

Sidewalk Carousel Horses

Sandra Lach Arlinghaus

William E. Arlinghaus, Adrienne Coley Dison, Richard 'Clay' Hamilton



Link to associated kmz file,
<http://www.mylovedone.com/image/solstice/sum17/MeridianCarouselHorses.kmz>

Introduction

Visitors to Meridian, Mississippi, often comment on the beautiful, full-sized, hand-painted carousel horses that dot both the downtown and outlying landscapes. Sidewalks in the downtown, and in a number of outlying areas, boast a horse menagerie scattered along roadways. Outdoor public sculptures of this sort are not uncommon: Chicago has Sidewalk Cows. Joseph Kerski tells the story, using Esri Story Maps, of Sidewalk Boots in a small town in Texas (the principal author thanks Dr. Kerski for sending his information: Kerski, 2016). Meridian has Sidewalk Carousel Horses.

A bit of superficial research suggests a simple local connection as to WHY carousel horses: Meridian is home to a carousel, not readily visible, that is unique. Indeed, according to Wikipedia [2017, Dentzel Carousel and Shelter Building],

The **Highland Park Dentzel Carousel and Shelter Building** is a carousel and building in Highland Park in Meridian, Mississippi. Manufactured about 1896 for the 1904 St. Louis Exposition by the Dentzel Carousel Company of Philadelphia, Pennsylvania, the carousel was sold and shipped to Meridian. Highland Park Dentzel Carousel has been in operation since 1909 and was declared a National Historic Landmark in 1987. It is the only remaining two-row stationary Dentzel menagerie in the world.

.....

Original oil paintings of museum quality adorn the top crown of the carousel. The carousel is approximately 30 feet (9.1 m) in diameter, smaller than the time's standard 2-abreast — 42 feet (13 m) in diameter, with 28 animals, two-abreast, and 2 chariots, providing seating for 36 people. All 28 animals on the carousel, including a lion, a tiger, 2 deer, 2 antelope, 2 giraffes, and 20 horses, are meticulously hand-carved of brass and poplar wood and have been recently restored to their original beauty.

A fine photo (Figure 1) in Wikipedia shows a recent view of the carousel inside its carousel house (which is open only limited hours). Beyond the superficial, the inventory for application to the Department of the Interior, National Park Service for National Register of Historic Places designation, reveals more information as recorded in 1979 (Figure 2).

As is often the case with carousels, the horse is the dominant animal in the menagerie. One way to make a connection between the Dentzel Carousel and the sidewalk horses is to consider a fanciful vision of Mary Poppins (Julie Andrews, 2016: YouTube), riding atop a horse on the Dentzel Carousel, and then jumping her horse off to make a circuit of the entire city, as she leads a group of trailing horses and drops them off along sidewalk locations on the route.



Figure 1. Dentzel Carousel, Meridian, Mississippi.

Photograph Attribution: Dudemanfellabra at English Wikipedia [CC BY-SA 3.0

(<http://creativecommons.org/licenses/by-sa/3.0>) or GFDL (<http://www.gnu.org/copyleft/fdl.html>), via Wikimedia Commons

Meridian honors its unique historical treasure with an outdoor public art exhibit, Around Town Carousels Abound: the sidewalk carousel horses. The exhibit features about 65 unique life-sized carousel horse sculptures that began appearing around town in 2000. Each horse is individually painted by local resident artists and sponsored by local businesses, individuals, or other groups. A portion of the proceeds are then donated in support of Hope Village for Children (around \$3000 per horse). The art beautifies the city, and fosters a love for art by involving the local population in an interactive manner, as it supports its innocent, disadvantaged residents

through Hope Village—a true win-win situation [Around Town Carousels Abound: <http://www.hopevillagems.org/carousels-abound/>].

“Around Town Carousels Abound is more than a collection of beautifully painted horses,” says Sela Ward (actress and founder of Hope Village) “It is a testament to what communities can do when they come together to help their least fortunate children.” ...

Just as an adult lifts a child onto a carousel horse, so too does this project lift the children of Mississippi onto a road of hope.

5. Dentzel Carousel, 1909

Purchased in 1909 by the City of Meridian, the Dentzel carousel is a stationary carousel approximately thirty feet in diameter with two animals abreast. The twenty-eight handcarved animals secured by brass poles include one lion, one tiger, two deer, two antelope, two giraffes, and twenty horses, all decorated with carvings of parrots, eagles, clown faces, flags, and young girls, with the outer ring displaying more elaborate carving. Two double-seated chariots ornamented by scrolls and flowers increase the seating capacity of the carousel to thirty-six. All stations are of brightly painted carved wood trimmed with gold. The carousel is further ornamented with three tiers of "scenery" containing sixty-four original oil paintings. Above the outer ring of animals, at the end of the sixteen-spoke rafters, are thirty-two oil paintings on wood. Sixteen are large views of animals ranging from chickens to buffalo, framed in a long cartouche of painted scrolls. Between these and over each animal is a smaller landscape painting set in a frame of gilded wood scrolls. Much of the mechanical equipment and structural members are concealed by two inner tiers of paintings. The upper tier features fifteen genre and landscape scenes of Europe and the Middle East painted in oil on canvas. On the sixteenth panel is the advertisement: "G. A. DENTZEL BUILDER of the LATEST IMPROVED CARROUSEL [sic] 3635-41 Germantown, Pa." Both paintings and advertisement are framed in wood with painted scrolls. One scene in the upper tier has been repainted, with minimal success. Below are sixteen canvases which unfortunately have been painted over in red, white, and blue, with eagle decals applied over the alternating white canvases. These too were originally small landscapes. A deck of wide planks forms the riding platform, which is raised twelve inches off the floor and encircled by a four-inch metal rim. The original carousel pipe organ fell into disrepair years ago and was supplanted by recorded music. Otherwise, the carousel is in excellent mechanical condition.

