridge and Locks	2484	26634	Station	14214
186	Wildcat Bridge and Locks	2484	27186	Station	14628
187	Wildcat Bridge and Locks	2760	28842	Station	16422
188	Wildcat Bridge and Locks	690	27600	Station	15456
189	Wildcat Bridge and Locks	414	28290	Station	16284
190	Wildcat Bridge and Locks	414	26910	Station	15042
191	Wildcat Bridge and Locks	1656	23046	Station	11316
192	Wildcat Bridge and Locks	1380	31464	Station	22494
193	Wildcat Bridge and Locks	138	34500	Station	19458
194	Wildcat Bridge and Locks	552	23322	Station	11316
195	Wildcat Bridge and Locks	1380	24564	Station	12834
196	Wildcat Bridge and Locks	3588	29532	Station	17112
197	Wildcat Bridge and Locks	4278	31050	Station	18630
198	Wildcat Bridge and Locks	4140	32430	Station	20148
199	Wildcat Bridge and Locks	6072	35052	Station	22356
200	Wildcat Bridge and Locks	1656	32706	Station	20562
201	Basin	1932	15456	Station	4830
202	Basin	276	16836	Station	5244
203	Basin	2070	17802	Station	7038
204	Basin	2208	19182	Station	8280
205	Basin	1380	19458	Station	8280
206	Basin	276	19596	Station	8004
207	Basin	2070	20562	Station	9660
208	Basin	138	21252	Station	9660
209	Basin	2622	18078	Station	5658
210	Wildcat Bridge and Locks	3174	23598	Station	10764
211	Wildcat Bridge and Locks	4830	24840	Station	12006
212	Wildcat Bridge and Locks	3726	24840	Station	12420
213	Wildcat Bridge and Locks	3450	24978	Station	12696
214	Wildcat Bridge and Locks	3450	21942	Station	13248
215	Wildcat Bridge and Locks	2622	25668	Station	13524
216	Wildcat Bridge and Locks	2484	25254	Station	13110
217	Wildcat Bridge and Locks	2484	24840	Station	12696
218	Wildcat Bridge and Locks	2898	24564	Station	12282
219	Wildcat Bridge and Locks	1380	24426	Station	12558
220	Wildcat Bridge and Locks	138	22080	Station	9798
221	Wildcat Bridge and Locks	138	21528	Station	9522
222	Wildcat Bridge and Locks	414	23184	Station	11316
223	Wildcat Bridge and Locks	966	22908	Station	11178
224	Wildcat Bridge and Locks	2760	23046	Station	11730
225	Wildcat Bridge and Locks	2760	24012	Station	12834
226	Wildcat Bridge and Locks	2208	18906	Station	7038
227	Basin	3588	15180	Station	5658
228	Guardlock	8280	18630	Station	14628
229	Guardlock	8556	15042	Station	11316
230	Guardlock	2070	23598	Station	20010
231	Guardlock	3312	23184	Station	19596
232	Guardlock	4416	22908	Station	19182
233	Guardlock	966	16422	Station	12972
234	Guardlock	3726	15456	Station	11868
235	Guardlock	8142	19596	Station	15732
236	Guardlock	9108	21528	Station	17664
237	Guardlock	9108	22218	Station	18354
238	Guardlock	4416	28704	Station	26910
239	Guardlock	7038	22908	Station	19044
240	Guardlock	828	11316	Station	7728

	O	P	Q	R	S
241	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
242		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
243	Guardlock	828	10074	Station	6762
244	Guardlock	138	11040	Station	7452
245	Towpath Bridge	1932	7590	Station	3588
246	Guardlock	3450	10488	Station	6488
247	Lock	3588	7314	Station	4140
248	Lock	3864	6900	Station	3726

	T	U	V	W	X	Y
1	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
2		<u>Body of Water</u>	<u>Water</u>			
3		276	Flint Creek	Yes	Yes	Yes
4	Granville	5658	Flint Creek	Yes	Yes	Yes
5	Granville	3588	Flint Creek	Yes	Yes	Yes
6	Granville	4416	Flint Creek	Yes	Yes	Yes
7	Granville	4968	Flint Creek	Yes	Yes	Yes
8	Granville	4968	Flint Creek	Yes	Yes	Yes
9	Granville	5796	Flint Creek	Yes	Yes	Yes
10	Granville	4140	Flint Creek	Yes	Yes	Yes
11	Granville	3450	Flint Creek	Yes	Yes	Yes
12	Granville	6486	Wabash River	Yes	Yes	Yes
13	Granville	690	Flint Creek	Yes	Yes	Yes
14	Granville	3036	Flint Creek	Yes	Yes	No
15	Granville	2898	Wabash River	No	Yes	Yes
16	Granville	3726	Wabash River	No	Yes	Yes
17	Granville	6762	Wabash River	No	Yes	Yes
18	Granville	7038	Wabash River	Yes	Yes	Yes
19		690	Flint Creek	Yes	Yes	Yes
20	Granville	1932	Wabash River	No	Yes	Yes
21	Granville	1518	Wabash River	No	Yes	Yes
22	Granville	966	Wabash River	No	Yes	Yes
23	Granville	966	Wabash River	No	Yes	Yes
24	Granville	1518	Wabash River	No	Yes	Yes
25	Granville	1242	Wabash River	No	Yes	Yes
26	Granville	2070	Wabash River	No	Yes	Yes
27	Granville	1656	Wabash River	No	Yes	Yes
28	Granville	1656	Wabash River	No	Yes	Yes
29	Granville	1518	Wabash River	No	Yes	Yes
30	Granville	1104	Wabash River	No	Yes	Yes
31	Granville	552	Wabash River	No	Yes	Yes
32	Granville	4002	Wabash River	No	Yes	Yes
33	Granville	3864	Wabash River	No	Yes	Yes
34	Granville	7452	Wabash River	No	Yes	Yes
35	Granville	10902	Wabash River	No	Yes	Yes
36	Granville	9246	Wabash River	No	Yes	Yes
37	Granville	6900	Wabash River	No	Yes	Yes
38	Granville	2346	Wabash River	No	Yes	Yes
39	Granville	3864	Wabash River	No	Yes	Yes
40	Granville	3312	Wabash River	No	Yes	Yes
41	Granville	9384	Wabash River	No	Yes	Yes
42	Granville	3864	Wabash River	No	Yes	Yes
43	Granville	6348	Wabash River	No	Yes	Yes
44	Granville	3174	Wabash River	No	Yes	Yes
45	Granville	5658	Wabash River	No	Yes	Yes
46	Granville	6348	Wabash River	No	Yes	Yes
47	Granville	6624	Wabash River	No	Yes	Yes
48	Granville	6762	Wabash River	No	Yes	Yes
49	Granville	7038	Wabash River	No	Yes	Yes
50	Lafayette	828	Wea Creek	Yes	Yes	Yes
51	Lafayette	3726	Wea Creek	Yes	Yes	Yes
52	Lafayette	2070	Wea Creek	Yes	Yes	Yes
53	Lafayette	1242	Wea Creek	Yes	Yes	Yes
54	Lafayette	966	Wabash River	No	Yes	Yes
55	Lafayette	1104	Wea Creek	No	Yes	Yes
56	Lafayette	276	Wea Creek	No	Yes	Yes
57	Lafayette	690	Wea Creek	No	Yes	Yes
58	Lafayette	414	Wabash River	No	Yes	Yes
59	Lafayette	138	Mill Race	No	Yes	Yes
60	Lafayette	138	Mill Race	No	Yes	Yes

	T	U	V	W	X	Y
61	Town	Distance to Nearest	Body of	RR	WE	WA
62		Body of Water	Water			
63	Lafayette	2070	Wea Creek	No	Yes	Yes
64	Granville	8970	Wea Creek	Yes	Yes	No
65	Lafayette	9798	Wea Creek	Yes	Yes	Yes
66	Lafayette	8556	Wea Creek	Yes	Yes	Yes
67	Granville	1518	Wabash River	No	Yes	Yes
68	Granville	1380	Wabash River	No	Yes	Yes
69	Granville	1380	Wabash River	No	Yes	Yes
70	Granville	6624	Wabash River	No	Yes	Yes
71	Granville	12144	Wea Creek	No	Yes	Yes
72	Lafayette	10488	Wea Creek	Yes	Yes	Yes
73	Lafayette	690	Wea Creek	Yes	Yes	Yes
74	Lafayette	1242	Wea Creek	Yes	Yes	Yes
75	Lafayette	1656	Wea Creek	Yes	Yes	Yes
76	Lafayette	1518	Wea Creek	Yes	Yes	Yes
77	Granville	6762	Wabash River	No	Yes	Yes
78	Granville	13248	Wabash River	Yes	Yes	Yes
79	Lafayette	138	Mill Race	Yes	Yes	Yes
80	Lafayette	138	Mill Race	Yes	Yes	Yes
81	Lafayette	414	Mill Race	Yes	Yes	Yes
82	Lafayette	414	Mill Race	Yes	Yes	Yes
83	Lafayette	1932	Mill Race	Yes	Yes	Yes
84	Lafayette	276	Wabash River	Yes	Yes	Yes
85	Lafayette	414	Wea Creek	No	Yes	Yes
86	Lafayette	2070	Wabash River	Yes	Yes	Yes
87	Delphi	414	Wabash River	Yes	Yes	Yes
88	Delphi	1794	Wabash River	Yes	Yes	Yes
89	Americus	1794	Wabash River	Yes	Yes	Yes
90	Americus	414	Wabash River	Yes	Yes	Yes
91	Americus	4830	Wabash River	Yes	Yes	Yes
92	Americus	3726	Wabash River	Yes	Yes	Yes
93	Americus	1932	Wabash River	Yes	Yes	Yes
94	Americus	5382	Wabash River	Yes	Yes	Yes
95	Americus	5106	Wabash River	Yes	Yes	Yes
96	Delphi	1656	Wabash River	Yes	Yes	Yes
97	Americus	4830	Wabash River	Yes	Yes	Yes
98	Delphi	4692	Wabash River	Yes	Yes	Yes
99	Americus	552	Sugar Creek	Yes	Yes	Yes
100	Americus	276	Sugar Creek	Yes	Yes	Yes
101	Americus	276	Sugar Creek	Yes	Yes	Yes
102	Americus	966	Sugar Creek	Yes	Yes	Yes
103	Americus	414	Sugar Creek	Yes	Yes	Yes
104	Americus	552	Sugar Creek	Yes	Yes	Yes
105	Americus	3588	Wabash River	No	Yes	Yes
106	Americus	3588	Wabash River	No	Yes	Yes
107	Americus	3588	Wabash River	No	Yes	Yes
108	Americus	4002	Wabash River	Yes	Yes	Yes
109	Americus	4278	Wabash River	Yes	Yes	Yes
110	Americus	3036	Buck Creek	Yes	Yes	Yes
111	Americus	3036	Buck Creek	Yes	Yes	Yes
112	Americus	1932	Sugar Creek	Yes	Yes	Yes
113	Americus	3312	Sugar Creek	Yes	Yes	Yes
114	Americus	552	Buck Creek	Yes	Yes	Yes
115	Americus	552	Buck Creek	Yes	Yes	Yes
116	Americus	1518	Buck Creek	Yes	Yes	Yes
117	Americus	1380	Buck Creek	Yes	Yes	Yes
118	Americus	138	Buck Creek	Yes	Yes	Yes
119	Americus	414	Buck Creek	Yes	Yes	Yes
120	Americus	138	Buck Creek	Yes	Yes	Yes

	T	U	V	W	X	Y
121	Town	Distance to Nearest	Body of	RR	WE	WA
122		Body of Water	Water			
123	Americus	414	Buck Creek	Yes	Yes	Yes
124	Americus	138	Buck Creek	Yes	Yes	Yes
125	Americus	414	Buck Creek	Yes	Yes	Yes
126	Americus	138	Buck Creek	No	Yes	Yes
127	Americus	3726	Wabash River	No	Yes	Yes
128	Americus	2622	Buck Creek	Yes	Yes	Yes
129	Americus	2622	Buck Creek	Yes	Yes	Yes
130	Americus	276	Buck Creek	Yes	Yes	Yes
131	Americus	6210	Buck Creek	Yes	Yes	No
132	Linwood	138	Wabash River	Yes	Yes	Yes
133	Lafayette	1794	Wabash River	Yes	Yes	Yes
134	Linwood	2484	Wabash River	Yes	Yes	Yes
135	Lafayette	2346	Wabash River	Yes	Yes	Yes
136	Linwood	2346	Wabash River	Yes	Yes	Yes
137	Lafayette	2346	Wabash River	Yes	Yes	Yes
138	Linwood	2898	Wabash River	Yes	Yes	Yes
139	Americus	3588	Wabash River	Yes	Yes	Yes
140	Americus	5382	Wabash River	Yes	Yes	Yes
141	Lafayette	6762	Buck Creek	Yes	Yes	Yes
142	Americus	2622	Wabash River	No	Yes	Yes
143	Americus	5106	Wabash River	Yes	Yes	Yes
144	Americus	2760	Sugar Creek	Yes	Yes	Yes
145	Americus	2208	Sugar Creek	Yes	Yes	Yes
146	Americus	2208	Sugar Creek	Yes	Yes	Yes
147	Americus	1794	Sugar Creek	No	Yes	Yes
148	Americus	966	Sugar Creek	No	Yes	Yes
149	Americus	276	Sugar Creek	Yes	Yes	Yes
150	Americus	138	Sugar Creek	Yes	Yes	Yes
151	Americus	966	Sugar Creek	No	Yes	Yes
152	Americus	1518	Sugar Creek	Yes	Yes	Yes
153	Americus	2346	Sugar Creek	Yes	Yes	Yes
154	Americus	138	Sugar Creek	No	Yes	Yes
155	Americus	138	Sugar Creek	No	Yes	Yes
156	Americus	2898	Wabash River	No	Yes	Yes
157	Americus	1242	Wabash River	No	Yes	Yes
158	Americus	1104	Wabash River	No	Yes	Yes
159	Americus	828	Wabash River	No	Yes	Yes
160	Americus	966	Wabash River	No	Yes	Yes
161	Americus	1380	Sugar Creek	No	Yes	Yes
162	Americus	690	Sugar Creek	No	Yes	Yes
163	Americus	690	Sugar Creek	No	Yes	Yes
164	Americus	138	Sugar Creek	No	Yes	Yes
165	Americus	8004	Wabash River	Yes	Yes	Yes
166	Americus	8556	Wabash River	Yes	Yes	Yes
167	Americus	8970	Wabash River	Yes	Yes	Yes
168	Americus	552	Wabash River	No	Yes	Yes
169	Americus	6900	Wabash River	Yes	Yes	Yes
170	Americus	6762	Wabash River	Yes	Yes	Yes
171	Americus	5382	Sugar Creek	No	Yes	Yes
172	Americus	2898	Wabash River	No	Yes	Yes
173	Americus	3864	Wabash River	Yes	Yes	Yes
174	Linwood	6762	Wabash River	Yes	Yes	Yes
175	Linwood	6762	Wabash River	Yes	Yes	Yes
176	Linwood	11040	Wabash River	Yes	Yes	Yes
177	Linwood	10764	Wabash River	Yes	Yes	Yes
178	Linwood	690	Wildcat Creek	Yes	Yes	Yes
179	Linwood	138	Wabash River	No	Yes	Yes
180	Linwood	2208	Wildcat Creek	Yes	Yes	Yes

	T	U	V	W	X	Y
181	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
182		<u>Body of Water</u>	<u>Water</u>			
183	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
184	Linwood	1656	Wildcat Creek	Yes	Yes	Yes
185	Linwood	1932	Wildcat Creek	Yes	Yes	Yes
186	Linwood	2346	Wildcat Creek	Yes	Yes	Yes
187	Linwood	4140	Wildcat Creek	Yes	Yes	Yes
188	Linwood	3726	Wildcat Creek	Yes	Yes	Yes
189	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
190	Linwood	4002	Wildcat Creek	Yes	Yes	Yes
191	Linwood	1794	Wildcat Creek	No	Yes	No
192	Linwood	8280	Wildcat Creek	Yes	Yes	Yes
193	Linwood	10626	Wabash River	Yes	Yes	Yes
194	Linwood	3036	Wildcat Creek	Yes	Yes	Yes
195	Linwood	3174	Wabash River	No	Yes	Yes
196	Linwood	4278	Wildcat Creek	Yes	Yes	Yes
197	Linwood	4830	Wabash River	Yes	Yes	Yes
198	Linwood	5106	Wabash River	Yes	Yes	Yes
199	Linwood	3588	Wabash River	Yes	Yes	Yes
200	Linwood	7728	Wabash River	Yes	Yes	Yes
201	Linwood	3864	Wabash River	Yes	Yes	Yes
202	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
203	Linwood	3588	Wabash River	Yes	Yes	Yes
204	Linwood	3174	Wabash River	Yes	Yes	Yes
205	Linwood	4002	Wabash River	Yes	Yes	Yes
206	Linwood	5244	Wabash River	Yes	Yes	Yes
207	Linwood	3312	Wabash River	Yes	Yes	Yes
208	Linwood	4416	Wildcat Creek	Yes	Yes	Yes
209	Linwood	5658	Wildcat Creek	Yes	Yes	Yes
210	Linwood	690	Wildcat Creek	Yes	Yes	Yes
211	Linwood	690	Wildcat Creek	Yes	Yes	Yes
212	Linwood	690	Wildcat Creek	Yes	Yes	Yes
213	Linwood	138	Wildcat Creek	Yes	Yes	Yes
214	Linwood	276	Wildcat Creek	Yes	Yes	Yes
215	Linwood	828	Wildcat Creek	Yes	Yes	Yes
216	Linwood	414	Wildcat Creek	Yes	Yes	Yes
217	Linwood	138	Wildcat Creek	Yes	Yes	Yes
218	Linwood	276	Wildcat Creek	No	Yes	No
219	Linwood	414	Wildcat Creek	Yes	Yes	Yes
220	Linwood	138	Wildcat Creek	Yes	Yes	Yes
221	Linwood	276	Wildcat Creek	No	Yes	No
222	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
223	Linwood	1242	Wildcat Creek	No	Yes	No
224	Linwood	828	Wildcat Creek	No	Yes	No
225	Linwood	1656	Wildcat Creek	No	Yes	No
226	Linwood	2760	Wildcat Creek	No	Yes	No
227	Linwood	5796	Wildcat Creek	No	Yes	No
228	Delphi	9936	Wabash River	Yes	Yes	Yes
229	Delphi	9936	Deer Creek	Yes	Yes	Yes
230	Delphi	5934	Wabash River	Yes	Yes	Yes
231	Delphi	6762	Wabash River	Yes	Yes	Yes
232	Delphi	7590	Wabash River	Yes	Yes	Yes
233	Delphi	3036	Wabash River	Yes	Yes	Yes
234	Delphi	5934	Wabash River	Yes	Yes	Yes
235	Delphi	10350	Wabash River	Yes	Yes	Yes
236	Delphi	11592	Wabash River	Yes	Yes	Yes
237	Delphi	11592	Wabash River	Yes	Yes	Yes
238	Americus	10212	Wabash River	Yes	Yes	Yes
239	Delphi	10074	Wabash River	Yes	Yes	Yes
240	Delphi	8004	Wabash River	No	Yes	Yes

	T	U	V	W	X	Y
241	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
242		<u>Body of Water</u>	<u>Water</u>			
243	Delphi	1518	Deer Creek	No	Yes	Yes
244	Delphi	2346	Deer Creek	No	Yes	Yes
245	Delphi	2484	Deer Creek	Yes	Yes	Yes
246	Delphi	4554	Deer Creek	Yes	Yes	Yes
247	Delphi	3588	Deer Creek	Yes	Yes	Yes
248	Delphi	3312	Deer Creek	Yes	Yes	Yes

	A	B	C	D	E	F
1	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
2						Neighbor (in feet)
3	Railroad-Era	Washington	Section 21	Nine	School	1932
4	Railroad-Era	Washington	Section 21	Nine	Mill	414
5	Railroad-Era	Washington	Section 21	Seven	Individual Structure	1104
6	Railroad-Era	Washington	Section 21	Eight	Farmstead\Homestead	1794
7	Railroad-Era	Washington	Section 20		Individual Structure	828
8	Railroad-Era	Washington	Section 20		Farmstead\Homestead	1518
9	Railroad-Era	Washington	Section 19	One	Farmstead\Homestead	828
10	Railroad-Era	Washington	Section 20		Farmstead\Homestead	1104
11	Railroad-Era	Washington	Section 28	Three	Individual Structure	966
12	Railroad-Era	Washington	Section 28	Four	Farmstead\Homestead	2484
13	Railroad-Era	Washington	Section 10	Two	Individual Structure	2208
14	Railroad-Era	Washington	Section 28	Two	Farmstead\Homestead	966
15	Railroad-Era	Washington	Section 21	Four	Individual Structure	1242
16	Railroad-Era	Washington	Section 21	Six	Individual Structure	1104
17	Railroad-Era	Washington	Section 21	Two	Individual Structure	1242
18	Railroad-Era	Washington	Section 21	Three	Individual Structure	414
19	Railroad-Era	Washington	Section 20		Individual Structure	828
20	Railroad-Era	Washington	Section 15		Individual Structure	828
21	Railroad-Era	Washington	Section 27	Four	Farmstead\Homestead	1380
22	Railroad-Era	Washington	Section 15	One	Farmstead\Homestead	1518
23	Railroad-Era	Washington	Section 15	Two	Farmstead\Homestead	2622
24	Railroad-Era	Washington	Section 27	Seven	School	414
25	Railroad-Era	Fairfield	Section 1	Four	Farmstead\Homestead	1242
26	Railroad-Era	Washington	Section 27	Five	Farmstead\Homestead	1242
27	Railroad-Era	Washington	Section 27	Six	Farmstead\Homestead	1242
28	Railroad-Era	Washington	Section 14	Two	Farmstead\Homestead	1656
29	Railroad-Era	Washington	Section 14	Three	Individual Structure	1380
30	Railroad-Era	Washington	Section 13	One	Farmstead\Homestead	2346
31	Railroad-Era	Washington	Section 14	One	Farmstead\Homestead	828
32	Railroad-Era	Washington	Section 14	Seven	Individual Structure	1380
33	Railroad-Era	Washington	Section 14		Individual Structure	1794
34	Railroad-Era	Washington	Section 14	Three	Farmstead\Homestead	1794
35	Railroad-Era	Washington	Section 14	Six	Farmstead\Homestead	1104
36	Railroad-Era	Washington	Section 10	One	Individual Structure	1518
37	Railroad-Era	Washington	Section 29	Eight	Individual Structure	1380
38	Railroad-Era	Washington	Section 29	Nine	Individual Structure	1104
39	Railroad-Era	Washington	Section 29	Six	Individual Structure	1380
40	Railroad-Era	Washington	Section 29	Seven	Individual Structure	1380
41	Railroad-Era	Washington	Section 30	Five	Individual Structure	2346
42	Railroad-Era	Washington	Section 30	Ten	Farmstead\Homestead	828
43	Railroad-Era	Washington	Section 29	Ten	Individual Structure	1104
44	Railroad-Era	Washington	Section 30	One	School	690
45	Railroad-Era	Washington	Section 25	Two	Individual Structure	276
46	Railroad-Era	Washington	Section 25	Three	Individual Structure	276
47	Railroad-Era	Washington	Section 22	Five	Individual Structure	690
48	Railroad-Era	Washington	Section 22		Farmstead\Homestead	1794
49	Railroad-Era	Washington	Section 29	Four	Farmstead\Homestead	1380
50	Railroad-Era	Washington	Section 29	Five	Farmstead\Homestead	1242
51	Railroad-Era	Washington	Section 25	Five	Farmstead\Homestead	690
52	Railroad-Era	Washington	Section 25	Six	Farmstead\Homestead	1104
53	Railroad-Era	Washington	Section 30		Farmstead\Homestead	828
54	Railroad-Era	Washington	Section 35	Two	Farmstead\Homestead	1794
55	Railroad-Era	Washington	Section 35		Individual Structure	828
56	Railroad-Era	Washington	Section 32	Two	Individual Structure	552
57	Railroad-Era	Washington	Section 32	Four	Individual Structure	1242
58	Railroad-Era	Washington	Section 36	Five	Farmstead\Homestead	1242
59	Railroad-Era	Washington	Section 36	Seven	Farmstead\Homestead	3036
60	Railroad-Era	Washington	Section 36	One	Individual Structure	828

	A	B	C	D	E	F
61	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
62						Neighbor (in feet)
63	Railroad-Era	Washington	Section 36	Three	Farmstead\Homestead	828
64	Railroad-Era	Washington	Section 30		Farmstead\Homestead	1380
65	Railroad-Era	Washington	Section 31	One	Farmstead\Homestead	1656
66	Railroad-Era	Washington	Section 30		Farmstead\Homestead	1932
67	Railroad-Era	Washington	Section 30		Individual Structure	552
68	Railroad-Era	Washington	Section 31		Farmstead\Homestead	2484
69	Railroad-Era	Washington	Section 32	One	Individual Structure	552
70	Railroad-Era	Washington	Section 31	Three	Farmstead\Homestead	552
71	Railroad-Era	Washington	Section 31	Four	Farmstead\Homestead	
72	Railroad-Era	Deer Creek	Section 5	Two	Farmstead\Homestead	4002
73	Railroad-Era	Deer Creek	Section 6	Four	Farmstead\Homestead	3450
74	Railroad-Era	Fairfield	Section 15		Individual Structure	414
75	Railroad-Era	Deer Creek	Section 5	One	Farmstead\Homestead	1380
76	Railroad-Era	Deer Creek	Section 6	Seven	School	552
77	Railroad-Era	Deer Creek	Section 6	Eight	Farmstead\Homestead	552
78	Railroad-Era	Deer Creek	Section 6	Five	Farmstead\Homestead	3450
79	Railroad-Era	Deer Creek	Section 6	Six	Farmstead\Homestead	1380
80	Railroad-Era	Fairfield	Section 10		Individual Structure	414
81	Railroad-Era	Fairfield	Section 10		Individual Structure	1656
82	Railroad-Era	Fairfield	Section 10		Individual Structure	414
83	Railroad-Era	Fairfield	Section 10		Farmstead\Homestead	1656
84	Railroad-Era	Fairfield	Section 15		School	414
85	Railroad-Era	Fairfield	Section 15		Farmstead\Homestead	276
86	Railroad-Era	Fairfield	Section 14	Two	Individual Structure	1104
87	Railroad-Era	Fairfield	Section 14		Farmstead\Homestead	1794
88	Railroad-Era	Deer Creek	Section 7	One	Farmstead\Homestead	2484
89	Railroad-Era	Deer Creek	Section 32	One	Farmstead\Homestead	966
90	Railroad-Era	Deer Creek	Section 32	Two	Farmstead\Homestead	3036
91	Railroad-Era	Deer Creek	Section 31	Seven	Farmstead\Homestead	1104
92	Railroad-Era	Deer Creek	Section 31	Eight	Individual Structure	1242
93	Railroad-Era	Deer Creek	Section 32	Five	Farmstead\Homestead	2898
94	Railroad-Era	Deer Creek	Section 32	Six	Brckyard	1932
95	Railroad-Era	Deer Creek	Section 32	Three	Farmstead\Homestead	828
96	Railroad-Era	Deer Creek	Section 32	Four	Farmstead\Homestead	828
97	Railroad-Era	Deer Creek	Section 7	Four	Farmstead\Homestead	2484
98	Railroad-Era	Deer Creek	Section 30	Two	Individual Structure	
99	Railroad-Era	Deer Creek	Section 7	Two	Individual Structure	2070
100	Railroad-Era	Deer Creek	Section 7	Three	Farmstead\Homestead	2484
101	Railroad-Era	Deer Creek	Section 31	Five	Individual Structure	414
102	Railroad-Era	Deer Creek	Section 31	Six	Individual Structure	690
103	Railroad-Era	Deer Creek	Section 31	Three	Farmstead\Homestead	1932
104	Railroad-Era	Deer Creek	Section 31	Four	Individual Structure	414
105	Railroad-Era	Fairfield	Section 10	Thirteen	Individual Structure	2346
106	Railroad-Era	Fairfield	Section 11		School	828
107	Railroad-Era	Fairfield	Section 12		Individual Structure	2760
108	Railroad-Era	Fairfield	Section 11	Eight	Farmstead\Homestead	1104
109	Railroad-Era	Fairfield	Section 11		Farmstead\Homestead	690
110	Railroad-Era	Fairfield	Section 4	Three	Individual Structure	4416
111	Railroad-Era	Fairfield	Section 2	Two	Individual Structure	414
112	Railroad-Era	Fairfield	Section 12		Individual Structure	1242
113	Railroad-Era	Fairfield	Section 4	One	Farmstead\Homestead	2760
114	Railroad-Era	Fairfield	Section 1		Farmstead\Homestead	2622
115	Railroad-Era	Fairfield	Section 3	One	Farmstead\Homestead	3036
116	Railroad-Era	Fairfield	Section 1		Farmstead\Homestead	828
117	Railroad-Era	Fairfield	Section 1		Individual Structure	828
118	Railroad-Era	Fairfield	Section 11	Six	Farmstead\Homestead	1104
119	Railroad-Era	Fairfield	Section 11	Seven	Farmstead\Homestead	1242
120	Railroad-Era	Fairfield	Section 3		Individual Structure	1380

	A	B	C	D	E	F
121	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
122						Neighbor (in feet)
123	Railroad-Era	Fairfield	Section 3		Individual Structure	1380
124	Railroad-Era	Fairfield	Section 2		Farmstead\Homestead	276
125	Railroad-Era	Fairfield	Section 9	Four	Individual Structure	414
126	Railroad-Era	Fairfield	Section 9	Six	Farmstead\Homestead	552
127	Railroad-Era	Fairfield	Section 9	Three	Farmstead\Homestead	1242
128	Railroad-Era	Fairfield	Section 9	Four	Individual Structure	1242
129	Railroad-Era	Fairfield	Section 9		Farmstead\Homestead	552
130	Railroad-Era	Fairfield	Section 10	Ten	Individual Structure	2208
131	Railroad-Era	Fairfield	Section 9	Eight	School	1242
132	Railroad-Era	Fairfield	Section 9		Individual Structure	1794
133	Railroad-Era	Fairfield	Section 2		Farmstead\Homestead	966
134	Railroad-Era	Fairfield	Section 2		Black Smith	690
135	Railroad-Era	Fairfield	Section 2		Individual Structure	414
136	Railroad-Era	Fairfield	Section 2		Farmstead\Homestead	2346
137	Railroad-Era	Fairfield	Section 9	Two	Individual Structure	690
138	Railroad-Era	Fairfield	Section 9	Three	Individual Structure	414
139	Railroad-Era	Fairfield	Section 2		Individual Structure	276
140	Railroad-Era	Fairfield	Section 9	One	Individual Structure	828
141	Railroad-Era	Washington	Section 22	Four	Individual Structure	690
142	Railroad-Era	Wayne	Section 11	One	Individual Structure	552
143	Railroad-Era	Wayne	Section 11	Three	Farmstead\Homestead	1242
144	Railroad-Era	Wayne	Section 12	One	Individual Structure	2070
145	Railroad-Era	Union	Section 1	Twelve	School	1104
146	Railroad-Era	Union	Section 1	Eleven	Mill	414
147	Railroad-Era	Union	Section 1	Eight	Individual Structure	414
148	Railroad-Era	Union	Section 1	Seven	Individual Structure	414
149	Railroad-Era	Union	Section 1	Three	Individual Structure	966
150	Railroad-Era	Union	Section 1	Two	Individual Structure	552
151	Railroad-Era	Union	Section 1	One	Individual Structure	1932
152	Railroad-Era	Wayne	Section 22	One	Farmstead\Homestead	1518
153	Railroad-Era	Union	Section 1	Six	Individual Structure	1104
154	Railroad-Era	Union	Section 1	Four	Individual Structure	966
155	Railroad-Era	Union	Section 1	Thirteen	Individual Structure	414
156	Railroad-Era	Union	Section 11	Three	Church	1242
157	Railroad-Era	Union	Section 3	Five	Farmstead\Homestead	1932
158	Railroad-Era	Union	Section 3	Four	School	1656
159	Railroad-Era	Union	Section 12	Six	Individual Structure	1932
160	Railroad-Era	Wayne	Section 5	One	Farmstead\Homestead	1242
161	Railroad-Era	Wayne	Section 5	Two	Farmstead\Homestead	3864
162	Railroad-Era	Union	Section 3	Three	Farmstead\Homestead	2070
163	Railroad-Era	Union	Section 1	Fifteen	Individual Structure	1518
164	Railroad-Era	Union	Section 1	Fourteen	Farmstead\Homestead	1380
165	Railroad-Era	Wayne	Section 6	One	Farmstead\Homestead	690
166	Railroad-Era	Union	Section 3	Two	Individual Structure	1794
167	Railroad-Era	Union	Section 1	Seventeen	Individual Structure	
168	Railroad-Era	Union	Section 1	Sixteen	Individual Structure	966
169	Railroad-Era	Wayne	Section 31	One	Farmstead\Homestead	414
170	Railroad-Era	Wayne	Section 30	Two	Farmstead\Homestead	2484
171	Railroad-Era	Wayne	Section 29	Nine	School	690
172	Railroad-Era	Wayne	Section 32	One	Farmstead\Homestead	
173	Railroad-Era	Wayne	Section 31	Four	Farmstead\Homestead	828
174	Railroad-Era	Wayne	Section 31	Two	Farmstead\Homestead	1380
175	Railroad-Era	Wayne	Section 29	Eight	Farmstead\Homestead	1104
176	Railroad-Era	Wayne	Section 29	One	Farmstead\Homestead	1242
177	Railroad-Era	Wayne	Section 25	Five	Individual Structure	138
178	Railroad-Era	Wayne	Section 25	Four	Farmstead\Homestead	690
179	Railroad-Era	Wayne	Section 29	Seven	Farmstead\Homestead	1380
180	Railroad-Era	Wayne	Section 29	Six	Farmstead\Homestead	1380

	A	B	C	D	E	F
181	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
182						Neighbor (in feet)
183	Railroad-Era	Wayne	Section 29	Five	Farmstead\Homestead	1104
184	Railroad-Era	Wayne	Section 35	One	Farmstead\Homestead	966
185	Railroad-Era	Wayne	Section 2	Three	Individual Structure	828
186	Railroad-Era	Wayne	Section 2	One	Farmstead\Homestead	690
187	Railroad-Era	Wayne	Section 22	Two	Individual Structure	1932
188	Railroad-Era	Wayne	Section 2	Seven	Individual Structure	1932
189	Railroad-Era	Wayne	Section 2	Six	Farmstead\Homestead	828
190	Railroad-Era	Wayne	Section 2	Five	Individual Structure	552
191	Railroad-Era	Wayne	Section 22	Three	Farmstead\Homestead	1932
192	Railroad-Era	Wayne	Section 36	One	Farmstead\Homestead	552
193	Railroad-Era	Wayne	Section 35	Four	Farmstead\Homestead	828
194	Railroad-Era	Wayne	Section 35	Three	Individual Structure	4554
195	Railroad-Era	Wayne	Section 25	One	Farmstead\Homestead	1656
196	Railroad-Era	Wayne	Section 36	Three	Farmstead\Homestead	1380
197	Railroad-Era	Wayne	Section 36	Two	Farmstead\Homestead	414
198	Railroad-Era	Union	Section 29	One	Farmstead\Homestead	1794
199	Railroad-Era	Wayne	Section 3B	Nine	School	1518
200	Railroad-Era	Wayne	Section 1	One	Farmstead\Homestead	552
201	Railroad-Era	Union	Section 2	Four	Mill	1656
202	Railroad-Era	Wayne	Section 3B	Eight	Individual Structure	552
203	Railroad-Era	Washington	Section 11	Two	Individual Structure	1518
204	Railroad-Era	Washington	Section 11	Three	Individual Structure	276
205	Railroad-Era	Washington	Section 11	Eight	Individual Structure	1518
206	Railroad-Era	Washington	Section 11	Nine	Farmstead\Homestead	552
207	Railroad-Era	Washington	Section 11	Ten	School	552
208	Railroad-Era	Washington	Section 11	Four	Individual Structure	690
209	Railroad-Era	Washington	Section 11	Five	Individual Structure	1656
210	Railroad-Era	Washington	Section 11	Seven	Individual Structure	1104
211	Railroad-Era	Wayne	Section 3B	Seven	Individual Structure	552
212	Railroad-Era	Wayne	Section 2B	One	Individual Structure	4278
213	Railroad-Era	Wayne	Section 3B	One	Farmstead\Homestead	1656
214	Railroad-Era	Union	Section 2	Twelve	Farmstead\Homestead	1104
215	Railroad-Era	Washington	Section 1	One	Individual Structure	1656
216	Railroad-Era	Washington	Section 1	Two	Individual Structure	1656
217	Railroad-Era	Wayne	Section 1B	Two	Individual Structure	4278
218	Railroad-Era	Wayne	Section 3B	Three	Individual Structure	1656
219	Railroad-Era	Union	Section 2	Seven	Farmstead\Homestead	1104
220	Railroad-Era	Wayne	Section 3B	Five	Farmstead\Homestead	1242
221	Railroad-Era	Union	Section 2	Eleven	Individual Structure	2760
222	Railroad-Era	Union	Section 2	Ten	Farmstead\Homestead	2898
223	Railroad-Era	Union	Section 2	Nine	Individual Structure	3864
224	Railroad-Era	Union	Section 33	Seven	Farmstead\Homestead	2208
225	Railroad-Era	Washington	Section 12	Four	Farmstead\Homestead	3450
226	Railroad-Era	Union	Section 34	Three	X Ice house	2622
227	Railroad-Era	Union	Section 34	Six	Farmstead\Homestead	1794
228	Railroad-Era	Union	Section 34	Five	Farmstead\Homestead	1242
229	Railroad-Era	Union	Section 33	Six	Farmstead\Homestead	2484
230	Railroad-Era	Union	Section 33	Three	Farmstead\Homestead	1380
231	Railroad-Era	Union	Section 33	One	Farmstead\Homestead	2760
232	Railroad-Era	Washington	Section 22	One	Individual Structure	2760
233	Railroad-Era	Washington	Section 12	Five	Individual Structure	1656
234	Railroad-Era	Union	Section 33	Five	Farmstead\Homestead	1932
235	Railroad-Era	Union	Section 35	Two	Farmstead\Homestead	552
236	Railroad-Era	Union	Section 4	Three	Individual Structure	1656
237	Railroad-Era	Washington	Section 12	Two	Individual Structure	1242
238	Railroad-Era	Wayne	Section 3	One	Individual Structure	1104
239	Railroad-Era	Washington	Section 11	Eleven	Farmstead\Homestead	276
240	Railroad-Era	Washington	Section 11	Twelve	Farmstead\Homestead	828

	A	B	C	D	E	F
241	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
242						<u>Neighbor (in feet)</u>
243	Railroad-Era	Union	Section 4	One	Farmstead/Homestead	1242
244	Railroad-Era	Union	Section 36	Four	Individual Structure	1932
245	Railroad-Era	Union	Section 35	Three	Individual Structure	552
246	Railroad-Era	Washington	Section 12	Three	Individual Structure	2898
247	Railroad-Era	Union	Section 4	Two	Farmstead/Homestead	690

	G	H	I	J
1	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
2	Nearest Neighbor		Opposite Direction	River
3	2208	138	414	6624
4	1794	276	414	4002
5	1932	690	1656	8694
6	2346	1656	1656	6348
7	1518	138	3450	828
8	1932	1380	1380	2208
9	1104	828	4416	2898
10	1932	138	3174	966
11	2070	138	690	9660
12	2622	1104	1518	11316
13	2622	138	1380	5106
14	2346	138	414	9384
15	1518	276	276	5106
16	1932	138	1794	8004
17	2208	828	2070	4278
18	1518	552	552	4554
19	1104	138	2622	1104
20	1794	552	690	8832
21	1518	828	828	15456
22	2760	138	2760	2898
23	2760	690	2760	3864
24	552	138	138	19872
25	2760	414	2898	10764
26	1380	966	3174	17388
27	1380	552	1518	18768
28	1932	552	2484	7176
29	1794	1380	1518	8556
30	2760	138	828	8004
31	1104	276	4416	6900
32	3174	2622	2898	8142
33	2760	3174	3174	12834
34	3450	2484	2760	10350
35	1242	138	3312	7314
36	3174	1518	3588	2622
37	2760	3036	4416	7176
38	4140	1380	3450	7728
39	1380	138	2484	9384
40	2208	2622	3450	6348
41	2622	276	2208	5658
42	1104	276	5382	3726
43	3174	414	1656	8142
44	1104	138	1656	4416
45	690	414	414	3588
46	690	138	138	3588
47	1242	138	2070	10488
48	2346	414	1656	10074
49	1380	138	4002	9936
50	1380	414	3174	10350
51	690	138	276	4278
52	1104	138	828	5382
53	828	138	5244	3036
54	2622	138	5382	1794
55	1656	138	1518	2208
56	1380	138	2484	12420
57	1656	828	2898	11454
58	1380	552	1380	3588
59	3726	138	1380	7866
60	828	138	3036	2346