Figure 2. Text from original submission to Department of the Interior, National Park Service, 1979, in support of nomination of the Dentzel Carousel for placement on the National Register of Historic Places. <https://www.apps.mdah.ms.gov/nom/prop/17099.pdf>

One Map for All Downtown Horse Locations

Ongoing archival work from Lauderdale County (containing Meridian) on their visitors website [Meridian/Lauderdale County Tourism Bureau], shows photos of each horse, information about the donor, artist, horse name, and a link to a location map showing the location of that particular horse, and only of that horse. Co-Editor of this issue, Richard ‘Clay’ Hamilton recalls photographing the horses at the opening ceremony for each, during his time as an ace reporter for the Meridian Star (separate from the photographs here that currently appear on the noted website). He commented that the presentations were often closely spaced in time.

The County website is one that is both useful to visitors and likely to attract them. Figure 3 shows the mapped, spatial location (recorded by street address on the County website) of each horse in the downtown Meridian area in Google Earth as a yellow area ‘placemark’. The entire

downtown distribution of horses is shown here, on a single map in Figure 3. On the County website there appears to be no such map showing the entire distribution.

We used Google Earth (free version) so that we have a dynamic, interactive, view of horse location in association with 3D buildings, and other layers and views, in the default Google Earth loadset. We offer the reader the associated kmz file to download so that he/she might experience the full capability of moving around and adding extra layers of information.



Figure 3. Yellow arrows point to locations of 15 carousel horse sculptures in downtown Meridian.

The 15 downtown horses are numbered on the County website according to alphabetical order of the name of the horse. While that strategy is useful in finding a particular horse by name, that numerical ordering of the horses does not correspond to an efficient tour for viewing the horses—a quick glance at Figure 3 reveals that situation.

If one clicks on a yellow arrow in the associated kmz file, the photo of the horse along with artist and sponsor information pops up (Figures 4a-4o). The sequence of static images in Figure 4 consists of screen captures from that kmz file. The QR code in Figure 4p takes the reader to a link in the corresponding html file that displays the sequence of all 65 horses archived on the Lauderdale County website, in animation.

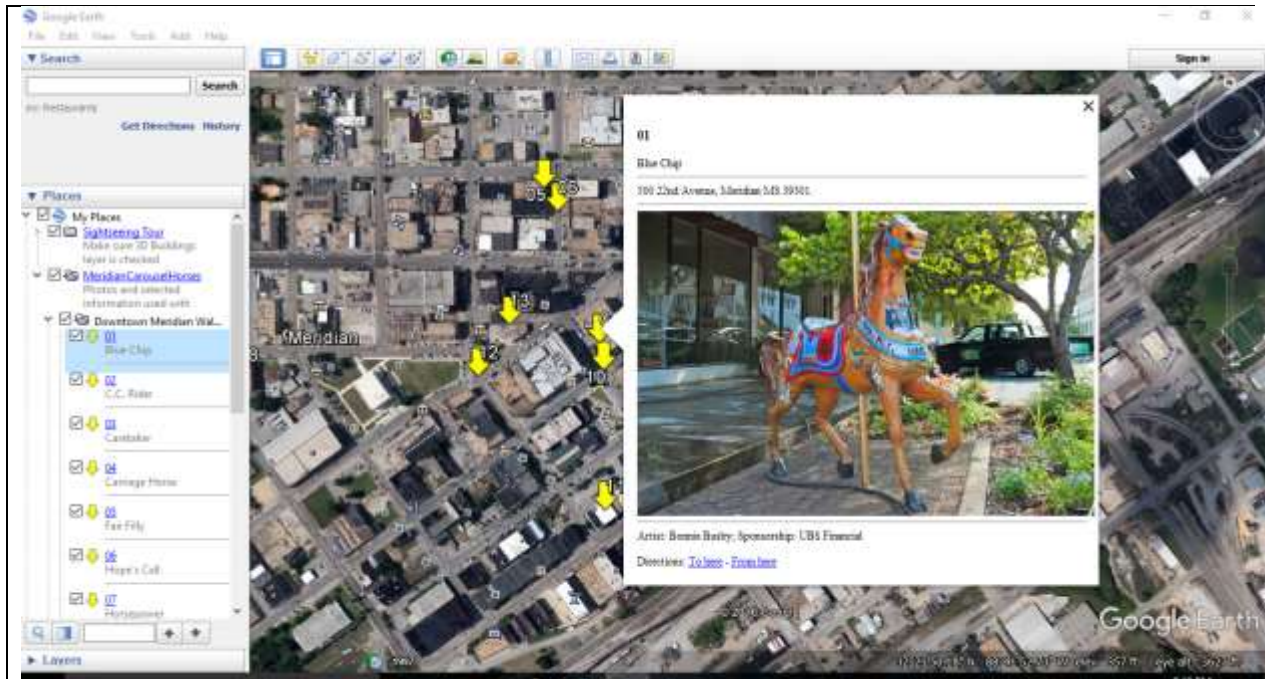


Figure 4a. Blue Chip.