	G	H	I	J
61	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road In</u>	<u>Distance to Wabash</u>
62	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
63	2346	138	2346	2346
64	1794	1104	1518	7314
65	2346	1242	1380	7038
66	2484	138	276	3036
67	1932	138	414	7452
68	2760	138	414	11178
69	1794	138	1932	12006
70	1932	276	414	8694
71		966	3450	12420
72	4002	690	3588	11454
73	5106	276	1380	3036
74	1104	138	3450	11040
75	3174	276	3864	9936
76	1932	276	828	11592
77	2484	276	414	11592
78	4554	1242	2760	6348
79	1932	276	2760	10350
80	1656	138	414	9384
81	2070	828	1242	7728
82	1656	138	138	9660
83	1932	138	1932	11178
84	966	276	3174	10902
85	1242	552	1380	12282
86	1380	690	1518	12558
87	1932	690	966	12282
88		966	2898	10212
89	2208	828	1794	5382
90	3864	414	3450	5934
91	1380	138	414	4416
92	1380	690	1104	4554
93	3864	3312	3864	9384
94	3312	138	2760	11454
95		1104	3174	7590
96		276	2484	8004
97	2760	138	2760	10074
98		690		4002
99	2622	138	2208	7590
100	2622	414	2070	7728
101	690	414	2070	2346
102	1242	414	1794	2622
103	2346	138	3450	2484
104	1104	414	2484	2070
105	2346	138	1242	10350
106	1518	138	552	5658
107	3036	1242	2208	10902
108	1242	138	414	9384
109	828	276	276	6072
110	4692	138	4278	1794
111	1380	138	1380	4830
112	3036	138	3312	9936
113	3036	138	276	5244
114	4554	1932	2622	5382
115	4002	138	5244	5382
116		138	5382	10764
117		414	4554	9936
118	1380	138	690	8280
119	1380	138	966	9384
120	1518	3726	4002	2208

	G	H	I	J
121	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
122	Nearest Neighbor		Opposite Direction	River
123	1932	3450	4416	3174
124	1656	2346	2484	3450
125	828	138	690	5382
126	1656	138	3174	5106
127	1656	1932	5382	3864
128	2070	2208	4692	3174
129	1242	138	2760	4968
130	2484	138	1518	8418
131	1794	138	1518	5382
132	1794	138	1518	3036
133	1380	138	1104	6486
134	966	138	138	6072
135	1242	138	1242	4554
136	2484	138	414	4278
137	828	966	1242	4278
138	690	138	690	4968
139	1380	2484	2484	3174
140	1242	1104	1932	4140
141	2208	414	2484	9936
142	1242	138	552	6762
143	1656	138	1242	7038
144	4140	276	4416	12006
145	1104	138	828	8418
146	552	414	966	6348
147	414	138	1242	6900
148	552	552	1242	6486
149	1380	138	2208	4692
150	1518	138	276	3726
151	1932	138	4554	3036
152		138	6900	15594
153	2208	276	1932	8694
154	1794	138	1380	5106
155	552	138	138	3174
156	10350	414	552	10626
157	4692	276	4002	4692
158	4002	138	5934	8142
159	2346	2760	3036	10764
160	1794	138	5796	9936
161	4554	138	1104	8970
162	4002	138	9660	13386
163	2346	552	2622	8418
164	1656	414	1242	4692
165	1656	138	5658	9798
166	2070	138	7590	13110
167		2760	5382	9936
168	1242	138	414	7590
169	1794	138	2898	3864
170	3174	138	966	3864
171	1380	138	276	1380
172		138	4830	9246
173	2346	552	5106	10902
174	3864	138	2760	7452
175	1242	138	4554	1932
176	1518	138	6210	1242
177	552	138	138	1518
178	966	138	2208	966
179	2070	138	1380	552
180	1380	138	2622	1104

	G	H	I	J
181	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
182	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
183	1380	138	4002	1518
184	1518	138	1380	2346
185	828	138	1242	6348
186	966	138	276	3174
187	2208	138	3864	11454
188	2484	414	2070	3864
189	1242	552	1242	7038
190	966	138	414	6762
191		138	2070	12834
192	5244	276	4278	9384
193	1794	552	2208	1380
194	4968	138	2760	3312
195	3864	552	3726	1932
196	3864	138	4140	6348
197	3036	138	3036	3864
198	2484	138	1932	1242
199	1656	690	2760	6486
200	5520	138	4278	9384
201	2898	276	1242	4830
202	1932	138	414	9660
203	2346	414	2484	414
204	1242	138	2346	4830
205	2208	1518	2208	1794
206	690	138	552	3036
207	828	276	276	3174
208	828	138	1242	3726
209	2346	138	1242	1932
210	2898	414	1932	5106
211	1242	138	966	9660
212	4692	138	552	4416
213	1794	138	1518	7452
214	9384	138	1242	9522
215	2898	138	1794	414
216	4416	138	1794	1794
217	4416	3174	4416	4554
218	1794	138	1794	7314
219	1518	1656	2346	8418
220	1656	138	276	9108
221	3450	414	1656	4140
222	7866	276	1794	8280
223	8004	1932	3036	9936
224	3588	1380	3864	6072
225	3864	138	414	1794
226	4002	4830	8004	1794
227	2898	138	7452	7590
228	2484	138	8142	6486
229	4002	4278	4278	1518
230	2622	5520	5658	1380
231	2760	138	828	1518
232	3174	276	3864	8418
233	2898	138	138	4692
234	2484	2070	2070	1242
235	1794	138	4140	2070
236	2208	138	5382	7038
237	3450	414	3588	4830
238	3588	3864	5520	2898
239	1518	138	2760	4968
240	1242	414	2070	6210

	G	H	I	J
241	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road In</u>	<u>Distance to Wabash</u>
242	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
243	1656	138	6900	6762
244	2622	138	2208	2898
245	1932	138	4692	1656
246	3312	1518	3726	4692
247	1794	138	5658	13248

	K	L	M	N
1	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
2	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
3	8004	Ferry	6348	7866
4	9384	Ferry	4002	9246
5	9936	Ferry	8418	9798
6	10350	Ferry	6210	7314
7	8832	Ferry	828	3588
8	9660	Ferry	2070	3312
9	16560	Ferry	414	4416
10	7038	Ferry	966	5520
11	11868	Ferry	9660	10902
12	16560	Ferry	10626	9938
13	5934	Ford	1104	5934
14	12144	Ferry	9384	10350
15	8418	Ferry	5106	8280
16	9798	Ferry	7728	9660
17	7590	Ferry	4140	7452
18	9660	Ferry	4554	9522
19	8004	Ferry	1104	4416
20	9522	Ferry	7866	9384
21	17664	Ferry	15456	15732
22	11040	Ferry	1656	4692
23	13662	Ferry	3588	4278
24	20010	Ferry	19596	19872
25	16008	Ferry	10074	12834
26	18078	Ferry	16974	17940
27	18768	Ferry	18630	18630
28	7314	Ford	6762	6762
29	9660	Ford	7176	10902
30	8418	Ford	7728	8418
31	7038	Ford	5520	6210
32	9522	Ford	6348	9384
33	9798	Ferry	10074	10074
34	10626	Ford	9108	10074
35	7038	Ford	4554	6072
36	4968	Ferry	414	4968
37	13800	Ferry	4554	7176
38	17802	Ferry	6762	6762
39	13386	Ferry	6072	10074
40	12420	Ferry	3450	7176
41	8556	Ferry	1656	10350
42	11868	Ferry	1104	5382
43	18906	Ferry	7590	7452
44	5520	Ferry	828	12282
45	3588	Ferry	138	15042
46	3588	Ferry	138	14766
47	10764	Ferry	10350	10626
48	10626	Ferry	9522	10488
49	14904	Ferry	7038	10212
50	16284	Ferry	7728	9936
51	4278	Ferry	828	15042
52	5382	Ferry	1518	14352
53	11454	Ferry	138	5244
54	8694	Ferry	414	12558
55	23598	Ferry	828	14214
56	14628	Ferry	9108	14078
57	16422	Ferry	8694	11040
58	3174	Ferry	552	16146
59	9108	Ferry	5382	17802
60	6624	Ferry	828	15180

	K	L	M	N
61	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
62	River Feature		and Erie Canal	and Erie Canal Feature
63	5934	Ferry	690	15870
64	12420	Ferry	4692	9384
65	7314	Ferry	3450	13524
66	6624	Ferry	138	10764
67	10902	Ferry	4692	10902
68	12144	Ferry	7866	13800
69	15042	Ferry	8556	13800
70	11454	Ferry	5382	10902
71	12006	Ferry	8832	16974
72	15318	Ford	10626	10350
73	12006	Ford	2622	6486
74	14766	Ferry	2898	7452
75	16974	Ford	10074	11040
76	19458	Ford	11040	13524
77	19872	Ford	11178	14076
78	12696	Ford	5658	6762
79	17526	Ford	9936	11730
80	12558	Ferry	1932	2622
81	10902	Ferry	138	1656
82	12972	Ferry	2208	2760
83	14214	Ferry	3450	4416
84	15042	Ferry	3174	7866
85	13524	Bridge	9246	8832
86	16836	Ferry	5934	5934
87	16422	Ferry	5658	5658
88	14352	Ford	9108	16284
89	8418	Ford	5106	5244
90	9936	Ford	5520	5520
91	7452	Ford	3864	4140
92	5658	Ford	3036	3312
93	12834	Ford	8832	8832
94	14076	Ford	11868	12006
95	10212	Ford	7038	7038
96	10212	Ford	7176	7176
97	17802	Ford	9660	14076
98	5658	Ford	966	2346
99	12558	Ford	6624	14490
100	14490	Ford	7038	16008
101	6486	Ford	1932	2070
102	6486	Ford	2346	2484
103	7866	Ford	2070	1518
104	6486	Ford	1794	1932
105	14490	Ferry	3588	3588
106	12144	Ferry	2484	
107	18354	Ferry	10764	9522
108	15042	Ferry	4278	4554
109	12834	Ferry	3312	4692
110	1518	Ferry	5244	9246
111	12282	Ferry	4140	5934
112	16698	Ferry	9798	12006
113	6486	Ferry	5796	8280
114	12282	Ferry	5244	10626
115	5934	Ferry	4416	5382
116	12834	Ferry	8970	17112
117	12006	Ferry	8280	16836
118	14214	Ferry	3588	4140
119	15594	Ferry	5106	5520
120	8556	Ferry	1794	4968

	K	L	M	N
121	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
122	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
123	8694	Ferry	552	3036
124	10074	Ferry	2208	4692
125	7314	Ferry	5244	8004
126	10074	Ferry	2898	2898
127	11868	Ferry	2622	6762
128	10626	Ferry	4002	3726
129	10074	Ferry	3588	3864
130	12834	Ferry	1794	1656
131	8280	Ferry	4416	4968
132	8556	Ferry	5382	9798
133	13938	Ferry	4968	6210
134	13110	Ferry	4002	5382
135	12696	Ferry	4278	6072
136	13110	Ferry	4140	8280
137	7452	Ferry	5658	9108
138	7314	Ferry	5382	8418
139	9936	Ferry	2346	4830
140	8280	Ferry	4968	9522
141	10074	Ferry	9798	9936
142	19458	Ford	4002	3726
143	20424	Ford	3726	3726
144	17526	Ford	10074	10074
145	26772	Bridge	8418	11178
146	24150	Bridge	6348	10626
147	24702	Bridge	6900	10764
148	24564	Bridge	6486	10350
149	21666	Bridge	4416	11040
150	18906	Bridge	3036	12558
151	22908	Bridge	3036	7452
152			13524	13386
153	26358	Bridge	8694	12144
154	22494	Bridge	4968	10764
155	18630	Bridge	2898	12972
156	29946	Ford	10350	11316
157	30636	Ford	4692	4830
158	28704	Ford	4002	4830
159	25806	Bridge	10626	15870
160	13662	Ford	9798	12696
161	16836	Ford	8832	10212
162	29670	Ford	10764	11592
163	19872	Bridge	8418	13938
164	20562	Bridge	4278	12282
165	12972	Ford	9798	11592
166	28290	Ford	11454	11454
167	24012	Bridge	9660	16146
168	25944	Bridge	7452	10488
169	4140	Ford	3036	3036
170	5106	Ford	2070	4416
171	13938	Ford	1242	13524
172	14076	Ford	8970	12834
173	12144	Ford	10488	10902
174	7728	Ford	6762	7176
175	8970	Ford	1518	8556
176	8280	Ford	1104	7452
177	1518	Ford	414	414
178	1794	Ford	276	2760
179	12834	Ford	552	9522
180	11592	Ford	828	10902

	K	L	M	N
181	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
182	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
183	10212	Ford	1656	9522
184	14214	Ford	1380	1380
185	18216	Ford	3726	3864
186	13800	Ford	2070	2208
187			8832	9246
188	15180	Ford	2346	2898
189	17802	Ford	4416	4554
190	19044	Ford	4140	4002
191			10488	10626
192	10488	Ford	5796	8418
193	14904	Ford	276	6348
194	9384	Ford	414	5934
195	3312	Ford	828	4278
196	5658	Ford	5520	5796
197	3588	Ford	3036	3450
198	15732	Ford	552	5934
199			3174	3450
200	10764	Ford	7176	8280
201	27048	Bridge	4554	5796
202			7314	7866
203	414	Ford	414	828
204	4554	Ford	3036	3726
205	1794	Ferry	138	552
206	3036	Ferry	2208	2208
207	3174	Ferry	2484	2622
208	3726	Ford	2760	2760
209	2346	Ford	1656	2346
210	5520	Ford	4830	5658
211			7038	7314
212			2346	5934
213			4416	4416
214	28842	Bridge	9384	10626
215	9246	Ford	276	7176
216	8556	Ford	1656	8142
217			5106	5106
218			4692	4830
219	26082	Bridge	8418	8832
220			6210	6486
221	26082	Bridge	3450	4554
222	28980	Bridge	7866	8418
223	31602	Bridge	8004	8142
224	20562	Ford	5106	5382
225	4554	Ford	1656	5658
226	22632	Ford	276	276
227	24702	Ford	4002	4968
228	24564	Ford	5106	4830
229	18906	Ford	690	3450
230	20010	Ford	414	2070
231	14490	Ford	1380	7590
232	8418	Ferry	8280	8280
233	9936	Ford	4554	11178
234	16422	Ford	552	5934
235	23184	Bridge	1794	5658
236	18354	Ford	5796	5796
237	5520	Ford	4692	5934
238	20148	Ford	138	414
239	4416	Ferry	3174	3864
240	6348	Ferry	4968	5382

	K	L	M	N
241	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
242	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
243	23736	Ford	5658	5244
244	19872	Bridge	2622	10626
245	22770	Bridge	1380	5796
246	7728	Ford	4554	8832
247	26358	Ford	12144	11730

	O	P	Q	R	S
1	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
2		Railroad	Railroad Feature	Feature	Nearest Town
3	Bridge	9384	11454	Station	6210
4	Aqueduct	11040	11454	Station	7452
5	Bridge	7314	9522	Station	8142
6	Aqueduct	8970	9384	Station	8556
7	Aqueduct	14214	14352	Station	7866
8	Aqueduct	12834	12834	Station	8556
9	Aqueduct	12282	15318	Station	12834
10	Aqueduct	14490	14904	Station	5796
11	Aqueduct	5796	7590	Station	6762
12	Aqueduct	3726	3864	Station	3174
13	Guardlock	10350	11316	Station	6624
14	Aqueduct	5934	7176	Station	6486
15	Aqueduct	10488	11316	Station	6486
16	Aqueduct	7866	9522	Station	8004
17	Aqueduct	11454	12282	Station	5520
18	Aqueduct	10626	11178	Station	7728
19	Aqueduct	14214	14352	Station	7038
20	Bridge	8280	8418	Station	3864
21	Aqueduct	138	3864	Station	3174
22	Bridge	13110	13110	Station	2622
23	Bridge	12558	13248	Station	2622
24	Bridge	3726	9660	Station	9108
25	Wildcat Bridge and Locks	414	8418	Stockyard	22218
26	Bridge	1380	6762	Station	6348
27	Bridge	2484	9522	Station	8970
28	Guardlock	5382	7176	Station	5934
29	Guardlock	7728	7590	Station	4830
30	Guardlock	2760	5934	Station	5244
31	Guardlock	7038	8418	Station	7314
32	Guardlock	7866	7866	Station	6072
33	Guardlock	2898	3864	Station	4416
34	Guardlock	4416	4830	Station	3588
35	Guardlock	8004	9246	Station	7038
36	Bridge	13662	14076	Station	3174
37	Aqueduct	7866	9660	Station	7176
38	Aqueduct	7452	7728	Station	6762
39	Aqueduct	5520	9384	Station	4830
40	Aqueduct	8556	10902	Station	7866
41	Aqueduct	8970	14490	Station	13662
42	Aqueduct	11178	13800	Station	12558
43	Aqueduct	7038	7038	Station	6348
44	Aqueduct	10626	17526	Station	16698
45	Aqueduct	10764	19734	Stockyard	18906
46	Aqueduct	10764	20010	Stockyard	18768
47	Bridge	5858	10764	Station	8832
48	Bridge	6762	8556	Station	828
49	Aqueduct	4968	7590	Station	7314
50	Aqueduct	4692	7038	Station	6072
51	Aqueduct	10074	19596	Stockyard	18492
52	Aqueduct	10074	20010	Stockyard	17388
53	Aqueduct	12006	13800	Station	13110
54	Wildcat Bridge and Locks	9108	12144	Stockyard	23598
55	Wildcat Bridge and Locks	9384	12558	Stockyard	2622
56	Aqueduct	2208	9522	Station	8832
57	Aqueduct	3588	6210	Station	5658
58	Aqueduct	10764	18630	Stockyard	19596
59	Aqueduct	5796	17112	Stockyard	17112
60	Wildcat Bridge and Locks	9384	14214	Stockyard	22908

	O	P	Q	R	S
61	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
62		Railroad	Railroad Feature	Feature	Nearest Town
63	Wildcat Bridge and Locks	9798	15042	Stockyard	22356
64	Aqueduct	6762	10488	Station	9108
65	Aqueduct	7728	16146	Station	15456
66	Aqueduct	11178	16422	Station	15318
67	Aqueduct	8624	11868	Station	11316
68	Aqueduct	3450	12282	Station	11592
69	Aqueduct	2622	10074	Station	9246
70	Aqueduct	6072	11454	Station	10764
71	Aqueduct	2346	14628	Station	13938
72	Guardlock	8556	15042	Station	12144
73	Guardlock	966	16422	Station	12972
74	Basin	1242	6072	Stockyard	3036
75	Guardlock	8280	18630	Station	14628
76	Guardlock	9108	21528	Station	17664
77	Guardlock	9108	22218	Station	18354
78	Guardlock	3726	15456	Station	11868
79	Guardlock	8142	19596	Station	15732
80	Wildcat Bridge and Locks	1380	1656	Stockyard	8142
81	Wildcat Bridge and Locks	3174	3174	Stockyard	9108
82	Wildcat Bridge and Locks	1104	1380	Stockyard	9522
83	Wildcat Bridge and Locks	138	1932	Stockyard	6624
84	Wildcat Bridge and Locks	1242	6486	Stockyard	2622
85	Basin	3174	9246	Stockyard	276
86	Wildcat Bridge and Locks	2760	2484	Stockyard	9936
87	Wildcat Bridge and Locks	2346	2346	Stockyard	8280
88	Guardlock	4416	14628	Station	14628
89	Towpath Bridge	1932	7590	Station	3588
90	Guardlock	3450	10488	Station	6486
91	Towpath Bridge	966	7590	Station	3726
92	Towpath Bridge	276	6900	Station	3036
93	Towpath Bridge	5520	11178	Station	7728
94	Towpath Bridge	8142	11040	Station	8418
95	Lock	3588	7314	Station	4140
96	Lock	3864	6900	Station	3726
97	Guardlock	7038	21114	Station	19044
98	Lock	414	4140	Station	966
99	Guardlock	2760	16698	Station	16836
100	Guardlock	3864	19320	Station	19320
101	Towpath Bridge	138	8694	Station	5108
102	Towpath Bridge	138	8004	Station	4416
103	Guardlock	138	11040	Station	7452
104	Towpath Bridge	276	9108	Station	5382
105	Wildcat Bridge and Locks	414	414	Stockyard	8970
106	Wildcat Bridge and Locks	3312	3312	Stockyard	14490
107	Wildcat Bridge and Locks	1380	5382	Stockyard	17940
108	Wildcat Bridge and Locks	414	276	Stockyard	12834
109	Wildcat Bridge and Locks	2898	3174	Stockyard	15180
110	Wildcat Bridge and Locks	1794	12420	Stockyard	13938
111	Wildcat Bridge and Locks	4278	4968	Stockyard	16698
112	Wildcat Bridge and Locks	552	8142	Stockyard	20976
113	Wildcat Bridge and Locks	552	10212	Stockyard	9522
114	Wildcat Bridge and Locks	4692	8694	Stockyard	21114
115	Wildcat Bridge and Locks	1656	7866	Stockyard	10212
116	Wildcat Bridge and Locks	1932	13800	Stockyard	18216
117	Wildcat Bridge and Locks	2898	14214	Stockyard	18216
118	Wildcat Bridge and Locks	690	690	Stockyard	12696
119	Wildcat Bridge and Locks	414	1104	Stockyard	14076
120	Wildcat Bridge and Locks	6900	6900	Stockyard	15180

	O	P	Q	R	S
121	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
122		Railroad	Railroad Feature	Feature	Nearest Town
123	Wildcat Bridge and Locks	6210	6072	Stockyard	13938
124	Wildcat Bridge and Locks	5520	5382	Stockyard	15180
125	Wildcat Bridge and Locks	276	22356	Station	10626
126	Basin	276	10074	Stockyard	6348
127	Basin	2070	11730	Stockyard	4968
128	Basin	2208	12006	Stockyard	6348
129	Basin	276	10074	Stockyard	6762
130	Wildcat Bridge and Locks	1380	1242	Stockyard	10212
131	Basin	138	9936	Stockyard	7866
132	Wildcat Bridge and Locks	690	11592	Stockyard	8280
133	Wildcat Bridge and Locks	2484	4002	Stockyard	16422
134	Wildcat Bridge and Locks	2898	3036	Stockyard	15732
135	Wildcat Bridge and Locks	3864	4692	Stockyard	16560
136	Wildcat Bridge and Locks	5106	7038	Stockyard	18906
137	Wildcat Bridge and Locks	1380	22080	Station	10626
138	Wildcat Bridge and Locks	690	22218	Station	10626
139	Wildcat Bridge and Locks	5658	5658	Stockyard	15456
140	Wildcat Bridge and Locks	1380	21252	Station	9936
141	Bridge	6486	10764	Station	8142
142	Basin	10764	26496	Station	19182
143	Basin	9522	26496	Station	20148
144	Basin	9384	20286	Station	16284
145	Wea Aqueduct\Lock System	2070	15180	Railroad Yard	8556
146	Wea Aqueduct\Lock System	1518	12696	Railroad Yard	6072
147	Wea Aqueduct\Lock System	1656	12972	Railroad Yard	6486
148	Wea Aqueduct\Lock System	1380	13248	Railroad Yard	6624
149	Wea Aqueduct\Lock System	138	9936	Railroad Yard	3450
150	Wea Aqueduct\Lock System	1518	7176	Railroad Yard	828
151	Wea Aqueduct\Lock System	1794	11730	Railroad Yard	6210
152	Aqueduct	138	30360	Station	29808
153	Wea Aqueduct\Lock System	2622	13938	Railroad Yard	8004
154	Wea Aqueduct\Lock System	276	10764	Railroad Yard	4416
155	Wea Aqueduct\Lock System	1242	6900	Railroad Yard	414
156	Wea Aqueduct\Lock System	966	18492	Railroad Yard	24012
157	Wea Aqueduct\Lock System	7176	16836	Station	14214
158	Wea Aqueduct\Lock System	9108	16422	Station	16422
159	Wea Aqueduct\Lock System	690	14076	Railroad Yard	8004
160	Bridge	13800	14904	Station	10350
161	Basin	12696	12834	Station	12972
162	Basin	4278	9936	Station	25392
163	Wea Aqueduct\Lock System	966	12282	Railroad Yard	5934
164	Wea Aqueduct\Lock System	1242	8970	Railroad Yard	2484
165	Bridge	14214	15870	Station	9522
166	Basin	5520	9108	Station	23736
167	Wea Aqueduct\Lock System	2484	12420	Railroad Yard	6624
168	Wea Aqueduct\Lock System	1518	14214	Railroad Yard	7728
169	Bridge	22632	15042	Station	2070
170	Bridge	23736	24426	Station	1104
171	Basin	21114	20562	Station	10212
172	Aqueduct	14904			10488
173	Bridge	15042	16836	Station	8418
174	Basin	18492			5796
175	Bridge	22770	22632	Station	5382
176	Bridge	23736	23598	Station	4140
177	Bridge	25254	27324	Station	138
178	Bridge	24978	28152	Station	2346
179	Basin	22080	21528	Station	8832
180	Bridge	22218	21804	Station	7452

	O	P	Q	R	S
181	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
182		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
183	Bridge	22356	22080	Station	6210
184	Bridge	18078	29946	Station	14490
185	Basin	12006	26634	Station	17940
186	Bridge	17526	26634	Station	14076
187	Aqueduct	3174			
188	Bridge	15594	27738	Station	15318
189	Basin	12006	25944	Station	16698
190	Basin	11040	26358	Station	18630
191	Aqueduct	4140			
192	Bridge	16836	23874	Station	9936
193	Basin	18216	30774	Station	15180
194	Bridge	22080	28566	Station	10212
195	Bridge	24150	28290	Station	4002
196	Bridge	19734	21804	Station	4830
197	Bridge	22356	24978	Station	2484
198	Basin	20148	20562	Station	12558
199	Basin	8556			22632
200	Bridge	2898	18354	Station	9936
201	Wea Aqueduct/Lock System	3588	16146	Railroad Yard	10764
202	Basin	2898			26358
203	Guardlock	8694	14214	Station	12834
204	Guardlock	8694	11040	Station	9384
205	Guardlock	9522	13800	Station	11316
206	Guardlock	8004	11730	Station	11040
207	Guardlock	7590	11178	Station	11454
208	Guardlock	8142	11316	Station	10212
209	Guardlock	6762	12006	Station	11040
210	Guardlock	4140	8832	Station	8004
211	Basin	3450			26082
212	Basin	5382			
213	Basin	6900			23460
214	Wea Aqueduct/Lock System	1380	17388	Railroad Yard	11040
215	Guardlock	1656	15456	Station	17250
216	Guardlock	1242	16284	Station	15870
217	Aqueduct	1380			
218	Basin	5520			25254
219	Wea Aqueduct/Lock System	276	15732	Railroad Yard	9522
220	Basin	4692			25392
221	Wea Aqueduct/Lock System	4554	15456	Railroad Yard	10212
222	Wea Aqueduct/Lock System	1656	17664	Railroad Yard	11592
223	Wea Aqueduct/Lock System	4140	16008	Railroad Yard	14076
224	Basin	14214	14490	Station	16284
225	Guardlock	4002	13248	Station	12558
226	Basin	16146	18630	Station	18908
227	Wea Aqueduct/Lock System	10488	16008	Station	18078
228	Wea Aqueduct/Lock System	12144	14490	Station	22080
229	Basin	18216	19182	Station	14904
230	Wea Aqueduct/Lock System	18216	19320	Station	17526
231	Wea Aqueduct/Lock System	20286	20286	Station	11178
232	Bridge	8004	5658	Station	6486
233	Guardlock	1242	14214	Station	12696
234	Basin	20424	20286	Station	12420
235	Wea Aqueduct/Lock System	3588	12558	Railroad Yard	7866
236	Basin	12006	13110	Station	18492
237	Guardlock	3450	9384	Station	8694
238	Basin	13524			20976
239	Guardlock	8694	10902	Station	9246
240	Guardlock	7314	8418	Station	9660

	O	P	Q	R	S
241	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
242		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
243	Basin	12006	14076	Station	19596
244	Wea Aqueduct/Lock System	414	8556	Railroad Yard	2898
245	Wea Aqueduct/Lock System	3726	12144	Railroad Yard	7590
246	Guardlock	690	12144	Station	11316
247	Basin	5796	8004	Station	22494

	T	U	V	W	X	Y
1	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
2		<u>Body of Water</u>	<u>Water</u>			
3	Americus	552	Sugar Creek	Yes	Yes	Yes
4	Americus	138	Sugar Creek	No	Yes	Yes
5	Americus	2346	Sugar Creek	Yes	Yes	Yes
6	Transitville	1518	Sugar Creek	Yes	Yes	Yes
7	Americus	828	Wabash River	No	Yes	Yes
8	Americus	1656	Sugar Creek	No	Yes	Yes
9	Transitville	2898	Wabash River	No	Yes	Yes
10	Americus	966	Wabash River	No	Yes	Yes
11	Transitville	2208	Sugar Creek	Yes	Yes	Yes
12	Transitville	1656	Buck Creek	Yes	Yes	No
13	Americus	5106	Wabash River	Yes	Yes	Yes
14	Transitville	2208	Sugar Creek	Yes	Yes	Yes
15	Americus	138	Sugar Creek	Yes	Yes	Yes
16	Americus	1518	Sugar Creek	Yes	Yes	Yes
17	Americus	966	Sugar Creek	Yes	Yes	Yes
18	Americus	276	Sugar Creek	Yes	Yes	Yes
19	Americus	1104	Wabash River	No	Yes	Yes
20	Chapmanvi	3864	Sugar Creek	Yes	Yes	Yes
21	Chapmanvi	8970	Sugar Creek	No	Yes	Yes
22	Americus	2898	Wabash River	No	Yes	Yes
23	Americus	3864	Wabash River	No	Yes	Yes
24	Transitville	8832	Sugar Creek	No	Yes	Yes
25	Linwood	10764	Wabash River	Yes	Yes	Yes
26	Transitville	8142	Sugar Creek	No	Yes	Yes
27	Transitville	7728	Sugar Creek	No	Yes	Yes
28	Chapmanvi	6762	Wabash River	Yes	Yes	Yes
29	Chapmanvi	4830	Sugar Creek	Yes	Yes	Yes
30	Chapmanvi	8004	Wabash River	Yes	Yes	Yes
31	Chapmanvi	6900	Wabash River	Yes	Yes	Yes
32	Chapmanvi	6072	Sugar Creek	Yes	Yes	Yes
33	Chapmanvi	4416	Sugar Creek	Yes	Yes	Yes
34	Chapmanvi	5382	Sugar Creek	Yes	Yes	Yes
35	Chapmanvi	7038	Wabash River	Yes	Yes	Yes
36	Americus	2622	Wabash River	Yes	Yes	Yes
37	Transitville	3036	Buck Creek	Yes	Yes	Yes
38	Transitville	3174	Sugar Creek	Yes	Yes	Yes
39	Transitville	966	Buck Creek	Yes	Yes	Yes
40	Transitville	2346	Buck Creek	Yes	Yes	Yes
41	Transitville	138	Buck Creek	Yes	Yes	Yes
42	Transitville	3726	Wabash River	No	Yes	Yes
43	Transitville	3450	Sugar Creek	Yes	Yes	Yes
44	Transitville	1518	Buck Creek	Yes	Yes	Yes
45	Transitville	3588	Wabash River	No	Yes	Yes
46	Transitville	3588	Wabash River	No	Yes	Yes
47	Americus	414	Sugar Creek	No	Yes	Yes
48	Chapmanvi	828	Sugar Creek	Yes	Yes	Yes
49	Transitville	552	Buck Creek	Yes	Yes	Yes
50	Transitville	552	Buck Creek	Yes	Yes	Yes
51	Transitville	4278	Wabash River	Yes	Yes	Yes
52	Transitville	3036	Buck Creek	Yes	Yes	Yes
53	Transitville	3036	Wabash River	No	Yes	Yes
54	Linwood	1794	Wabash River	Yes	Yes	Yes
55	Linwood	2208	Wabash River	Yes	Yes	Yes
56	Transitville	3450	Buck Creek	Yes	Yes	No
57	Transitville	552	Buck Creek	Yes	Yes	No
58	Transitville	3588	Wabash River	Yes	Yes	Yes
59	Transitville	6762	Buck Creek	Yes	Yes	Yes
60	Transitville	2346	Wabash River	Yes	Yes	Yes

	T	U	V	W	X	Y
61	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
62		<u>Body of Water</u>	<u>Water</u>			
63	Transitville	2346	Wabash River	Yes	Yes	Yes
64	Transitville	1104	Buck Creek	No	Yes	Yes
65	Transitville	2622	Buck Creek	Yes	Yes	Yes
66	Transitville	276	Buck Creek	No	Yes	Yes
67	Transitville	552	Buck Creek	No	Yes	Yes
68	Transitville	3588	Buck Creek	Yes	Yes	No
69	Transitville	3174	Buck Creek	Yes	Yes	No
70	Transitville	276	Buck Creek	Yes	Yes	Yes
71	Transitville	6210	Buck Creek	Yes	Yes	No
72	Delphi	9936	Deer Creek	Yes	Yes	Yes
73	Delphi	3036	Wabash River	Yes	Yes	Yes
74	Linwood	4554	Wildcat Creek	Yes	Yes	Yes
75	Delphi	9936	Wabash River	Yes	Yes	Yes
76	Delphi	11592	Wabash River	Yes	Yes	Yes
77	Delphi	11592	Wabash River	Yes	Yes	Yes
78	Delphi	5934	Wabash River	Yes	Yes	Yes
79	Delphi	10350	Wabash River	Yes	Yes	Yes
80	Linwood	1104	Wildcat Creek	Yes	Yes	Yes
81	Linwood	1380	Wildcat Creek	Yes	Yes	Yes
82	Linwood	690	Wildcat Creek	Yes	Yes	Yes
83	Linwood	690	Wildcat Creek	No	Yes	No
84	Linwood	4968	Wildcat Creek	Yes	Yes	Yes
85	Lafayette	6900	Wildcat Creek	No	Yes	No
86	Linwood	1656	Wildcat Creek	No	Yes	No
87	Linwood	828	Wildcat Creek	No	Yes	No
88	Chapmanville	10212	Wabash River	Yes	Yes	Yes
89	Delphi	2484	Deer Creek	Yes	Yes	Yes
90	Delphi	4554	Deer Creek	Yes	Yes	Yes
91	Delphi	1794	Deer Creek	Yes	Yes	Yes
92	Delphi	552	Deer Creek	No	Yes	Yes
93	Delphi	6900	Deer Creek	Yes	Yes	Yes
94	Delphi	8004	Deer Creek	Yes	Yes	Yes
95	Delphi	3588	Deer Creek	Yes	Yes	Yes
96	Delphi	3312	Deer Creek	Yes	Yes	Yes
97	Delphi	10074	Wabash River	Yes	Yes	Yes
98	Delphi	828	Deer Creek	No	Yes	Yes
99	Chapmanville	7590	Wabash River	Yes	Yes	Yes
100	Chapmanville	7728	Wabash River	Yes	Yes	Yes
101	Delphi	966	Deer Creek	No	Yes	Yes
102	Delphi	828	Deer Creek	No	Yes	Yes
103	Delphi	2346	Deer Creek	No	Yes	Yes
104	Delphi	966	Deer Creek	No	Yes	Yes
105	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
106	Linwood	3864	Wildcat Creek	Yes	Yes	Yes
107	Linwood	6486	Wildcat Creek	Yes	Yes	Yes
108	Linwood	4002	Wildcat Creek	Yes	Yes	Yes
109	Linwood	4692	Wildcat Creek	Yes	Yes	Yes
110	Linwood	1794	Wabash River	No	Yes	Yes
111	Linwood	4830	Wabash River	Yes	Yes	Yes
112	Linwood	8418	Wildcat Creek	Yes	Yes	Yes
113	Linwood	3036	Wildcat Creek	Yes	Yes	Yes
114	Transitville	5382	Wabash River	Yes	Yes	Yes
115	Linwood	690	Wildcat Creek	Yes	Yes	Yes
116	Transitville	10764	Wabash River	Yes	Yes	Yes
117	Transitville	9936	Wabash River	Yes	Yes	Yes
118	Linwood	3726	Wildcat Creek	Yes	Yes	Yes
119	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
120	Linwood	2208	Wabash River	Yes	Yes	Yes

	T	U	V	W	X	Y
121	Town	Distance to Nearest	Body of	RR	WE	WA
122		Body of Water	Water			
123	Linwood	2208	Wildcat Creek	Yes	Yes	Yes
124	Linwood	3450	Wabash River	Yes	Yes	Yes
125	Linwood	4002	Wabash River	Yes	Yes	Yes
126	Linwood	5244	Wabash River	Yes	Yes	Yes
127	Linwood	3588	Wabash River	Yes	Yes	Yes
128	Linwood	3174	Wabash River	Yes	Yes	Yes
129	Linwood	4968	Wildcat Creek	Yes	Yes	Yes
130	Linwood	414	Wildcat Creek	Yes	Yes	Yes
131	Linwood	4416	Wildcat Creek	Yes	Yes	Yes
132	Linwood	3036	Wabash River	Yes	Yes	Yes
133	Linwood	6210	Wildcat Creek	Yes	Yes	Yes
134	Linwood	5382	Wildcat Creek	Yes	Yes	Yes
135	Linwood	4554	Wabash River	Yes	Yes	Yes
136	Linwood	4278	Wabash River	Yes	Yes	Yes
137	Linwood	4278	Wabash River	Yes	Yes	Yes
138	Linwood	4416	Wabash River	Yes	Yes	Yes
139	Linwood	3174	Wabash River	Yes	Yes	Yes
140	Linwood	4140	Wabash River	Yes	Yes	Yes
141	Americus	966	Sugar Creek	No	Yes	Yes
142	Granville	6762	Wabash River	No	Yes	Yes
143	Granville	7038	Wabash River	Yes	Yes	No
144	Granville	12006	Wabash River	Yes	Yes	No
145	Elston	2070	Wea Creek	No	Yes	Yes
146	Elston	138	Mill Race	No	Yes	Yes
147	Elston	690	Wea Creek	No	Yes	Yes
148	Elston	276	Wea Creek	No	Yes	Yes
149	Elston	2070	Wea Creek	Yes	Yes	Yes
150	Elston	3726	Wea Creek	Yes	Yes	Yes
151	Elston	828	Wea Creek	Yes	Yes	Yes
152	Wea Station	690	Flint Creek	Yes	Yes	Yes
153	Elston	1104	Wea Creek	No	Yes	Yes
154	Elston	1242	Wea Creek	Yes	Yes	Yes
155	Elston	3174	Wabash River	Yes	Yes	Yes
156	Elston	4416	Wea Creek	No	Yes	Yes
157	Elston	1656	Wea Creek	Yes	Yes	Yes
158	Wea Station	2208	Wea Creek	Yes	Yes	Yes
159	Elston	276	Wea Creek	No	Yes	No
160	Granville	9936	Wabash River	No	Yes	Yes
161	Granville	8970	Wabash River	No	Yes	Yes
162	Lafayette	8556	Wea Creek	Yes	Yes	Yes
163	Elston	1794	Wea Creek	No	Yes	Yes
164	Elston	3312	Wea Creek	Yes	Yes	Yes
165	Granville	9798	Wabash River	No	Yes	No
166	Lafayette	9798	Wea Creek	Yes	Yes	Yes
167	Elston	1380	Wea Creek	No	Yes	Yes
168	Elston	1104	Wea Creek	No	Yes	Yes
169	Granville	3864	Wabash River	No	Yes	Yes
170	Granville	3864	Wabash River	No	Yes	Yes
171	Granville	1380	Wabash River	No	Yes	Yes
172	Granville	9246	Wabash River	No	Yes	Yes
173	Granville	10902	Wabash River	No	Yes	Yes
174	Granville	7452	Wabash River	No	Yes	Yes
175	Granville	1932	Wabash River	No	Yes	Yes
176	Granville	1242	Wabash River	No	Yes	Yes
177	Granville	1518	Wabash River	No	Yes	Yes
178	Granville	966	Wabash River	No	Yes	Yes
179	Granville	552	Wabash River	No	Yes	Yes
180	Granville	1104	Wabash River	No	Yes	Yes