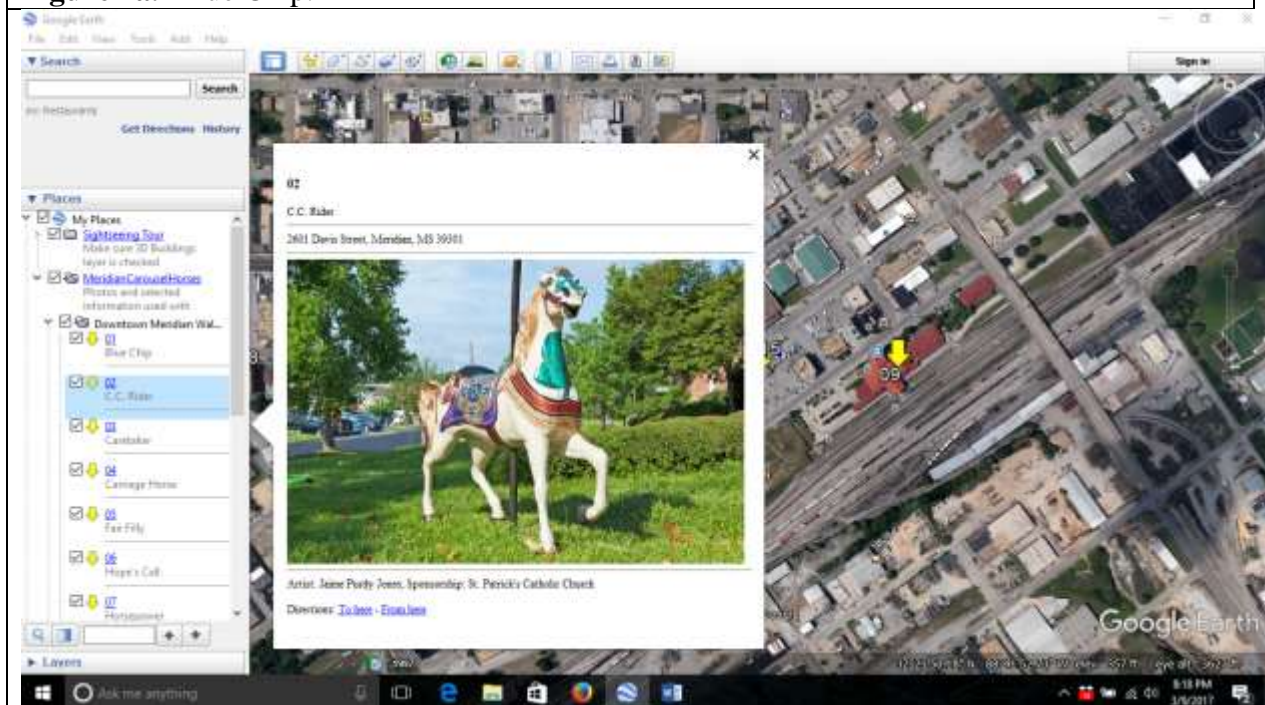


Figure 4b. C. C. Rider.

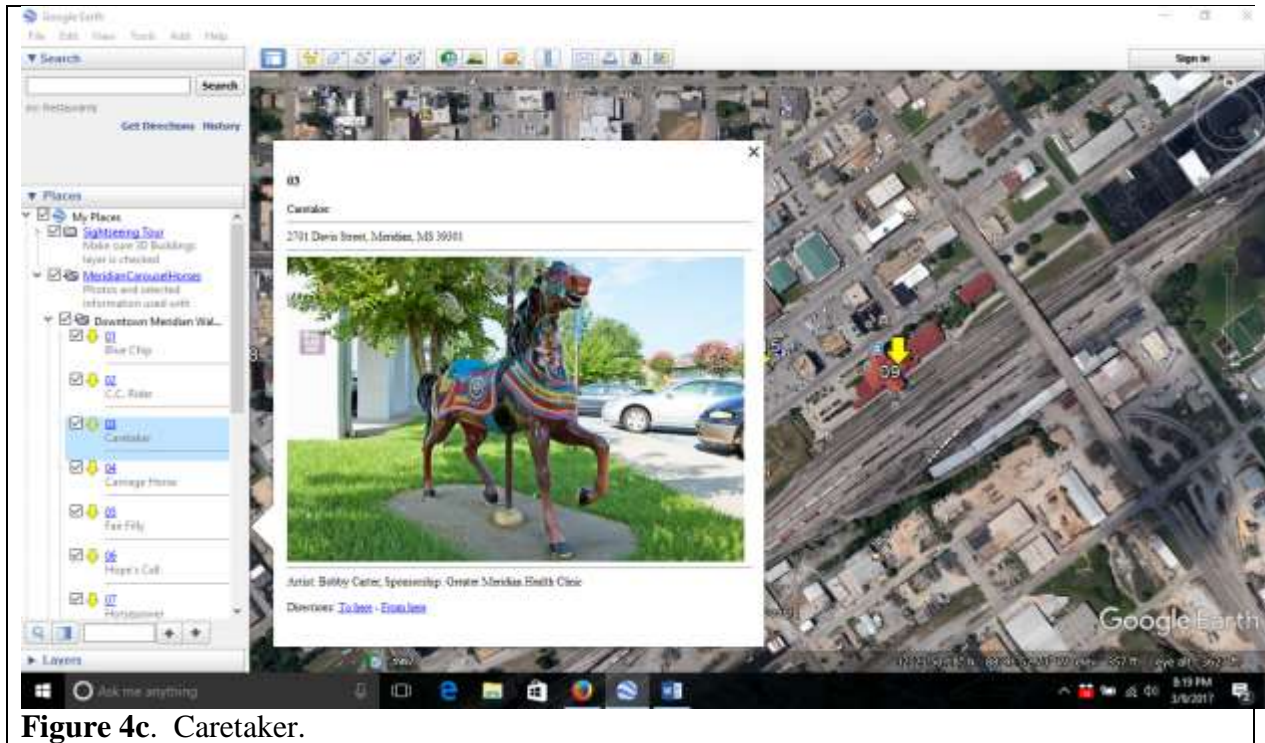


Figure 4c. Caretaker.