	T	U	V	W	X	Y
181	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
182		<u>Body of Water</u>	<u>Water</u>			
183	Granville	1518	Wabash River	No	Yes	Yes
184	Granville	2346	Wabash River	No	Yes	Yes
185	Granville	6348	Wabash River	No	Yes	Yes
186	Granville	3174	Wabash River	No	Yes	Yes
187		3726	Wabash River	Yes	Yes	Yes
188	Granville	3864	Wabash River	No	Yes	Yes
189	Granville	7038	Wabash River	No	Yes	Yes
190	Granville	6762	Wabash River	No	Yes	Yes
191		3450	Wabash River	Yes	Yes	No
192	Granville	9384	Wabash River	No	Yes	Yes
193	Granville	1380	Wabash River	No	Yes	Yes
194	Granville	3312	Wabash River	No	Yes	Yes
195	Granville	1932	Wabash River	No	Yes	Yes
196	Granville	6348	Wabash River	No	Yes	Yes
197	Granville	3864	Wabash River	No	Yes	Yes
198	Granville	1242	Wabash River	No	Yes	Yes
199	Granville	6486	Wabash River	Yes	Yes	Yes
200	Granville	9246	Wabash River	No	Yes	Yes
201	Elston	414	Mill Race	Yes	Yes	Yes
202	Wea Station	3450	Flint Creek	Yes	Yes	Yes
203	Americus	414	Wabash River	Yes	Yes	Yes
204	Americus	4830	Wabash River	Yes	Yes	Yes
205	Americus	1794	Wabash River	Yes	Yes	Yes
206	Americus	3036	Wabash River	Yes	Yes	Yes
207	Americus	3174	Wabash River	Yes	Yes	Yes
208	Chapmanvi	3726	Wabash River	Yes	Yes	Yes
209	Chapmanvi	1932	Wabash River	Yes	Yes	Yes
210	Chapmanvi	5106	Wabash River	Yes	Yes	Yes
211	Wea Station	4140	Flint Creek	Yes	Yes	Yes
212		4416	Wabash River	Yes	Yes	Yes
213	Granville	5658	Flint Creek	Yes	Yes	Yes
214	Elston	2070	Mill Race	No	Yes	Yes
215	Chapmanvi	414	Wabash River	Yes	Yes	Yes
216	Chapmanvi	1794	Wabash River	Yes	Yes	Yes
217		690	Wabash River	Yes	Yes	Yes
218	Granville	4416	Flint Creek	Yes	Yes	Yes
219	Elston	414	Wea Creek	No	Yes	Yes
220	Granville	4968	Flint Creek	Yes	Yes	Yes
221	Elston	414	Mill Race	Yes	Yes	Yes
222	Elston	2622	Mill Race	Yes	Yes	Yes
223	Elston	4278	Mill Race	Yes	Yes	Yes
224	Granville	6072	Wabash River	No	Yes	Yes
225	Chapmanvi	1794	Wabash River	Yes	Yes	Yes
226	Granville	1794	Wabash River	No	Yes	Yes
227	Elston	10488	Wea Creek	Yes	Yes	Yes
228	Granville	12144	Wea Creek	No	Yes	Yes
229	Granville	1518	Wabash River	No	Yes	Yes
230	Granville	1380	Wabash River	No	Yes	Yes
231	Granville	1518	Wabash River	No	Yes	Yes
232	Americus	552	Sugar Creek	Yes	Yes	Yes
233	Chapmanvi	4692	Wabash River	Yes	Yes	Yes
234	Granville	1242	Wabash River	No	Yes	Yes
235	Elston	1104	Wea Creek	Yes	Yes	Yes
236	Granville	7038	Wabash River	No	Yes	Yes
237	Chapmanvi	4830	Wabash River	Yes	Yes	Yes
238	Granville	2898	Wabash River	No	Yes	Yes
239	Americus	4968	Wabash River	Yes	Yes	Yes
240	Americus	6210	Wabash River	Yes	Yes	Yes

	T	U	V	W	X	Y
241	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
242		<u>Body of Water</u>	<u>Water</u>			
243	Granville	6762	Wabash River	No	Yes	Yes
244	Elston	2898	Wabash River	Yes	Yes	Yes
245	Elston	1518	Wea Creek	Yes	Yes	Yes
246	Chapmanvi.	4692	Wabash River	Yes	Yes	Yes
247	Granville	13248	Wabash River	Yes	Yes	Yes

	A	B	C	D	E	F
1	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
2						Neighbor (in feet)
3	Canal-Era	Washington	Section 13	One	Farmstead/Homestead	552
4	Canal-Era	Washington	Section 21	Seven	Individual Structure	1104
5	Canal-Era	Washington	Section 21	Six	Individual Structure	1104
6	Canal-Era	Washington	Section 14	One	Farmstead/Homestead	1656
7	Canal-Era	Washington	Section 13	Three	Individual Structure	414
8	Canal-Era	Washington	Section 13	Two	Individual Structure	414
9	Canal-Era	Washington	Section 21	Four	Individual Structure	1242
10	Canal-Era	Washington	Section 28	One	Individual Structure	1932
11	Canal-Era	Washington	Section 10	Two	Individual Structure	2898
12	Canal-Era	Washington	Section 36	Seven	Farmstead/Homestead	3726
13	Canal-Era	Washington	Section 21	Three	Individual Structure	414
14	Canal-Era	Washington	Section 28	Three	Individual Structure	828
15	Canal-Era	Washington	Section 28	Two	Farmstead/Homestead	828
16	Canal-Era	Fairfield	Section 11	Two	Individual Structure	276
17	Canal-Era	Fairfield	Section 11	One	Individual Structure	276
18	Canal-Era	Fairfield	Section 3	Three	Individual Structure	2484
19	Canal-Era	Fairfield	Section 11	Five	Individual Structure	828
20	Canal-Era	Fairfield	Section 11	Four	Individual Structure	414
21	Canal-Era	Fairfield	Section 11	Three	Individual Structure	276
22	Canal-Era	Fairfield	Section 3	One	Farmstead/Homestead	1518
23	Canal-Era	Fairfield	Section 1	One	Individual Structure	828
24	Canal-Era	Washington	Section 15	Two	Farmstead/Homestead	2622
25	Canal-Era	Washington	Section 14	Two	Farmstead/Homestead	1656
26	Canal-Era	Fairfield	Section 1	Four	Farmstead/Homestead	1932
27	Canal-Era	Fairfield	Section 1	Three	Farmstead/Homestead	828
28	Canal-Era	Fairfield	Section 1	Two	Farmstead/Homestead	828
29	Canal-Era	Washington	Section 36	Six	Individual Structure	414
30	Canal-Era	Washington	Section 30	Four	Farmstead/Homestead	552
31	Canal-Era	Washington	Section 30	Three	Individual Structure	552
32	Canal-Era	Washington	Section 30	Two	Individual Structure	552
33	Canal-Era	Washington	Section 30	Seven	Mill	414
34	Canal-Era	Washington	Section 30	Six	Individual Structure	690
35	Canal-Era	Washington	Section 30	Five	Individual Structure	552
36	Canal-Era	Washington	Section 30	One	School	552
37	Canal-Era	Washington	Section 29	Two	Individual Structure	2760
38	Canal-Era	Washington	Section 29	One	Individual Structure	2622
39	Canal-Era	Washington	Section 25	Six	Farmstead/Homestead	1104
40	Canal-Era	Washington	Section 29	Five	Farmstead/Homestead	1380
41	Canal-Era	Washington	Section 29	Four	Farmstead/Homestead	1380
42	Canal-Era	Washington	Section 29	Three	Individual Structure	1932
43	Canal-Era	Washington	Section 36	Two	Farmstead/Homestead	276
44	Canal-Era	Washington	Section 36	One	Individual Structure	276
45	Canal-Era	Washington	Section 35	Three	Individual Structure	828
46	Canal-Era	Washington	Section 36	Five	Farmstead/Homestead	1104
47	Canal-Era	Washington	Section 36	Four	Individual Structure	552
48	Canal-Era	Washington	Section 36	Three	Farmstead/Homestead	552
49	Canal-Era	Washington	Section 35	Two	Farmstead/Homestead	2070
50	Canal-Era	Washington	Section 31	Two	Farmstead/Homestead	2070
51	Canal-Era	Washington	Section 31	One	Farmstead/Homestead	2208
52	Canal-Era	Washington	Section 30	Eight	Individual Structure	414
53	Canal-Era	Washington	Section 35	One	Individual Structure	828
54	Canal-Era	Washington	Section 31	Four	Farmstead/Homestead	
55	Canal-Era	Washington	Section 31	Three	Farmstead/Homestead	1242
56	Canal-Era	Fairfield	Section 11	Six	Farmstead/Homestead	1104
57	Canal-Era	Deer Creek	Section 6	Three	Individual Structure	1104
58	Canal-Era	Deer Creek	Section 6	Two	Individual Structure	1242
59	Canal-Era	Deer Creek	Section 6	One	Individual Structure	1242
60	Canal-Era	Deer Creek	Section 6	Six	Farmstead/Homestead	1380

	A	B	C	D	E	F
61	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
62						Neighbor (in feet)
63	Canal-Era	Deer Creek	Section 6	Five	Farmstead/Homestead	3450
64	Canal-Era	Deer Creek	Section 6	Four	Farmstead/Homestead	3450
65	Canal-Era	Deer Creek	Section 5	Four	Farmstead/Homestead	2346
66	Canal-Era	Fairfield	Section 10	Thirteen	Individual Structure	552
67	Canal-Era	Fairfield	Section 10	Eleven	Individual Structure	552
68	Canal-Era	Fairfield	Section 10	Ten	Individual Structure	1104
69	Canal-Era	Deer Creek	Section 5	Three	Individual Structure	3174
70	Canal-Era	Deer Creek	Section 5	Two	Farmstead/Homestead	4002
71	Canal-Era	Deer Creek	Section 5	One	Farmstead/Homestead	1380
72	Canal-Era	Deer Creek	Section 32	Four	Farmstead/Homestead	828
73	Canal-Era	Deer Creek	Section 32	Three	Farmstead/Homestead	828
74	Canal-Era	Deer Creek	Section 32	Two	Farmstead/Homestead	3036
75	Canal-Era	Deer Creek	Section 33	Six	School	1242
76	Canal-Era	Deer Creek	Section 33	Five	Farmstead/Homestead	1242
77	Canal-Era	Deer Creek	Section 33	One	Farmstead/Homestead	5244
78	Canal-Era	Deer Creek	Section 32	One	Farmstead/Homestead	2484
79	Canal-Era	Deer Creek	Section 7	One	Farmstead/Homestead	2484
80	Canal-Era	Deer Creek	Section 6	Eight	Farmstead/Homestead	552
81	Canal-Era	Deer Creek	Section 6	Seven	School	552
82	Canal-Era	Deer Creek	Section 8	One	Individual Structure	2070
83	Canal-Era	Deer Creek	Section 7	Five	Farmstead/Homestead	966
84	Canal-Era	Deer Creek	Section 7	Four	Farmstead/Homestead	2484
85	Canal-Era	Fairfield	Section 10	Eight	Individual Structure	276
86	Canal-Era	Fairfield	Section 2	Five	Individual Structure	2622
87	Canal-Era	Fairfield	Section 2	Four	Individual Structure	2622
88	Canal-Era	Fairfield	Section 2	Three	Farmstead/Homestead	1656
89	Canal-Era	Fairfield	Section 9	Three	Farmstead/Homestead	1380
90	Canal-Era	Fairfield	Section 9	Two	Farmstead/Homestead	1932
91	Canal-Era	Fairfield	Section 9	One	Individual Structure	828
92	Canal-Era	Fairfield	Section 2	Two	Individual Structure	1518
93	Canal-Era	Fairfield	Section 12	One	Individual Structure	
94	Canal-Era	Fairfield	Section 11	Eight	Farmstead/Homestead	1104
95	Canal-Era	Fairfield	Section 11	Seven	Farmstead/Homestead	1242
96	Canal-Era	Fairfield	Section 2	One	Farmstead/Homestead	966
97	Canal-Era	Fairfield	Section 4	One	Farmstead/Homestead	828
98	Canal-Era	Fairfield	Section 12	Two	Individual Structure	1932
99	Canal-Era	Fairfield	Section 10	Four	Individual Structure	552
100	Canal-Era	Fairfield	Section 10	Three	Individual Structure	552
101	Canal-Era	Fairfield	Section 10	Two	Individual Structure	1932
102	Canal-Era	Fairfield	Section 10	Seven	Individual Structure	276
103	Canal-Era	Fairfield	Section 10	Six	Individual Structure	414
104	Canal-Era	Fairfield	Section 10	Five	Individual Structure	690
105	Canal-Era	Fairfield	Section 10	One	Individual Structure	1518
106	Canal-Era	Fairfield	Section 9	Six	Farmstead/Homestead	1104
107	Canal-Era	Fairfield	Section 9	Five	Individual Structure	966
108	Canal-Era	Fairfield	Section 9	Four	Individual Structure	966
109	Canal-Era	Fairfield	Section 9	Nine	Individual Structure	2208
110	Canal-Era	Fairfield	Section 9	Eight	School	966
111	Canal-Era	Fairfield	Section 9	Seven	Individual Structure	966
112	Canal-Era	Washington	Section 25	Five	Farmstead/Homestead	552
113	Canal-Era	Union	Section 36	One	Individual Structure	828
114	Canal-Era	Union	Section 36	Two	Individual Structure	828
115	Canal-Era	Union	Section 36	Three	Watch House	2070
116	Canal-Era	Wayne	Section 3B	Eight	Individual Structure	552
117	Canal-Era	Wayne	Section 3B	Seven	Individual Structure	552
118	Canal-Era	Union	Section 35	One	Farmstead/Homestead	2484
119	Canal-Era	Union	Section 4	Two	Farmstead/Homestead	
120	Canal-Era	Union	Section 2	Three	Individual Structure	828

	A	B	C	D	E	F
121	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
122						<u>Neighbor (in feet)</u>
123	Canal-Era	Union	Section 2	Four	Mill	138
124	Canal-Era	Union	Section 2	Five	Individual Structure	2070
125	Canal-Era	Union	Section 2	One	Individual Structure	276
126	Canal-Era	Union	Section 2	Two	Individual Structure	276
127	Canal-Era	Wayne	Section 3B	Six	Individual Structure	690
128	Canal-Era	Union	Section 1	Four	Farmstead/Homestead	966
129	Canal-Era	Union	Section 3	One	Farmstead/Homestead	828
130	Canal-Era	Union	Section 3	Two	Individual Structure	828
131	Canal-Era	Union	Section 1	One	Farmstead/Homestead	828
132	Canal-Era	Union	Section 1	Two	Farmstead/Homestead	1932
133	Canal-Era	Union	Section 1	Three	Individual Structure	966
134	Canal-Era	Union	Section 3	Three	Farmstead/Homestead	1932
135	Canal-Era	Wayne	Section 4B	Two	Individual Structure	
136	Canal-Era	Wayne	Section 4B	One	Individual Structure	690
137	Canal-Era	Wayne	Section 3B	Nine	School	1518
138	Canal-Era	Union	Section 34	Six	Farmstead/Homestead	2760
139	Canal-Era	Wayne	Section 22	One	Farmstead/Homestead	1656
140	Canal-Era	Wayne	Section 11	Two	Farmstead/Homestead	690
141	Canal-Era	Union	Section 2	Six	Individual Structure	414
142	Canal-Era	Washington	Section 12	One	Individual Structure	3036
143	Canal-Era	Washington	Section 12	Two	Individual Structure	1242
144	Canal-Era	Washington	Section 12	Three	Individual Structure	3864
145	Canal-Era	Wayne	Section 3B	Four	Individual Structure	414
146	Canal-Era	Wayne	Section 3B	Three	Individual Structure	1242
147	Canal-Era	Washington	Section 11	Seven	Individual Structure	1104
148	Canal-Era	Washington	Section 22	One	Individual Structure	1794
149	Canal-Era	Wayne	Section 1B	One	Individual Structure	
150	Canal-Era	Wayne	Section 3B	One	Farmstead/Homestead	1656
151	Canal-Era	Wayne	Section 3B	Two	Individual Structure	1794
152	Canal-Era	Washington	Section 22	Two	Individual Structure	414
153	Canal-Era	Washington	Section 25	Four	Individual Structure	414
154	Canal-Era	Washington	Section 22	Three	Individual Structure	414
155	Canal-Era	Washington	Section 11	Six	Individual Structure	1656
156	Canal-Era	Washington	Section 11	Three	Individual Structure	1242
157	Canal-Era	Washington	Section 1	One	Individual Structure	1656
158	Canal-Era	Union	Section 2	Eight	Individual Structure	414
159	Canal-Era	Washington	Section 1	Two	Individual Structure	1656
160	Canal-Era	Washington	Section 11	One	Individual Structure	1794
161	Canal-Era	Washington	Section 11	Two	Individual Structure	1794
162	Canal-Era	Wayne	Section 3B	Five	Farmstead/Homestead	414
163	Canal-Era	Washington	Section 11	Four	Individual Structure	1242
164	Canal-Era	Washington	Section 11	Five	Individual Structure	2346
165	Canal-Era	Washington	Section 22	Four	Individual Structure	690
166	Canal-Era	Washington	Section 22	Six	Individual Structure	1242
167	Canal-Era	Washington	Section 22	Five	Individual Structure	690

	G	H	I	J
1	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
2	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
3	966	138	828	8004
4	1242	690	1656	8694
5	2070	138	1794	8004
6	1656	276	4416	6900
7	138	138	1794	8970
8	552	138	1380	8556
9	1518	276	276	5106
10	2760	138	276	7176
11	4002	138	1380	5106
12	4278	138	1380	7866
13	414	552	552	4554
14	1932	138	690	9660
15	2346	138	414	9384
16	276	138	1518	7314
17	552	138	1242	7452
18	2898	3036	3174	3726
19	2208	276	1242	6210
20	690	138	2208	6624
21	414	138	1794	7038
22	2622	138	5244	5382
23	3312	3174	3312	6762
24	2760	690	2760	3864
25	2208	552	2484	7176
26		414	2898	10764
27		414	3864	11040
28	3450	3726	3864	6762
29	1104	138	828	5382
30	1794	138	276	3726
31	1380	138	414	3588
32	1242	414	1518	4002
33	828	138	1794	6072
34	1104	276	1656	6210
35	828	276	2208	5658
36	690	138	1656	4416
37	3036	3174	3726	5796
38	3312	3036	3450	5796
39	1104	138	828	5382
40		414	3174	10350
41	3312	138	4002	9936
42	3036	3588	1656	8004
43	552	138	2760	2346
44	552	138	3036	2346
45	1794	138	4692	1104
46	1242	552	1380	3588
47	828	414	2760	2898
48	828	138	2346	2346
49	2208	138	5382	1794
50	2208	552	2346	8280
51	2208	1242	1380	7038
52	1242	276	1518	5934
53	2622	828	4692	138
54		966	3450	12420
55	2622	276	414	8694
56	1380	2070	2760	8280
57	2760	138	2760	7590
58	1104	138	1656	6762
59	2346	138	276	414
60	1932	276	2760	10350

	G	H	I	J
61	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
62	Nearest Neighbor		Opposite Direction	River
63	4554	1242	2760	6348
64	5106	276	1380	3036
65	2898	2898	4278	15318
66	1242	138	1242	10350
67	1656	138	1242	10488
68	1242	138	1518	8418
69	3312	3588	3726	13386
70	4002	690	3588	11454
71	3174	276	3864	9936
72		276	2484	8004
73		1104	3174	7590
74	3864	414	3450	5934
75	1794	138	138	15594
76	3450	414	1518	15870
77	5382	276	2208	14214
78	3036	828	1794	5382
79		966	2898	10212
80	2484	276	414	11592
81	1932	276	828	11592
82	2760	138	2346	14214
83	2760	552	3174	14766
84	2760	138	2760	10074
85	690	138	414	7314
86	2760	138	276	7728
87	3312	138	3174	3588
88	2622	138	2070	5106
89	1656	1932	5382	3864
90	2208	138	6072	5658
91	1932	1104	6762	3864
92	1656	138	1380	4830
93		138	3312	10074
94	1242	3174	3450	9384
95	1380	2760	3312	9384
96	1518	414	966	5382
97	966	138	276	5244
98		138	2760	10626
99	552	138	276	6624
100	828	138	690	6486
101	2070	1104	2760	5658
102	414	138	414	7176
103	552	138	690	6900
104	828	138	552	6210
105	1932	552	4002	6486
106	1656	138	3174	5106
107	1242	1242	3864	4002
108	1380	2208	4692	3174
109	2898	2346	2760	8556
110	1104	138	1518	5382
111	1380	1932	2898	3312
112	690	138	276	4278
113	828	414	6072	2346
114	828	276	5244	2346
115	3726	1656	2208	1518
116	690	138	414	9660
117	1380	138	966	9660
118	2898	414	1794	2622
119		138	5658	13248
120	1242	276	1242	4830

	G	H	I	J
121	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
122	Nearest Neighbor		Opposite Direction	River
123	552	276	1242	4830
124	2484	138	1380	7452
125	690	276	276	5796
126	552	138	414	5520
127	828	276	276	9246
128	1794	138	1380	5106
129	1932	1104	7866	12282
130	1794	138	7590	13110
131	828	138	4554	3036
132	2208	138	276	3726
133	1794	138	2208	4692
134	2070	138	9660	13386
135		138	3174	12834
136	1242	276	276	10074
137	2760	690	2760	6486
138	4140	138	7452	7590
139	2484	138	6900	15594
140	1104	138	552	7038
141	2484	2070	2760	5658
142	3174	138	414	1656
143	3450	414	3588	4830
144	4002	1518	3726	4692
145	828	138	414	8556
146	1794	138	1794	7314
147	2898	414	1932	5106
148	2070	276	3864	8418
149		414	2760	4140
150	1794	138	1518	7452
151	3036	138	1242	6072
152	1794	414	4140	10074
153	414	138	552	4002
154	1794	414	3864	10212
155	1932	1242	1794	5382
156	2760	138	2346	4830
157	3036	138	1794	414
158	1932	1518	2208	5934
159	4278	138	1794	1794
160	2898	2070	2622	1794
161	2346	414	2484	414
162	690	138	276	9108
163	2346	138	1242	3726
164	2346	138	1242	1932
165	1794	414	2484	9936
166		1104	1242	11730
167	1242	138	2070	10488

	K	L	M	N
1	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
2	River Feature		and Erie Canal	and Erie Canal Feature
3	8418	Ford	7728	8418
4	9936	Ferry	8418	9798
5	9798	Ferry	7728	9660
6	7038	Ford	5520	6210
7	9246	Ford	8694	9246
8	8832	Ford	8280	8832
9	8418	Ferry	5106	8280
10	12558	Ferry	2760	7038
11	5934	Ford	1104	5934
12	9108	Ferry	5382	17802
13	9660	Ferry	4554	9522
14	11868	Ferry	9660	10902
15	12144	Ferry	9384	10350
16	12006	Ferry	1242	1518
17	12006	Ferry	1104	1242
18	8556	Ferry	276	3174
19	12558	Ferry	2898	4002
20	12144	Ferry	1518	2208
21	12006	Ferry	1380	1794
22	5934	Ferry	4416	5382
23	13110	Ferry	6072	11040
24	13662	Ferry	3588	4278
25	7314	Ford	6762	6762
26	16008	Ferry	10074	12834
27	13662	Ferry	9522	16284
28	12282	Ferry	5934	11868
29	5244	Ferry	1932	14490
30	6900	Ferry	414	10350
31	6210	Ferry	138	10764
32	5382	Ferry	414	12144
33	9384	Ferry	2484	9936
34	8556	Ferry	2760	10902
35	8556	Ferry	1656	10350
36	5520	Ferry	828	12282
37	14490	Ferry	4002	4416
38	13248	Ferry	3450	6900
39	5382	Ferry	1518	14352
40	16284	Ferry	7728	9936
41	14904	Ferry	7038	10212
42	14490	Ferry	7176	7038
43	6486	Ferry	828	14490
44	6624	Ferry	828	15180
45	8418	Ferry	966	12696
46	3174	Ferry	552	16146
47	7176	Ferry	1380	14490
48	5934	Ferry	690	15870
49	8694	Ferry	414	12558
50	9384	Ferry	4830	12696
51	7314	Ferry	3450	13524
52	9660	Ferry	2484	9522
53	6210	Ferry	1242	14490
54	12006	Ferry	8832	16974
55	11454	Ferry	5382	10902
56	14214	Ferry	3588	4140
57	15180	Ford	7176	16698
58	14076	Ford	5520	15594
59	12834	Ford	4416	14214
60	17526	Ford	9936	11730

	K	L	M	N
61	Distance to Nearest Wabash	River Feature	Distance to Wabash	Distance to Nearest Wabash
62	River Feature		and Erie Canal	and Erie Canal Feature
63	12696	Ford	5658	6762
64	12006	Ford	2622	6486
65	19182	Ford	14628	14352
66	14490	Ferry	3588	3588
67	13938	Ferry	3036	3588
68	12834	Ferry	1794	1656
69	18630	Ford	12972	13248
70	15318	Ford	10626	10350
71	16974	Ford	10074	11040
72	10212	Ford	7176	7176
73	10212	Ford	7038	7038
74	9936	Ford	5520	5520
75	17802	Ford	14214	14352
76	18078	Ford	14766	14904
77	16698	Ford	13662	13662
78	8418	Ford	5106	5244
79	14352	Ford	9108	16284
80	19872	Ford	11178	14076
81	19458	Ford	11040	13524
82	21252	Ford	13524	22356
83	21114	Ford	14076	22356
84	17802	Ford	9660	14076
85	11730	Ferry	828	552
86	15870	Ferry	7590	8280
87	11868	Ferry	3450	8832
88	13386	Ferry	4968	7590
89	11868	Ferry	2622	6762
90	12696	Ferry	690	690
91	14352	Bridge	690	1242
92	12282	Ferry	4140	5934
93	17802	Ferry	7866	8556
94	15042	Ferry	4278	4554
95	15594	Ferry	5106	5520
96	12144	Ferry	2898	4692
97	6486	Ferry	5796	8280
98	16560	Ferry	9522	10902
99	10764	Ferry	138	138
100	10350	Ferry	552	828
101	8556	Ferry	2346	2898
102	11730	Ferry	690	552
103	11592	Ferry	690	828
104	10764	Ferry	138	552
105	8142	Ferry	2760	4278
106	10074	Ferry	2898	2898
107	10074	Ferry	3588	3588
108	10626	Ferry	4002	3726
109	12558	Ferry	552	2760
110	8280	Ferry	4416	4968
111	8970	Ferry	4968	4968
112	4278	Ferry	828	15042
113	22494	Bridge	2208	7038
114	21942	Bridge	2208	7728
115	18078	Bridge	966	11178
116			7314	7866
117			7038	7314
118	24150	Bridge	2208	4830
119	26358	Ford	12144	11730
120	26082	Bridge	4554	5796

	K	L	M	N
121	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
122	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
123	27048	Bndge	4554	5796
124	28566	Bndge	6762	7176
125	27462	Bndge	4968	5382
126	27186	Bndge	4830	5244
127			6210	6486
128	22494	Bndge	4968	10764
129	27600	Bndge	10764	10488
130	28290	Ford	11454	11454
131	22908	Bndge	3036	7452
132	18906	Bndge	3036	12558
133	21666	Bndge	4416	11040
134	29670	Ford	10764	11592
135			9798	9936
136			7038	8280
137			3174	3450
138	24702	Ford	4002	4968
139			13524	13386
140	19872	Ford	3864	3864
141	26082	Bndge	6486	8556
142	3726	Ford	1518	4968
143	5520	Ford	4692	5934
144	7728	Ford	4554	8832
145			5796	1794
146			4692	4830
147	5520	Ford	4830	5658
148	8418	Ferry	8280	8280
149			1518	1518
150			4416	4416
151			3726	4830
152	10074	Ferry	9936	9936
153	4002	Ferry	552	14766
154	10350	Ferry	10074	10212
155	5382	Ford	4554	4554
156	4554	Ford	3036	3726
157	9246	Ford	276	7176
158	27462	Bndge	5934	9936
159	8556	Ford	1656	8142
160	2346	Ford	138	828
161	414	Ford	414	828
162			6210	6486
163	3726	Ford	2760	2760
164	2346	Ford	1656	2346
165	10074	Ferry	9798	9936
166	12144	Ferry	11592	12006
167	10764	Ferry	10350	10626

	O	P	Q	R	S
1	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
2		Railroad	Railroad Feature	Feature	Nearest Town
3	Guardlock	2760	27186	Station	13938
4	Bridge	7314	44850	Station	8142
5	Aqueduct	7866	44850	Station	8004
6	Guardlock	7038	29256	Station	9522
7	Guardlock	2346	25116	Station	13938
8	Guardlock	2484	24012	Station	13938
9	Aqueduct	10488	45816	Station	6486
10	Aqueduct	7866	61824	Station	11316
11	Guardlock	10350	31188	Station	6624
12	Aqueduct	5796	43884	Station	31050
13	Aqueduct	10626	47334	Station	7728
14	Aqueduct	5796	43332	Station	10212
15	Aqueduct	5934	44160	Station	10626
16	Wildcat Bridge and Locks	2346	26358	Station	13800
17	Wildcat Bridge and Locks	2346	25944	Station	13524
18	Wildcat Bridge and Locks	5934	27462	Station	14766
19	Wildcat Bridge and Locks	2760	28842	Station	16422
20	Wildcat Bridge and Locks	2484	27186	Station	14628
21	Wildcat Bridge and Locks	2484	26634	Station	14214
22	Wildcat Bridge and Locks	1656	24564	Station	12144
23	Wildcat Bridge and Locks	3312	35880	Station	23598
24	Bridge	12558	37674	Station	2622
25	Guardlock	5382	28566	Station	11178
26	Wildcat Bridge and Locks	414	36294	Station	24426
27	Wildcat Bridge and Locks	1242	40434	Station	28428
28	Wildcat Bridge and Locks	3726	36708	Station	24426
29	Aqueduct	9108	46782	Station	25806
30	Aqueduct	10902	51060	Station	21666
31	Aqueduct	11178	50508	Station	22080
32	Aqueduct	10902	49266	Station	23322
33	Aqueduct	8694	51336	Station	20562
34	Aqueduct	8418	50508	Station	23046
35	Aqueduct	8970	51336	Station	21114
36	Aqueduct	10626	48990	Station	23598
37	Aqueduct	9798	59064	Station	13110
38	Aqueduct	8556	55476	Station	16560
39	Aqueduct	10074	47472	Station	24978
40	Aqueduct	4692	52716	Station	17526
41	Aqueduct	4968	54096	Station	18492
42	Aqueduct	7314	59892	Station	12972
43	Aqueduct	9522	41676	Station	28428
44	Wildcat Bridge and Locks	9384	41124	Station	27876
45	Wildcat Bridge and Locks	8694	39054	Station	26082
46	Aqueduct	10764	45540	Station	27462
47	Wildcat Bridge and Locks	8832	53130	Station	27600
48	Wildcat Bridge and Locks	9798	41952	Station	28704
49	Wildcat Bridge and Locks	9108	38364	Station	25530
50	Aqueduct	6624	48990	Station	23184
51	Aqueduct	7728	47610	Station	24564
52	Aqueduct	8694	52026	Station	20148
53	Wildcat Bridge and Locks	11316	41400	Station	27738
54	Aqueduct	2346	45678	Station	26772
55	Aqueduct	6072	51612	Station	20976
56	Wildcat Bridge and Locks	690	27600	Station	15456
57	Guardlock	4416	22908	Station	19182
58	Guardlock	3312	23184	Station	19596
59	Guardlock	2070	23598	Station	20010
60	Guardlock	8142	19596	Station	15732

	O	P	Q	R	S
61	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
62		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
63	Guardlock	3726	15456	Station	11868
64	Guardlock	966	16422	Station	12972
65	Guardlock	12420	18078	Station	14628
66	Wildcat Bridge and Locks	414	23184	Station	11316
67	Wildcat Bridge and Locks	138	22080	Station	9798
68	Wildcat Bridge and Locks	1380	24426	Station	12558
69	Guardlock	11040	19044	Station	15456
70	Guardlock	8556	15042	Station	11316
71	Guardlock	8280	18630	Station	14628
72	Lock	3864	6900	Station	3726
73	Lock	3588	7314	Station	4140
74	Guardlock	3450	10488	Station	6486
75	Lock	11316	12420	Station	9798
76	Lock	11868	13110	Station	10764
77	Towpath Bridge	10764	14352	Station	11454
78	Towpath Bridge	1932	7590	Station	3588
79	Guardlock	4416	28704	Station	26910
80	Guardlock	9108	22218	Station	18354
81	Guardlock	9108	21528	Station	17664
82	Guardlock	10764	24840	Station	21114
83	Guardlock	10488	27324	Station	19182
84	Guardlock	7038	22908	Station	19044
85	Wildcat Bridge and Locks	2484	24840	Station	12696
86	Wildcat Bridge and Locks	1656	32706	Station	20562
87	Wildcat Bridge and Locks	6072	35052	Station	22356
88	Wildcat Bridge and Locks	4140	32430	Station	20148
89	Basin	2070	17802	Station	7038
90	Basin	276	16836	Station	5244
91	Basin	1932	15456	Station	4830
92	Wildcat Bridge and Locks	4278	31050	Station	18630
93	Wildcat Bridge and Locks	1380	31464	Station	22494
94	Wildcat Bridge and Locks	414	26910	Station	15042
95	Wildcat Bridge and Locks	414	28290	Station	16284
96	Wildcat Bridge and Locks	3588	29532	Station	17112
97	Wildcat Bridge and Locks	552	23322	Station	11316
98	Wildcat Bridge and Locks	138	34500	Station	19458
99	Wildcat Bridge and Locks	3450	24978	Station	12696
100	Wildcat Bridge and Locks	3726	24840	Station	12420
101	Wildcat Bridge and Locks	4830	24840	Station	12006
102	Wildcat Bridge and Locks	2484	25254	Station	13110
103	Wildcat Bridge and Locks	2622	25668	Station	13524
104	Wildcat Bridge and Locks	3450	21942	Station	13248
105	Wildcat Bridge and Locks	3174	23598	Station	10764
106	Basin	276	19596	Station	8004
107	Basin	1380	19458	Station	8280
108	Basin	2208	19182	Station	8280
109	Basin	2622	18078	Station	5658
110	Basin	138	21252	Station	9660
111	Basin	2070	20562	Station	9660
112	Aqueduct	10074	46782	Station	25944
113	Wea Aqueduct\Lock System	2484	4830	Watch House	17112
114	Wea Aqueduct\Lock System	1794	4140	Watch House	16422
115	Wea Aqueduct\Lock System	138	0	Watch House	12282
116	Basin	2898			26910
117	Basin	3450			26220
118	Wea Aqueduct\Lock System	4416	7314	Watch House	19320
119	Basin	5796	22908	Watch House	22494
120	Wea Aqueduct\Lock System	3174	8418	Watch House	20562

	O	P	Q	R	S
121	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
122		Railroad	Railroad Feature	Feature	Nearest Town
123	Wea Aqueduct\Lock System	3588	9384	Watch House	21666
124	Wea Aqueduct\Lock System	2760	10626	Watch House	23046
125	Wea Aqueduct\Lock System	4140	9936	Watch House	22218
126	Wea Aqueduct\Lock System	4002	9660	Watch House	21804
127	Basin	4416			24426
128	Wea Aqueduct\Lock System	276	4554	Watch House	16560
129	Wea Aqueduct\Lock System	6210	21114	Watch House	23460
130	Basin	5520	20562	Watch House	23736
131	Wea Aqueduct\Lock System	1794	4830	Watch House	17250
132	Wea Aqueduct\Lock System	1518	2070	Watch House	12834
133	Wea Aqueduct\Lock System	138	3726	Watch House	15456
134	Basin	4278	19320	Watch House	25392
135	Basin	828			27600
136	Basin	3036			27462
137	Basin	8556			22632
138	Wea Aqueduct\Lock System	10488	7314	Watch House	24564
139	Aqueduct	138			
140	Basin	10074	52854	Watch House	19596
141	Wea Aqueduct\Lock System	690	8004	Watch House	20424
142	Guardlock	4554	18768	Station	18768
143	Guardlock	3450	24150	Station	14766
144	Guardlock	690	20148	Station	17112
145	Basin	4968			24978
146	Basin	5520			25254
147	Guardlock	4140	25392	Station	13662
148	Bridge	8004	25944	Station	6486
149	Basin	4554			
150	Basin	6900			23460
151	Basin	5520			26634
152	Bridge	6210	41952		8142
153	Aqueduct	10488	46782	Station	25668
154	Bridge	6072	41676		8418
155	Guardlock	7038	25116	Station	10350
156	Guardlock	8694	28428	Station	9384
157	Guardlock	1656	15456	Station	11868
158	Wea Aqueduct\Lock System	1242	8142	Watch House	21804
159	Guardlock	1242	16284	Station	13524
160	Guardlock	10074	24012	Station	11040
161	Guardlock	8694	25116	Station	12834
162	Basin	4692			25392
163	Guardlock	8142	27186	Station	10626
164	Guardlock	6762	24840	Station	12972
165	Bridge	6486	39744	Station	8142
166	Bridge	4554	40434		10074
167	Bridge	5658	40020	Station	8832

	T	U	V	W	X	Y
1	Town	Distance to Nearest	Body of	RR	WE	WA
2		Body of Water	Water			
3	Americus	8004	Wabash River	Yes	Yes	Yes
4	Americus	2346	Sugar Creek	Yes	Yes	Yes
5	Americus	1518	Sugar Creek	Yes	Yes	Yes
6	Americus	6900	Wabash River	Yes	Yes	Yes
7	Americus	8970	Wabash River	Yes	Yes	Yes
8	Americus	8556	Wabash River	Yes	Yes	Yes
9	Americus	138	Sugar Creek	Yes	Yes	Yes
10	Americus	2760	Sugar Creek	Yes	Yes	Yes
11	Americus	5106	Wabash River	Yes	Yes	Yes
12	Lafayette	6762	Buck Creek	Yes	Yes	Yes
13	Americus	276	Sugar Creek	Yes	Yes	Yes
14	Americus	2208	Sugar Creek	Yes	Yes	Yes
15	Americus	2208	Sugar Creek	Yes	Yes	Yes
16	Linwood	1656	Wildcat Creek	Yes	Yes	Yes
17	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
18	Linwood	2208	Wildcat Creek	Yes	Yes	Yes
19	Linwood	4140	Wildcat Creek	Yes	Yes	Yes
20	Linwood	2346	Wildcat Creek	Yes	Yes	Yes
21	Linwood	1932	Wildcat Creek	Yes	Yes	Yes
22	Linwood	690	Wildcat Creek	Yes	Yes	Yes
23	Linwood	6762	Wabash River	Yes	Yes	Yes
24	Americus	3864	Wabash River	Yes	Yes	Yes
25	Americus	6762	Wabash River	Yes	Yes	Yes
26	Linwood	10764	Wabash River	Yes	Yes	Yes
27	Linwood	11040	Wabash River	Yes	Yes	Yes
28	Linwood	6762	Wabash River	Yes	Yes	Yes
29	Americus	5382	Wabash River	Yes	Yes	Yes
30	Americus	414	Buck Creek	Yes	Yes	Yes
31	Americus	138	Buck Creek	Yes	Yes	Yes
32	Americus	1380	Buck Creek	Yes	Yes	Yes
33	Americus	138	Buck Creek	Yes	Yes	Yes
34	Americus	414	Buck Creek	Yes	Yes	Yes
35	Americus	138	Buck Creek	Yes	Yes	Yes
36	Americus	1518	Buck Creek	Yes	Yes	Yes
37	Americus	1932	Sugar Creek	Yes	Yes	Yes
38	Americus	3036	Buck Creek	Yes	Yes	Yes
39	Americus	3036	Buck Creek	Yes	Yes	Yes
40	Americus	552	Buck Creek	Yes	Yes	Yes
41	Americus	552	Buck Creek	Yes	Yes	Yes
42	Americus	3312	Sugar Creek	Yes	Yes	Yes
43	Linwood	2346	Wabash River	Yes	Yes	Yes
44	Lafayette	2346	Wabash River	Yes	Yes	Yes
45	Linwood	2484	Wabash River	Yes	Yes	Yes
46	Americus	3588	Wabash River	Yes	Yes	Yes
47	Linwood	2898	Wabash River	Yes	Yes	Yes
48	Lafayette	2346	Wabash River	Yes	Yes	Yes
49	Lafayette	1794	Wabash River	Yes	Yes	Yes
50	Americus	2622	Buck Creek	Yes	Yes	Yes
51	Americus	2622	Buck Creek	Yes	Yes	Yes
52	Americus	414	Buck Creek	Yes	Yes	Yes
53	Linwood	138	Wabash River	Yes	Yes	Yes
54	Americus	6210	Buck Creek	Yes	Yes	No
55	Americus	276	Buck Creek	Yes	Yes	Yes
56	Linwood	3726	Wildcat Creek	Yes	Yes	Yes
57	Delphi	7590	Wabash River	Yes	Yes	Yes
58	Delphi	6762	Wabash River	Yes	Yes	Yes
59	Delphi	5934	Wabash River	Yes	Yes	Yes
60	Delphi	10350	Wabash River	Yes	Yes	Yes

	T	U	V	W	X	Y
61	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
62		<u>Body of Water</u>	<u>Water</u>			
63	Delphi	5934	Wabash River	Yes	Yes	Yes
64	Delphi	3036	Wabash River	Yes	Yes	Yes
65	Delphi	13800	Deer Creek	Yes	No	No
66	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
67	Linwood	138	Wildcat Creek	Yes	Yes	Yes
68	Linwood	414	Wildcat Creek	Yes	Yes	Yes
69	Delphi	13248	Deer Creek	Yes	No	No
70	Delphi	9936	Deer Creek	Yes	Yes	Yes
71	Delphi	9936	Wabash River	Yes	Yes	Yes
72	Delphi	3312	Deer Creek	Yes	Yes	Yes
73	Delphi	3588	Deer Creek	Yes	Yes	Yes
74	Delphi	4554	Deer Creek	Yes	Yes	Yes
75	Delphi	8280	Deer Creek	Yes	No	No
76	Delphi	7728	Deer Creek	Yes	No	No
77	Delphi	11040	Deer Creek	Yes	No	No
78	Delphi	2484	Deer Creek	Yes	Yes	Yes
79	Americus	10212	Wabash River	Yes	Yes	Yes
80	Delphi	11592	Wabash River	Yes	Yes	Yes
81	Delphi	11592	Wabash River	Yes	Yes	Yes
82	Delphi	14076	Wabash River	Yes	No	No
83	Delphi	14766	Wabash River	Yes	No	No
84	Delphi	10074	Wabash River	Yes	Yes	Yes
85	Linwood	138	Wildcat Creek	Yes	Yes	Yes
86	Linwood	7728	Wabash River	Yes	Yes	Yes
87	Linwood	3588	Wabash River	Yes	Yes	Yes
88	Linwood	5106	Wabash River	Yes	Yes	Yes
89	Linwood	3588	Wabash River	Yes	Yes	Yes
90	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
91	Linwood	3864	Wabash River	Yes	Yes	Yes
92	Linwood	4830	Wabash River	Yes	Yes	Yes
93	Linwood	8280	Wildcat Creek	Yes	Yes	Yes
94	Linwood	4002	Wildcat Creek	Yes	Yes	Yes
95	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
96	Linwood	4278	Wildcat Creek	Yes	Yes	Yes
97	Linwood	3036	Wildcat Creek	Yes	Yes	Yes
98	Linwood	10626	Wabash River	Yes	Yes	Yes
99	Linwood	138	Wildcat Creek	Yes	Yes	Yes
100	Linwood	690	Wildcat Creek	Yes	Yes	Yes
101	Linwood	690	Wildcat Creek	Yes	Yes	Yes
102	Linwood	414	Wildcat Creek	Yes	Yes	Yes
103	Linwood	828	Wildcat Creek	Yes	Yes	Yes
104	Linwood	276	Wildcat Creek	Yes	Yes	Yes
105	Linwood	690	Wildcat Creek	Yes	Yes	Yes
106	Linwood	5244	Wabash River	Yes	Yes	Yes
107	Linwood	4002	Wabash River	Yes	Yes	Yes
108	Linwood	3174	Wabash River	Yes	Yes	Yes
109	Linwood	5658	Wildcat Creek	Yes	Yes	Yes
110	Linwood	4416	Wildcat Creek	Yes	Yes	Yes
111	Linwood	3312	Wabash River	Yes	Yes	Yes
112	Americus	4278	Wabash River	Yes	Yes	Yes
113	Lafayette	1242	Wea Creek	Yes	Yes	Yes
114	Lafayette	1656	Wea Creek	Yes	Yes	Yes
115	Lafayette	1518	Wea Creek	Yes	Yes	Yes
116	Granville	3450	Flint Creek	Yes	Yes	Yes
117	Granville	4140	Flint Creek	Yes	Yes	Yes
118	Lafayette	690	Wea Creek	Yes	Yes	Yes
119	Granville	13248	Wabash River	Yes	Yes	Yes
120	Lafayette	414	Mill Race	Yes	Yes	Yes

	T	U	V	W	X	Y
121	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
122		<u>Body of Water</u>	<u>Water</u>			
123	Lafayette	414	Mill Race	Yes	Yes	Yes
124	Lafayette	1932	Mill Race	Yes	Yes	Yes
125	Lafayette	138	Mill Race	Yes	Yes	Yes
126	Lafayette	138	Mill Race	Yes	Yes	Yes
127	Granville	5796	Flint Creek	Yes	Yes	Yes
128	Lafayette	1242	Wea Creek	Yes	Yes	Yes
129	Granville	8970	Wea Creek	Yes	Yes	No
130	Lafayette	9798	Wea Creek	Yes	Yes	Yes
131	Lafayette	828	Wea Creek	Yes	Yes	Yes
132	Lafayette	3726	Wea Creek	Yes	Yes	Yes
133	Lafayette	2070	Wea Creek	Yes	Yes	Yes
134	Lafayette	8556	Wea Creek	Yes	Yes	Yes
135	Granville	3036	Flint Creek	Yes	Yes	No
136	Granville	690	Flint Creek	Yes	Yes	Yes
137	Granville	6486	Wabash River	Yes	Yes	Yes
138	Lafayette	10488	Wea Creek	Yes	Yes	Yes
139		690	Flint Creek	Yes	Yes	Yes
140	Granville	7038	Wabash River	Yes	Yes	Yes
141	Lafayette	276	Wabash River	Yes	Yes	Yes
142	Delphi	1656	Wabash River	Yes	Yes	Yes
143	Americus	4830	Wabash River	Yes	Yes	Yes
144	Delphi	4692	Wabash River	Yes	Yes	Yes
145	Granville	4968	Flint Creek	Yes	Yes	Yes
146	Granville	4416	Flint Creek	Yes	Yes	Yes
147	Americus	5106	Wabash River	Yes	Yes	Yes
148	Americus	552	Sugar Creek	Yes	Yes	Yes
149		276	Flint Creek	Yes	Yes	Yes
150	Granville	5658	Flint Creek	Yes	Yes	Yes
151	Granville	3588	Flint Creek	Yes	Yes	Yes
152	Americus	276	Sugar Creek	Yes	Yes	Yes
153	Americus	4002	Wabash River	Yes	Yes	Yes
154	Americus	276	Sugar Creek	Yes	Yes	Yes
155	Americus	5382	Wabash River	Yes	Yes	Yes
156	Americus	4830	Wabash River	Yes	Yes	Yes
157	Delphi	414	Wabash River	Yes	Yes	Yes
158	Lafayette	2070	Wabash River	Yes	Yes	Yes
159	Delphi	1794	Wabash River	Yes	Yes	Yes
160	Americus	1794	Wabash River	Yes	Yes	Yes
161	Americus	414	Wabash River	Yes	Yes	Yes
162	Granville	4968	Flint Creek	Yes	Yes	Yes
163	Americus	3726	Wabash River	Yes	Yes	Yes
164	Americus	1932	Wabash River	Yes	Yes	Yes
165	Americus	966	Sugar Creek	Yes	Yes	Yes
166	Americus	552	Sugar Creek	Yes	Yes	Yes
167	Americus	414	Sugar Creek	Yes	Yes	Yes

	A	B	C	D	E	F
1	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
2						Neighbor (in feet)
3	Railroad-Era	Washington	Section 21	Six	Individual Structure	1104
4	Railroad-Era	Washington	Section 21	Seven	Individual Structure	1104
5	Railroad-Era	Washington	Section 21	Three	Individual Structure	414
6	Railroad-Era	Washington	Section 21	Four	Individual Structure	1242
7	Railroad-Era	Washington	Section 13	One	Farmstead/Homestead	2346
8	Railroad-Era	Washington	Section 14	One	Farmstead/Homestead	828
9	Railroad-Era	Washington	Section 21	Eight	Farmstead/Homestead	1794
10	Railroad-Era	Washington	Section 21	Nine	School	1932
11	Railroad-Era	Washington	Section 10	One	Individual Structure	1518
12	Railroad-Era	Washington	Section 10	Two	Individual Structure	2208
13	Railroad-Era	Washington	Section 36	Five	Farmstead/Homestead	1242
14	Railroad-Era	Washington	Section 36	Seven	Farmstead/Homestead	3036
15	Railroad-Era	Washington	Section 28	Four	Farmstead/Homestead	2484
16	Railroad-Era	Washington	Section 21	Two	Individual Structure	1242
17	Railroad-Era	Washington	Section 28	Two	Farmstead/Homestead	966
18	Railroad-Era	Washington	Section 28	Three	Individual Structure	966
19	Railroad-Era	Washington	Section 23	Two	Farmstead/Homestead	1932
20	Railroad-Era	Washington	Section 23	Three	Farmstead/Homestead	1656
21	Railroad-Era	Washington	Section 27	Two	Farmstead/Homestead	966
22	Railroad-Era	Washington	Section 23	One	Individual Structure	1242
23	Railroad-Era	Washington	Section 23	Six	Farmstead/Homestead	966
24	Railroad-Era	Washington	Section 23	Seven	Church	690
25	Railroad-Era	Washington	Section 23	Four	Individual Structure	1656
26	Railroad-Era	Washington	Section 23	Five	Farmstead/Homestead	1518
27	Railroad-Era	Washington	Section 14	Three	Farmstead/Homestead	1794
28	Railroad-Era	Washington	Section 14	Six	Farmstead/Homestead	1104
29	Railroad-Era	Washington	Section 14	Two	Farmstead/Homestead	1656
30	Railroad-Era	Washington	Section 14	Three	Individual Structure	1380
31	Railroad-Era	Washington	Section 15		Individual Structure	828
32	Railroad-Era	Washington	Section 27	One	Individual Structure	1380
33	Railroad-Era	Washington	Section 14	Seven	Individual Structure	1380
34	Railroad-Era	Washington	Section 14		Individual Structure	1794
35	Railroad-Era	Washington	Section 36	Three	Farmstead/Homestead	828
36	Railroad-Era	Washington	Section 29	Seven	Individual Structure	1380
37	Railroad-Era	Washington	Section 29	Eight	Individual Structure	1380
38	Railroad-Era	Washington	Section 29	Five	Farmstead/Homestead	1242
39	Railroad-Era	Washington	Section 29	Six	Individual Structure	1380
40	Railroad-Era	Washington	Section 30	One	School	690
41	Railroad-Era	Washington	Section 30	Five	Individual Structure	2346
42	Railroad-Era	Washington	Section 29	Nine	Individual Structure	1104
43	Railroad-Era	Washington	Section 29	Ten	Individual Structure	1104
44	Railroad-Era	Washington	Section 22		Farmstead/Homestead	1242
45	Railroad-Era	Washington	Section 22		Individual Structure	1242
46	Railroad-Era	Washington	Section 12	Five	Individual Structure	1656
47	Railroad-Era	Washington	Section 22	One	Individual Structure	2760
48	Railroad-Era	Washington	Section 25	Six	Farmstead/Homestead	1104
49	Railroad-Era	Washington	Section 29	Four	Farmstead/Homestead	1380
50	Railroad-Era	Washington	Section 22		Farmstead/Homestead	1794
51	Railroad-Era	Washington	Section 25	Five	Farmstead/Homestead	690
52	Railroad-Era	Washington	Section 33	One	Farmstead/Homestead	690
53	Railroad-Era	Washington	Section 33	Two	Individual Structure	1380
54	Railroad-Era	Washington	Section 32	Five	Farmstead/Homestead	1380
55	Railroad-Era	Washington	Section 32	Six	Farmstead/Homestead	1656
56	Railroad-Era	Washington	Section 35		Individual Structure	828
57	Railroad-Era	Washington	Section 36	One	Individual Structure	828
58	Railroad-Era	Washington	Section 33	Three	Farmstead/Homestead	414
59	Railroad-Era	Washington	Section 35	Two	Farmstead/Homestead	1794
60	Railroad-Era	Washington	Section 31	Four	Farmstead/Homestead	

	A	B	C	D	E	F
61	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
62						<u>Neighbor (in feet)</u>
63	Railroad-Era	Washington	Section 31		Farmstead/Homestead	2484
64	Railroad-Era	Washington	Section 31	One	Farmstead/Homestead	1656
65	Railroad-Era	Washington	Section 31	Three	Farmstead/Homestead	552
66	Railroad-Era	Washington	Section 32	Three	Farmstead/Homestead	1380
67	Railroad-Era	Washington	Section 32	Four	Individual Structure	1242
68	Railroad-Era	Washington	Section 32	One	Individual Structure	552
69	Railroad-Era	Washington	Section 32	Two	Individual Structure	552
70	Railroad-Era	Washington	Section 23	Eight	Farmstead/Homestead	1932
71	Railroad-Era	Deer Creek	Section 6	Four	Farmstead/Homestead	3450
72	Railroad-Era	Deer Creek	Section 6	Five	Farmstead/Homestead	3450
73	Railroad-Era	Deer Creek	Section 5	Two	Farmstead/Homestead	4002
74	Railroad-Era	Deer Creek	Section 5	Four	Farmstead/Homestead	2346
75	Railroad-Era	Deer Creek	Section 6	Eight	Farmstead/Homestead	552
76	Railroad-Era	Deer Creek	Section 7	One	Farmstead/Homestead	2484
77	Railroad-Era	Deer Creek	Section 6	Six	Farmstead/Homestead	1380
78	Railroad-Era	Deer Creek	Section 6	Seven	School	552
79	Railroad-Era	Fairfield	Section 10		Individual Structure	414
80	Railroad-Era	Fairfield	Section 10		Individual Structure	414
81	Railroad-Era	Fairfield	Section 10	Ten	Individual Structure	2208
82	Railroad-Era	Fairfield	Section 10	Thirteen	Individual Structure	2346
83	Railroad-Era	Fairfield	Section 15		Individual Structure	414
84	Railroad-Era	Deer Creek	Section 5	One	Farmstead/Homestead	1380
85	Railroad-Era	Fairfield	Section 10		Individual Structure	1656
86	Railroad-Era	Fairfield	Section 15		School	414
87	Railroad-Era	Deer Creek	Section 32	Six	Brickyard	1932
88	Railroad-Era	Deer Creek	Section 33	One	Farmstead/Homestead	2070
89	Railroad-Era	Deer Creek	Section 32	Four	Farmstead/Homestead	828
90	Railroad-Era	Deer Creek	Section 32	Five	Farmstead/Homestead	2898
91	Railroad-Era	Deer Creek	Section 33	Four	Individual Structure	1518
92	Railroad-Era	Deer Creek	Section 33	Five	Farmstead/Homestead	1242
93	Railroad-Era	Deer Creek	Section 33	Two	Individual Structure	2070
94	Railroad-Era	Deer Creek	Section 33	Three	Farmstead/Homestead	1656
95	Railroad-Era	Deer Creek	Section 7	Four	Farmstead/Homestead	2484
96	Railroad-Era	Deer Creek	Section 7	Five	Farmstead/Homestead	966
97	Railroad-Era	Deer Creek	Section 7	Two	Individual Structure	2070
98	Railroad-Era	Deer Creek	Section 7	Three	Farmstead/Homestead	2484
99	Railroad-Era	Deer Creek	Section 32	Two	Farmstead/Homestead	3036
100	Railroad-Era	Deer Creek	Section 32	Three	Farmstead/Homestead	828
101	Railroad-Era	Deer Creek	Section 31	Seven	Farmstead/Homestead	1104
102	Railroad-Era	Deer Creek	Section 32	One	Farmstead/Homestead	966
103	Railroad-Era	Fairfield	Section 9		Farmstead/Homestead	552
104	Railroad-Era	Fairfield	Section 11	Eight	Farmstead/Homestead	1104
105	Railroad-Era	Fairfield	Section 11		Farmstead/Homestead	690
106	Railroad-Era	Fairfield	Section 11	Six	Farmstead/Homestead	1104
107	Railroad-Era	Fairfield	Section 11	Seven	Farmstead/Homestead	1242
108	Railroad-Era	Fairfield	Section 12		Individual Structure	1242
109	Railroad-Era	Fairfield	Section 4	One	Farmstead/Homestead	2760
110	Railroad-Era	Fairfield	Section 11		School	828
111	Railroad-Era	Fairfield	Section 12		Individual Structure	2760
112	Railroad-Era	Fairfield	Section 1		Farmstead/Homestead	828
113	Railroad-Era	Fairfield	Section 1		Individual Structure	828
114	Railroad-Era	Washington	Section 26	One	Farmstead/Homestead	1380
115	Railroad-Era	Fairfield	Section 1	Four	Farmstead/Homestead	1242
116	Railroad-Era	Fairfield	Section 3		Individual Structure	1380
117	Railroad-Era	Fairfield	Section 3		Individual Structure	1380
118	Railroad-Era	Fairfield	Section 1		Farmstead/Homestead	2622
119	Railroad-Era	Fairfield	Section 3	One	Farmstead/Homestead	3036
120	Railroad-Era	Fairfield	Section 9	Three	Farmstead/Homestead	1242

	A	B	C	D	E	F
121	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
122						<u>Neighbor (In feet)</u>
123	Railroad-Era	Fairfield	Section 9	Four	Individual Structure	1242
124	Railroad-Era	Fairfield	Section 9	Two	Individual Structure	690
125	Railroad-Era	Fairfield	Section 9	Three	Individual Structure	414
126	Railroad-Era	Fairfield	Section 9	Eight	School	1242
127	Railroad-Era	Fairfield	Section 9		Individual Structure	1794
128	Railroad-Era	Fairfield	Section 9	Four	Individual Structure	414
129	Railroad-Era	Fairfield	Section 9	Six	Farmstead/Homestead	552
130	Railroad-Era	Fairfield	Section 2		Individual Structure	414
131	Railroad-Era	Fairfield	Section 2		Farmstead/Homestead	2346
132	Railroad-Era	Fairfield	Section 2	Two	Individual Structure	414
133	Railroad-Era	Fairfield	Section 2		Farmstead/Homestead	276
134	Railroad-Era	Fairfield	Section 2		Individual Structure	276
135	Railroad-Era	Fairfield	Section 9	One	Individual Structure	828
136	Railroad-Era	Fairfield	Section 2		Farmstead/Homestead	966
137	Railroad-Era	Fairfield	Section 2		Black Smith	690
138	Railroad-Era	Washington	Section 12	Four	Farmstead/Homestead	3450
139	Railroad-Era	Wayne	Section 22	Two	Individual Structure	1932
140	Railroad-Era	Union	Section 1	Two	Individual Structure	552
141	Railroad-Era	Wayne	Section 22	Three	Farmstead/Homestead	1932
142	Railroad-Era	Union	Section 1	One	Individual Structure	1932
143	Railroad-Era	Wayne	Section 5	Five	Farmstead/Homestead	690
144	Railroad-Era	Union	Section 1	Three	Individual Structure	966
145	Railroad-Era	Wayne	Section 5	Three	School	690
146	Railroad-Era	Wayne	Section 5	Four	Farmstead/Homestead	414
147	Railroad-Era	Union	Section 34	Six	Farmstead/Homestead	1794
148	Railroad-Era	Union	Section 4	Five	Farmstead/Homestead	414
149	Railroad-Era	Union	Section 4	Four	Individual Structure	1104
150	Railroad-Era	Union	Section 2	Four	Mill	1656
151	Railroad-Era	Union	Section 4	Six	Church	414
152	Railroad-Era	Union	Section 35	Three	Individual Structure	552
153	Railroad-Era	Union	Section 35	Two	Farmstead/Homestead	552
154	Railroad-Era	Union	Section 4	Two	Farmstead/Homestead	690
155	Railroad-Era	Union	Section 36	Four	Individual Structure	1932
156	Railroad-Era	Union	Section 3	Two	Individual Structure	1794
157	Railroad-Era	Wayne	Section 11	Three	Farmstead/Homestead	1242
158	Railroad-Era	Wayne	Section 12	Two	Individual Structure	2208
159	Railroad-Era	Union	Section 1	Four	Individual Structure	966
160	Railroad-Era	Union	Section 3	Five	Farmstead/Homestead	1932
161	Railroad-Era	Union	Section 3	Four	School	1656
162	Railroad-Era	Wayne	Section 12	One	Individual Structure	2070
163	Railroad-Era	Union	Section 3	Three	Farmstead/Homestead	2070
164	Railroad-Era	Wayne	Section 12	Three	Farmstead/Homestead	2760
165	Railroad-Era	Wayne	Section 7	One	Farmstead/Homestead	1518
166	Railroad-Era	Wayne	Section 7	Two	Individual Structure	690
167	Railroad-Era	Wayne	Section 22	One	Farmstead/Homestead	1518
168	Railroad-Era	Wayne	Section 6	Two	Individual Structure	1518
169	Railroad-Era	Wayne	Section 8	Two	Farmstead/Homestead	1242
170	Railroad-Era	Wayne	Section 8	Three	Individual Structure	690
171	Railroad-Era	Wayne	Section 7	Three	Farmstead/Homestead	
172	Railroad-Era	Wayne	Section 8	One	Individual Structure	552
173	Railroad-Era	Wayne	Section 3B	Five	Farmstead/Homestead	1242
174	Railroad-Era	Washington	Section 11	Seven	Individual Structure	1104
175	Railroad-Era	Washington	Section 11	Nine	Farmstead/Homestead	552
176	Railroad-Era	Washington	Section 11	Eight	Individual Structure	1518
177	Railroad-Era	Washington	Section 11	Five	Individual Structure	1656
178	Railroad-Era	Washington	Section 11	Two	Individual Structure	1518
179	Railroad-Era	Washington	Section 1	Two	Individual Structure	1656
180	Railroad-Era	Washington	Section 11	Four	Individual Structure	690

	A	B	C	D	E	F
181	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
182						<u>Neighbor (in feet)</u>
183	Railroad-Era	Washington	Section 11	Three	Individual Structure	276
184	Railroad-Era	Wayne	Section 1B	Two	Individual Structure	4278
185	Railroad-Era	Wayne	Section 2B	One	Individual Structure	4278
186	Railroad-Era	Washington	Section 12	Three	Individual Structure	2898
187	Railroad-Era	Washington	Section 12	Two	Individual Structure	1242
188	Railroad-Era	Washington	Section 11	Twelve	Farmstead/Homestead	828
189	Railroad-Era	Wayne	Section 3B	One	Farmstead/Homestead	1656
190	Railroad-Era	Wayne	Section 3B	Three	Individual Structure	1656
191	Railroad-Era	Washington	Section 11	Eleven	Farmstead/Homestead	276
192	Railroad-Era	Washington	Section 11	Ten	School	552
193	Railroad-Era	Union	Section 9	One	School	1242
194	Railroad-Era	Union	Section 9	Two	Individual Structure	690
195	Railroad-Era	Wayne	Section 6B	Three	School	
196	Railroad-Era	Union	Section 1	Thirteen	Individual Structure	414
197	Railroad-Era	Union	Section 2	Nine	Individual Structure	3864
198	Railroad-Era	Union	Section 2	Ten	Farmstead/Homestead	2898
199	Railroad-Era	Union	Section 2	Eleven	Individual Structure	2760
200	Railroad-Era	Wayne	Section 6B	Two	Farmstead/Homestead	690
201	Railroad-Era	Wayne	Section 3B	Eight	Individual Structure	552
202	Railroad-Era	Wayne	Section 3B	Nine	School	1518
203	Railroad-Era	Washington	Section 1	One	Individual Structure	1656
204	Railroad-Era	Wayne	Section 3B	Seven	Individual Structure	552
205	Railroad-Era	Wayne	Section 1	Two	Farmstead/Homestead	2070
206	Railroad-Era	Wayne	Section 6B	One	Farmstead/Homestead	3312
207	Railroad-Era	Union	Section 1	Fourteen	Farmstead/Homestead	1380

	G	H	I	J
1	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
2	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
3	1932	138	1794	8004
4	1932	690	1656	8694
5	1518	552	552	4554
6	1518	276	276	5106
7	2760	138	828	8004
8	1104	276	4416	6900
9	2346	1656	1656	6348
10	2208	138	414	6624
11	3174	1518	3588	2622
12	2622	138	1380	5106
13	1380	552	1380	3588
14	3726	138	1380	7866
15	2622	1104	1518	11316
16	2208	828	2070	4278
17	2346	138	414	9384
18	2070	138	690	9660
19	2346	1518	2484	13248
20	1794	1242	2484	12144
21	1380	138	276	14628
22	1380	276	414	14214
23	1380	1104	1242	14628
24	828	138	1518	15042
25	1794	2760	2898	13386
26	1656	1656	2484	13662
27	3450	2484	2760	10350
28	1242	138	3312	7314
29	1932	552	2484	7176
30	1794	1380	1518	8556
31	1794	552	690	8832
32	3726	828	4692	12696
33	3174	2622	2898	8142
34	2760	3174	3174	12834
35	2346	138	2346	2346
36	2208	2622	3450	6348
37	2760	3036	4416	7176
38	1380	414	3174	10350
39	1380	138	2484	9384
40	1104	138	1656	4416
41	2622	276	2208	5658
42	4140	1380	3450	7728
43	3174	414	1656	8142
44	1932	966	1104	11592
45	3726	138	3864	12144
46	2898	138	138	4692
47	3174	276	3864	8418
48	1104	138	828	5382
49	1380	138	4002	9936
50	2346	414	1656	10074
51	690	138	276	4278
52	1656	138	828	13386
53	1656	276	552	14904
54	2070	690	1242	13110
55	3036	138	3036	14076
56	1656	138	1518	2208
57	828	138	3036	2346
58	414	138	966	13938
59	2622	138	5382	1794
60		966	3450	12420

	G	H	I	J
61	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
62	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
63	2760	138	414	11178
64	2346	1242	1380	7038
65	1932	276	414	8694
66	1518	138	3864	13110
67	1656	828	2898	11454
68	1794	138	1932	12006
69	1380	138	2484	12420
70	2208	1518	2346	15870
71	5106	276	1380	3036
72	4554	1242	2760	6348
73	4002	690	3588	11454
74	2898	2898	4278	15318
75	2484	276	414	11592
76		966	2898	10212
77	1932	276	2760	10350
78	1932	276	828	11592
79	1656	138	138	9660
80	1656	138	414	9384
81	2484	138	1518	8418
82	2346	138	1242	10350
83	1104	138	3450	11040
84	3174	276	3864	9936
85	2070	828	1242	7728
86	966	276	3174	10902
87	3312	138	2760	11454
88	3588	276	2208	14214
89		276	2484	8004
90	3864	3312	3864	9384
91	1794	414	414	14490
92	3450	414	1518	15870
93	4416	138	966	16008
94	1794	1104	2070	14076
95	2760	138	2760	10074
96		552	3174	14766
97	2622	138	2208	7590
98	2622	414	2070	7728
99	3864	414	3450	5934
100		1104	3174	7590
101	1380	138	414	4416
102	2208	828	1794	5382
103	1242	138	2760	4968
104	1242	138	414	9384
105	828	276	276	6072
106	1380	138	690	8280
107	1380	138	966	9384
108	3036	138	3312	9936
109	3036	138	276	5244
110	1518	138	552	5658
111	3036	1242	2208	10902
112		138	5382	10764
113		414	4554	9936
114	1380	690	966	15594
115	2760	414	2898	10764
116	1518	3726	4002	2208
117	1932	3450	4416	3174
118	4554	1932	2622	5382
119	4002	138	5244	5382
120	1656	1932	5382	3864

	G	H	I	J
121	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road In</u>	<u>Distance to Wabash</u>
122	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
123	2070	2208	4692	3174
124	828	966	1242	4278
125	690	138	690	4968
126	1794	138	1518	5382
127	1794	138	1518	3036
128	828	138	690	5382
129	1656	138	3174	5106
130	1242	138	1242	4554
131	2484	138	414	4278
132	1380	138	1380	4830
133	1656	2346	2484	3450
134	1380	2484	2484	3174
135	1242	1104	1932	4140
136	1380	138	1104	6486
137	966	138	138	6072
138	3864	138	414	1794
139	2208	138	3864	11454
140	1518	138	276	3726
141		138	2070	12834
142	1932	138	4554	3038
143	1242	276	1242	14904
144	1380	138	2208	4692
145	1794	138	966	15870
146	1794	138	276	15456
147	2898	138	7452	7590
148	1794	276	690	14076
149	1242	138	3864	13662
150	2898	276	1242	4830
151	1380	138	138	14214
152	1932	138	4692	1656
153	1794	138	4140	2070
154	1794	138	5658	13248
155	2622	138	2208	2898
156	2070	138	7590	13110
157	1656	138	1242	7038
158	2622	138	138	15456
159	1794	138	1380	5106
160	4692	276	4002	4692
161	4002	138	5934	8142
162	4140	276	4416	12006
163	4002	138	9660	13386
164	3864	276	2898	16974
165	2346	138	3726	16146
166	2346	138	2070	17250
167		138	6900	15594
168	2622	138	2346	16974
169	1794	138	2484	15456
170	1104	138	828	15456
171		138	1794	22770
172	1794	138	138	15870
173	1656	138	276	9108
174	2898	414	1932	5106
175	690	138	552	3036
176	2208	1518	2208	1794
177	2346	138	1242	1932
178	2346	414	2484	414
179	4416	138	1794	1794
180	828	138	1242	3726

	G	H	I	J
181	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
182	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
183	1242	138	2346	4830
184	4416	3174	4416	4554
185	4692	138	552	4416
186	3312	1518	3726	4692
187	3450	414	3588	4830
188	1242	414	2070	6210
189	1794	138	1518	7452
190	1794	138	1794	7314
191	1518	138	2760	4968
192	828	276	276	3174
193	2070	138	3036	14352
194	1242	138	4416	13800
195		138	828	18078
196	552	138	138	3174
197	8004	1932	3036	9936
198	7866	276	1794	8280
199	3450	414	1656	4140
200	1380	138	276	18078
201	1932	138	414	9660
202	1656	690	2760	6486
203	2898	138	1794	414
204	1242	138	966	9660
205	2208	138	2070	13386
206	3588	138	138	15732
207	1656	414	1242	4692

	K	L	M	N
1	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
2	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
3	9798	Ferry	7728	9660
4	9936	Ferry	8418	9798
5	9660	Ferry	4554	9522
6	8418	Ferry	5106	8280
7	8418	Ford	7728	8418
8	7038	Ford	5520	6210
9	10350	Ferry	6210	7314
10	8004	Ferry	6348	7866
11	4968	Ferry	414	4968
12	5934	Ford	1104	5934
13	3174	Ferry	552	16146
14	9108	Ferry	5382	17802
15	16560	Ferry	10626	9936
16	7590	Ferry	4140	7452
17	12144	Ferry	9384	10350
18	11868	Ferry	9660	10902
19	13662	Ferry	12558	13524
20	12834	Ferry	10902	12696
21	14628	Ferry	14766	14490
22	14490	Ferry	13800	14352
23	14904	Ford	12972	14214
24	15180	Ford	13800	14628
25	13800	Ferry	12282	13662
26	14490	Ferry	12282	12972
27	10626	Ford	9108	10074
28	7038	Ford	4554	6072
29	7314	Ford	6762	6762
30	9660	Ford	7176	10902
31	9522	Ferry	7866	9384
32	12972	Ferry	12420	12834
33	9522	Ford	6348	9384
34	9798	Ferry	10074	10074
35	5934	Ferry	690	15870
36	12420	Ferry	3450	7176
37	13800	Ferry	4554	7176
38	16284	Ferry	7728	9936
39	13386	Ferry	6072	10074
40	5520	Ferry	828	12282
41	8556	Ferry	1656	10350
42	17802	Ferry	6762	6762
43	18906	Ferry	7590	7452
44	12144	Ferry	11592	12006
45	12420	Ferry	12144	12282
46	9936	Ford	4554	11178
47	8418	Ferry	8280	8280
48	5382	Ferry	1518	14352
49	14904	Ferry	7038	10212
50	10626	Ferry	9522	10488
51	4278	Ferry	828	15042
52	20562	Ferry	13938	13938
53	18906	Ferry	12420	12420
54	18630	Ferry	10626	12144
55	17388	Ferry	10902	14214
56	23598	Ferry	828	14214
57	6624	Ferry	828	15180
58	18492	Ferry	13248	13248
59	8694	Ferry	414	12558
60	12006	Ferry	8832	16974

	K	L	M	N
61	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
62	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
63	12144	Ferry	7866	13800
64	7314	Ferry	3450	13524
65	11454	Ferry	5382	10902
66	15870	Ferry	9798	14076
67	16422	Ferry	8694	11040
68	15042	Ferry	8556	13800
69	14628	Ferry	9108	14076
70	16560	Ferry	14904	16836
71	12006	Ford	2622	6486
72	12696	Ford	5658	6762
73	15318	Ford	10626	10350
74	19182	Ford	14628	14352
75	19872	Ford	11178	14076
76	14352	Ford	9108	16284
77	17526	Ford	9936	11730
78	19458	Ford	11040	13524
79	12972	Ferry	2208	2760
80	12558	Ferry	1932	2622
81	12834	Ferry	1794	1656
82	14490	Ferry	3588	3588
83	14766	Ferry	2898	7452
84	16974	Ford	10074	11040
85	10902	Ferry	138	1656
86	15042	Ferry	3174	7866
87	14076	Ford	11868	12006
88	16698	Ford	13662	13662
89	10212	Ford	7176	7176
90	12834	Ford	8832	8832
91	16836	Ford	13386	13524
92	18078	Ford	14766	14904
93	19320	Ford	15456	15456
94	16560	Ford	13524	13938
95	17802	Ford	9660	14076
96	21114	Ford	14076	22356
97	12558	Ford	6624	14490
98	14490	Ford	7038	16008
99	9936	Ford	5520	5520
100	10212	Ford	7038	7038
101	7452	Ford	3864	4140
102	8418	Ford	5106	5244
103	10074	Ferry	3588	3864
104	15042	Ferry	4278	4554
105	12834	Ferry	3312	4692
106	14214	Ferry	3588	4140
107	15594	Ferry	5106	5520
108	16698	Ferry	9798	12006
109	6486	Ferry	5796	8280
110	12144	Ferry	2484	
111	18354	Ferry	10764	9522
112	12834	Ferry	8970	17112
113	12006	Ferry	8280	16836
114	15594	Ferry	15318	15732
115	16008	Ferry	10074	12834
116	8556	Ferry	1794	4968
117	8694	Ferry	552	3036
118	12282	Ferry	5244	10626
119	5934	Ferry	4416	5382
120	11868	Ferry	2622	6762

	K	L	M	N
121	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
122	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
123	10626	Ferry	4002	3726
124	7452	Ferry	5658	9108
125	7314	Ferry	5382	8418
126	8280	Ferry	4416	4968
127	8556	Ferry	5382	9798
128	7314	Ferry	5244	8004
129	10074	Ferry	2898	2898
130	12696	Ferry	4278	6072
131	13110	Ferry	4140	8280
132	12282	Ferry	4140	5934
133	10074	Ferry	2208	4692
134	9936	Ferry	2346	4830
135	8280	Ferry	4968	9522
136	13938	Ferry	4968	6210
137	13110	Ferry	4002	5382
138	4554	Ford	1656	5658
139			8832	9246
140	18906	Bridge	3036	12558
141			10488	10626
142	22908	Bridge	3036	7452
143	21114	Ford	14766	14628
144	21666	Bridge	4416	11040
145	18906	Ford	15732	16974
146	19596	Ford	15318	18630
147	24702	Ford	4002	4968
148	22770	Ford	13386	13386
149	25254	Ford	12144	12144
150	27048	Bridge	4554	5796
151	22494	Ford	13524	13662
152	22770	Bridge	1380	5796
153	23184	Bridge	1794	5658
154	26358	Ford	12144	11730
155	19872	Bridge	2622	10626
156	28290	Ford	11454	11454
157	20424	Ford	3726	3726
158	17250	Ford	14076	14214
159	22494	Bridge	4968	10764
160	30636	Ford	4692	4830
161	28704	Ford	4002	4830
162	17526	Ford	10074	10074
163	29670	Ford	10764	11592
164	20010	Ford	14490	14490
165	18078	Ford	16008	17112
166	18906	Ford	17112	17802
167			13524	13386
168	16974	Ford	16284	16422
169	21114	Ford	15318	20010
170	22080	Ford	15318	21114
171	25392	Ford	22632	21942
172	20148	Ford	15732	19044
173			6210	6486
174	5520	Ford	4830	5658
175	3036	Ferry	2208	2208
176	1794	Ferry	138	552
177	2346	Ford	1656	2346
178	414	Ford	414	828
179	8556	Ford	1656	8142
180	3726	Ford	2760	2760

	K	L	M	N
181	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
182	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
183	4554	Ford	3036	3726
184			5106	5106
185			2346	5934
186	7728	Ford	4554	8832
187	5520	Ford	4692	5934
188	6348	Ferry	4968	5382
189			4416	4416
190			4692	4830
191	4416	Ferry	3174	3864
192	3174	Ferry	2484	2622
193	24840	Ford	13110	13110
194	26082	Ford	12144	12144
195	25254	Ford	15456	15456
196	18630	Bridge	2898	12972
197	31602	Bridge	8004	8142
198	28980	Bridge	7866	8418
199	26082	Bridge	3450	4554
200	24150	Ford	15456	15456
201			7314	7866
202			3174	3450
203	9246	Ford	276	7176
204			7038	7314
205	16974	Ford	12006	12006
206	24012	Ford	12144	12144
207	20562	Bridge	4278	12282

	O	P	Q	R	S
1	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
2		Railroad	Railroad Feature	Feature	Nearest Town
3	Aqueduct	7866	9522	Station	8004
4	Bridge	7314	9522	Station	8142
5	Aqueduct	10626	11178	Station	7728
6	Aqueduct	10488	11316	Station	6486
7	Guardlock	2760	5934	Station	5244
8	Guardlock	7038	8418	Station	7314
9	Aqueduct	8970	9384	Station	8556
10	Bridge	9384	11454	Station	6210
11	Bridge	13662	14076	Station	3174
12	Guardlock	10350	11316	Station	6624
13	Aqueduct	10764	18630	Stockyard	19596
14	Aqueduct	5796	17112	Stockyard	17112
15	Aqueduct	3726	3864	Station	3174
16	Aqueduct	11454	12282	Station	5520
17	Aqueduct	5934	7176	Station	6486
18	Aqueduct	5796	7590	Station	6762
19	Bridge	3312	7590	Station	6348
20	Bridge	5244	5382	Station	4416
21	Bridge	1794	10902	Station	9384
22	Bridge	2208	9522	Station	8418
23	Guardlock	1932	2484	Station	1518
24	Guardlock	966	1932	Station	552
25	Bridge	3174	5520	Station	4554
26	Bridge	3174	4002	Station	2898
27	Guardlock	4416	4830	Station	3588
28	Guardlock	8004	9246	Station	7038
29	Guardlock	5382	7176	Station	5934
30	Guardlock	7728	7590	Station	4830
31	Bridge	8280	8418	Station	3864
32	Bridge	17388	8280	Station	7452
33	Guardlock	7866	7866	Station	6072
34	Guardlock	2898	3864	Station	4416
35	Wildcat Bridge and Locks	9798	15042	Stockyard	22356
36	Aqueduct	8556	10902	Station	7866
37	Aqueduct	7866	9660	Station	7176
38	Aqueduct	4692	7038	Station	6072
39	Aqueduct	5520	9384	Station	4830
40	Aqueduct	10626	17526	Station	16698
41	Aqueduct	8970	14490	Station	13662
42	Aqueduct	7452	7728	Station	6762
43	Aqueduct	7038	7038	Station	6348
44	Bridge	4554	9798	Station	276
45	Bridge	4002	9660	Station	2346
46	Guardlock	1242	14214	Station	12696
47	Bridge	8004	5658	Station	6486
48	Aqueduct	10074	20010	Stockyard	17388
49	Aqueduct	4968	7590	Station	7314
50	Bridge	6762	8556	Station	828
51	Aqueduct	10074	19596	Stockyard	18492
52	Aqueduct	276	2622	Station	1932
53	Aqueduct	1794	2898	Station	2070
54	Aqueduct	2070	4002	Station	3312
55	Aqueduct	828	6762	Station	5934
56	Wildcat Bridge and Locks	9384	12558	Stockyard	2622
57	Wildcat Bridge and Locks	9384	14214	Stockyard	22908
58	Aqueduct	1104	1242	Station	552
59	Wildcat Bridge and Locks	9108	12144	Stockyard	23598
60	Aqueduct	2346	14628	Station	13938