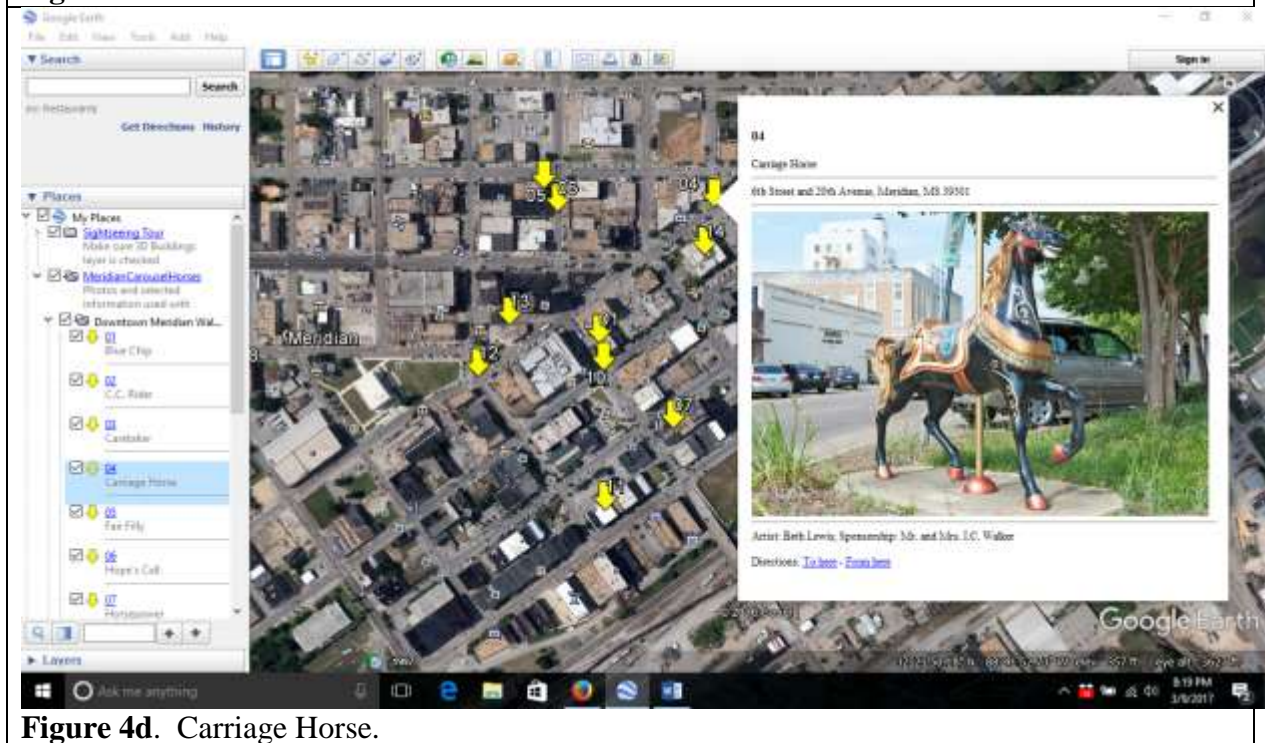


Figure 4d. Carriage Horse.