	O	P	Q	R	S
61	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
62		Railroad	Railroad Feature	Feature	Nearest Town
63	Aqueduct	3450	12282	Station	11592
64	Aqueduct	7728	16146	Station	15456
65	Aqueduct	6072	11454	Station	10764
66	Aqueduct	1518	8142	Station	7590
67	Aqueduct	3588	6210	Station	5658
68	Aqueduct	2622	10074	Station	9246
69	Aqueduct	2208	9522	Station	8832
70	Bridge	1242	5106	Station	3726
71	Guardlock	966	16422	Station	12972
72	Guardlock	3726	15456	Station	11868
73	Guardlock	8556	15042	Station	12144
74	Guardlock	12420	18078	Station	14628
75	Guardlock	9108	22218	Station	18354
76	Guardlock	4416	14628	Station	14628
77	Guardlock	8142	19596	Station	15732
78	Guardlock	9108	21528	Station	17664
79	Wildcat Bridge and Locks	1104	1380	Stockyard	9522
80	Wildcat Bridge and Locks	1380	1656	Stockyard	8142
81	Wildcat Bridge and Locks	1380	1242	Stockyard	10212
82	Wildcat Bridge and Locks	414	414	Stockyard	8970
83	Basin	1242	6072	Stockyard	3036
84	Guardlock	8280	18630	Station	14628
85	Wildcat Bridge and Locks	3174	3174	Stockyard	9108
86	Wildcat Bridge and Locks	1242	6486	Stockyard	2622
87	Towpath Bridge	8142	11040	Station	8418
88	Towpath Bridge	10764	14352	Station	11454
89	Lock	3864	6900	Station	3726
90	Towpath Bridge	5520	11178	Station	7728
91	Lock	10626	11730	Station	8970
92	Lock	11868	13110	Station	10764
93	Towpath Bridge	12696	16284	Station	13662
94	Towpath Bridge	10212	12144	Station	9936
95	Guardlock	7038	21114	Station	19044
96	Guardlock	10488	18354	Station	19182
97	Guardlock	2760	16698	Station	16836
98	Guardlock	3864	19320	Station	19320
99	Guardlock	3450	10488	Station	6486
100	Lock	3588	7314	Station	4140
101	Towpath Bridge	966	7590	Station	3726
102	Towpath Bridge	1932	7590	Station	3588
103	Basin	276	10074	Stockyard	6762
104	Wildcat Bridge and Locks	414	276	Stockyard	12834
105	Wildcat Bridge and Locks	2898	3174	Stockyard	15180
106	Wildcat Bridge and Locks	690	690	Stockyard	12696
107	Wildcat Bridge and Locks	414	1104	Stockyard	14076
108	Wildcat Bridge and Locks	552	8142	Stockyard	20976
109	Wildcat Bridge and Locks	552	10212	Stockyard	9522
110	Wildcat Bridge and Locks	3312	3312	Stockyard	14490
111	Wildcat Bridge and Locks	1380	5382	Stockyard	17940
112	Wildcat Bridge and Locks	1932	13800	Stockyard	18216
113	Wildcat Bridge and Locks	2898	14214	Stockyard	18216
114	Bridge	828	9660	Station	8556
115	Wildcat Bridge and Locks	414	8418	Stockyard	22218
116	Wildcat Bridge and Locks	6900	6900	Stockyard	15180
117	Wildcat Bridge and Locks	6210	6072	Stockyard	13938
118	Wildcat Bridge and Locks	4692	8694	Stockyard	21114
119	Wildcat Bridge and Locks	1656	7866	Stockyard	10212
120	Basin	2070	11730	Stockyard	4968

	O	P	Q	R	S
121	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
122		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
123	Basin	2208	12006	Stockyard	6348
124	Wildcat Bridge and Locks	1380	22080	Station	10626
125	Wildcat Bridge and Locks	690	22218	Station	10626
126	Basin	138	9936	Stockyard	7866
127	Wildcat Bridge and Locks	690	11592	Stockyard	8280
128	Wildcat Bridge and Locks	276	22356	Station	10626
129	Basin	276	10074	Stockyard	6348
130	Wildcat Bridge and Locks	3864	4692	Stockyard	16560
131	Wildcat Bridge and Locks	5106	7038	Stockyard	18906
132	Wildcat Bridge and Locks	4278	4968	Stockyard	16698
133	Wildcat Bridge and Locks	5520	5382	Stockyard	15180
134	Wildcat Bridge and Locks	5658	5658	Stockyard	15456
135	Wildcat Bridge and Locks	1380	21252	Station	9936
136	Wildcat Bridge and Locks	2484	4002	Stockyard	16422
137	Wildcat Bridge and Locks	2898	3036	Stockyard	15732
138	Guardlock	4002	13248	Station	12558
139	Aqueduct	3174			
140	Wea Aqueduct\Lock System	1518	7176	Railroad Yard	828
141	Aqueduct	4140			
142	Wea Aqueduct\Lock System	1794	11730	Railroad Yard	6210
143	Basin	6900	7038	Station	7038
144	Wea Aqueduct\Lock System	138	9936	Railroad Yard	3450
145	Bridge	7866	10350	Station	10350
146	Bridge	7452	9108	Station	9108
147	Wea Aqueduct\Lock System	10488	16008	Station	18078
148	Basin	6762	6486	Station	6486
149	Basin	6210	6762	Station	6762
150	Wea Aqueduct\Lock System	3588	16146	Railroad Yard	10764
151	Basin	6762	6762	Station	6762
152	Wea Aqueduct\Lock System	3726	12144	Railroad Yard	7590
153	Wea Aqueduct\Lock System	3588	12558	Railroad Yard	7866
154	Basin	5796	8004	Station	22494
155	Wea Aqueduct\Lock System	414	8556	Railroad Yard	2898
156	Basin	5520	9108	Station	23736
157	Basin	9522	26496	Station	20148
158	Basin	8556	16284	Station	15732
159	Wea Aqueduct\Lock System	276	10764	Railroad Yard	4416
160	Wea Aqueduct\Lock System	7176	16836	Station	14214
161	Wea Aqueduct\Lock System	9108	16422	Station	16422
162	Basin	9384	20286	Station	16284
163	Basin	4278	9936	Station	25392
164	Basin	5658	15456	Station	15456
165	Bridge	7728	12696	Station	12696
166	Bridge	7452	10626	Station	10626
167	Aqueduct	138	30360	Station	29808
168	Bridge	8418	14490	Station	14214
169	Bridge	6624	7314	Station	7314
170	Bridge	6348	6486	Station	6486
171	Basin	966	8556	Station	8556
172	Bridge	7038	8694	Station	8694
173	Basin	4692			25392
174	Guardlock	4140	8832	Station	8004
175	Guardlock	8004	11730	Station	11040
176	Guardlock	9522	13800	Station	11316
177	Guardlock	6762	12006	Station	11040
178	Guardlock	8694	14214	Station	12834
179	Guardlock	1242	16284	Station	15870
180	Guardlock	8142	11316	Station	10212

	O	P	Q	R	S
181	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
182		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
183	Guardlock	8694	11040	Station	9384
184	Aqueduct	1380			
185	Basin	5382			
186	Guardlock	690	12144	Station	11316
187	Guardlock	3450	9384	Station	8694
188	Guardlock	7314	8418	Station	9660
189	Basin	6900			23460
190	Basin	5520			25254
191	Guardlock	8694	10902	Station	9246
192	Guardlock	7590	11178	Station	11454
193	Basin	5796	5934	Station	5934
194	Basin	5520	6900	Station	6900
195	Basin	828	16008	Station	16284
196	Wea AqueductLock System	1242	6900	Railroad Yard	414
197	Wea AqueductLock System	4140	16008	Railroad Yard	14076
198	Wea AqueductLock System	1656	17664	Railroad Yard	11592
199	Wea AqueductLock System	4554	15456	Railroad Yard	10212
200	Basin	1380	15732	Station	15318
201	Basin	2898			26358
202	Basin	8556			22632
203	Guardlock	1656	15456	Station	17250
204	Basin	3450			26082
205	Basin	9384	18768	Station	15180
206	Basin	2484	19320	Station	19596
207	Wea AqueductLock System	1242	8970	Railroad Yard	2484

	T	U	V	W	X	Y
1	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
2		<u>Body of Water</u>	<u>Water</u>			
3	Americus	1518	Sugar Creek	Yes	Yes	Yes
4	Americus	2346	Sugar Creek	Yes	Yes	Yes
5	Americus	276	Sugar Creek	Yes	Yes	Yes
6	Americus	138	Sugar Creek	Yes	Yes	Yes
7	Chapmanvi	8004	Wabash River	Yes	Yes	Yes
8	Chapmanvi	6900	Wabash River	Yes	Yes	Yes
9	Transitville	1518	Sugar Creek	Yes	Yes	Yes
10	Americus	552	Sugar Creek	Yes	Yes	Yes
11	Americus	2622	Wabash River	Yes	Yes	Yes
12	Americus	5106	Wabash River	Yes	Yes	Yes
13	Transitville	3588	Wabash River	Yes	Yes	Yes
14	Transitville	6762	Buck Creek	Yes	Yes	Yes
15	Transitville	1656	Buck Creek	Yes	Yes	No
16	Americus	966	Sugar Creek	Yes	Yes	Yes
17	Transitville	2208	Sugar Creek	Yes	Yes	Yes
18	Transitville	2208	Sugar Creek	Yes	Yes	Yes
19	Chapmanvi	138	Sugar Creek	Yes	No	No
20	Chapmanvi	1380	Sugar Creek	Yes	No	No
21	Transitville	2760	Sugar Creek	Yes	No	No
22	Chapmanvi	1656	Sugar Creek	Yes	No	No
23	Chapmanvi	552	Sugar Creek	Yes	No	No
24	Chapmanvi	276	Sugar Creek	Yes	No	No
25	Chapmanvi	138	Sugar Creek	Yes	No	No
26	Chapmanvi	828	Sugar Creek	Yes	No	No
27	Chapmanvi	5382	Sugar Creek	Yes	Yes	Yes
28	Chapmanvi	7038	Wabash River	Yes	Yes	Yes
29	Chapmanvi	6762	Wabash River	Yes	Yes	Yes
30	Chapmanvi	4830	Sugar Creek	Yes	Yes	Yes
31	Chapmanvi	3864	Sugar Creek	Yes	Yes	Yes
32	Transitville	3588	Sugar Creek	Yes	No	No
33	Chapmanvi	6072	Sugar Creek	Yes	Yes	Yes
34	Chapmanvi	4416	Sugar Creek	Yes	Yes	Yes
35	Transitville	2346	Wabash River	Yes	Yes	Yes
36	Transitville	2346	Buck Creek	Yes	Yes	Yes
37	Transitville	3036	Buck Creek	Yes	Yes	Yes
38	Transitville	552	Buck Creek	Yes	Yes	Yes
39	Transitville	966	Buck Creek	Yes	Yes	Yes
40	Transitville	1518	Buck Creek	Yes	Yes	Yes
41	Transitville	138	Buck Creek	Yes	Yes	Yes
42	Transitville	3174	Sugar Creek	Yes	Yes	Yes
43	Transitville	3450	Sugar Creek	Yes	Yes	Yes
44	Chapmanvi	276	Sugar Creek	Yes	No	No
45	Transitville	2346	Sugar Creek	Yes	No	No
46	Chapmanvi	4692	Wabash River	Yes	Yes	Yes
47	Americus	552	Sugar Creek	Yes	Yes	Yes
48	Transitville	3036	Buck Creek	Yes	Yes	Yes
49	Transitville	552	Buck Creek	Yes	Yes	Yes
50	Chapmanvi	828	Sugar Creek	Yes	Yes	Yes
51	Transitville	4278	Wabash River	Yes	Yes	Yes
52	Transitville	1932	Buck Creek	Yes	No	No
53	Transitville	690	Buck Creek	Yes	No	No
54	Transitville	966	Buck Creek	Yes	No	No
55	Transitville	3588	Buck Creek	Yes	No	No
56	Linwood	2208	Wabash River	Yes	Yes	Yes
57	Transitville	2346	Wabash River	Yes	Yes	Yes
58	Transitville	276	Buck Creek	Yes	No	No
59	Linwood	1794	Wabash River	Yes	Yes	Yes
60	Transitville	6210	Buck Creek	Yes	Yes	No

	T	U	V	W	X	Y
61	Town	Distance to Nearest	Body of	RR	WE	WA
62		Body of Water	Water			
63	Transitville	3588	Buck Creek	Yes	Yes	No
64	Transitville	2622	Buck Creek	Yes	Yes	Yes
65	Transitville	276	Buck Creek	Yes	Yes	Yes
66	Transitville	3174	Buck Creek	Yes	No	No
67	Transitville	552	Buck Creek	Yes	Yes	No
68	Transitville	3174	Buck Creek	Yes	Yes	No
69	Transitville	3450	Buck Creek	Yes	Yes	No
70	Chapmanvi	1656	Sugar Creek	Yes	No	No
71	Delphi	3036	Wabash River	Yes	Yes	Yes
72	Delphi	5934	Wabash River	Yes	Yes	Yes
73	Delphi	9936	Deer Creek	Yes	Yes	Yes
74	Delphi	13800	Deer Creek	Yes	No	No
75	Delphi	11592	Wabash River	Yes	Yes	Yes
76	Chapmanvi	10212	Wabash River	Yes	Yes	Yes
77	Delphi	10350	Wabash River	Yes	Yes	Yes
78	Delphi	11592	Wabash River	Yes	Yes	Yes
79	Linwood	690	Wildcat Creek	Yes	Yes	Yes
80	Linwood	1104	Wildcat Creek	Yes	Yes	Yes
81	Linwood	414	Wildcat Creek	Yes	Yes	Yes
82	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
83	Linwood	4554	Wildcat Creek	Yes	Yes	Yes
84	Delphi	9936	Wabash River	Yes	Yes	Yes
85	Linwood	1380	Wildcat Creek	Yes	Yes	Yes
86	Linwood	4968	Wildcat Creek	Yes	Yes	Yes
87	Delphi	8004	Deer Creek	Yes	Yes	Yes
88	Delphi	11040	Deer Creek	Yes	No	No
89	Delphi	3312	Deer Creek	Yes	Yes	Yes
90	Delphi	6900	Deer Creek	Yes	Yes	Yes
91	Delphi	7728	Deer Creek	Yes	No	No
92	Delphi	7728	Deer Creek	Yes	No	No
93	Delphi	12972	Deer Creek	Yes	No	No
94	Delphi	9246	Deer Creek	Yes	No	No
95	Delphi	10074	Wabash River	Yes	Yes	Yes
96	Chapmanvi	14766	Wabash River	Yes	No	No
97	Chapmanvi	7590	Wabash River	Yes	Yes	Yes
98	Chapmanvi	7728	Wabash River	Yes	Yes	Yes
99	Delphi	4554	Deer Creek	Yes	Yes	Yes
100	Delphi	3588	Deer Creek	Yes	Yes	Yes
101	Delphi	1794	Deer Creek	Yes	Yes	Yes
102	Delphi	2484	Deer Creek	Yes	Yes	Yes
103	Linwood	4968	Wildcat Creek	Yes	Yes	Yes
104	Linwood	4002	Wildcat Creek	Yes	Yes	Yes
105	Linwood	4692	Wildcat Creek	Yes	Yes	Yes
106	Linwood	3726	Wildcat Creek	Yes	Yes	Yes
107	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
108	Linwood	8418	Wildcat Creek	Yes	Yes	Yes
109	Linwood	3036	Wildcat Creek	Yes	Yes	Yes
110	Linwood	3864	Wildcat Creek	Yes	Yes	Yes
111	Linwood	6486	Wildcat Creek	Yes	Yes	Yes
112	Transitville	10764	Wabash River	Yes	Yes	Yes
113	Transitville	9936	Wabash River	Yes	Yes	Yes
114	Chapmanvi	2898	Sugar Creek	Yes	No	No
115	Linwood	10764	Wabash River	Yes	Yes	Yes
116	Linwood	2208	Wabash River	Yes	Yes	Yes
117	Linwood	2208	Wildcat Creek	Yes	Yes	Yes
118	Transitville	5382	Wabash River	Yes	Yes	Yes
119	Linwood	690	Wildcat Creek	Yes	Yes	Yes
120	Linwood	3588	Wabash River	Yes	Yes	Yes

	T	U	V	W	X	Y
121	Town	Distance to Nearest	Body of	RR	WE	WA
122		Body of Water	Water			
123	Linwood	3174	Wabash River	Yes	Yes	Yes
124	Linwood	4278	Wabash River	Yes	Yes	Yes
125	Linwood	4416	Wabash River	Yes	Yes	Yes
126	Linwood	4416	Wildcat Creek	Yes	Yes	Yes
127	Linwood	3036	Wabash River	Yes	Yes	Yes
128	Linwood	4002	Wabash River	Yes	Yes	Yes
129	Linwood	5244	Wabash River	Yes	Yes	Yes
130	Linwood	4554	Wabash River	Yes	Yes	Yes
131	Linwood	4278	Wabash River	Yes	Yes	Yes
132	Linwood	4830	Wabash River	Yes	Yes	Yes
133	Linwood	3450	Wabash River	Yes	Yes	Yes
134	Linwood	3174	Wabash River	Yes	Yes	Yes
135	Linwood	4140	Wabash River	Yes	Yes	Yes
136	Linwood	6210	Wildcat Creek	Yes	Yes	Yes
137	Linwood	5382	Wildcat Creek	Yes	Yes	Yes
138	Chapmanvi	1794	Wabash River	Yes	Yes	Yes
139		3726	Wabash River	Yes	Yes	Yes
140	Elston	3726	Wea Creek	Yes	Yes	Yes
141		3450	Wabash River	Yes	Yes	No
142	Elston	828	Wea Creek	Yes	Yes	Yes
143	Wea Station	14904	Wabash River	Yes	No	No
144	Elston	2070	Wea Creek	Yes	Yes	Yes
145	Wea Station	15870	Wabash River	Yes	No	No
146	Wea Station	15456	Wabash River	Yes	No	No
147	Elston	10488	Wea Creek	Yes	Yes	Yes
148	Wea Station	14076	Wabash River	Yes	No	No
149	Wea Station	12558	Wea Creek	Yes	No	No
150	Elston	414	Mill Race	Yes	Yes	Yes
151	Wea Station	14214	Wabash River	Yes	No	No
152	Elston	1518	Wea Creek	Yes	Yes	Yes
153	Elston	1104	Wea Creek	Yes	Yes	Yes
154	Granville	13248	Wabash River	Yes	Yes	Yes
155	Elston	2898	Wabash River	Yes	Yes	Yes
156	Lafayette	9798	Wea Creek	Yes	Yes	Yes
157	Granville	7038	Wabash River	Yes	Yes	No
158	Granville	15456	Wabash River	Yes	No	No
159	Elston	1242	Wea Creek	Yes	Yes	Yes
160	Elston	1656	Wea Creek	Yes	Yes	Yes
161	Wea Station	2208	Wea Creek	Yes	Yes	Yes
162	Granville	12006	Wabash River	Yes	Yes	No
163	Lafayette	8556	Wea Creek	Yes	Yes	Yes
164	Wea Station	16974	Wabash River	Yes	No	No
165	Wea Station	16146	Wabash River	Yes	No	No
166	Wea Station	17250	Wabash River	Yes	No	No
167	Wea Station	690	Flint Creek	Yes	Yes	Yes
168	Wea Station	16974	Wabash River	Yes	No	No
169	Wea Station	15456	Wabash River	Yes	No	No
170	Wea Station	15456	Wabash River	Yes	No	No
171	Wea Station	22770	Wabash River	Yes	No	No
172	Wea Station	15870	Wabash River	Yes	No	No
173	Granville	4968	Flint Creek	Yes	Yes	Yes
174	Chapmanvi	5106	Wabash River	Yes	Yes	Yes
175	Americus	3036	Wabash River	Yes	Yes	Yes
176	Americus	1794	Wabash River	Yes	Yes	Yes
177	Chapmanvi	1932	Wabash River	Yes	Yes	Yes
178	Americus	414	Wabash River	Yes	Yes	Yes
179	Chapmanvi	1794	Wabash River	Yes	Yes	Yes
180	Chapmanvi	3726	Wabash River	Yes	Yes	Yes

	T	U	V	W	X	Y
181	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
182		<u>Body of Water</u>	<u>Water</u>			
183	Americus	4830	Wabash River	Yes	Yes	Yes
184		690	Wabash River	Yes	Yes	Yes
185		4416	Wabash River	Yes	Yes	Yes
186	Chapmanvi	4692	Wabash River	Yes	Yes	Yes
187	Chapmanvi	4830	Wabash River	Yes	Yes	Yes
188	Americus	6210	Wabash River	Yes	Yes	Yes
189	Granville	5658	Flint Creek	Yes	Yes	Yes
190	Granville	4416	Flint Creek	Yes	Yes	Yes
191	Americus	4968	Wabash River	Yes	Yes	Yes
192	Americus	3174	Wabash River	Yes	Yes	Yes
193	Wea Station	13800	Wea Creek	Yes	No	No
194	Wea Station	12006	Wea Creek	Yes	No	No
195	Wea Station	12006	Flint Creek	Yes	No	No
196	Elston	3174	Wabash River	Yes	Yes	Yes
197	Elston	4278	Mill Race	Yes	Yes	Yes
198	Elston	2622	Mill Race	Yes	Yes	Yes
199	Elston	414	Mill Race	Yes	Yes	Yes
200	Wea Station	12420	Flint Creek	Yes	No	No
201	Wea Station	3450	Flint Creek	Yes	Yes	Yes
202	Granville	6486	Wabash River	Yes	Yes	Yes
203	Chapmanvi	414	Wabash River	Yes	Yes	Yes
204	Wea Station	4140	Flint Creek	Yes	Yes	Yes
205	Granville	13386	Wabash River	Yes	No	No
206	Wea Station	9660	Flint Creek	Yes	No	No
207	Elston	3312	Wea Creek	Yes	Yes	Yes

	A	B	C	D	E	F
1	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
2						<u>Neighbor (in feet)</u>
3	Canal-Era	Wayne	Section 1B	One	Individual Structure	
4	Canal-Era	Wayne	Section 3B	One	Farmstead\Homestead	1656
5	Canal-Era	Wayne	Section 3B	Two	Individual Structure	1794
6	Canal-Era	Wayne	Section 3B	Three	Individual Structure	1242
7	Canal-Era	Wayne	Section 3B	Four	Individual Structure	414
8	Canal-Era	Wayne	Section 3B	Five	Farmstead\Homestead	414
9	Canal-Era	Wayne	Section 3B	Six	Individual Structure	690
10	Canal-Era	Wayne	Section 3B	Seven	Individual Structure	552
11	Canal-Era	Wayne	Section 3B	Eight	Individual Structure	552
12	Canal-Era	Wayne	Section 3B	Nine	School	1518
13	Canal-Era	Wayne	Section 4B	One	Individual Structure	690
14	Canal-Era	Wayne	Section 3	One	Individual Structure	1104
15	Canal-Era	Wayne	Section 3	Two	Individual Structure	1104
16	Canal-Era	Wayne	Section 11	One	Individual Structure	552
17	Canal-Era	Wayne	Section 11	Two	Farmstead\Homestead	690
18	Canal-Era	Wayne	Section 22	One	Farmstead\Homestead	1656
19	Canal-Era	Wayne	Section 25	One	Farmstead\Homestead	828
20	Canal-Era	Wayne	Section 25	Two	Individual Structure	414
21	Canal-Era	Wayne	Section 25	Three	Individual Structure	414
22	Canal-Era	Wayne	Section 25	Four	Farmstead\Homestead	690
23	Canal-Era	Wayne	Section 25	Five	Individual Structure	138
24	Canal-Era	Wayne	Section 29	One	Farmstead\Homestead	690
25	Canal-Era	Wayne	Section 29	Two	Farmstead\Homestead	690
26	Canal-Era	Wayne	Section 29	Three	Farmstead\Homestead	690
27	Canal-Era	Wayne	Section 29	Four	Farmstead\Homestead	552
28	Canal-Era	Wayne	Section 29	Five	Farmstead\Homestead	552
29	Canal-Era	Wayne	Section 29	Six	Farmstead\Homestead	1380
30	Canal-Era	Wayne	Section 29	Seven	Farmstead\Homestead	1380
31	Canal-Era	Wayne	Section 30	One	Farmstead\Homestead	1242
32	Canal-Era	Wayne	Section 31	One	Farmstead\Homestead	414
33	Canal-Era	Wayne	Section 31	Two	Farmstead\Homestead	1380
34	Canal-Era	Wayne	Section 31	Three	Farmstead\Homestead	
35	Canal-Era	Wayne	Section 32	One	Farmstead\Homestead	
36	Canal-Era	Wayne	Section 32	Two	Individual Structure	
37	Canal-Era	Wayne	Section 35	One	Farmstead\Homestead	966
38	Canal-Era	Wayne	Section 35	Two	Individual Structure	828
39	Canal-Era	Wayne	Section 35	Three	Individual Structure	4554
40	Canal-Era	Wayne	Section 36	One	Farmstead\Homestead	552
41	Canal-Era	Wayne	Section 36	Two	Farmstead\Homestead	414
42	Canal-Era	Wayne	Section 36	Three	Farmstead\Homestead	1380
43	Canal-Era	Wayne	Section 2	One	Farmstead\Homestead	690
44	Canal-Era	Wayne	Section 2	Two	Individual Structure	1242
45	Canal-Era	Wayne	Section 2	Three	Individual Structure	552
46	Canal-Era	Wayne	Section 2	Four	Individual Structure	276
47	Canal-Era	Wayne	Section 2	Five	Individual Structure	276
48	Canal-Era	Wayne	Section 2	Six	Farmstead\Homestead	828
49	Canal-Era	Union	Section 1	One	Farmstead\Homestead	828
50	Canal-Era	Union	Section 1	Two	Farmstead\Homestead	1932
51	Canal-Era	Union	Section 1	Three	Individual Structure	966
52	Canal-Era	Union	Section 1	Four	Farmstead\Homestead	966
53	Canal-Era	Union	Section 1	Five	Individual Structure	2070
54	Canal-Era	Union	Section 1	Six	Farmstead\Homestead	1104
55	Canal-Era	Union	Section 1	Seven	Individual Structure	276
56	Canal-Era	Union	Section 1	Eight	Individual Structure	276
57	Canal-Era	Union	Section 1	Nine	Individual Structure	276
58	Canal-Era	Union	Section 1	Ten	Individual Structure	414
59	Canal-Era	Union	Section 1	Eleven	Mill	276
60	Canal-Era	Union	Section 1	Twelve	School	1104

	A	B	C	D	E	F
61	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
62						<u>Neighbor (In feet)</u>
63	Canal-Era	Union	Section 3	Two	Individual Structure	828
64	Canal-Era	Union	Section 3	Three	Farmstead/Homestead	1932
65	Canal-Era	Union	Section 33	One	Farmstead/Homestead	2760
66	Canal-Era	Union	Section 33	Two	Farmstead/Homestead	2760
67	Canal-Era	Union	Section 33	Three	Farmstead/Homestead	2760
68	Canal-Era	Union	Section 33	Four	Individual Structure	1242
69	Canal-Era	Union	Section 34	Five	Farmstead/Homestead	1242
70	Canal-Era	Union	Section 34	Six	Farmstead/Homestead	2760
71	Canal-Era	Union	Section 35	One	Farmstead/Homestead	2484
72	Canal-Era	Union	Section 36	One	Individual Structure	828
73	Canal-Era	Union	Section 36	Two	Individual Structure	828
74	Canal-Era	Union	Section 36	Three	Watch House	2070
75	Canal-Era	Union	Section 4	One	Farmstead/Homestead	1242
76	Canal-Era	Union	Section 4	Two	Farmstead/Homestead	
77	Canal-Era	Union	Section 2	One	Individual Structure	276
78	Canal-Era	Union	Section 2	Two	Individual Structure	276
79	Canal-Era	Union	Section 2	Three	Individual Structure	828
80	Canal-Era	Union	Section 2	Four	Mill	138
81	Canal-Era	Union	Section 2	Five	Individual Structure	2070
82	Canal-Era	Union	Section 2	Six	Individual Structure	414
83	Canal-Era	Union	Section 2	Seven	Farmstead/Homestead	1104
84	Canal-Era	Union	Section 2	Eight	Individual Structure	414
85	Canal-Era	Washington	Section 1	One	Individual Structure	1656
86	Canal-Era	Washington	Section 1	Two	Individual Structure	1656
87	Canal-Era	Washington	Section 11	One	Individual Structure	1794
88	Canal-Era	Washington	Section 11	Two	Individual Structure	1794
89	Canal-Era	Washington	Section 11	Three	Individual Structure	1242
90	Canal-Era	Washington	Section 11	Four	Individual Structure	1242
91	Canal-Era	Washington	Section 11	Five	Individual Structure	2346
92	Canal-Era	Washington	Section 11	Six	Individual Structure	1656
93	Canal-Era	Washington	Section 11	Seven	Individual Structure	1104
94	Canal-Era	Washington	Section 12	One	Individual Structure	3036
95	Canal-Era	Washington	Section 12	Two	Individual Structure	1242
96	Canal-Era	Washington	Section 12	Three	Individual Structure	3864
97	Canal-Era	Washington	Section 22	One	Individual Structure	1794
98	Canal-Era	Washington	Section 22	Two	Individual Structure	414
99	Canal-Era	Washington	Section 22	Three	Individual Structure	414
100	Canal-Era	Washington	Section 22	Four	Individual Structure	690
101	Canal-Era	Washington	Section 22	Five	Individual Structure	690
102	Canal-Era	Washington	Section 22	Six	Individual Structure	1242
103	Canal-Era	Washington	Section 25	One	Individual Structure	276
104	Canal-Era	Washington	Section 25	Two	Individual Structure	276
105	Canal-Era	Washington	Section 25	Three	Individual Structure	276
106	Canal-Era	Washington	Section 25	Four	Individual Structure	414
107	Canal-Era	Washington	Section 25	Five	Farmstead/Homestead	552
108	Canal-Era	Washington	Section 25	Six	Farmstead/Homestead	1104
109	Canal-Era	Washington	Section 29	One	Individual Structure	2622
110	Canal-Era	Washington	Section 29	Two	Individual Structure	2760
111	Canal-Era	Washington	Section 29	Three	Individual Structure	1932
112	Canal-Era	Washington	Section 29	Four	Farmstead/Homestead	1380
113	Canal-Era	Washington	Section 29	Five	Farmstead/Homestead	1380
114	Canal-Era	Washington	Section 30	One	School	552
115	Canal-Era	Washington	Section 30	Two	Individual Structure	552
116	Canal-Era	Washington	Section 30	Three	Individual Structure	552
117	Canal-Era	Washington	Section 30	Four	Farmstead/Homestead	552
118	Canal-Era	Washington	Section 30	Five	Individual Structure	552
119	Canal-Era	Washington	Section 30	Six	Individual Structure	690
120	Canal-Era	Washington	Section 30	Seven	Mill	414

	A	B	C	D	E	F
121	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
122						<u>Neighbor (in feet)</u>
123	Canal-Era	Washington	Section 30	Eight	Individual Structure	414
124	Canal-Era	Washington	Section 30	Nine	Individual Structure	1242
125	Canal-Era	Washington	Section 30	Ten	Farmstead/Homestead	1104
126	Canal-Era	Washington	Section 31	One	Farmstead/Homestead	2208
127	Canal-Era	Washington	Section 31	Two	Farmstead/Homestead	2070
128	Canal-Era	Washington	Section 31	Three	Farmstead/Homestead	1242
129	Canal-Era	Washington	Section 35	One	Individual Structure	828
130	Canal-Era	Washington	Section 35	Two	Farmstead/Homestead	2070
131	Canal-Era	Washington	Section 35	Three	Individual Structure	828
132	Canal-Era	Washington	Section 36	One	Individual Structure	276
133	Canal-Era	Washington	Section 36	Two	Farmstead/Homestead	276
134	Canal-Era	Washington	Section 36	Three	Farmstead/Homestead	552
135	Canal-Era	Washington	Section 36	Four	Individual Structure	552
136	Canal-Era	Washington	Section 36	Five	Farmstead/Homestead	1104
137	Canal-Era	Washington	Section 36	Six	Individual Structure	414
138	Canal-Era	Washington	Section 36	Seven	Farmstead/Homestead	3726
139	Canal-Era	Washington	Section 10	One	Individual Structure	1518
140	Canal-Era	Washington	Section 10	Two	Individual Structure	2898
141	Canal-Era	Washington	Section 28	One	Individual Structure	1932
142	Canal-Era	Washington	Section 28	Two	Farmstead/Homestead	828
143	Canal-Era	Washington	Section 28	Three	Individual Structure	828
144	Canal-Era	Washington	Section 21	One	Individual Structure	966
145	Canal-Era	Washington	Section 21	Two	Individual Structure	966
146	Canal-Era	Washington	Section 21	Three	Individual Structure	414
147	Canal-Era	Washington	Section 21	Four	Individual Structure	1242
148	Canal-Era	Washington	Section 21	Five	Individual Structure	2760
149	Canal-Era	Washington	Section 21	Six	Individual Structure	1104
150	Canal-Era	Washington	Section 21	Seven	Individual Structure	1104
151	Canal-Era	Washington	Section 21	Eight	Individual Structure	276
152	Canal-Era	Washington	Section 21	Nine	Mill	276
153	Canal-Era	Washington	Section 19	One	Farmstead/Homestead	1104
154	Canal-Era	Washington	Section 20	One	Individual Structure	552
155	Canal-Era	Washington	Section 20	Two	Individual Structure	552
156	Canal-Era	Washington	Section 20	Three	Individual Structure	828
157	Canal-Era	Washington	Section 20	Four	Individual Structure	1518
158	Canal-Era	Washington	Section 20	Five	Individual Structure	2346
159	Canal-Era	Washington	Section 20	Six	Individual Structure	414
160	Canal-Era	Washington	Section 20	Seven	Individual Structure	414
161	Canal-Era	Washington	Section 20	Eight	Individual Structure	414
162	Canal-Era	Washington	Section 13	One	Farmstead/Homestead	552
163	Canal-Era	Washington	Section 13	Two	Individual Structure	414
164	Canal-Era	Washington	Section 13	Three	Individual Structure	414
165	Canal-Era	Washington	Section 16	One	Individual Structure	2760
166	Canal-Era	Washington	Section 14	One	Farmstead/Homestead	1658
167	Canal-Era	Washington	Section 14	Two	Farmstead/Homestead	1658
168	Canal-Era	Washington	Section 14	Three	Farmstead/Homestead	
169	Canal-Era	Washington	Section 15	One	Farmstead/Homestead	1518
170	Canal-Era	Washington	Section 15	Two	Farmstead/Homestead	2622
171	Canal-Era	Fairfield	Section 1	One	Individual Structure	828
172	Canal-Era	Fairfield	Section 1	Two	Farmstead/Homestead	828
173	Canal-Era	Fairfield	Section 1	Three	Farmstead/Homestead	828
174	Canal-Era	Fairfield	Section 1	Four	Farmstead/Homestead	1932
175	Canal-Era	Fairfield	Section 3	One	Farmstead/Homestead	1518
176	Canal-Era	Fairfield	Section 3	Two	Individual Structure	5382
177	Canal-Era	Fairfield	Section 3	Three	Individual Structure	2484
178	Canal-Era	Fairfield	Section 11	One	Individual Structure	276
179	Canal-Era	Fairfield	Section 11	Two	Individual Structure	276
180	Canal-Era	Fairfield	Section 11	Three	Individual Structure	276

	A	B	C	D	E	F
181	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
182						<u>Neighbor (in feet)</u>
183	Canal-Era	Fairfield	Section 11	Four	Individual Structure	414
184	Canal-Era	Fairfield	Section 11	Five	Individual Structure	828
185	Canal-Era	Fairfield	Section 11	Six	Farmstead/Homestead	1104
186	Canal-Era	Fairfield	Section 11	Seven	Farmstead/Homestead	1242
187	Canal-Era	Fairfield	Section 11	Eight	Farmstead/Homestead	1104
188	Canal-Era	Fairfield	Section 12	One	Individual Structure	
189	Canal-Era	Fairfield	Section 12	Two	Individual Structure	1932
190	Canal-Era	Fairfield	Section 4	One	Farmstead/Homestead	828
191	Canal-Era	Fairfield	Section 4	Two	Individual Structure	1518
192	Canal-Era	Fairfield	Section 2	One	Farmstead/Homestead	966
193	Canal-Era	Fairfield	Section 2	Two	Individual Structure	1518
194	Canal-Era	Fairfield	Section 2	Three	Farmstead/Homestead	1656
195	Canal-Era	Fairfield	Section 2	Four	Individual Structure	2622
196	Canal-Era	Fairfield	Section 2	Five	Individual Structure	2622
197	Canal-Era	Fairfield	Section 9	One	Individual Structure	828
198	Canal-Era	Fairfield	Section 9	Two	Farmstead/Homestead	1932
199	Canal-Era	Fairfield	Section 9	Three	Farmstead/Homestead	1380
200	Canal-Era	Fairfield	Section 9	Four	Individual Structure	966
201	Canal-Era	Fairfield	Section 9	Five	Individual Structure	966
202	Canal-Era	Fairfield	Section 9	Six	Farmstead/Homestead	1104
203	Canal-Era	Fairfield	Section 9	Seven	Individual Structure	966
204	Canal-Era	Fairfield	Section 9	Eight	School	966
205	Canal-Era	Fairfield	Section 9	Nine	Individual Structure	2208
206	Canal-Era	Fairfield	Section 10	One	Individual Structure	1518
207	Canal-Era	Fairfield	Section 10	Two	Individual Structure	1932
208	Canal-Era	Fairfield	Section 10	Three	Individual Structure	552
209	Canal-Era	Fairfield	Section 10	Four	Individual Structure	552
210	Canal-Era	Fairfield	Section 10	Five	Individual Structure	690
211	Canal-Era	Fairfield	Section 10	Six	Individual Structure	414
212	Canal-Era	Fairfield	Section 10	Seven	Individual Structure	276
213	Canal-Era	Fairfield	Section 10	Eight	Individual Structure	276
214	Canal-Era	Fairfield	Section 10	Ten	Individual Structure	1104
215	Canal-Era	Fairfield	Section 10	Eleven	Individual Structure	552
216	Canal-Era	Fairfield	Section 10	Thirteen	Individual Structure	552
217	Canal-Era	Deer Creek	Section 5	One	Farmstead/Homestead	1380
218	Canal-Era	Deer Creek	Section 5	Two	Farmstead/Homestead	4002
219	Canal-Era	Deer Creek	Section 6	One	Individual Structure	1242
220	Canal-Era	Deer Creek	Section 6	Two	Individual Structure	1242
221	Canal-Era	Deer Creek	Section 6	Three	Individual Structure	1104
222	Canal-Era	Deer Creek	Section 6	Four	Farmstead/Homestead	3450
223	Canal-Era	Deer Creek	Section 6	Five	Farmstead/Homestead	3450
224	Canal-Era	Deer Creek	Section 6	Six	Farmstead/Homestead	1380
225	Canal-Era	Deer Creek	Section 6	Seven	School	552
226	Canal-Era	Deer Creek	Section 6	Eight	Farmstead/Homestead	552
227	Canal-Era	Deer Creek	Section 7	One	Farmstead/Homestead	2484
228	Canal-Era	Deer Creek	Section 7	Four	Farmstead/Homestead	2484
229	Canal-Era	Deer Creek	Section 31	One	Individual Structure	1104
230	Canal-Era	Deer Creek	Section 31	Two	Individual Structure	1104
231	Canal-Era	Deer Creek	Section 31	Three	Farmstead/Homestead	1104
232	Canal-Era	Deer Creek	Section 32	One	Farmstead/Homestead	2484
233	Canal-Era	Deer Creek	Section 32	Two	Farmstead/Homestead	3036
234	Canal-Era	Deer Creek	Section 32	Three	Farmstead/Homestead	828
235	Canal-Era	Deer Creek	Section 32	Four	Farmstead/Homestead	828

	G	H	I	J
1	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
2	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
3		414	2760	4140
4	1794	138	1518	7452
5	3036	138	1242	6072
6	1794	138	1794	7314
7	828	138	414	8556
8	690	138	276	9108
9	828	276	276	9246
10	1380	138	966	9660
11	690	138	414	9660
12	2760	690	2760	6486
13	1242	276	276	10074
14	3588	3864	5520	2898
15	3036	3174	5382	3726
16	690	138	552	6762
17	1104	138	552	7038
18	2484	138	6900	15594
19	1104	552	3726	1932
20	828	276	3174	1518
21	828	138	2898	966
22	966	138	2208	966
23	552	138	138	1518
24	1380	138	6210	1242
25	690	138	5658	2070
26	690	138	5106	1656
27	1518	138	4554	1656
28	1242	138	4002	1518
29	1380	138	2622	1104
30	2070	138	1380	552
31	1518	138	4002	4002
32	1794	138	2898	3864
33	3864	138	2760	7452
34		138	4278	10902
35		138	4830	9246
36		138	1794	6900
37	1518	138	1380	2346
38		138	276	3864
39	4968	138	2760	3312
40	5244	276	4278	9384
41	3036	138	3036	3864
42	3864	138	4140	6348
43	966	138	276	3174
44	1380	138	2484	5658
45	828	138	1242	6348
46	552	138	690	6624
47	552	138	414	6762
48	966	552	1242	7038
49	828	138	4554	3036
50	2208	138	276	3726
51	1794	138	2208	4692
52	1794	138	1380	5106
53	2484	138	2622	8280
54	2208	276	1932	8694
55	414	552	1242	6486
56	414	138	1242	6900
57	276	138	1104	6624
58	552	138	552	6762
59	966	414	966	6348
60	1104	138	828	8418

	G	H	I	J
61	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road In</u>	<u>Distance to Wabash</u>
62	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
63	1794	138	7590	13110
64	2070	138	9660	13386
65	2760	138	828	1518
66	2760	2898	6210	1380
67	5520	5520	5658	1380
68	2484	138	5658	6624
69	2484	138	8142	6486
70	4140	138	7452	7590
71	2898	414	1794	2622
72	828	414	6072	2346
73	828	276	5244	2346
74	3726	1656	2208	1518
75	1242	138	6900	6762
76		138	5658	13248
77	690	276	276	5796
78	552	138	414	5520
79	1242	276	1242	4830
80	552	276	1242	4830
81	2484	138	1380	7452
82	2484	2070	2760	5658
83	1932	1656	2346	8418
84	1932	1518	2208	5934
85	3036	138	1794	414
86	4278	138	1794	1794
87	2898	2070	2622	1794
88	2346	414	2484	414
89	2760	138	2346	4830
90	2346	138	1242	3726
91	2346	138	1242	1932
92	1932	1242	1794	5382
93	2898	414	1932	5106
94	3174	138	414	1656
95	3450	414	3588	4830
96	4002	1518	3726	4692
97	2070	276	3864	8418
98	1794	414	4140	10074
99	1794	414	3864	10212
100	1794	414	2484	9936
101	1242	138	2070	10488
102		1104	1242	11730
103	552	690	690	3588
104	276	414	414	3588
105	414	138	138	3588
106	414	138	552	4002
107	690	138	276	4278
108	1104	138	828	5382
109	3312	3036	3450	5796
110	3036	3174	3726	5796
111	3036	3588	1656	8004
112	3312	138	4002	9936
113		414	3174	10350
114	690	138	1656	4416
115	1242	414	1518	4002
116	1380	138	414	3588
117	1794	138	276	3726
118	828	276	2208	5658
119	1104	276	1656	6210
120	828	138	1794	6072

	G	H	I	J
121	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
122	Nearest Neighbor		Opposite Direction	River
123	1242	276	1518	5934
124	2070	552	552	7590
125	2622	276	5382	3726
126	2208	1242	1380	7038
127	2208	552	2346	8280
128	2622	276	414	8694
129	2622	828	4692	138
130	2208	138	5382	1794
131	1794	138	4692	1104
132	552	138	3036	2346
133	552	138	2760	2346
134	828	138	2346	2346
135	828	414	2760	2898
136	1242	552	1380	3588
137	1104	138	828	5382
138	4278	138	1380	7866
139	3174	1518	3588	2622
140	4002	138	1380	5106
141	2760	138	276	7176
142	2346	138	414	9384
143	1932	138	690	9660
144	1932	1656	3450	3450
145	1242	828	2070	4278
146	414	552	552	4554
147	1518	276	276	5106
148	3174	276	966	5106
149	2070	138	1794	8004
150	1242	690	1656	8694
151	414	276	552	4140
152	414	276	414	4002
153	2898	828	4416	2898
154	1242	138	5244	1242
155	828	138	4692	1104
156	1242	138	3864	828
157	1518	138	1380	966
158	2346	414	1518	1518
159	414	276	1518	2346
160	414	276	1794	2484
161	414	138	1932	2760
162	966	138	828	8004
163	552	138	1380	8556
164	138	138	1794	8970
165	3174	828	4140	552
166	1656	276	4416	6900
167	2208	552	2484	7176
168		2484	2760	10350
169	2760	138	2760	2898
170	2760	690	2760	3864
171	3312	3174	3312	6762
172	3450	3726	3864	6762
173		414	3864	11040
174		414	2898	10764
175	2622	138	5244	5382
176	5658	3174	3312	138
177	2898	3036	3174	3726
178	552	138	1242	7452
179	276	138	1518	7314
180	414	138	1794	7038

	G	H	I	J
181	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
182	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
183	690	138	2208	6624
184	2208	276	1242	6210
185	1380	2070	2760	8280
186	1380	2760	3312	9384
187	1242	3174	3450	9384
188		138	3312	10074
189		138	2760	10626
190	966	138	276	5244
191	2208	414	1656	3174
192	1518	414	966	5382
193	1656	138	1380	4830
194	2622	138	2070	5106
195	3312	138	3174	3588
196	2760	138	276	7728
197	1932	1104	6762	3864
198	2208	138	6072	5658
199	1656	1932	5382	3864
200	1380	2208	4692	3174
201	1242	1242	3864	4002
202	1656	138	3174	5106
203	1380	1932	2898	3312
204	1104	138	1518	5382
205	2898	2346	2760	8556
206	1932	552	4002	6486
207	2070	1104	2760	5658
208	828	138	690	6486
209	552	138	276	6624
210	828	138	552	6210
211	552	138	690	6900
212	414	138	414	7176
213	690	138	414	7314
214	1242	138	1518	8418
215	1656	138	1242	10488
216	1242	138	1242	10350
217	3174	276	3864	9936
218	4002	690	3588	11454
219	2346	138	276	414
220	1104	138	1656	6762
221	2760	138	2760	7590
222	5106	276	1380	3036
223	4554	1242	2760	6348
224	1932	276	2760	10350
225	1932	276	828	11592
226	2484	276	414	11592
227		966	2898	10212
228	2760	138	2760	10074
229	1104	1104	1242	1518
230	1242	1104	1242	1242
231	1242	138	3450	2484
232	3036	828	1794	5382
233	3864	414	3450	5934
234		1104	3174	7590
235		276	2484	8004

	K	L	M	N
1	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
2	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
3			1518	1518
4			4416	4416
5			3726	4830
6			4692	4830
7			5796	1794
8			6210	6486
9			6210	6486
10			7038	7314
11			7314	7866
12			3174	3450
13			7038	8280
14	20148	Ford	138	414
15	20700	Ford	414	414
16	19458	Ford	4002	3726
17	19872	Ford	3864	3864
18			13524	13386
19	3312	Ford	828	4278
20	2484	Ford	414	3450
21	2208	Ford	138	3174
22	1794	Ford	276	2760
23	1518	Ford	414	414
24	8280	Ford	1104	7452
25	8694	Ford	1518	7728
26	9108	Ford	1380	8556
27	9798	Ford	1656	9108
28	10212	Ford	1656	9522
29	11592	Ford	828	10902
30	12834	Ford	552	9522
31	5382	Ford	2070	4278
32	4140	Ford	3036	3036
33	7728	Ford	6762	7176
34	11730	Ford	10488	9936
35	14076	Ford	8970	12834
36	16422	Ford	6900	8556
37	14214	Ford	1380	1380
38	13110	Ford	2484	2760
39	9384	Ford	414	5934
40	10488	Ford	5796	8418
41	3588	Ford	3036	3450
42	5658	Ford	5520	5796
43	13800	Ford	2070	2208
44	17250	Ford	3174	3864
45	18216	Ford	3726	3864
46	18768	Ford	4002	3864
47	19044	Ford	4140	4002
48	17802	Ford	4416	4554
49	22908	Bridge	3036	7452
50	18906	Bridge	3036	12558
51	21666	Bridge	4416	11040
52	22494	Bridge	4968	10764
53	24426	Bridge	8142	13248
54	26358	Bridge	8694	12144
55	24564	Bridge	6486	10350
56	24702	Bridge	6900	10764
57	24426	Bridge	6624	10764
58	24288	Bridge	6762	11178
59	24150	Bridge	6348	10626
60	26772	Bridge	8418	11178

	K	L	M	N
61	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
62	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
63	28290	Ford	11454	11454
64	29670	Ford	10764	11592
65	14490	Ford	1380	7590
66	17250	Ford	414	4830
67	20010	Ford	414	2070
68	22218	Ford	5796	5382
69	24564	Ford	5106	4830
70	24702	Ford	4002	4968
71	24150	Bridge	2208	4830
72	22494	Bridge	2208	7038
73	21942	Bridge	2208	7728
74	18078	Bridge	966	11178
75	23736	Ford	5658	5244
76	26358	Ford	12144	11730
77	27462	Bridge	4968	5382
78	27186	Bridge	4830	5244
79	26082	Bridge	4554	5796
80	27048	Bridge	4554	5796
81	28566	Bridge	6762	7176
82	26082	Bridge	6486	8556
83	26082	Bridge	8418	8832
84	27462	Bridge	5934	9936
85	9246	Ford	276	7176
86	8556	Ford	1656	8142
87	2346	Ford	138	828
88	414	Ford	414	828
89	4554	Ford	3036	3726
90	3726	Ford	2760	2760
91	2346	Ford	1656	2346
92	5382	Ford	4554	4554
93	5520	Ford	4830	5658
94	3726	Ford	1518	4968
95	5520	Ford	4692	5934
96	7728	Ford	4554	8832
97	8418	Ferry	8280	8280
98	10074	Ferry	9936	9936
99	10350	Ferry	10074	10212
100	10074	Ferry	9798	9936
101	10764	Ferry	10350	10626
102	12144	Ferry	11592	12006
103	3588	Ferry	138	15318
104	3588	Ferry	138	15042
105	3588	Ferry	138	14766
106	4002	Ferry	552	14766
107	4278	Ferry	828	15042
108	5382	Ferry	1518	14352
109	13248	Ferry	3450	6900
110	14490	Ferry	4002	4416
111	14490	Ferry	7176	7038
112	14904	Ferry	7038	10212
113	16284	Ferry	7728	9936
114	5520	Ferry	828	12282
115	5382	Ferry	414	12144
116	6210	Ferry	138	10764
117	6900	Ferry	414	10350
118	8556	Ferry	1656	10350
119	8556	Ferry	2760	10902
120	9384	Ferry	2484	9936

	K	L	M	N
121	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
122	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
123	9660	Ferry	2484	9522
124	11454	Ferry	4278	9936
125	11868	Ferry	1104	5382
126	7314	Ferry	3450	13524
127	9384	Ferry	4830	12696
128	11454	Ferry	5382	10902
129	6210	Ferry	1242	14490
130	8694	Ferry	414	12558
131	8418	Ferry	966	12696
132	6624	Ferry	828	15180
133	6486	Ferry	828	14490
134	5934	Ferry	690	15870
135	7176	Ferry	1380	14490
136	3174	Ferry	552	16146
137	5244	Ferry	1932	14490
138	9108	Ferry	5382	17802
139	4968	Ferry	414	4968
140	5934	Ford	1104	5934
141	12558	Ferry	2760	7038
142	12144	Ferry	9384	10350
143	11868	Ferry	9660	10902
144	7038	Ferry	3174	6762
145	7590	Ferry	4140	7452
146	9660	Ferry	4554	9522
147	8418	Ferry	5106	8280
148	5934	Ferry	4968	5796
149	9798	Ferry	7728	9660
150	9936	Ferry	8418	9798
151	9246	Ferry	4140	9108
152	9384	Ferry	4002	9246
153	16560	Ferry	414	4416
154	7314	Ferry	1242	5382
155	7866	Ferry	1104	4830
156	8418	Ferry	828	4002
157	10902	Ferry	552	1518
158	13800	Ferry	138	1380
159	12006	Ferry	1518	1656
160	11730	Ferry	1794	1932
161	12282	Ferry	1932	2070
162	8418	Ford	7728	8418
163	8832	Ford	8280	8832
164	9246	Ford	8694	9246
165	4692	Ferry	276	4692
166	7038	Ford	5520	6210
167	7314	Ford	6762	6762
168	10626	Ford	9108	10074
169	11040	Ferry	1656	4692
170	13662	Ferry	3588	4278
171	13110	Ferry	6072	11040
172	12282	Ferry	5934	11868
173	13662	Ferry	9522	16284
174	16008	Ferry	10074	12834
175	5934	Ferry	4416	5382
176	3174	Ferry	2484	8694
177	8556	Ferry	276	3174
178	12006	Ferry	1104	1242
179	12006	Ferry	1242	1518
180	12006	Ferry	1380	1794

	K	L	M	N
181	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
182	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
183	12144	Ferry	1518	2208
184	12558	Ferry	2898	4002
185	14214	Ferry	3588	4140
186	15594	Ferry	5106	5520
187	15042	Ferry	4278	4554
188	17802	Ferry	7866	8556
189	16560	Ferry	9522	10902
190	6486	Ferry	5796	8280
191	5244	Ferry	6762	9246
192	12144	Ferry	2898	4692
193	12282	Ferry	4140	5934
194	13386	Ferry	4968	7590
195	11868	Ferry	3450	8832
196	15870	Ferry	7590	8280
197	14352	Bridge	690	1242
198	12696	Ferry	690	690
199	11868	Ferry	2622	6762
200	10626	Ferry	4002	3726
201	10074	Ferry	3588	3588
202	10074	Ferry	2898	2898
203	8970	Ferry	4968	4968
204	8280	Ferry	4416	4968
205	12558	Ferry	552	2760
206	8142	Ferry	2760	4278
207	8556	Ferry	2346	2898
208	10350	Ferry	552	828
209	10764	Ferry	138	138
210	10764	Ferry	138	552
211	11592	Ferry	690	828
212	11730	Ferry	690	552
213	11730	Ferry	828	552
214	12834	Ferry	1794	1656
215	13938	Ferry	3036	3588
216	14490	Ferry	3588	3588
217	16974	Ford	10074	11040
218	15318	Ford	10626	10350
219	12834	Ford	4416	14214
220	14076	Ford	5520	15594
221	15180	Ford	7176	16698
222	12006	Ford	2622	6486
223	12696	Ford	5658	6762
224	17526	Ford	9936	11730
225	19458	Ford	11040	13524
226	19872	Ford	11178	14076
227	14352	Ford	9108	16284
228	17802	Ford	9660	14076
229	7176	Ford	966	1242
230	6486	Ford	828	966
231	7866	Ford	2070	1518
232	8418	Ford	5106	5244
233	9936	Ford	5520	5520
234	10212	Ford	7038	7038
235	10212	Ford	7176	7176

	O	P	Q	R	S
1	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
2		Railroad	Railroad Feature	Feature	Nearest Town
3	Basin	4554			
4	Basin	6900			23460
5	Basin	5520			26634
6	Basin	5520			25254
7	Basin	4968			24978
8	Basin	4692			25392
9	Basin	4416			24426
10	Basin	3450			26220
11	Basin	2898			26910
12	Basin	8556			22632
13	Basin	3036			27462
14	Basin	13524	55614	Watch House	20976
15	Basin	12006	57132	Watch House	21390
16	Basin	10764	53268	Watch House	19182
17	Basin	10074	52854	Watch House	19596
18	Aqueduct	138			
19	Bridge	24150	32568	Watch House	4002
20	Bridge	24840	29256	Watch House	3312
21	Bridge	24978	29118	Watch House	3036
22	Bridge	24978	42918	Watch House	2346
23	Bridge	25254	44160	Watch House	138
24	Bridge	23736	34086	Watch House	4140
25	Bridge	23184	33672	Watch House	7314
26	Bridge	23046	34362	Watch House	7590
27	Bridge	22494	32706	Watch House	8418
28	Bridge	22356	32292	Watch House	6210
29	Bridge	22218	30636	Watch House	7452
30	Basin	22080	29118	Watch House	8832
31	Bridge	24564	36432	Watch House	1104
32	Bridge	22632	40986	Watch House	2070
33	Basin	18492	39744	Watch House	5796
34	Bridge	15456	35880	Watch House	8280
35	Aqueduct	14904	32154	Watch House	10488
36	Basin	16008	27600	Watch House	12420
37	Bridge	18078			14490
38	Bridge	17664	35742	Watch House	13386
39	Bridge	22080	50232	Watch House	10212
40	Bridge	16836	45126	Watch House	9936
41	Bridge	22356	40434	Watch House	2484
42	Bridge	19734	40710	Watch House	4830
43	Bridge	17526	52440	Watch House	14076
44	Basin	13248	52302	Watch House	17112
45	Basin	12006	51888	Watch House	17940
46	Basin	11454	52164	Watch House	18492
47	Basin	11040	52026	Watch House	18630
48	Basin	12006	51198	Watch House	16698
49	Wea AqueductLock System	1794	4830	Watch House	17250
50	Wea AqueductLock System	1518	2070	Watch House	12834
51	Wea AqueductLock System	138	3726	Watch House	15456
52	Wea AqueductLock System	276	4554	Watch House	16560
53	Wea AqueductLock System	276	6486	Watch House	18078
54	Wea AqueductLock System	2622	8694	Watch House	20148
55	Wea AqueductLock System	1380	6900	Watch House	18492
56	Wea AqueductLock System	1656	6486	Watch House	18768
57	Wea AqueductLock System	1794	7176	Watch House	18492
58	Wea AqueductLock System	2208	6486	Watch House	18216
59	Wea AqueductLock System	1518	6210	Watch House	18216
60	Wea AqueductLock System	2070	8832	Watch House	20700

	O	P	Q	R	S
61	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
62		Railroad	Railroad Feature	Feature	Nearest Town
63	Basin	5520	20562	Watch House	23736
64	Basin	4278	19320	Watch House	25392
65	Wea Aqueduct\Lock System	20286	27738	Watch House	11178
66	Basin	19734	24978	Watch House	14628
67	Wea Aqueduct\Lock System	18216	22080	Watch House	17526
68	Basin	12696	21528	Watch House	19734
69	Wea Aqueduct\Lock System	12144	16284	Watch House	22080
70	Wea Aqueduct\Lock System	10488	7314	Watch House	24564
71	Wea Aqueduct\Lock System	4416	7314	Watch House	19320
72	Wea Aqueduct\Lock System	2484	4830	Watch House	17112
73	Wea Aqueduct\Lock System	1794	4140	Watch House	16422
74	Wea Aqueduct\Lock System	138	0	Watch House	12282
75	Basin	12006	20286	Watch House	19596
76	Basin	5796	22908	Watch House	22494
77	Wea Aqueduct\Lock System	4140	9936	Watch House	22218
78	Wea Aqueduct\Lock System	4002	9660	Watch House	21804
79	Wea Aqueduct\Lock System	3174	8418	Watch House	20562
80	Wea Aqueduct\Lock System	3588	9384	Watch House	21666
81	Wea Aqueduct\Lock System	2760	10626	Watch House	23046
82	Wea Aqueduct\Lock System	690	8004	Watch House	20424
83	Wea Aqueduct\Lock System	276	9246	Watch House	20424
84	Wea Aqueduct\Lock System	1242	8142	Watch House	21804
85	Guardlock	1656	15456	Station	11868
86	Guardlock	1242	16284	Station	13524
87	Guardlock	10074	24012	Station	11040
88	Guardlock	8694	25116	Station	12834
89	Guardlock	8694	28428	Station	9384
90	Guardlock	8142	27186	Station	10626
91	Guardlock	6762	24840	Station	12972
92	Guardlock	7038	25116	Station	10350
93	Guardlock	4140	25392	Station	13662
94	Guardlock	4554	18768	Station	18768
95	Guardlock	3450	24150	Station	14766
96	Guardlock	690	20148	Station	17112
97	Bridge	8004	25944	Station	6486
98	Bridge	6210	41952		8142
99	Bridge	6072	41676		8418
100	Bridge	6486	39744	Station	8142
101	Bridge	5658	40020	Station	8832
102	Bridge	4554	40434		10074
103	Aqueduct	10626	46230	Station	26358
104	Aqueduct	10764	46920	Station	26082
105	Aqueduct	10764	47058	Station	25806
106	Aqueduct	10488	46782	Station	25668
107	Aqueduct	10074	46782	Station	25944
108	Aqueduct	10074	47472	Station	24978
109	Aqueduct	8556	55476	Station	16560
110	Aqueduct	9798	59064	Station	13110
111	Aqueduct	7314	59892	Station	12972
112	Aqueduct	4968	54096	Station	18492
113	Aqueduct	4692	52716	Station	17526
114	Aqueduct	10626	48990	Station	23598
115	Aqueduct	10902	49266	Station	23322
116	Aqueduct	11178	50508	Station	22080
117	Aqueduct	10902	51060	Station	21666
118	Aqueduct	8970	51336	Station	21114
119	Aqueduct	8418	50508	Station	23046
120	Aqueduct	8694	51336	Station	20562

	O	P	Q	R	S
121	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
122		Railroad	Railroad Feature	Feature	Nearest Town
123	Aqueduct	8694	52026	Station	20148
124	Aqueduct	7038	52440	Station	19872
125	Aqueduct	11178	55752	Station	16284
126	Aqueduct	7728	47610	Station	24564
127	Aqueduct	6624	48990	Station	23184
128	Aqueduct	6072	51612	Station	20976
129	Wildcat Bridge and Locks	11316	41400	Station	27738
130	Wildcat Bridge and Locks	9108	38364	Station	25530
131	Wildcat Bridge and Locks	8694	39054	Station	26082
132	Wildcat Bridge and Locks	9384	41124	Station	27876
133	Aqueduct	9522	41676	Station	28428
134	Wildcat Bridge and Locks	9798	41952	Station	28704
135	Wildcat Bridge and Locks	8832	53130	Station	27600
136	Aqueduct	10764	45540	Station	27462
137	Aqueduct	9108	46782	Station	25806
138	Aqueduct	5796	43884	Station	31050
139	Bridge	13662	33672	Station	3174
140	Guardlock	10350	31188	Station	6624
141	Aqueduct	7866	61824	Station	11316
142	Aqueduct	5934	44160	Station	10626
143	Aqueduct	5796	43332	Station	10212
144	Bridge	12420	41952	Station	5106
145	Aqueduct	11454	45264	Station	5520
146	Aqueduct	10626	47334	Station	7728
147	Aqueduct	10488	45816	Station	6486
148	Bridge	11040	39468	Station	4002
149	Aqueduct	7866	44850	Station	8004
150	Bridge	7314	44850	Station	8142
151	Aqueduct	10902	44298	Station	7452
152	Aqueduct	11040	47334	Station	7452
153	Aqueduct	12282	56718	Station	15456
154	Aqueduct	14076	43332	Station	5934
155	Aqueduct	14076	43884	Station	6486
156	Aqueduct	14076	44850	Station	7176
157	Aqueduct	14076	47058	Station	9660
158	Aqueduct	13662	50232	Station	12696
159	Aqueduct	12834	48162	Station	10626
160	Aqueduct	12558	47886	Station	10350
161	Aqueduct	12420	48300	Station	11040
162	Guardlock	2760	27186	Station	13938
163	Guardlock	2484	24012	Station	13938
164	Guardlock	2346	25116	Station	13938
165	Bridge	15456	40710	Station	3312
166	Guardlock	7038	29256	Station	9522
167	Guardlock	5382	28566	Station	11178
168	Guardlock	4416	31188	Station	11454
169	Bridge	13110	35328	Station	2622
170	Bridge	12558	37674	Station	2622
171	Wildcat Bridge and Locks	3312	35880	Station	23598
172	Wildcat Bridge and Locks	3726	36708	Station	24426
173	Wildcat Bridge and Locks	1242	40434	Station	28428
174	Wildcat Bridge and Locks	414	36294	Station	24426
175	Wildcat Bridge and Locks	1656	24564	Station	12144
176	Wildcat Bridge and Locks	2208	24702	Station	17388
177	Wildcat Bridge and Locks	5934	27462	Station	14766
178	Wildcat Bridge and Locks	2346	25944	Station	13524
179	Wildcat Bridge and Locks	2346	26358	Station	13800
180	Wildcat Bridge and Locks	2484	26634	Station	14214

	O	P	Q	R	S
181	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
182		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
183	Wildcat Bridge and Locks	2484	27186	Station	14628
184	Wildcat Bridge and Locks	2760	28842	Station	16422
185	Wildcat Bridge and Locks	690	27600	Station	15456
186	Wildcat Bridge and Locks	414	28290	Station	16284
187	Wildcat Bridge and Locks	414	26910	Station	15042
188	Wildcat Bridge and Locks	1380	31464	Station	22494
189	Wildcat Bridge and Locks	138	34500	Station	19458
190	Wildcat Bridge and Locks	552	23322	Station	11316
191	Wildcat Bridge and Locks	1380	24564	Station	12834
192	Wildcat Bridge and Locks	3588	29532	Station	17112
193	Wildcat Bridge and Locks	4278	31050	Station	18630
194	Wildcat Bridge and Locks	4140	32430	Station	20148
195	Wildcat Bridge and Locks	6072	35052	Station	22356
196	Wildcat Bridge and Locks	1856	32706	Station	20562
197	Basin	1932	15456	Station	4830
198	Basin	276	16836	Station	5244
199	Basin	2070	17802	Station	7038
200	Basin	2208	19182	Station	8280
201	Basin	1380	19458	Station	8280
202	Basin	276	19596	Station	8004
203	Basin	2070	20562	Station	9660
204	Basin	138	21252	Station	9660
205	Basin	2622	18078	Station	5658
206	Wildcat Bridge and Locks	3174	23598	Station	10764
207	Wildcat Bridge and Locks	4830	24840	Station	12006
208	Wildcat Bridge and Locks	3726	24840	Station	12420
209	Wildcat Bridge and Locks	3450	24978	Station	12696
210	Wildcat Bridge and Locks	3450	21942	Station	13248
211	Wildcat Bridge and Locks	2622	25668	Station	13524
212	Wildcat Bridge and Locks	2484	25254	Station	13110
213	Wildcat Bridge and Locks	2484	24840	Station	12896
214	Wildcat Bridge and Locks	1380	24426	Station	12558
215	Wildcat Bridge and Locks	138	22080	Station	9798
216	Wildcat Bridge and Locks	414	23184	Station	11316
217	Guardlock	8280	18630	Station	14628
218	Guardlock	8556	15042	Station	11316
219	Guardlock	2070	23598	Station	20010
220	Guardlock	3312	23184	Station	19596
221	Guardlock	4416	22908	Station	19182
222	Guardlock	966	16422	Station	12972
223	Guardlock	3726	15456	Station	11868
224	Guardlock	8142	19596	Station	15732
225	Guardlock	9108	21528	Station	17664
226	Guardlock	9108	22218	Station	18354
227	Guardlock	4416	28704	Station	26910
228	Guardlock	7038	22908	Station	19044
229	Guardlock	828	11316	Station	7728
230	Guardlock	828	10074	Station	6762
231	Guardlock	138	11040	Station	7452
232	Towpath Bridge	1932	7590	Station	3588
233	Guardlock	3450	10488	Station	6486
234	Lock	3588	7314	Station	4140
235	Lock	3864	6900	Station	3726

	T	U	V	W	X	Y
1	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
2		<u>Body of Water</u>	<u>Water</u>			
3		276	Flint Creek	Yes	Yes	Yes
4	Granville	5658	Flint Creek	Yes	Yes	Yes
5	Granville	3588	Flint Creek	Yes	Yes	Yes
6	Granville	4416	Flint Creek	Yes	Yes	Yes
7	Granville	4968	Flint Creek	Yes	Yes	Yes
8	Granville	4968	Flint Creek	Yes	Yes	Yes
9	Granville	5796	Flint Creek	Yes	Yes	Yes
10	Granville	4140	Flint Creek	Yes	Yes	Yes
11	Granville	3450	Flint Creek	Yes	Yes	Yes
12	Granville	6486	Wabash River	Yes	Yes	Yes
13	Granville	690	Flint Creek	Yes	Yes	Yes
14	Granville	2898	Wabash River	No	Yes	Yes
15	Granville	3726	Wabash River	No	Yes	Yes
16	Granville	6762	Wabash River	No	Yes	Yes
17	Granville	7038	Wabash River	Yes	Yes	Yes
18		690	Flint Creek	Yes	Yes	Yes
19	Granville	1932	Wabash River	No	Yes	Yes
20	Granville	1518	Wabash River	No	Yes	Yes
21	Granville	966	Wabash River	No	Yes	Yes
22	Granville	966	Wabash River	No	Yes	Yes
23	Granville	1518	Wabash River	No	Yes	Yes
24	Granville	1242	Wabash River	No	Yes	Yes
25	Granville	2070	Wabash River	No	Yes	Yes
26	Granville	1656	Wabash River	No	Yes	Yes
27	Granville	1656	Wabash River	No	Yes	Yes
28	Granville	1518	Wabash River	No	Yes	Yes
29	Granville	1104	Wabash River	No	Yes	Yes
30	Granville	552	Wabash River	No	Yes	Yes
31	Granville	4002	Wabash River	No	Yes	Yes
32	Granville	3864	Wabash River	No	Yes	Yes
33	Granville	7452	Wabash River	No	Yes	Yes
34	Granville	10902	Wabash River	No	Yes	Yes
35	Granville	9246	Wabash River	No	Yes	Yes
36	Granville	6900	Wabash River	No	Yes	Yes
37	Granville	2346	Wabash River	No	Yes	Yes
38	Granville	3864	Wabash River	No	Yes	Yes
39	Granville	3312	Wabash River	No	Yes	Yes
40	Granville	9384	Wabash River	No	Yes	Yes
41	Granville	3864	Wabash River	No	Yes	Yes
42	Granville	6348	Wabash River	No	Yes	Yes
43	Granville	3174	Wabash River	No	Yes	Yes
44	Granville	5658	Wabash River	No	Yes	Yes
45	Granville	6348	Wabash River	No	Yes	Yes
46	Granville	6624	Wabash River	No	Yes	Yes
47	Granville	6762	Wabash River	No	Yes	Yes
48	Granville	7038	Wabash River	No	Yes	Yes
49	Lafayette	828	Wea Creek	Yes	Yes	Yes
50	Lafayette	3726	Wea Creek	Yes	Yes	Yes
51	Lafayette	2070	Wea Creek	Yes	Yes	Yes
52	Lafayette	1242	Wea Creek	Yes	Yes	Yes
53	Lafayette	966	Wabash River	No	Yes	Yes
54	Lafayette	1104	Wea Creek	No	Yes	Yes
55	Lafayette	276	Wea Creek	No	Yes	Yes
56	Lafayette	690	Wea Creek	No	Yes	Yes
57	Lafayette	414	Wabash River	No	Yes	Yes
58	Lafayette	138	Mill Race	No	Yes	Yes
59	Lafayette	138	Mill Race	No	Yes	Yes
60	Lafayette	2070	Wea Creek	No	Yes	Yes

	T	U	V	W	X	Y
61	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
62		<u>Body of Water</u>	<u>Water</u>			
63	Lafayette	9798	Wea Creek	Yes	Yes	Yes
64	Lafayette	8556	Wea Creek	Yes	Yes	Yes
65	Granville	1518	Wabash River	No	Yes	Yes
66	Granville	1380	Wabash River	No	Yes	Yes
67	Granville	1380	Wabash River	No	Yes	Yes
68	Granville	6624	Wabash River	No	Yes	Yes
69	Granville	12144	Wea Creek	No	Yes	Yes
70	Lafayette	10488	Wea Creek	Yes	Yes	Yes
71	Lafayette	690	Wea Creek	Yes	Yes	Yes
72	Lafayette	1242	Wea Creek	Yes	Yes	Yes
73	Lafayette	1656	Wea Creek	Yes	Yes	Yes
74	Lafayette	1518	Wea Creek	Yes	Yes	Yes
75	Granville	6762	Wabash River	No	Yes	Yes
76	Granville	13248	Wabash River	Yes	Yes	Yes
77	Lafayette	138	Mill Race	Yes	Yes	Yes
78	Lafayette	138	Mill Race	Yes	Yes	Yes
79	Lafayette	414	Mill Race	Yes	Yes	Yes
80	Lafayette	414	Mill Race	Yes	Yes	Yes
81	Lafayette	1932	Mill Race	Yes	Yes	Yes
82	Lafayette	276	Wabash River	Yes	Yes	Yes
83	Lafayette	414	Wea Creek	No	Yes	Yes
84	Lafayette	2070	Wabash River	Yes	Yes	Yes
85	Delphi	414	Wabash River	Yes	Yes	Yes
86	Delphi	1794	Wabash River	Yes	Yes	Yes
87	Americus	1794	Wabash River	Yes	Yes	Yes
88	Americus	414	Wabash River	Yes	Yes	Yes
89	Americus	4830	Wabash River	Yes	Yes	Yes
90	Americus	1932	Wabash River	Yes	Yes	Yes
91	Americus	5382	Wabash River	Yes	Yes	Yes
92	Americus	5106	Wabash River	Yes	Yes	Yes
93	Americus	5106	Wabash River	Yes	Yes	Yes
94	Delphi	1656	Wabash River	Yes	Yes	Yes
95	Americus	4830	Wabash River	Yes	Yes	Yes
96	Delphi	4692	Wabash River	Yes	Yes	Yes
97	Americus	552	Sugar Creek	Yes	Yes	Yes
98	Americus	276	Sugar Creek	Yes	Yes	Yes
99	Americus	276	Sugar Creek	Yes	Yes	Yes
100	Americus	966	Sugar Creek	Yes	Yes	Yes
101	Americus	414	Sugar Creek	Yes	Yes	Yes
102	Americus	552	Sugar Creek	Yes	Yes	Yes
103	Americus	3588	Wabash River	No	Yes	Yes
104	Americus	3588	Wabash River	No	Yes	Yes
105	Americus	3588	Wabash River	No	Yes	Yes
106	Americus	4002	Wabash River	Yes	Yes	Yes
107	Americus	4278	Wabash River	Yes	Yes	Yes
108	Americus	3036	Buck Creek	Yes	Yes	Yes
109	Americus	3036	Buck Creek	Yes	Yes	Yes
110	Americus	1932	Sugar Creek	Yes	Yes	Yes
111	Americus	3312	Sugar Creek	Yes	Yes	Yes
112	Americus	552	Buck Creek	Yes	Yes	Yes
113	Americus	552	Buck Creek	Yes	Yes	Yes
114	Americus	1518	Buck Creek	Yes	Yes	Yes
115	Americus	1380	Buck Creek	Yes	Yes	Yes
116	Americus	138	Buck Creek	Yes	Yes	Yes
117	Americus	414	Buck Creek	Yes	Yes	Yes
118	Americus	138	Buck Creek	Yes	Yes	Yes
119	Americus	414	Buck Creek	Yes	Yes	Yes
120	Americus	138	Buck Creek	Yes	Yes	Yes

	T	U	V	W	X	Y
121	Town	Distance to Nearest	Body of	RR	WE	WA
122		Body of Water	Water			
123	Americus	414	Buck Creek	Yes	Yes	Yes
124	Americus	138	Buck Creek	No	Yes	Yes
125	Americus	3726	Wabash River	No	Yes	Yes
126	Americus	2622	Buck Creek	Yes	Yes	Yes
127	Americus	2622	Buck Creek	Yes	Yes	Yes
128	Americus	276	Buck Creek	Yes	Yes	Yes
130	Lafayette	1794	Wabash River	Yes	Yes	Yes
131	Linwood	2484	Wabash River	Yes	Yes	Yes
132	Lafayette	2346	Wabash River	Yes	Yes	Yes
133	Linwood	2346	Wabash River	Yes	Yes	Yes
134	Lafayette	2346	Wabash River	Yes	Yes	Yes
135	Linwood	2898	Wabash River	Yes	Yes	Yes
136	Americus	3588	Wabash River	Yes	Yes	Yes
137	Americus	5382	Wabash River	Yes	Yes	Yes
138	Lafayette	6762	Buck Creek	Yes	Yes	Yes
139	Americus	2622	Wabash River	No	Yes	Yes
140	Americus	5106	Wabash River	Yes	Yes	Yes
141	Americus	2760	Sugar Creek	Yes	Yes	Yes
142	Americus	2208	Sugar Creek	Yes	Yes	Yes
143	Americus	2208	Sugar Creek	Yes	Yes	Yes
144	Americus	1794	Sugar Creek	No	Yes	Yes
145	Americus	966	Sugar Creek	No	Yes	Yes
146	Americus	276	Sugar Creek	Yes	Yes	Yes
147	Americus	138	Sugar Creek	Yes	Yes	Yes
148	Americus	966	Sugar Creek	No	Yes	Yes
149	Americus	1518	Sugar Creek	Yes	Yes	Yes
150	Americus	2346	Sugar Creek	Yes	Yes	Yes
151	Americus	138	Sugar Creek	No	Yes	Yes
152	Americus	138	Sugar Creek	No	Yes	Yes
153	Americus	2898	Wabash River	No	Yes	Yes
154	Americus	1242	Wabash River	No	Yes	Yes
155	Americus	1104	Wabash River	No	Yes	Yes
156	Americus	828	Wabash River	No	Yes	Yes
157	Americus	966	Wabash River	No	Yes	Yes
158	Americus	1380	Sugar Creek	No	Yes	Yes
159	Americus	690	Sugar Creek	No	Yes	Yes
160	Americus	690	Sugar Creek	No	Yes	Yes
161	Americus	138	Sugar Creek	No	Yes	Yes
162	Americus	8004	Wabash River	Yes	Yes	Yes
163	Americus	8556	Wabash River	Yes	Yes	Yes
164	Americus	8970	Wabash River	Yes	Yes	Yes
165	Americus	552	Wabash River	No	Yes	Yes
166	Americus	6900	Wabash River	Yes	Yes	Yes
167	Americus	6762	Wabash River	Yes	Yes	Yes
168	Americus	5382	Sugar Creek	No	Yes	Yes
169	Americus	2898	Wabash River	No	Yes	Yes
170	Americus	3864	Wabash River	Yes	Yes	Yes
171	Linwood	6762	Wabash River	Yes	Yes	Yes
172	Linwood	6762	Wabash River	Yes	Yes	Yes
173	Linwood	11040	Wabash River	Yes	Yes	Yes
174	Linwood	10764	Wabash River	Yes	Yes	Yes
175	Linwood	690	Wildcat Creek	Yes	Yes	Yes
176	Linwood	138	Wabash River	No	Yes	Yes
177	Linwood	2208	Wildcat Creek	Yes	Yes	Yes
178	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
179	Linwood	1656	Wildcat Creek	Yes	Yes	Yes
180	Linwood	1932	Wildcat Creek	Yes	Yes	Yes

	T	U	V	W	X	Y
181	Town	Distance to Nearest	Body of	RR	WE	WA
182		Body of Water	Water			
183	Linwood	2346	Wildcat Creek	Yes	Yes	Yes
184	Linwood	4140	Wildcat Creek	Yes	Yes	Yes
185	Linwood	3726	Wildcat Creek	Yes	Yes	Yes
186	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
187	Linwood	4002	Wildcat Creek	Yes	Yes	Yes
188	Linwood	8280	Wildcat Creek	Yes	Yes	Yes
189	Linwood	10626	Wabash River	Yes	Yes	Yes
190	Linwood	3036	Wildcat Creek	Yes	Yes	Yes
191	Linwood	3174	Wabash River	No	Yes	Yes
192	Linwood	4278	Wildcat Creek	Yes	Yes	Yes
193	Linwood	4830	Wabash River	Yes	Yes	Yes
194	Linwood	5106	Wabash River	Yes	Yes	Yes
195	Linwood	3588	Wabash River	Yes	Yes	Yes
196	Linwood	7728	Wabash River	Yes	Yes	Yes
197	Linwood	3864	Wabash River	Yes	Yes	Yes
198	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
199	Linwood	3588	Wabash River	Yes	Yes	Yes
200	Linwood	3174	Wabash River	Yes	Yes	Yes
201	Linwood	4002	Wabash River	Yes	Yes	Yes
202	Linwood	5244	Wabash River	Yes	Yes	Yes
203	Linwood	3312	Wabash River	Yes	Yes	Yes
204	Linwood	4416	Wildcat Creek	Yes	Yes	Yes
205	Linwood	5658	Wildcat Creek	Yes	Yes	Yes
206	Linwood	690	Wildcat Creek	Yes	Yes	Yes
207	Linwood	690	Wildcat Creek	Yes	Yes	Yes
208	Linwood	690	Wildcat Creek	Yes	Yes	Yes
209	Linwood	138	Wildcat Creek	Yes	Yes	Yes
210	Linwood	276	Wildcat Creek	Yes	Yes	Yes
211	Linwood	828	Wildcat Creek	Yes	Yes	Yes
212	Linwood	414	Wildcat Creek	Yes	Yes	Yes
213	Linwood	138	Wildcat Creek	Yes	Yes	Yes
214	Linwood	414	Wildcat Creek	Yes	Yes	Yes
215	Linwood	138	Wildcat Creek	Yes	Yes	Yes
216	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
217	Delphi	9936	Wabash River	Yes	Yes	Yes
218	Delphi	9936	Deer Creek	Yes	Yes	Yes
219	Delphi	5934	Wabash River	Yes	Yes	Yes
220	Delphi	6762	Wabash River	Yes	Yes	Yes
221	Delphi	7590	Wabash River	Yes	Yes	Yes
222	Delphi	3036	Wabash River	Yes	Yes	Yes
223	Delphi	5934	Wabash River	Yes	Yes	Yes
224	Delphi	10350	Wabash River	Yes	Yes	Yes
225	Delphi	11592	Wabash River	Yes	Yes	Yes
226	Delphi	11592	Wabash River	Yes	Yes	Yes
227	Americus	10212	Wabash River	Yes	Yes	Yes
228	Delphi	10074	Wabash River	Yes	Yes	Yes
229	Delphi	8004	Wabash River	No	Yes	Yes
230	Delphi	1518	Deer Creek	No	Yes	Yes
231	Delphi	2346	Deer Creek	No	Yes	Yes
232	Delphi	2484	Deer Creek	Yes	Yes	Yes
233	Delphi	4554	Deer Creek	Yes	Yes	Yes
234	Delphi	3588	Deer Creek	Yes	Yes	Yes
235	Delphi	3312	Deer Creek	Yes	Yes	Yes