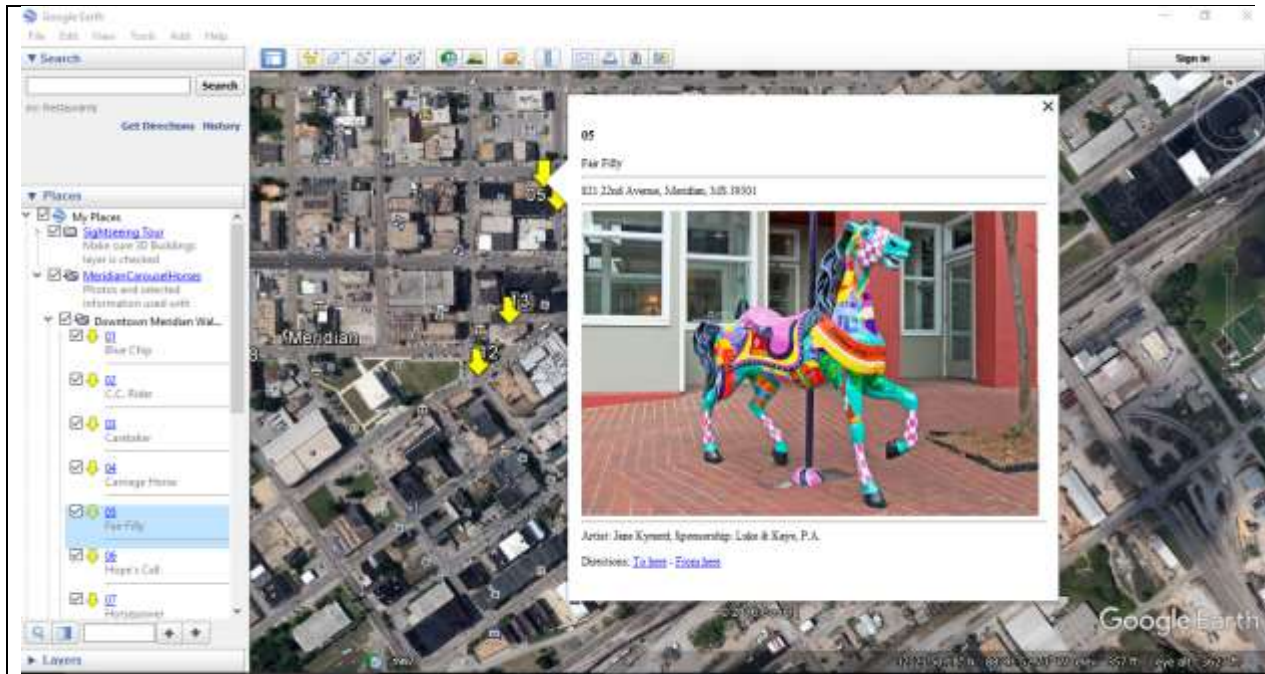


Figure 4e. Fair Filly.

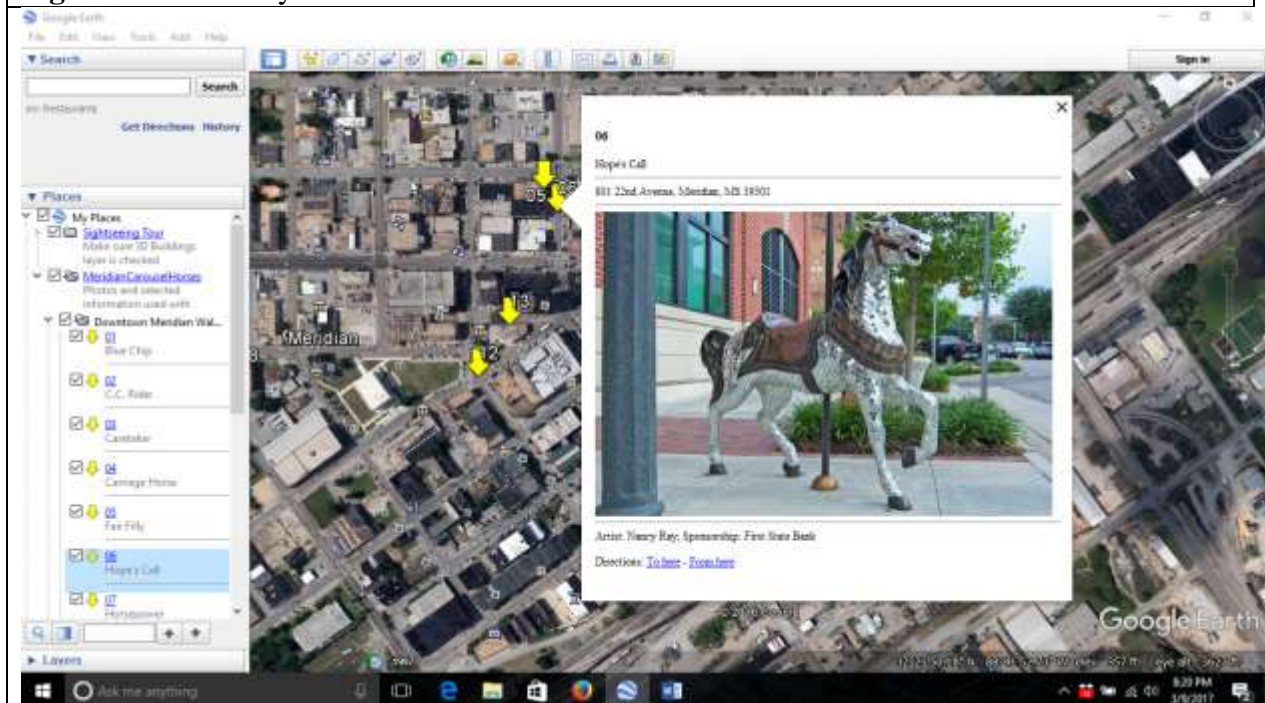


Figure 4f. Hope's Call.