	A	B	C	D	E	F
1	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
2						<u>Neighbor (in feet)</u>
3	Railroad-Era	Washington	Section 21	Nine	School	1932
4	Railroad-Era	Washington	Section 21	Nine	Mill	414
5	Railroad-Era	Washington	Section 21	Seven	Individual Structure	1104
6	Railroad-Era	Washington	Section 21	Eight	Farmstead\Homestead	1794
7	Railroad-Era	Washington	Section 20		Farmstead\Homestead	1104
8	Railroad-Era	Washington	Section 20		Individual Structure	828
9	Railroad-Era	Washington	Section 19	One	Farmstead\Homestead	828
10	Railroad-Era	Washington	Section 19		Farmstead\Homestead	3450
11	Railroad-Era	Washington	Section 28	Two	Farmstead\Homestead	966
12	Railroad-Era	Washington	Section 28	Three	Individual Structure	966
13	Railroad-Era	Washington	Section 10	One	Individual Structure	1518
14	Railroad-Era	Washington	Section 10	Two	Individual Structure	2208
15	Railroad-Era	Washington	Section 21	Four	Individual Structure	1242
16	Railroad-Era	Washington	Section 21	Six	Individual Structure	1104
17	Railroad-Era	Washington	Section 21	Two	Individual Structure	1242
18	Railroad-Era	Washington	Section 21	Three	Individual Structure	414
19	Railroad-Era	Washington	Section 15	One	Farmstead\Homestead	1518
20	Railroad-Era	Washington	Section 15	Two	Farmstead\Homestead	2622
21	Railroad-Era	Washington	Section 14	Seven	Individual Structure	1380
22	Railroad-Era	Washington	Section 14		Individual Structure	1794
23	Railroad-Era	Washington	Section 27	Five	Farmstead\Homestead	1242
24	Railroad-Era	Washington	Section 27	Six	Farmstead\Homestead	1242
25	Railroad-Era	Washington	Section 15		Individual Structure	828
26	Railroad-Era	Washington	Section 27	Four	Farmstead\Homestead	1380
27	Railroad-Era	Washington	Section 13	One	Farmstead\Homestead	2346
28	Railroad-Era	Washington	Section 14	One	Farmstead\Homestead	828
29	Railroad-Era	Washington	Section 20		Farmstead\Homestead	1518
30	Railroad-Era	Washington	Section 20		Individual Structure	828
31	Railroad-Era	Washington	Section 14	Three	Farmstead\Homestead	1794
32	Railroad-Era	Washington	Section 14	Six	Farmstead\Homestead	1104
33	Railroad-Era	Washington	Section 14	Two	Farmstead\Homestead	1656
34	Railroad-Era	Washington	Section 14	Three	Individual Structure	1380
35	Railroad-Era	Washington	Section 36	Seven	Farmstead\Homestead	3036
36	Railroad-Era	Washington	Section 25		Individual Structure	3450
37	Railroad-Era	Washington	Section 29	Four	Farmstead\Homestead	1380
38	Railroad-Era	Washington	Section 25	Five	Farmstead\Homestead	690
39	Railroad-Era	Washington	Section 25	Six	Farmstead\Homestead	1104
40	Railroad-Era	Washington	Section 29	Seven	Individual Structure	1380
41	Railroad-Era	Washington	Section 29	Eight	Individual Structure	1380
42	Railroad-Era	Washington	Section 29	Five	Farmstead\Homestead	1242
43	Railroad-Era	Washington	Section 29	Six	Individual Structure	1380
44	Railroad-Era	Washington	Section 22	One	Individual Structure	2760
45	Railroad-Era	Washington	Section 22	Four	Individual Structure	690
46	Railroad-Era	Washington	Section 12	Four	Farmstead\Homestead	3450
47	Railroad-Era	Washington	Section 12	Five	Individual Structure	1656
48	Railroad-Era	Washington	Section 25	Two	Individual Structure	276
49	Railroad-Era	Washington	Section 25	Three	Individual Structure	276
50	Railroad-Era	Washington	Section 22	Five	Individual Structure	690
51	Railroad-Era	Washington	Section 22		Farmstead\Homestead	1794
52	Railroad-Era	Washington	Section 31	Three	Farmstead\Homestead	552
53	Railroad-Era	Washington	Section 35	Two	Farmstead\Homestead	1794
54	Railroad-Era	Washington	Section 30		Farmstead\Homestead	1380
55	Railroad-Era	Washington	Section 31	One	Farmstead\Homestead	1656
56	Railroad-Era	Washington	Section 36	Three	Farmstead\Homestead	828
57	Railroad-Era	Washington	Section 36	Five	Farmstead\Homestead	1242
58	Railroad-Era	Washington	Section 35		Individual Structure	828
59	Railroad-Era	Washington	Section 36	One	Individual Structure	828
60	Railroad-Era	Washington	Section 30	One	School	690

	A	B	C	D	E	F
61	Date	Township	Section	Unit Number	Type of Structure	Distance to Nearest
62						Neighbor (in feet)
63	Railroad-Era	Washington	Section 30	Five	Individual Structure	2346
64	Railroad-Era	Washington	Section 29	Nine	Individual Structure	1104
65	Railroad-Era	Washington	Section 29	Ten	Individual Structure	1104
66	Railroad-Era	Washington	Section 30		Farmstead\Homestead	1932
67	Railroad-Era	Washington	Section 30		Individual Structure	552
68	Railroad-Era	Washington	Section 30	Ten	Farmstead\Homestead	828
69	Railroad-Era	Washington	Section 30		Farmstead\Homestead	828
70	Railroad-Era	Deer Creek	Section 6	Four	Farmstead\Homestead	3450
71	Railroad-Era	Deer Creek	Section 6	Five	Farmstead\Homestead	3450
72	Railroad-Era	Deer Creek	Section 5	One	Farmstead\Homestead	1380
73	Railroad-Era	Deer Creek	Section 5	Two	Farmstead\Homestead	4002
74	Railroad-Era	Deer Creek	Section 6	Eight	Farmstead\Homestead	552
75	Railroad-Era	Deer Creek	Section 7	One	Farmstead\Homestead	2484
76	Railroad-Era	Deer Creek	Section 6	Six	Farmstead\Homestead	1380
77	Railroad-Era	Deer Creek	Section 6	Seven	School	552
78	Railroad-Era	Fairfield	Section 10	Thirteen	Individual Structure	2346
79	Railroad-Era	Fairfield	Section 10		Individual Structure	414
80	Railroad-Era	Fairfield	Section 9		Farmstead\Homestead	552
81	Railroad-Era	Fairfield	Section 10	Ten	Individual Structure	2208
82	Railroad-Era	Fairfield	Section 15		School	414
83	Railroad-Era	Fairfield	Section 15		Individual Structure	414
84	Railroad-Era	Fairfield	Section 10		Individual Structure	414
85	Railroad-Era	Fairfield	Section 10		Individual Structure	1656
86	Railroad-Era	Deer Creek	Section 32	One	Farmstead\Homestead	966
87	Railroad-Era	Deer Creek	Section 32	Two	Farmstead\Homestead	3036
88	Railroad-Era	Deer Creek	Section 31	Seven	Farmstead\Homestead	1104
89	Railroad-Era	Deer Creek	Section 31	Eight	Individual Structure	1242
90	Railroad-Era	Deer Creek	Section 32	Five	Farmstead\Homestead	2898
91	Railroad-Era	Deer Creek	Section 32	Six	Brickyard	1932
92	Railroad-Era	Deer Creek	Section 32	Three	Farmstead\Homestead	828
93	Railroad-Era	Deer Creek	Section 32	Four	Farmstead\Homestead	828
94	Railroad-Era	Deer Creek	Section 7	Four	Farmstead\Homestead	2484
95	Railroad-Era	Deer Creek	Section 30	Two	Individual Structure	
96	Railroad-Era	Deer Creek	Section 7	Two	Individual Structure	2070
97	Railroad-Era	Deer Creek	Section 7	Three	Farmstead\Homestead	2484
98	Railroad-Era	Deer Creek	Section 31	Five	Individual Structure	414
99	Railroad-Era	Deer Creek	Section 31	Six	Individual Structure	690
100	Railroad-Era	Deer Creek	Section 31	Three	Farmstead\Homestead	1932
101	Railroad-Era	Deer Creek	Section 31	Four	Individual Structure	414
102	Railroad-Era	Fairfield	Section 9		Individual Structure	1794
103	Railroad-Era	Fairfield	Section 11	Eight	Farmstead\Homestead	1104
104	Railroad-Era	Fairfield	Section 11		Farmstead\Homestead	690
105	Railroad-Era	Fairfield	Section 11	Six	Farmstead\Homestead	1104
106	Railroad-Era	Fairfield	Section 11	Seven	Farmstead\Homestead	1242
107	Railroad-Era	Fairfield	Section 12		Individual Structure	1242
108	Railroad-Era	Fairfield	Section 4	One	Farmstead\Homestead	2760
109	Railroad-Era	Fairfield	Section 11		School	828
110	Railroad-Era	Fairfield	Section 12		Individual Structure	2760
111	Railroad-Era	Fairfield	Section 1		Farmstead\Homestead	828
112	Railroad-Era	Fairfield	Section 1		Individual Structure	828
113	Railroad-Era	Washington	Section 27	Seven	School	414
114	Railroad-Era	Fairfield	Section 1	Four	Farmstead\Homestead	1242
115	Railroad-Era	Fairfield	Section 3		Individual Structure	1380
116	Railroad-Era	Fairfield	Section 3		Individual Structure	1380
117	Railroad-Era	Fairfield	Section 1		Farmstead\Homestead	2622
118	Railroad-Era	Fairfield	Section 3	One	Farmstead\Homestead	3036
119	Railroad-Era	Fairfield	Section 9	Three	Individual Structure	414
120	Railroad-Era	Fairfield	Section 9	Three	Farmstead\Homestead	1242

	A	B	C	D	E	F
121	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
122						<u>Neighbor (in feet)</u>
123	Railroad-Era	Fairfield	Section 9	One	Individual Structure	828
124	Railroad-Era	Fairfield	Section 9	Two	Individual Structure	690
125	Railroad-Era	Fairfield	Section 9	Six	Farmstead\Homestead	552
126	Railroad-Era	Fairfield	Section 9	Eight	School	1242
127	Railroad-Era	Fairfield	Section 9	Four	Individual Structure	1242
128	Railroad-Era	Fairfield	Section 9	Four	Individual Structure	414
129	Railroad-Era	Fairfield	Section 2		Farmstead\Homestead	276
130	Railroad-Era	Fairfield	Section 2		Individual Structure	414
131	Railroad-Era	Fairfield	Section 4	Three	Individual Structure	4416
132	Railroad-Era	Fairfield	Section 2	Two	Individual Structure	414
133	Railroad-Era	Fairfield	Section 2		Black Smith	690
134	Railroad-Era	Fairfield	Section 2		Individual Structure	276
135	Railroad-Era	Fairfield	Section 2		Farmstead\Homestead	2346
136	Railroad-Era	Fairfield	Section 2		Farmstead\Homestead	966
137	Railroad-Era	Washington	Section 12	Three	Individual Structure	2898
138	Railroad-Era	Union	Section 11	Three	Church	1242
139	Railroad-Era	Wayne	Section 36	Two	Farmstead\Homestead	414
140	Railroad-Era	Wayne	Section 36	One	Farmstead\Homestead	552
141	Railroad-Era	Wayne	Section 35	Three	Individual Structure	4554
142	Railroad-Era	Wayne	Section 35	Four	Farmstead\Homestead	828
143	Railroad-Era	Union	Section 3	Five	Farmstead\Homestead	1932
144	Railroad-Era	Union	Section 1	Seventeen	Individual Structure	
145	Railroad-Era	Union	Section 1	Sixteen	Individual Structure	966
146	Railroad-Era	Union	Section 3	Two	Individual Structure	1794
147	Railroad-Era	Union	Section 3	Four	School	1656
148	Railroad-Era	Union	Section 3	Three	Farmstead\Homestead	2070
149	Railroad-Era	Wayne	Section 35	One	Farmstead\Homestead	966
150	Railroad-Era	Wayne	Section 31	Two	Farmstead\Homestead	1380
151	Railroad-Era	Union	Section 33	Six	Farmstead\Homestead	2484
152	Railroad-Era	Union	Section 33	Seven	Farmstead\Homestead	2208
153	Railroad-Era	Union	Section 34	Five	Farmstead\Homestead	1242
154	Railroad-Era	Union	Section 34	Three	X Ice house	2622
155	Railroad-Era	Union	Section 33	Five	Farmstead\Homestead	1932
156	Railroad-Era	Wayne	Section 31	Four	Farmstead\Homestead	828
157	Railroad-Era	Wayne	Section 32	One	Farmstead\Homestead	
158	Railroad-Era	Union	Section 29	One	Farmstead\Homestead	1794
159	Railroad-Era	Union	Section 33	Three	Farmstead\Homestead	1380
160	Railroad-Era	Union	Section 33	One	Farmstead\Homestead	2760
161	Railroad-Era	Wayne	Section 2	Five	Individual Structure	552
162	Railroad-Era	Wayne	Section 2	Six	Farmstead\Homestead	828
163	Railroad-Era	Wayne	Section 2	Three	Individual Structure	828
164	Railroad-Era	Union	Section 1	Three	Individual Structure	966
165	Railroad-Era	Wayne	Section 2	One	Farmstead\Homestead	690
166	Railroad-Era	Wayne	Section 11	One	Individual Structure	552
167	Railroad-Era	Union	Section 1	Two	Individual Structure	552
168	Railroad-Era	Wayne	Section 22	One	Farmstead\Homestead	1518
169	Railroad-Era	Wayne	Section 22	Two	Individual Structure	1932
170	Railroad-Era	Wayne	Section 2	Seven	Individual Structure	1932
171	Railroad-Era	Union	Section 1	One	Individual Structure	1932
172	Railroad-Era	Union	Section 1	Four	Individual Structure	966
173	Railroad-Era	Union	Section 1	Twelve	School	1104
174	Railroad-Era	Union	Section 1	Eleven	Mill	414
175	Railroad-Era	Union	Section 1	Thirteen	Individual Structure	414
176	Railroad-Era	Union	Section 1	Fifteen	Individual Structure	1518
177	Railroad-Era	Union	Section 1	Fourteen	Farmstead\Homestead	1380
178	Railroad-Era	Union	Section 1	Eight	Individual Structure	414
179	Railroad-Era	Union	Section 1	Seven	Individual Structure	414
180	Railroad-Era	Union	Section 1	Six	Individual Structure	1104

	A	B	C	D	E	F
181	<u>Date</u>	<u>Township</u>	<u>Section</u>	<u>Unit Number</u>	<u>Type of Structure</u>	<u>Distance to Nearest</u>
182						<u>Neighbor (in feet)</u>
183	Railroad-Era	Wayne	Section 25	One	Farmstead\Homestead	1656
184	Railroad-Era	Wayne	Section 36	Three	Farmstead\Homestead	1380
185	Railroad-Era	Wayne	Section 25	Four	Farmstead\Homestead	690
186	Railroad-Era	Union	Section 34	Six	Farmstead\Homestead	1794
187	Railroad-Era	Wayne	Section 29	Five	Farmstead\Homestead	1104
188	Railroad-Era	Wayne	Section 29	Six	Farmstead\Homestead	1380
189	Railroad-Era	Washington	Section 1	One	Individual Structure	1656
190	Railroad-Era	Washington	Section 11	Two	Individual Structure	1518
191	Railroad-Era	Washington	Section 1	Two	Individual Structure	1656
192	Railroad-Era	Wayne	Section 29	Seven	Farmstead\Homestead	1380
193	Railroad-Era	Union	Section 2	Eleven	Individual Structure	2760
194	Railroad-Era	Union	Section 2	Ten	Farmstead\Homestead	2898
195	Railroad-Era	Union	Section 2	Twelve	Farmstead\Homestead	1104
196	Railroad-Era	Wayne	Section 1B	Two	Individual Structure	4278
197	Railroad-Era	Wayne	Section 2B	One	Individual Structure	4278
198	Railroad-Era	Washington	Section 11	Three	Individual Structure	276
199	Railroad-Era	Washington	Section 11	Ten	School	552
200	Railroad-Era	Washington	Section 11	Nine	Farmstead\Homestead	552
201	Railroad-Era	Washington	Section 11	Eleven	Farmstead\Homestead	276
202	Railroad-Era	Washington	Section 12	Two	Individual Structure	1242
203	Railroad-Era	Washington	Section 11	Twelve	Farmstead\Homestead	828
204	Railroad-Era	Wayne	Section 25	Five	Individual Structure	138
205	Railroad-Era	Washington	Section 11	Five	Individual Structure	1656
206	Railroad-Era	Washington	Section 11	Four	Individual Structure	690
207	Railroad-Era	Washington	Section 11	Seven	Individual Structure	1104
208	Railroad-Era	Wayne	Section 29	One	Farmstead\Homestead	1242
209	Railroad-Era	Washington	Section 11	Eight	Individual Structure	1518
210	Railroad-Era	Wayne	Section 31	One	Farmstead\Homestead	414
211	Railroad-Era	Wayne	Section 5	Two	Farmstead\Homestead	3864
212	Railroad-Era	Wayne	Section 30	Two	Farmstead\Homestead	2484
213	Railroad-Era	Wayne	Section 3	One	Individual Structure	1104
214	Railroad-Era	Wayne	Section 5	One	Farmstead\Homestead	1242
215	Railroad-Era	Union	Section 4	Three	Individual Structure	1656
216	Railroad-Era	Union	Section 35	Three	Individual Structure	552
217	Railroad-Era	Union	Section 35	Two	Farmstead\Homestead	552
218	Railroad-Era	Union	Section 36	Four	Individual Structure	1932
219	Railroad-Era	Union	Section 4	Two	Farmstead\Homestead	690
220	Railroad-Era	Union	Section 4	One	Farmstead\Homestead	1242
221	Railroad-Era	Wayne	Section 29	Nine	School	690
222	Railroad-Era	Wayne	Section 3B	One	Farmstead\Homestead	1656
223	Railroad-Era	Wayne	Section 3B	Three	Individual Structure	1656
224	Railroad-Era	Wayne	Section 3B	Five	Farmstead\Homestead	1242
225	Railroad-Era	Union	Section 2	Nine	Individual Structure	3864
226	Railroad-Era	Union	Section 2	Seven	Farmstead\Homestead	1104
227	Railroad-Era	Union	Section 2	Four	Mill	1656
228	Railroad-Era	Wayne	Section 1	One	Farmstead\Homestead	552
229	Railroad-Era	Wayne	Section 29	Eight	Farmstead\Homestead	1104
230	Railroad-Era	Wayne	Section 3B	Nine	School	1518
231	Railroad-Era	Wayne	Section 3B	Seven	Individual Structure	552
232	Railroad-Era	Wayne	Section 3B	Eight	Individual Structure	552

	G	H	I	J
1	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
2	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
3	2208	138	414	6624
4	1794	276	414	4002
5	1932	690	1656	8694
6	2346	1656	1656	6348
7	1932	138	3174	966
8	1518	138	3450	828
9	1104	828	4416	2898
10	4002	3036	4416	138
11	2346	138	414	9384
12	2070	138	690	9660
13	3174	1518	3588	2622
14	2622	138	1380	5106
15	1518	276	276	5106
16	1932	138	1794	8004
17	2208	828	2070	4278
18	1518	552	552	4554
19	2760	138	2760	2898
20	2760	690	2760	3864
21	3174	2622	2898	8142
22	2760	3174	3174	12834
23	1380	966	3174	17388
24	1380	552	1518	18768
25	1794	552	690	8832
26	1518	828	828	15456
27	2760	138	828	8004
28	1104	276	4416	6900
29	1932	1380	1380	2208
30	1104	138	2622	1104
31	3450	2484	2760	10350
32	1242	138	3312	7314
33	1932	552	2484	7176
34	1794	1380	1518	8556
35	3726	138	1380	7866
36	3450	276	3312	138
37	1380	138	4002	9936
38	690	138	276	4278
39	1104	138	828	5382
40	2208	2622	3450	6348
41	2760	3036	4416	7176
42	1380	414	3174	10350
43	1380	138	2484	9384
44	3174	276	3864	8418
45	2208	414	2484	9936
46	3864	138	414	1794
47	2898	138	138	4692
48	690	414	414	3588
49	690	138	138	3588
50	1242	138	2070	10488
51	2346	414	1656	10074
52	1932	276	414	8694
53	2622	138	5382	1794
54	1794	1104	1518	7314
55	2346	1242	1380	7038
56	2346	138	2346	2346
57	1380	552	1380	3588
58	1656	138	1518	2208
59	828	138	3036	2346
60	1104	138	1656	4416

	G	H	I	J
61	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
62	Nearest Neighbor		Opposite Direction	River
63	2622	276	2208	5658
64	4140	1380	3450	7728
65	3174	414	1656	8142
66	2484	138	276	3036
67	1932	138	414	7452
68	1104	276	5382	3726
69	828	138	5244	3036
70	5106	276	1380	3036
71	4554	1242	2760	6348
72	3174	276	3864	9936
73	4002	690	3588	11454
74	2484	276	414	11592
75		966	2898	10212
76	1932	276	2760	10350
77	1932	276	828	11592
78	2346	138	1242	10350
79	1656	138	138	9660
80	1242	138	2760	4968
81	2484	138	1518	8418
82	966	276	3174	10902
83	1104	138	3450	11040
84	1656	138	414	9384
85	2070	828	1242	7728
86	2208	828	1794	5382
87	3864	414	3450	5934
88	1380	138	414	4416
89	1380	690	1104	4554
90	3864	3312	3864	9384
91	3312	138	2760	11454
92		1104	3174	7590
93		276	2484	8004
94	2760	138	2760	10074
95		690		4002
96	2622	138	2208	7590
97	2622	414	2070	7728
98	690	414	2070	2346
99	1242	414	1794	2622
100	2346	138	3450	2484
101	1104	414	2484	2070
102	1794	138	1518	3036
103	1242	138	414	9384
104	828	276	276	6072
105	1380	138	690	8280
106	1380	138	966	9384
107	3036	138	3312	9936
108	3036	138	276	5244
109	1518	138	552	5658
110	3036	1242	2208	10902
111		138	5382	10764
112		414	4554	9936
113	552	138	138	19872
114	2760	414	2898	10764
115	1518	3726	4002	2208
116	1932	3450	4416	3174
117	4554	1932	2622	5382
118	4002	138	5244	5382
119	690	138	690	4968
120	1656	1932	5382	3864

	G	H	I	J
121	Distance to Second	Nearest Road	Nearest Road in	Distance to Wabash
122	Nearest Neighbor		Opposite Direction	River
123	1242	1104	1932	4140
124	828	966	1242	4278
125	1656	138	3174	5106
126	1794	138	1518	5382
127	2070	2208	4692	3174
128	828	138	690	5382
129	1656	2346	2484	3450
130	1242	138	1242	4554
131	4692	138	4278	1794
132	1380	138	1380	4830
133	966	138	138	6072
134	1380	2484	2484	3174
135	2484	138	414	4278
136	1380	138	1104	6486
137	3312	1518	3726	4692
138	10350	414	552	10626
139	3036	138	3036	3864
140	5244	276	4278	9384
141	4968	138	2760	3312
142	1794	552	2208	1380
143	4692	276	4002	4692
144		2760	5382	9936
145	1242	138	414	7590
146	2070	138	7590	13110
147	4002	138	5934	8142
148	4002	138	9660	13386
149	1518	138	1380	2346
150	3864	138	2760	7452
151	4002	4278	4278	1518
152	3588	1380	3864	6072
153	2484	138	8142	6486
154	4002	4830	8004	1794
155	2484	2070	2070	1242
156	2346	552	5106	10902
157		138	4830	9246
158	2484	138	1932	1242
159	2622	5520	5658	1380
160	2760	138	828	1518
161	966	138	414	6762
162	1242	552	1242	7038
163	828	138	1242	6348
164	1380	138	2208	4692
165	966	138	276	3174
166	1242	138	552	6762
167	1518	138	276	3726
168		138	6900	15594
169	2208	138	3864	11454
170	2484	414	2070	3864
171	1932	138	4554	3036
172	1794	138	1380	5106
173	1104	138	828	8418
174	552	414	966	6348
175	552	138	138	3174
176	2346	552	2622	8418
177	1656	414	1242	4692
178	414	138	1242	6900
179	552	552	1242	6486
180	2208	276	1932	8694

	G	H	I	J
181	<u>Distance to Second</u>	<u>Nearest Road</u>	<u>Nearest Road in</u>	<u>Distance to Wabash</u>
182	<u>Nearest Neighbor</u>		<u>Opposite Direction</u>	<u>River</u>
183	3864	552	3726	1932
184	3864	138	4140	6348
185	966	138	2208	966
186	2898	138	7452	7590
187	1380	138	4002	1518
188	1380	138	2622	1104
189	2898	138	1794	414
190	2346	414	2484	414
191	4416	138	1794	1794
192	2070	138	1380	552
193	3450	414	1656	4140
194	7866	276	1794	8280
195	9384	138	1242	9522
196	4416	3174	4416	4554
197	4692	138	552	4416
198	1242	138	2346	4830
199	828	276	276	3174
200	690	138	552	3036
201	1518	138	2760	4968
202	3450	414	3588	4830
203	1242	414	2070	6210
204	552	138	138	1518
205	2346	138	1242	1932
206	828	138	1242	3726
207	2898	414	1932	5106
208	1518	138	6210	1242
209	2208	1518	2208	1794
210	1794	138	2898	3864
211	4554	138	1104	8970
212	3174	138	966	3864
213	3588	3864	5520	2898
214	1794	138	5796	9936
215	2208	138	5382	7038
216	1932	138	4692	1656
217	1794	138	4140	2070
218	2622	138	2208	2898
219	1794	138	5658	13248
220	1656	138	6900	6762
221	1380	138	276	1380
222	1794	138	1518	7452
223	1794	138	1794	7314
224	1656	138	276	9108
225	8004	1932	3036	9936
226	1518	1656	2346	8418
227	2898	276	1242	4830
228	5520	138	4278	9384
229	1242	138	4554	1932
230	1656	690	2760	6486
231	1242	138	966	9660
232	1932	138	414	9660

	K	L	M	N
1	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
2	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
3	8004	Ferry	6348	7866
4	9384	Ferry	4002	9246
5	9936	Ferry	8418	9798
6	10350	Ferry	6210	7314
7	7038	Ferry	966	5520
8	8832	Ferry	828	3588
9	16560	Ferry	414	4416
10	8970	Ferry	2898	7038
11	12144	Ferry	9384	10350
12	11868	Ferry	9660	10902
13	4968	Ferry	414	4968
14	5934	Ford	1104	5934
15	8418	Ferry	5106	8280
16	9798	Ferry	7728	9660
17	7590	Ferry	4140	7452
18	9660	Ferry	4554	9522
19	11040	Ferry	1656	4692
20	13662	Ferry	3588	4278
21	9522	Ford	6348	9384
22	9798	Ferry	10074	10074
23	18078	Ferry	16974	17940
24	18768	Ferry	18630	18630
25	9522	Ferry	7866	9384
26	17664	Ferry	15456	15732
27	8418	Ford	7728	8418
28	7038	Ford	5520	6210
29	9660	Ferry	2070	3312
30	8004	Ferry	1104	4416
31	10626	Ford	9108	10074
32	7038	Ford	4554	6072
33	7314	Ford	6762	6762
34	9660	Ford	7176	10902
35	9108	Ferry	5382	17802
36	276	Ferry	3036	15456
37	14904	Ferry	7038	10212
38	4278	Ferry	828	15042
39	5382	Ferry	1518	14352
40	12420	Ferry	3450	7176
41	13800	Ferry	4554	7176
42	16284	Ferry	7728	9936
43	13386	Ferry	6072	10074
44	8418	Ferry	8280	8280
45	10074	Ferry	9798	9936
46	4554	Ford	1656	5658
47	9936	Ford	4554	11178
48	3588	Ferry	138	15042
49	3588	Ferry	138	14766
50	10764	Ferry	10350	10626
51	10626	Ferry	9522	10488
52	11454	Ferry	5382	10902
53	8694	Ferry	414	12558
54	12420	Ferry	4692	9384
55	7314	Ferry	3450	13524
56	5934	Ferry	690	15870
57	3174	Ferry	552	16146
58	23598	Ferry	828	14214
59	6624	Ferry	828	15180
60	5520	Ferry	828	12282

	K	L	M	N
61	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
62	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
63	8556	Ferry	1656	10350
64	17802	Ferry	6762	6762
65	18906	Ferry	7590	7452
66	6624	Ferry	138	10764
67	10902	Ferry	4692	10902
68	11868	Ferry	1104	5382
69	11454	Ferry	138	5244
70	12006	Ford	2622	6486
71	12696	Ford	5658	6762
72	16974	Ford	10074	11040
73	15318	Ford	10626	10350
74	19872	Ford	11178	14076
75	14352	Ford	9108	16284
76	17526	Ford	9936	11730
77	19458	Ford	11040	13524
78	14490	Ferry	3588	3588
79	12972	Ferry	2208	2760
80	10074	Ferry	3588	3864
81	12834	Ferry	1794	1856
82	15042	Ferry	3174	7866
83	14766	Ferry	2898	7452
84	12558	Ferry	1932	2622
85	10902	Ferry	138	1656
86	8418	Ford	5106	5244
87	9936	Ford	5520	5520
88	7452	Ford	3864	4140
89	5658	Ford	3036	3312
90	12834	Ford	8832	8832
91	14076	Ford	11868	12006
92	10212	Ford	7038	7038
93	10212	Ford	7176	7176
94	17802	Ford	9660	14076
95	5658	Ford	966	2346
96	12558	Ford	6624	14490
97	14490	Ford	7038	16008
98	6486	Ford	1932	2070
99	6486	Ford	2346	2484
100	7866	Ford	2070	1518
101	6486	Ford	1794	1932
102	8556	Ferry	5382	9798
103	15042	Ferry	4278	4554
104	12834	Ferry	3312	4692
105	14214	Ferry	3588	4140
106	15594	Ferry	5106	5520
107	16698	Ferry	9798	12006
108	6486	Ferry	5796	8280
109	12144	Ferry	2484	
110	18354	Ferry	10764	9522
111	12834	Ferry	8970	17112
112	12006	Ferry	8280	16836
113	20010	Ferry	19596	19872
114	16008	Ferry	10074	12834
115	8556	Ferry	1794	4968
116	8694	Ferry	552	3036
117	12282	Ferry	5244	10626
118	5934	Ferry	4418	5382
119	7314	Ferry	5382	8418
120	11868	Ferry	2622	6762

	K	L	M	N
121	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
122	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
123	8280	Ferry	4968	9522
124	7452	Ferry	5658	9108
125	10074	Ferry	2898	2898
126	8280	Ferry	4416	4968
127	10626	Ferry	4002	3726
128	7314	Ferry	5244	8004
129	10074	Ferry	2208	4692
130	12696	Ferry	4278	6072
131	1518	Ferry	5244	9246
132	12282	Ferry	4140	5934
133	13110	Ferry	4002	5382
134	9936	Ferry	2346	4830
135	13110	Ferry	4140	8280
136	13938	Ferry	4968	6210
137	7728	Ford	4554	8832
138	29946	Ford	10350	11316
139	3588	Ford	3036	3450
140	10488	Ford	5796	8418
141	9384	Ford	414	5934
142	14904	Ford	276	6348
143	30636	Ford	4692	4830
144	24012	Bridge	9660	16146
145	25944	Bridge	7452	10488
146	28290	Ford	11454	11454
147	28704	Ford	4002	4830
148	29670	Ford	10764	11592
149	14214	Ford	1380	1380
150	7728	Ford	6762	7176
151	18906	Ford	690	3450
152	20562	Ford	5106	5382
153	24564	Ford	5106	4830
154	22632	Ford	276	276
155	16422	Ford	552	5934
156	12144	Ford	10488	10902
157	14076	Ford	8970	12834
158	15732	Ford	552	5934
159	20010	Ford	414	2070
160	14490	Ford	1380	7590
161	19044	Ford	4140	4002
162	17802	Ford	4416	4554
163	18216	Ford	3726	3864
164	21666	Bridge	4416	11040
165	13800	Ford	2070	2208
166	19458	Ford	4002	3726
167	18906	Bridge	3036	12558
168			13524	13386
169			8832	9246
170	15180	Ford	2346	2898
171	22908	Bridge	3036	7452
172	22494	Bridge	4968	10764
173	26772	Bridge	8418	11178
174	24150	Bridge	6348	10626
175	18630	Bridge	2898	12972
176	19872	Bridge	8418	13938
177	20562	Bridge	4278	12282
178	24702	Bridge	6900	10764
179	24564	Bridge	6486	10350
180	26358	Bridge	8694	12144

	K	L	M	N
181	<u>Distance to Nearest Wabash</u>	<u>River Feature</u>	<u>Distance to Wabash</u>	<u>Distance to Nearest Wabash</u>
182	<u>River Feature</u>		<u>and Erie Canal</u>	<u>and Erie Canal Feature</u>
183	3312 Ford		828	4278
184	5658 Ford		5520	5796
185	1794 Ford		276	2760
186	24702 Ford		4002	4968
187	10212 Ford		1656	9522
188	11592 Ford		828	10902
189	9248 Ford		276	7176
190	414 Ford		414	828
191	8556 Ford		1656	8142
192	12834 Ford		552	9522
193	26082 Bndge		3450	4554
194	28980 Bndge		7866	8418
195	28842 Bndge		9384	10626
196			5106	5106
197			2346	5934
198	4554 Ford		3036	3726
199	3174 Ferry		2484	2622
200	3036 Ferry		2208	2208
201	4416 Ferry		3174	3864
202	5520 Ford		4692	5934
203	6348 Ferry		4968	5382
204	1518 Ford		414	414
205	2346 Ford		1656	2346
206	3726 Ford		2760	2760
207	5520 Ford		4830	5658
208	8280 Ford		1104	7452
209	1794 Ferry		138	552
210	4140 Ford		3036	3036
211	16836 Ford		8832	10212
212	5106 Ford		2070	4416
213	20148 Ford		138	414
214	13662 Ford		9798	12696
215	18354 Ford		5796	5796
216	22770 Bndge		1380	5796
217	23184 Bridge		1794	5658
218	19872 Bridge		2622	10626
219	26358 Ford		12144	11730
220	23736 Ford		5658	5244
221	13938 Ford		1242	13524
222			4416	4416
223			4692	4830
224			6210	6486
225	31602 Bridge		8004	8142
226	26082 Bndge		8418	8832
227	27048 Bndge		4554	5796
228	10764 Ford		7176	8280
229	8970 Ford		1518	8556
230			3174	3450
231			7038	7314
232			7314	7866

	O	P	Q	R	S
1	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
2		Railroad	Railroad Feature	Feature	Nearest Town
3	Bridge	9384	11454	Station	6210
4	Aqueduct	11040	11454	Station	7452
5	Bridge	7314	9522	Station	8142
6	Aqueduct	8970	9384	Station	8556
7	Aqueduct	14490	14904	Station	5796
8	Aqueduct	14214	14352	Station	7866
9	Aqueduct	12282	15318	Station	12834
10	Aqueduct	14490	17250	Station	16560
11	Aqueduct	5934	7176	Station	6486
12	Aqueduct	5796	7590	Station	6762
13	Bridge	13662	14076	Station	3174
14	Guardlock	10350	11316	Station	6624
15	Aqueduct	10488	11316	Station	6486
16	Aqueduct	7866	9522	Station	8004
17	Aqueduct	11454	12282	Station	5520
18	Aqueduct	10626	11178	Station	7728
19	Bridge	13110	13110	Station	2622
20	Bridge	12558	13248	Station	2622
21	Guardlock	7866	7866	Station	6072
22	Guardlock	2898	3864	Station	4416
23	Bridge	1380	6762	Station	6348
24	Bridge	2484	9522	Station	8970
25	Bridge	8280	8418	Station	3864
26	Aqueduct	138	3864	Station	3174
27	Guardlock	2760	5934	Station	5244
28	Guardlock	7038	8418	Station	7314
29	Aqueduct	12834	12834	Station	8556
30	Aqueduct	14214	14352	Station	7038
31	Guardlock	4416	4830	Station	3588
32	Guardlock	8004	9246	Station	7038
33	Guardlock	5382	7176	Station	5934
34	Guardlock	7728	7590	Station	4830
35	Aqueduct	5796	17112	Stockyard	17112
36	Aqueduct	12696	20148	Stockyard	21666
37	Aqueduct	4968	7590	Station	7314
38	Aqueduct	10074	19596	Stockyard	18492
39	Aqueduct	10074	20010	Stockyard	17388
40	Aqueduct	8556	10902	Station	7866
41	Aqueduct	7866	9660	Station	7176
42	Aqueduct	4692	7038	Station	6072
43	Aqueduct	5520	9384	Station	4830
44	Bridge	8004	5658	Station	6486
45	Bridge	6486	10764	Station	8142
46	Guardlock	4002	13248	Station	12558
47	Guardlock	1242	14214	Station	12696
48	Aqueduct	10764	19734	Stockyard	18906
49	Aqueduct	10764	20010	Stockyard	18768
50	Bridge	5658	10764	Station	8832
51	Bridge	6762	8556	Station	828
52	Aqueduct	6072	11454	Station	10764
53	Wildcat Bridge and Locks	9108	12144	Stockyard	23598
54	Aqueduct	6762	10488	Station	9108
55	Aqueduct	7728	16146	Station	15456
56	Wildcat Bridge and Locks	9798	15042	Stockyard	22356
57	Aqueduct	10764	18630	Stockyard	19596
58	Wildcat Bridge and Locks	9384	12558	Stockyard	2622
59	Wildcat Bridge and Locks	9384	14214	Stockyard	22908
60	Aqueduct	10626	17526	Station	16698

	O	P	Q	R	S
61	Canal Feature	Distance to Nearest	Distance to Nearest	Railroad	Distance to
62		Railroad	Railroad Feature	Feature	Nearest Town
63	Aqueduct	8970	14490	Station	13662
64	Aqueduct	7452	7728	Station	6762
65	Aqueduct	7038	7038	Station	6348
66	Aqueduct	11178	16422	Station	15318
67	Aqueduct	6624	11868	Station	11316
68	Aqueduct	11178	13800	Station	12558
69	Aqueduct	12006	13800	Station	13110
70	Guardlock	966	16422	Station	12972
71	Guardlock	3726	15456	Station	11868
72	Guardlock	8280	18630	Station	14628
73	Guardlock	8556	15042	Station	12144
74	Guardlock	9108	22218	Station	18354
75	Guardlock	4416	14628	Station	14628
76	Guardlock	8142	19596	Station	15732
77	Guardlock	9108	21528	Station	17664
78	Wildcat Bridge and Locks	414	414	Stockyard	8970
79	Wildcat Bridge and Locks	1104	1380	Stockyard	9522
80	Basin	276	10074	Stockyard	6762
81	Wildcat Bridge and Locks	1380	1242	Stockyard	10212
82	Wildcat Bridge and Locks	1242	6486	Stockyard	2622
83	Basin	1242	6072	Stockyard	3036
84	Wildcat Bridge and Locks	1380	1656	Stockyard	8142
85	Wildcat Bridge and Locks	3174	3174	Stockyard	9108
86	Towpath Bridge	1932	7590	Station	3588
87	Guardlock	3450	10488	Station	6486
88	Towpath Bridge	966	7590	Station	3726
89	Towpath Bridge	276	6900	Station	3036
90	Towpath Bridge	5520	11178	Station	7728
91	Towpath Bridge	8142	11040	Station	8418
92	Lock	3588	7314	Station	4140
93	Lock	3864	6900	Station	3728
94	Guardlock	7038	21114	Station	19044
95	Lock	414	4140	Station	966
96	Guardlock	2760	16698	Station	16836
97	Guardlock	3864	19320	Station	19320
98	Towpath Bridge	138	8694	Station	5106
99	Towpath Bridge	138	8004	Station	4416
100	Guardlock	138	11040	Station	7452
101	Towpath Bridge	276	9108	Station	5382
102	Wildcat Bridge and Locks	690	11592	Stockyard	8280
103	Wildcat Bridge and Locks	414	276	Stockyard	12834
104	Wildcat Bridge and Locks	2898	3174	Stockyard	15180
105	Wildcat Bridge and Locks	690	690	Stockyard	12696
106	Wildcat Bridge and Locks	414	1104	Stockyard	14076
107	Wildcat Bridge and Locks	552	8142	Stockyard	20976
108	Wildcat Bridge and Locks	552	10212	Stockyard	9522
109	Wildcat Bridge and Locks	3312	3312	Stockyard	14490
110	Wildcat Bridge and Locks	1380	5382	Stockyard	17940
111	Wildcat Bridge and Locks	1932	13800	Stockyard	18216
112	Wildcat Bridge and Locks	2898	14214	Stockyard	18216
113	Bridge	3726	9660	Station	9108
114	Wildcat Bridge and Locks	414	8418	Stockyard	22218
115	Wildcat Bridge and Locks	6900	6900	Stockyard	15180
116	Wildcat Bridge and Locks	6210	6072	Stockyard	13938
117	Wildcat Bridge and Locks	4692	8694	Stockyard	21114
118	Wildcat Bridge and Locks	1656	7866	Stockyard	10212
119	Wildcat Bridge and Locks	690	22218	Station	10626
120	Basin	2070	11730	Stockyard	4968