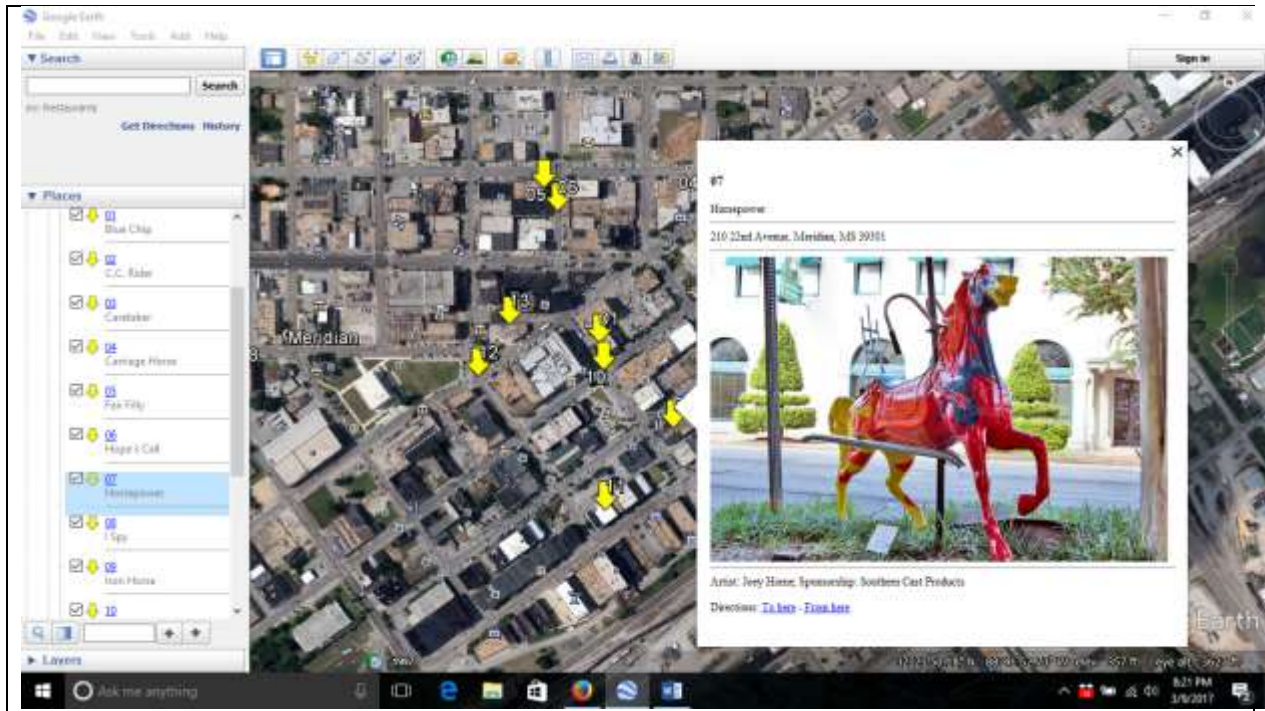


Figure 4g. Horsepower.

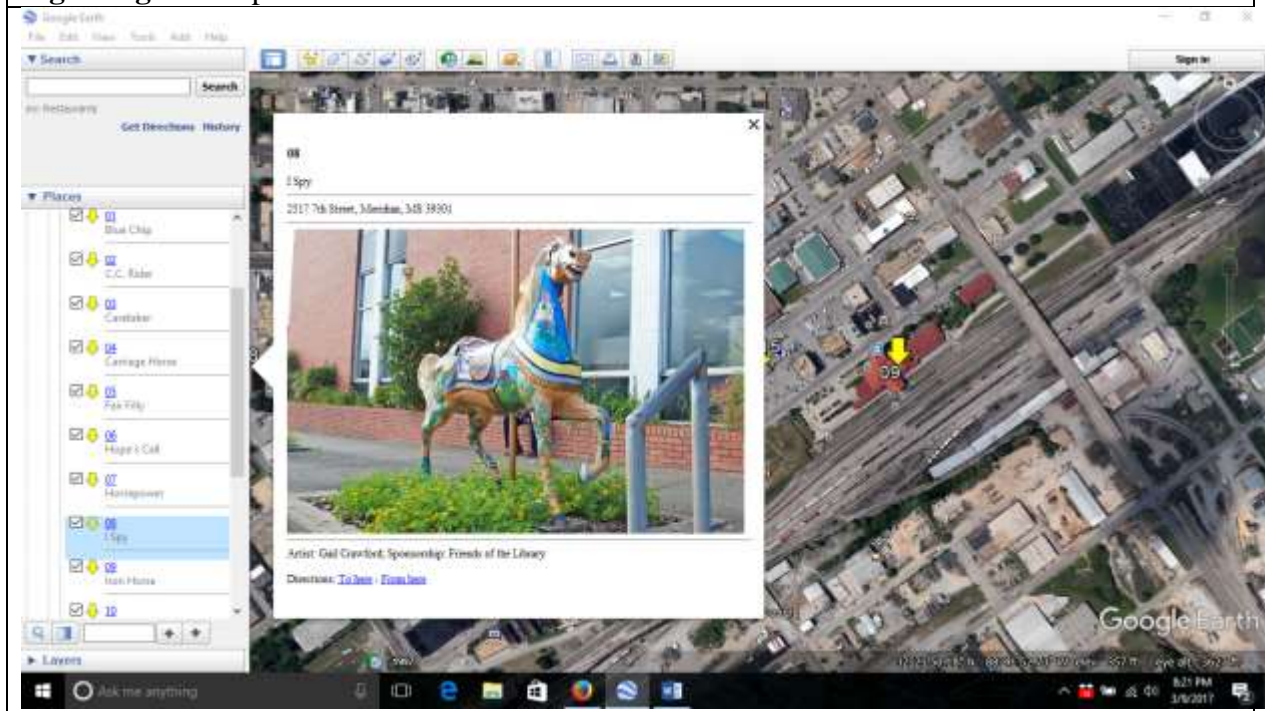


Figure 4h. I Spy.

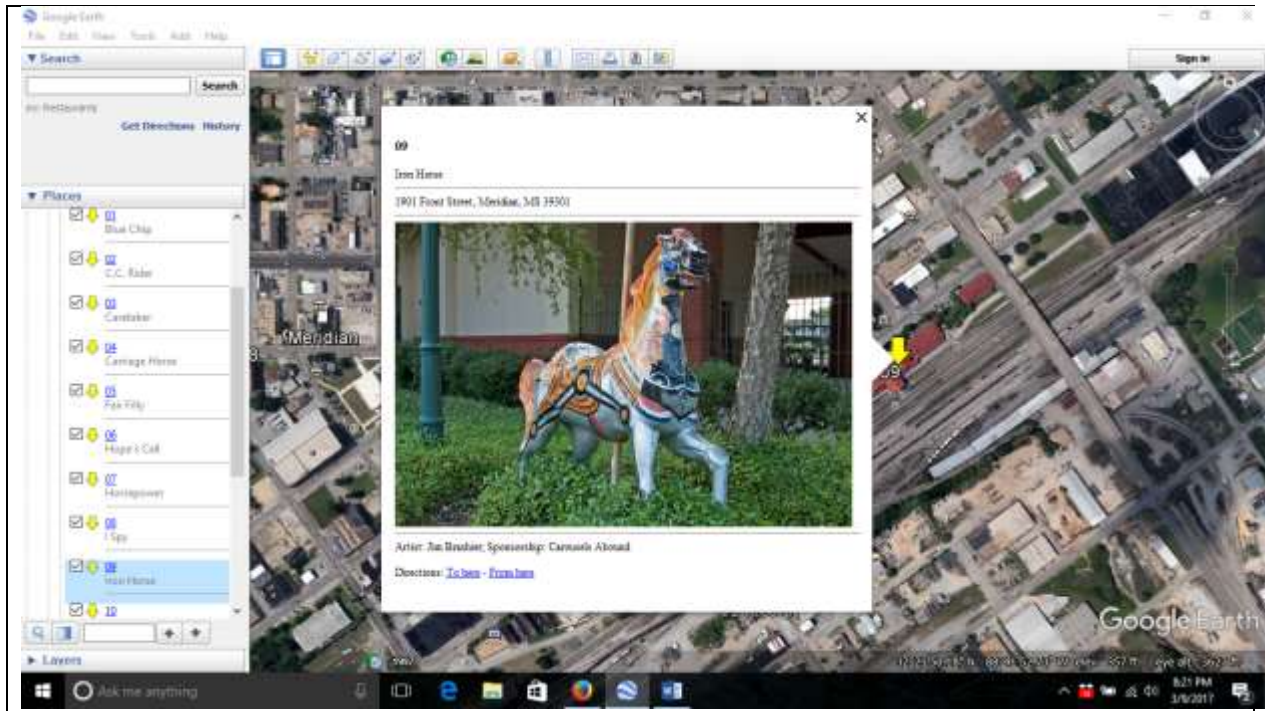


Figure 4i. Iron Horse.

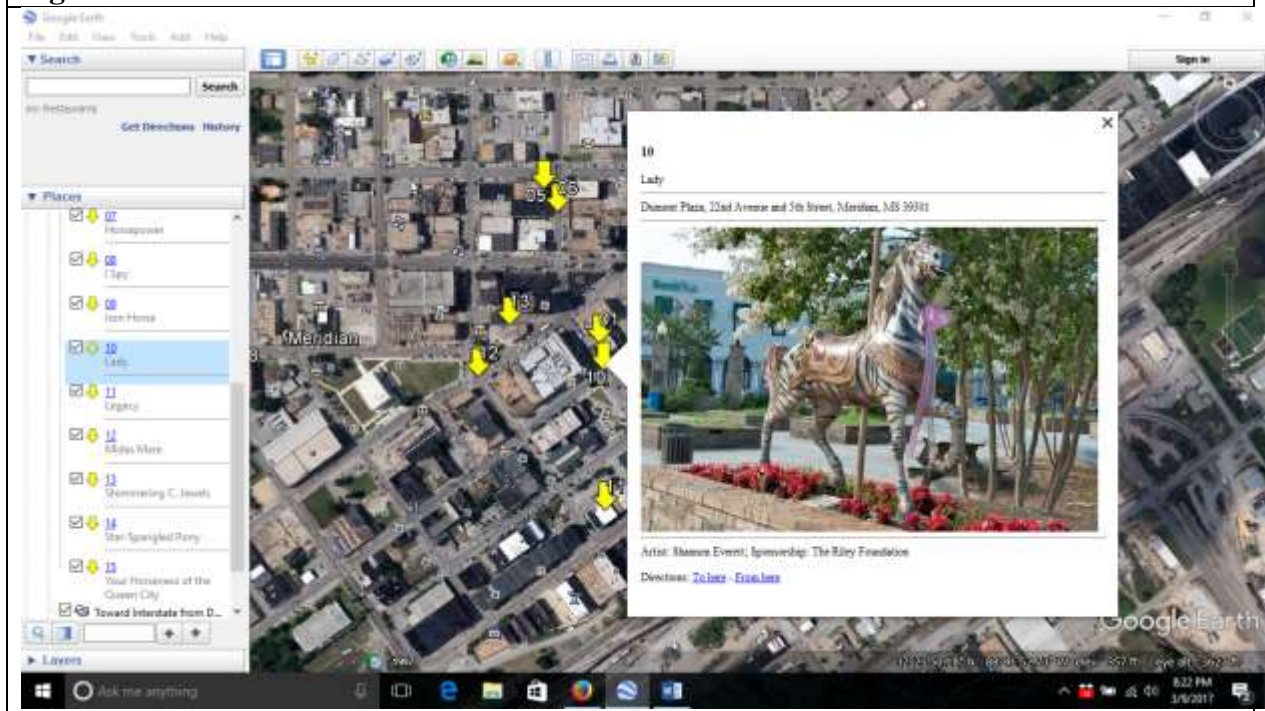


Figure 4j. Lady.