	O	P	Q	R	S
121	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
122		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
123	Wildcat Bridge and Locks	1380	21252	Station	9936
124	Wildcat Bridge and Locks	1380	22080	Station	10626
125	Basin	276	10074	Stockyard	6348
126	Basin	138	9936	Stockyard	7866
127	Basin	2208	12006	Stockyard	6348
128	Wildcat Bridge and Locks	276	22356	Station	10626
129	Wildcat Bridge and Locks	5520	5382	Stockyard	15180
130	Wildcat Bridge and Locks	3864	4692	Stockyard	16560
131	Wildcat Bridge and Locks	1794	12420	Stockyard	13938
132	Wildcat Bridge and Locks	4278	4968	Stockyard	16698
133	Wildcat Bridge and Locks	2898	3036	Stockyard	15732
134	Wildcat Bridge and Locks	5658	5658	Stockyard	15456
135	Wildcat Bridge and Locks	5106	7038	Stockyard	18906
136	Wildcat Bridge and Locks	2484	4002	Stockyard	16422
137	Guardlock	690	12144	Station	11316
138	Wea AqueductLock System	666	18402	Railroad Yard	24012
139	Bridge	22356	24978	Station	2484
140	Bridge	16836	23874	Station	9936
141	Bridge	22080	28566	Station	10212
142	Basin	18216	30774	Station	15180
143	Wea AqueductLock System	7176	16836	Station	14214
144	Wea AqueductLock System	2484	12420	Railroad Yard	6624
145	Wea AqueductLock System	1518	14214	Railroad Yard	7728
146	Basin	5520	9108	Station	23736
147	Wea AqueductLock System	9108	16422	Station	16422
148	Basin	4278	9936	Station	25392
149	Bridge	18078	29946	Station	14490
150	Basin	18492			5796
151	Basin	18216	19182	Station	14904
152	Basin	14214	14490	Station	16284
153	Wea AqueductLock System	12144	14490	Station	22080
154	Basin	16146	18630	Station	18906
155	Basin	20424	20286	Station	12420
156	Bridge	15042	16836	Station	8418
157	Aqueduct	14904			10488
158	Basin	20148	20562	Station	12558
159	Wea AqueductLock System	18216	19320	Station	17526
160	Wea AqueductLock System	20286	20286	Station	11178
161	Basin	11040	26358	Station	18630
162	Basin	12006	25944	Station	16698
163	Basin	12006	26634	Station	17940
164	Wea AqueductLock System	138	9936	Railroad Yard	3450
165	Bridge	17526	26634	Station	14076
166	Basin	10764	26496	Station	19182
167	Wea AqueductLock System	1518	7176	Railroad Yard	828
168	Aqueduct	138	30360	Station	29808
169	Aqueduct	3174			
170	Bridge	15594	27738	Station	15318
171	Wea AqueductLock System	1794	11730	Railroad Yard	6210
172	Wea AqueductLock System	276	10764	Railroad Yard	4416
173	Wea AqueductLock System	2070	15180	Railroad Yard	8556
174	Wea AqueductLock System	1518	12696	Railroad Yard	6072
175	Wea AqueductLock System	1242	6900	Railroad Yard	414
176	Wea AqueductLock System	966	12282	Railroad Yard	5934
177	Wea AqueductLock System	1242	8970	Railroad Yard	2484
178	Wea AqueductLock System	1656	12972	Railroad Yard	6486
179	Wea AqueductLock System	1380	13248	Railroad Yard	6624
180	Wea AqueductLock System	2622	13938	Railroad Yard	8004

	O	P	Q	R	S
181	<u>Canal Feature</u>	<u>Distance to Nearest</u>	<u>Distance to Nearest</u>	<u>Railroad</u>	<u>Distance to</u>
182		<u>Railroad</u>	<u>Railroad Feature</u>	<u>Feature</u>	<u>Nearest Town</u>
183	Bridge	24150	28290	Station	4002
184	Bridge	19734	21804	Station	4830
185	Bridge	24978	28152	Station	2346
186	Wea Aqueduct\Lock System	10488	16008	Station	18078
187	Bridge	22356	22080	Station	6210
188	Bridge	22218	21804	Station	7452
189	Guardlock	1656	15456	Station	17250
190	Guardlock	8694	14214	Station	12834
191	Guardlock	1242	16284	Station	15870
192	Basin	22080	21528	Station	8832
193	Wea Aqueduct\Lock System	4554	15456	Railroad Yard	10212
194	Wea Aqueduct\Lock System	1656	17664	Railroad Yard	11592
195	Wea Aqueduct\Lock System	1380	17388	Railroad Yard	11040
196	Aqueduct	1380			
197	Basin	5382			
198	Guardlock	8694	11040	Station	9384
199	Guardlock	7590	11178	Station	11454
200	Guardlock	8004	11730	Station	11040
201	Guardlock	8694	10902	Station	9246
202	Guardlock	3450	9384	Station	8694
203	Guardlock	7314	8418	Station	9660
204	Bridge	25254	27324	Station	138
205	Guardlock	6762	12006	Station	11040
206	Guardlock	8142	11316	Station	10212
207	Guardlock	4140	8832	Station	8004
208	Bridge	23736	23598	Station	4140
209	Guardlock	9522	13800	Station	11316
210	Bridge	22632	15042	Station	2070
211	Basin	12696	12834	Station	12972
212	Bridge	23736	24426	Station	1104
213	Basin	13524			20976
214	Bridge	13800	14904	Station	10350
215	Basin	12006	13110	Station	18492
216	Wea Aqueduct\Lock System	3726	12144	Railroad Yard	7590
217	Wea Aqueduct\Lock System	3588	12558	Railroad Yard	7866
218	Wea Aqueduct\Lock System	414	8556	Railroad Yard	2898
219	Basin	5796	8004	Station	22494
220	Basin	12006	14076	Station	19596
221	Basin	21114	20562	Station	10212
222	Basin	6900			23460
223	Basin	5520			25254
224	Basin	4692			25392
225	Wea Aqueduct\Lock System	4140	16008	Railroad Yard	14076
226	Wea Aqueduct\Lock System	276	15732	Railroad Yard	9522
227	Wea Aqueduct\Lock System	3588	16146	Railroad Yard	10764
228	Bridge	2898	18354	Station	9936
229	Bridge	22770	22632	Station	5382
230	Basin	8556			22632
231	Basin	3450			26082
232	Basin	2898			26358

	T	U	V	W	X	Y
1	Town	Distance to Nearest	Body of	RR	WE	WA
2		Body of Water	Water			
3	Americus	552	Sugar Creek	Yes	Yes	Yes
4	Americus	138	Sugar Creek	No	Yes	Yes
5	Americus	2346	Sugar Creek	Yes	Yes	Yes
6	Transitville	1518	Sugar Creek	Yes	Yes	Yes
7	Americus	966	Wabash River	No	Yes	Yes
8	Americus	828	Wabash River	No	Yes	Yes
9	Transitville	2898	Wabash River	No	Yes	Yes
10	Transitville	138	Wabash River	No	No	Yes
11	Transitville	2208	Sugar Creek	Yes	Yes	Yes
12	Transitville	2208	Sugar Creek	Yes	Yes	Yes
13	Americus	2622	Wabash River	Yes	Yes	Yes
14	Americus	5106	Wabash River	Yes	Yes	Yes
15	Americus	138	Sugar Creek	Yes	Yes	Yes
16	Americus	1518	Sugar Creek	Yes	Yes	Yes
17	Americus	966	Sugar Creek	Yes	Yes	Yes
18	Americus	276	Sugar Creek	Yes	Yes	Yes
19	Americus	2898	Wabash River	No	Yes	Yes
20	Americus	3864	Wabash River	No	Yes	Yes
21	Chapmanvi	6072	Sugar Creek	Yes	Yes	Yes
22	Chapmanvi	4416	Sugar Creek	Yes	Yes	Yes
23	Transitville	8142	Sugar Creek	No	Yes	Yes
24	Transitville	7728	Sugar Creek	No	Yes	Yes
25	Chapmanvi	3864	Sugar Creek	Yes	Yes	Yes
26	Chapmanvi	8970	Sugar Creek	No	Yes	Yes
27	Chapmanvi	8004	Wabash River	Yes	Yes	Yes
28	Chapmanvi	6900	Wabash River	Yes	Yes	Yes
29	Americus	1656	Sugar Creek	No	Yes	Yes
30	Americus	1104	Wabash River	No	Yes	Yes
31	Chapmanvi	5382	Sugar Creek	Yes	Yes	Yes
32	Chapmanvi	7038	Wabash River	Yes	Yes	Yes
33	Chapmanvi	6762	Wabash River	Yes	Yes	Yes
34	Chapmanvi	4830	Sugar Creek	Yes	Yes	Yes
35	Transitville	6762	Buck Creek	Yes	Yes	Yes
36	Transitville	138	Wabash River	No	No	Yes
37	Transitville	552	Buck Creek	Yes	Yes	Yes
38	Transitville	4278	Wabash River	Yes	Yes	Yes
39	Transitville	3036	Buck Creek	Yes	Yes	Yes
40	Transitville	2346	Buck Creek	Yes	Yes	Yes
41	Transitville	3036	Buck Creek	Yes	Yes	Yes
42	Transitville	552	Buck Creek	Yes	Yes	Yes
43	Transitville	966	Buck Creek	Yes	Yes	Yes
44	Americus	552	Sugar Creek	Yes	Yes	Yes
45	Americus	966	Sugar Creek	No	Yes	Yes
46	Chapmanvi	1794	Wabash River	Yes	Yes	Yes
47	Chapmanvi	4692	Wabash River	Yes	Yes	Yes
48	Transitville	3588	Wabash River	No	Yes	Yes
49	Transitville	3588	Wabash River	No	Yes	Yes
50	Americus	414	Sugar Creek	No	Yes	Yes
51	Chapmanvi	828	Sugar Creek	Yes	Yes	Yes
52	Transitville	276	Buck Creek	Yes	Yes	Yes
53	Linwood	1794	Wabash River	Yes	Yes	Yes
54	Transitville	1104	Buck Creek	No	Yes	Yes
55	Transitville	2622	Buck Creek	Yes	Yes	Yes
56	Transitville	2346	Wabash River	Yes	Yes	Yes
57	Transitville	3588	Wabash River	Yes	Yes	Yes
58	Linwood	2208	Wabash River	Yes	Yes	Yes
59	Transitville	2346	Wabash River	Yes	Yes	Yes
60	Transitville	1518	Buck Creek	Yes	Yes	Yes

	T	U	V	W	X	Y
61	<u>Town</u>	<u>Distance to Nearest</u>	<u>Body of</u>	<u>RR</u>	<u>WE</u>	<u>WA</u>
62		<u>Body of Water</u>	<u>Water</u>			
63	Transitville	138	Buck Creek	Yes	Yes	Yes
64	Transitville	3174	Sugar Creek	Yes	Yes	Yes
65	Transitville	3450	Sugar Creek	Yes	Yes	Yes
66	Transitville	276	Buck Creek	No	Yes	Yes
67	Transitville	552	Buck Creek	No	Yes	Yes
68	Transitville	3726	Wabash River	No	Yes	Yes
69	Transitville	3036	Wabash River	No	Yes	Yes
70	Delphi	3036	Wabash River	Yes	Yes	Yes
71	Delphi	5934	Wabash River	Yes	Yes	Yes
72	Delphi	9936	Wabash River	Yes	Yes	Yes
73	Delphi	9936	Deer Creek	Yes	Yes	Yes
74	Delphi	11592	Wabash River	Yes	Yes	Yes
75	Chapmanvi	10212	Wabash River	Yes	Yes	Yes
76	Delphi	10350	Wabash River	Yes	Yes	Yes
77	Delphi	11592	Wabash River	Yes	Yes	Yes
78	Linwood	1242	Wildcat Creek	Yes	Yes	Yes
79	Linwood	690	Wildcat Creek	Yes	Yes	Yes
80	Linwood	4968	Wildcat Creek	Yes	Yes	Yes
81	Linwood	414	Wildcat Creek	Yes	Yes	Yes
82	Linwood	4968	Wildcat Creek	Yes	Yes	Yes
83	Linwood	4554	Wildcat Creek	Yes	Yes	Yes
84	Linwood	1104	Wildcat Creek	Yes	Yes	Yes
85	Linwood	1380	Wildcat Creek	Yes	Yes	Yes
86	Delphi	2484	Deer Creek	Yes	Yes	Yes
87	Delphi	4554	Deer Creek	Yes	Yes	Yes
88	Delphi	1794	Deer Creek	Yes	Yes	Yes
89	Delphi	552	Deer Creek	No	Yes	Yes
90	Delphi	6900	Deer Creek	Yes	Yes	Yes
91	Delphi	8004	Deer Creek	Yes	Yes	Yes
92	Delphi	3588	Deer Creek	Yes	Yes	Yes
93	Delphi	3312	Deer Creek	Yes	Yes	Yes
94	Delphi	10074	Wabash River	Yes	Yes	Yes
95	Delphi	828	Deer Creek	No	Yes	Yes
96	Chapmanvi	7590	Wabash River	Yes	Yes	Yes
97	Chapmanvi	7728	Wabash River	Yes	Yes	Yes
98	Delphi	966	Deer Creek	No	Yes	Yes
99	Delphi	828	Deer Creek	No	Yes	Yes
100	Delphi	2346	Deer Creek	No	Yes	Yes
101	Delphi	966	Deer Creek	No	Yes	Yes
102	Linwood	3036	Wabash River	Yes	Yes	Yes
103	Linwood	4002	Wildcat Creek	Yes	Yes	Yes
104	Linwood	4692	Wildcat Creek	Yes	Yes	Yes
105	Linwood	3726	Wildcat Creek	Yes	Yes	Yes
106	Linwood	5106	Wildcat Creek	Yes	Yes	Yes
107	Linwood	8418	Wildcat Creek	Yes	Yes	Yes
108	Linwood	3036	Wildcat Creek	Yes	Yes	Yes
109	Linwood	3864	Wildcat Creek	Yes	Yes	Yes
110	Linwood	6486	Wildcat Creek	Yes	Yes	Yes
111	Transitville	10764	Wabash River	Yes	Yes	Yes
112	Transitville	9936	Wabash River	Yes	Yes	Yes
113	Transitville	8832	Sugar Creek	No	Yes	Yes
114	Linwood	10764	Wabash River	Yes	Yes	Yes
115	Linwood	2208	Wabash River	Yes	Yes	Yes
116	Linwood	2208	Wildcat Creek	Yes	Yes	Yes
117	Transitville	5382	Wabash River	Yes	Yes	Yes
118	Linwood	690	Wildcat Creek	Yes	Yes	Yes
119	Linwood	4416	Wabash River	Yes	Yes	Yes
120	Linwood	3588	Wabash River	Yes	Yes	Yes

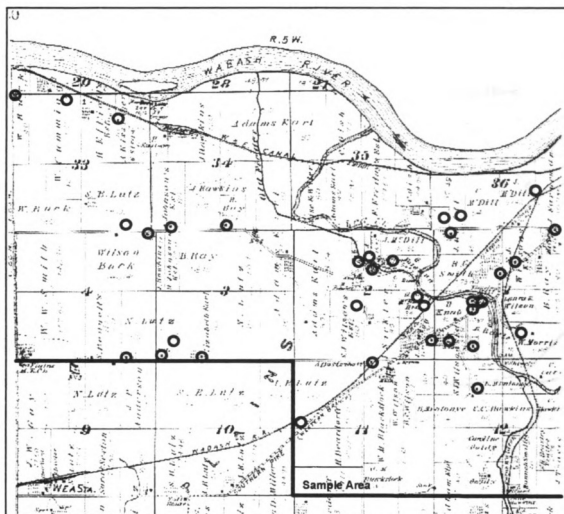
	T	U	V	W	X	Y
121	Town	Distance to Nearest	Body of	RR	WE	WA
122		Body of Water	Water			
123	Linwood	4140	Wabash River	Yes	Yes	Yes
124	Linwood	4278	Wabash River	Yes	Yes	Yes
125	Linwood	5244	Wabash River	Yes	Yes	Yes
126	Linwood	4416	Wildcat Creek	Yes	Yes	Yes
127	Linwood	3174	Wabash River	Yes	Yes	Yes
128	Linwood	4002	Wabash River	Yes	Yes	Yes
129	Linwood	3450	Wabash River	Yes	Yes	Yes
130	Linwood	4554	Wabash River	Yes	Yes	Yes
131	Linwood	1794	Wabash River	No	Yes	Yes
132	Linwood	4830	Wabash River	Yes	Yes	Yes
133	Linwood	5382	Wildcat Creek	Yes	Yes	Yes
134	Linwood	3174	Wabash River	Yes	Yes	Yes
135	Linwood	4278	Wabash River	Yes	Yes	Yes
136	Linwood	6210	Wildcat Creek	Yes	Yes	Yes
137	Chapmanvi	4692	Wabash River	Yes	Yes	Yes
138	Elston	4416	Wea Creek	No	Yes	Yes
139	Granville	3864	Wabash River	No	Yes	Yes
140	Granville	9384	Wabash River	No	Yes	Yes
141	Granville	3312	Wabash River	No	Yes	Yes
142	Granville	1380	Wabash River	No	Yes	Yes
143	Elston	1656	Wea Creek	Yes	Yes	Yes
144	Elston	1380	Wea Creek	No	Yes	Yes
145	Elston	1104	Wea Creek	No	Yes	Yes
146	Lafayette	9798	Wea Creek	Yes	Yes	Yes
147	Wea Station	2208	Wea Creek	Yes	Yes	Yes
148	Lafayette	8556	Wea Creek	Yes	Yes	Yes
149	Granville	2346	Wabash River	No	Yes	Yes
150	Granville	7452	Wabash River	No	Yes	Yes
151	Granville	1518	Wabash River	No	Yes	Yes
152	Granville	6072	Wabash River	No	Yes	Yes
153	Granville	12144	Wea Creek	No	Yes	Yes
154	Granville	1794	Wabash River	No	Yes	Yes
155	Granville	1242	Wabash River	No	Yes	Yes
156	Granville	10902	Wabash River	No	Yes	Yes
157	Granville	9246	Wabash River	No	Yes	Yes
158	Granville	1242	Wabash River	No	Yes	Yes
159	Granville	1380	Wabash River	No	Yes	Yes
160	Granville	1518	Wabash River	No	Yes	Yes
161	Granville	6762	Wabash River	No	Yes	Yes
162	Granville	7038	Wabash River	No	Yes	Yes
163	Granville	6348	Wabash River	No	Yes	Yes
164	Elston	2070	Wea Creek	Yes	Yes	Yes
165	Granville	3174	Wabash River	No	Yes	Yes
166	Granville	6762	Wabash River	No	Yes	Yes
167	Elston	3726	Wea Creek	Yes	Yes	Yes
168	Wea Station	690	Flint Creek	Yes	Yes	Yes
169		3726	Wabash River	Yes	Yes	Yes
170	Granville	3864	Wabash River	No	Yes	Yes
171	Elston	828	Wea Creek	Yes	Yes	Yes
172	Elston	1242	Wea Creek	Yes	Yes	Yes
173	Elston	2070	Wea Creek	No	Yes	Yes
174	Elston	138	Mill Race	No	Yes	Yes
175	Elston	3174	Wabash River	Yes	Yes	Yes
176	Elston	1794	Wea Creek	No	Yes	Yes
177	Elston	3312	Wea Creek	Yes	Yes	Yes
178	Elston	690	Wea Creek	No	Yes	Yes
179	Elston	276	Wea Creek	No	Yes	Yes
180	Elston	1104	Wea Creek	No	Yes	Yes

	T	U	V	W	X	Y
181	Town	Distance to Nearest	Body of	RR	WE	WA
182		Body of Water	Water			
183	Granville	1932	Wabash River	No	Yes	Yes
184	Granville	6348	Wabash River	No	Yes	Yes
185	Granville	966	Wabash River	No	Yes	Yes
186	Elston	10488	Wea Creek	Yes	Yes	Yes
187	Granville	1518	Wabash River	No	Yes	Yes
188	Granville	1104	Wabash River	No	Yes	Yes
189	Chapmanvi	414	Wabash River	Yes	Yes	Yes
190	Americus	414	Wabash River	Yes	Yes	Yes
191	Chapmanvi	1794	Wabash River	Yes	Yes	Yes
192	Granville	552	Wabash River	No	Yes	Yes
193	Elston	414	Mill Race	Yes	Yes	Yes
194	Elston	2622	Mill Race	Yes	Yes	Yes
195	Elston	2070	Mill Race	No	Yes	Yes
196		690	Wabash River	Yes	Yes	Yes
197		4416	Wabash River	Yes	Yes	Yes
198	Americus	4830	Wabash River	Yes	Yes	Yes
199	Americus	3174	Wabash River	Yes	Yes	Yes
200	Americus	3036	Wabash River	Yes	Yes	Yes
201	Americus	4968	Wabash River	Yes	Yes	Yes
202	Chapmanvi	4830	Wabash River	Yes	Yes	Yes
203	Americus	6210	Wabash River	Yes	Yes	Yes
204	Granville	1518	Wabash River	No	Yes	Yes
205	Chapmanvi	1932	Wabash River	Yes	Yes	Yes
206	Chapmanvi	3726	Wabash River	Yes	Yes	Yes
207	Chapmanvi	5106	Wabash River	Yes	Yes	Yes
208	Granville	1242	Wabash River	No	Yes	Yes
209	Americus	1794	Wabash River	Yes	Yes	Yes
210	Granville	3864	Wabash River	No	Yes	Yes
211	Granville	8970	Wabash River	No	Yes	Yes
212	Granville	3864	Wabash River	No	Yes	Yes
213	Granville	2898	Wabash River	No	Yes	Yes
214	Granville	9936	Wabash River	No	Yes	Yes
215	Granville	7038	Wabash River	No	Yes	Yes
216	Elston	1518	Wea Creek	Yes	Yes	Yes
217	Elston	1104	Wea Creek	Yes	Yes	Yes
218	Elston	2898	Wabash River	Yes	Yes	Yes
219	Granville	13248	Wabash River	Yes	Yes	Yes
220	Granville	6762	Wabash River	No	Yes	Yes
221	Granville	1380	Wabash River	No	Yes	Yes
222	Granville	5658	Flint Creek	Yes	Yes	Yes
223	Granville	4416	Flint Creek	Yes	Yes	Yes
224	Granville	4968	Flint Creek	Yes	Yes	Yes
225	Elston	4278	Mill Race	Yes	Yes	Yes
226	Elston	414	Wea Creek	No	Yes	Yes
227	Elston	414	Mill Race	Yes	Yes	Yes
228	Granville	9246	Wabash River	No	Yes	Yes
229	Granville	1932	Wabash River	No	Yes	Yes
230	Granville	6486	Wabash River	Yes	Yes	Yes
231	Wea Station	4140	Flint Creek	Yes	Yes	Yes
232	Wea Station	3450	Flint Creek	Yes	Yes	Yes

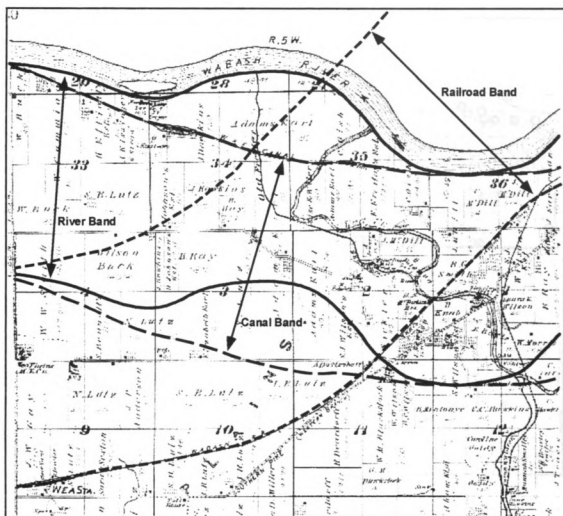
Appendix III

1878 Township Maps, Including 1866 Data Overlaid.

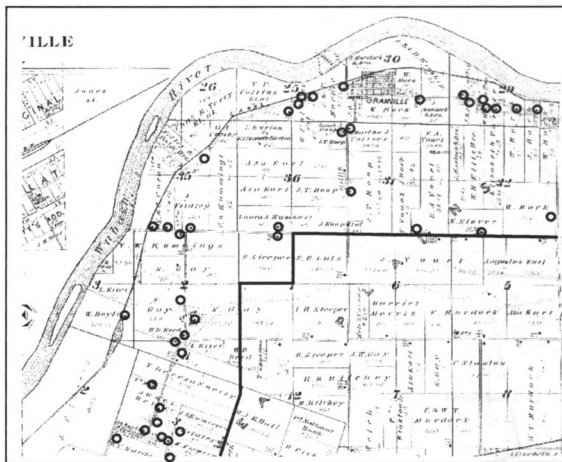
Union Township 1878 Data, with 1866 Overlaid.



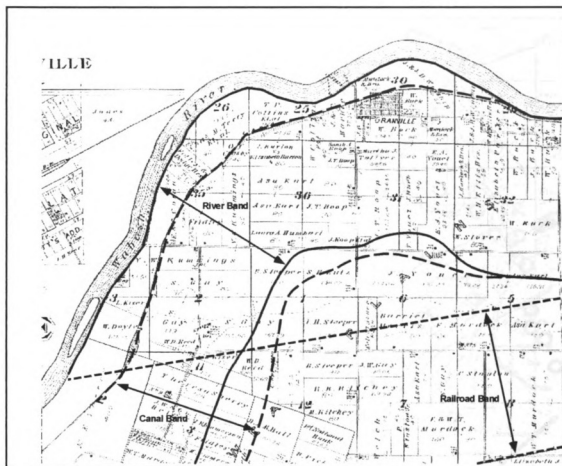
Union Township Band Areas.



Wayne Township 1878 Data, with 1866 Overlaid.



Wayne Township Band Areas



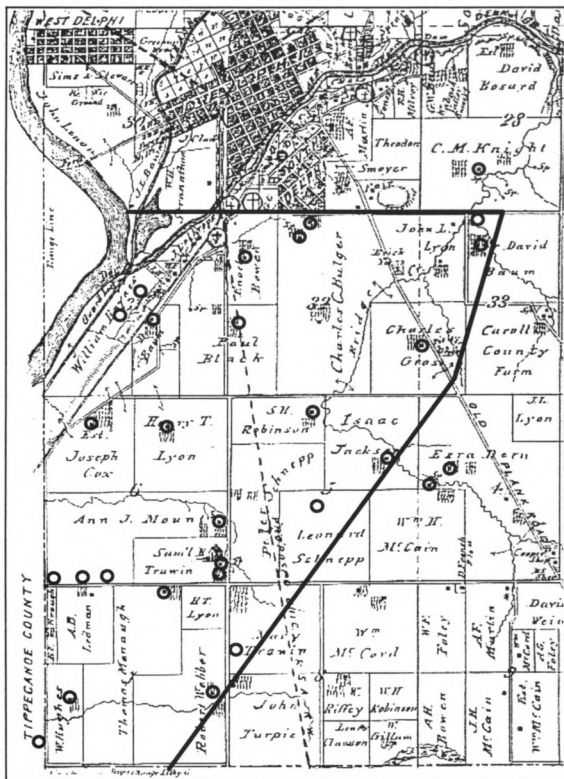
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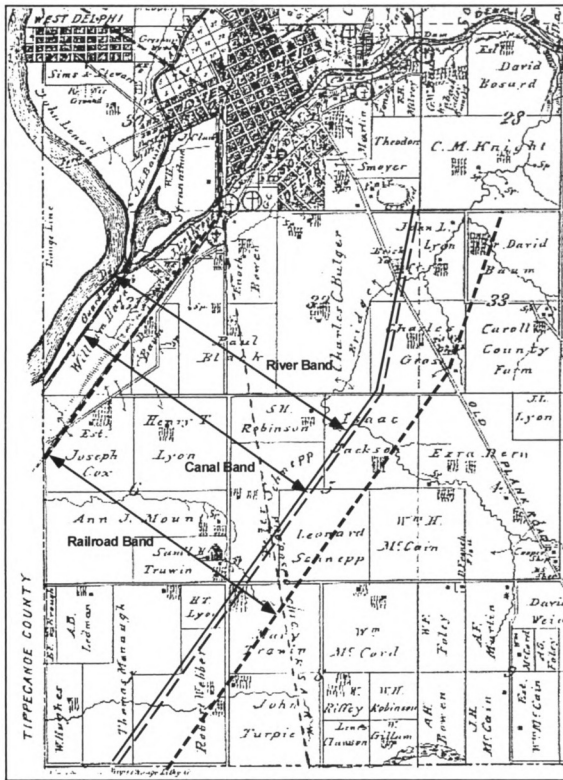
This is a historical map of Township 36 North, Range 10 West. The map shows the confluence of the Missouri River and the Platte River. The Missouri River is on the left, and the Platte River flows from the top right towards the center. The map includes numerous place names, property boundaries, and a grid system. Key locations include Grahamville, Platteville, and various smaller settlements and farms. The map is labeled 'TOWNSHIP' at the top right.

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Deer Creek Township 1874 Data, with 1863 Overlaid.



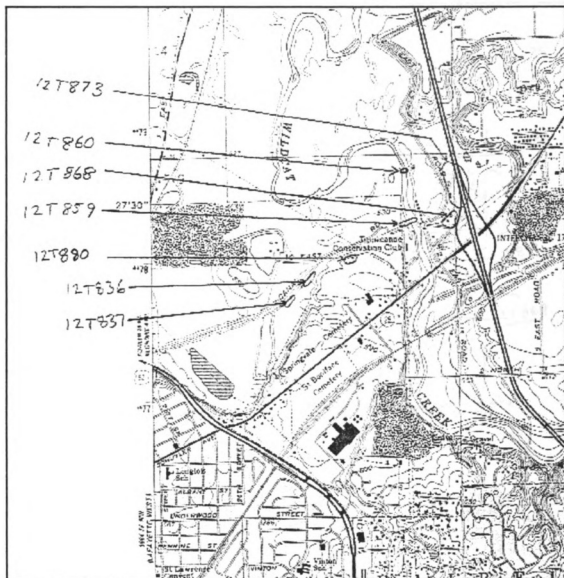
Deer Creek Township Band Areas



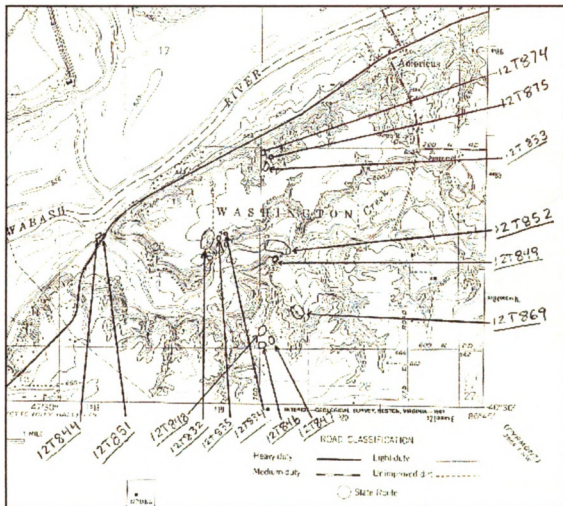
Appendix IV

USGS Maps with Archaeological Sites Shown, by Township.

Fairfield Township, Lafayette East USGS Topographic Map



Washington Township, Brookston USGS Topographic Map



STATE OF INDIANA
INDIANA DEPARTMENT OF CONSERVATION
INDIANAPOLIS, INDIANA

12T824
12T823
12T850
12T876

OHIO RIVER

North Union, Ind.
Delphi, Ind.
North Union, Ind.
North Union, Ind.
North Union, Ind.

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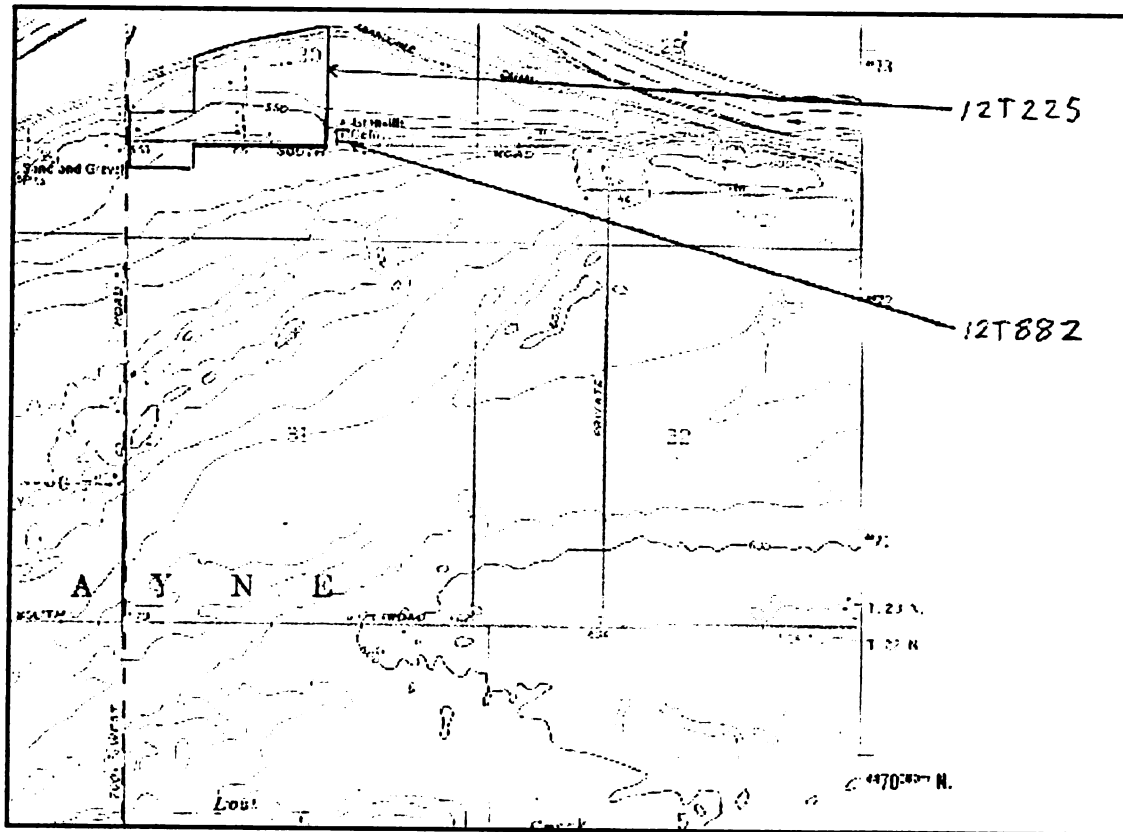
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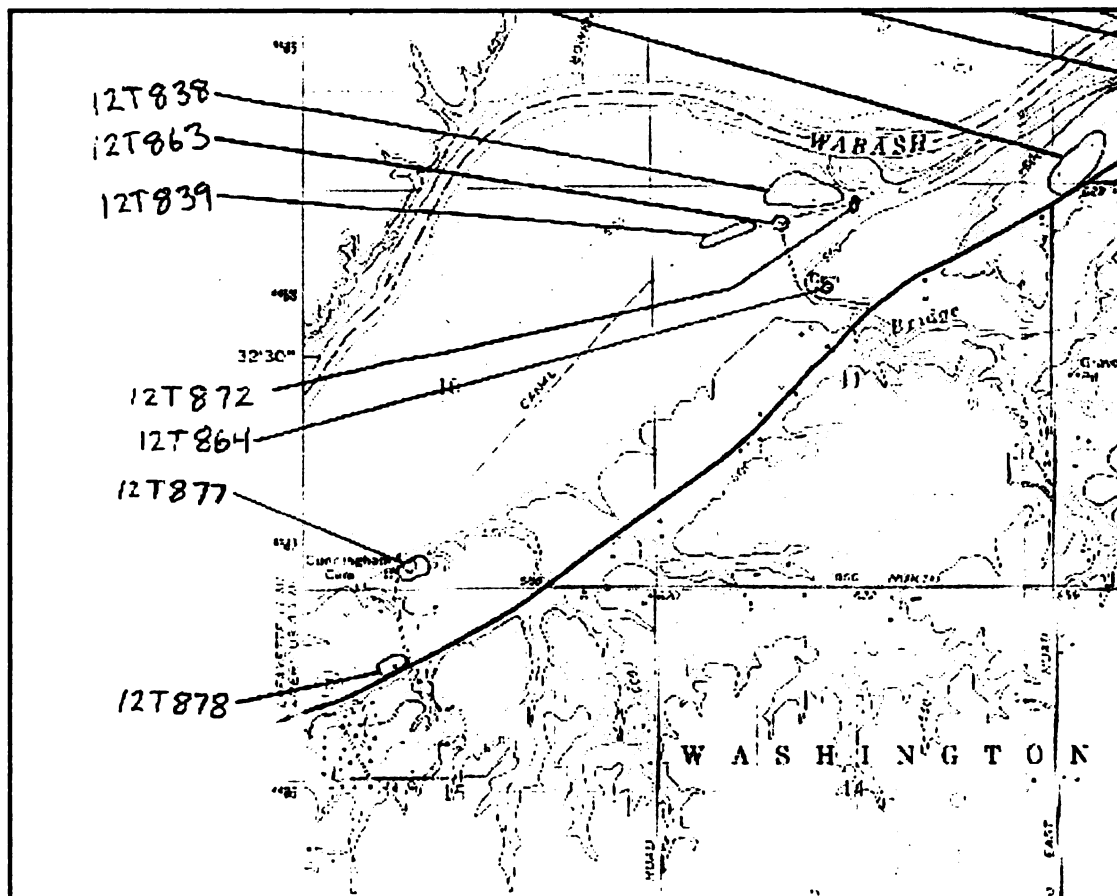
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Wayne Township, Otterbein USGS Topographic Map

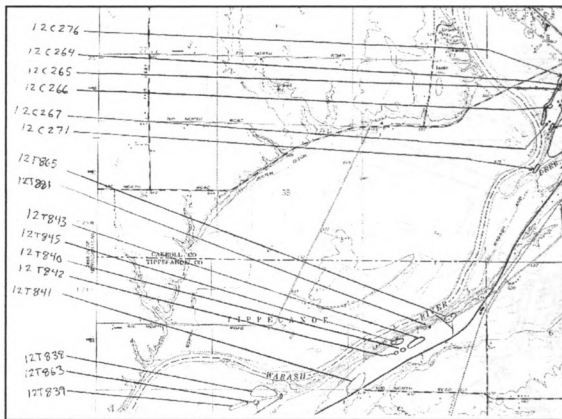


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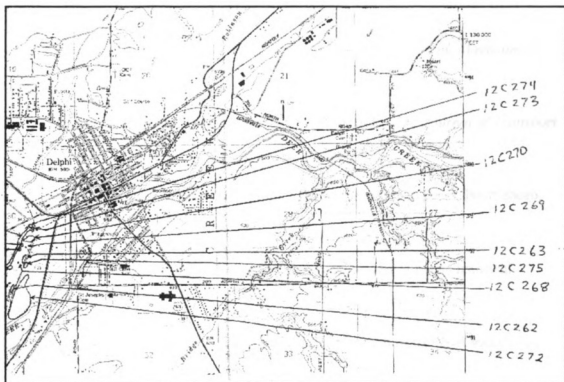
Washington Township, Delphi USGS Topographic Map



Washington and Deer Creek Township, Delphi USGS Topographic Map



Deer Creek Township, Delphi USGS Topographic Map



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Museum Archives

Carroll County Museum Archives

- * Contains material on local history, a collection of local photographs, and a number of original documents related to the Wabash and Erie Canal.

State Library of Indiana -- Photographic Archives

- * Contains material dealing with Delphi and Carroll County businesses from the 19th Century.

State Library of Indiana -- Wabash and Erie Canal Archives

- * Contains 1850s-1870s Wabash and Erie Canal Contracts and the papers of J.S. Williams, Chief Engineer of the State of Indiana, but some older pieces also are present. Most contracts and state documents prior to the construction of the canal south of Lafayette in the early 1850s do not exist.

Tippecanoe County Historical Association Archives

- * Contains material on local history, a collection of local photographs, and a number of original documents related to the Wabash and Erie Canal. Also contains a letterhead collection of various Lafayette businesses

Collections

Aborn, Mary J. (fl. 1852-1927) Papers

- * Ebenezer F. Lucas - engineer and superintendent, Wabash and Erie Canal (1842-1846) (IHSL/A).

Lane, Henry Smith (1811-1881) Papers

- * Contains the business papers of Isaac C. Elston (1840s-1850s), which relate to the Wabash and Erie Canal (IHSL/A)

Merrill, Samuel Papers

- * Contains a two-page history of Wabash and Erie Canal written in 1849 (IHSL/A).

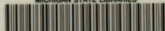
Zagel, Andreas Papers

* Letter of Zagel describing his trip from Fort Wayne to Lafayette on Wabash and Erie Canal. In German, with English translation (IHSL/A).

Computer Programs Used in this Project:

StatView – Abacus Concepts' statistics program. Contains very useful Reference and Tutorial books.

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