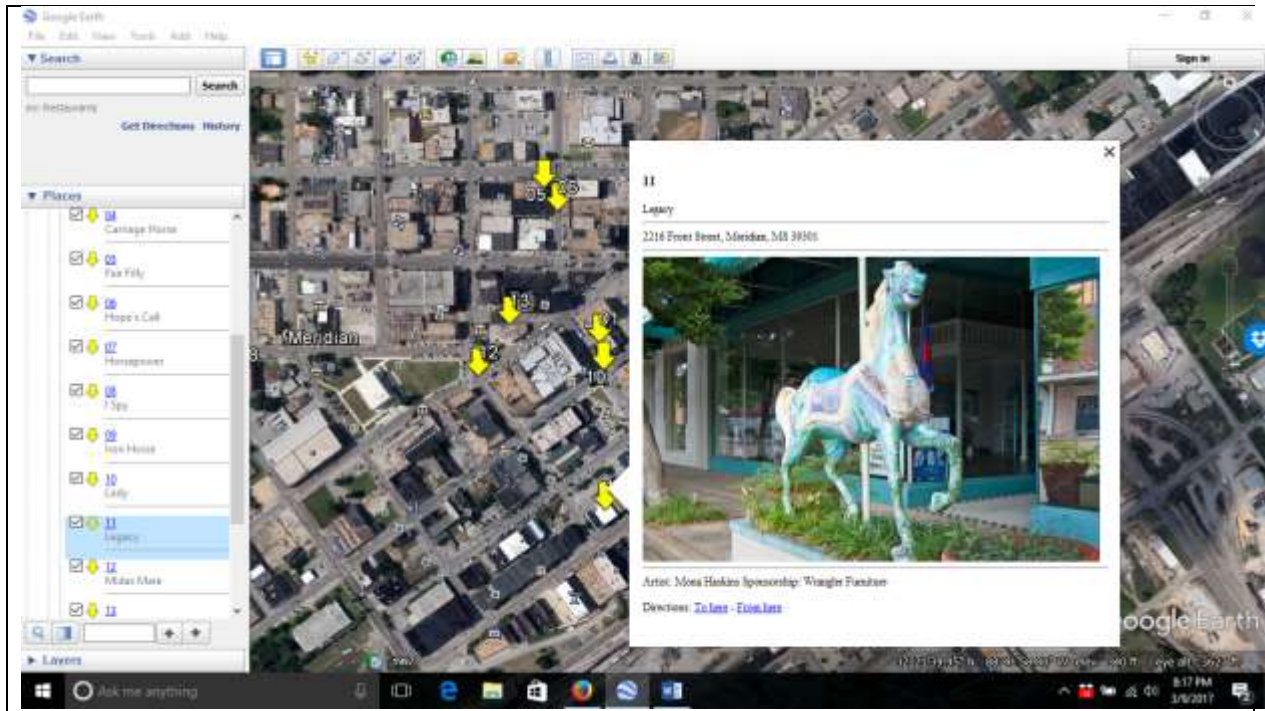


Figure 4k. Legacy.

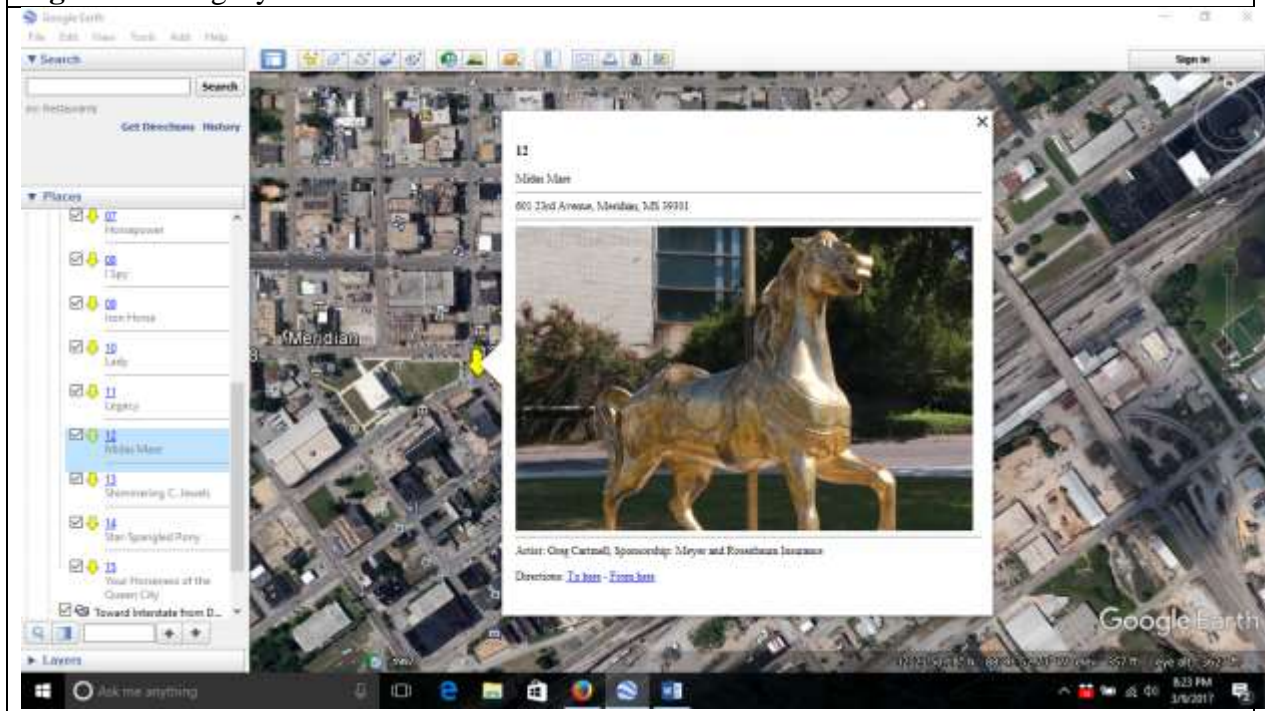


Figure 4l. Midas Mare.

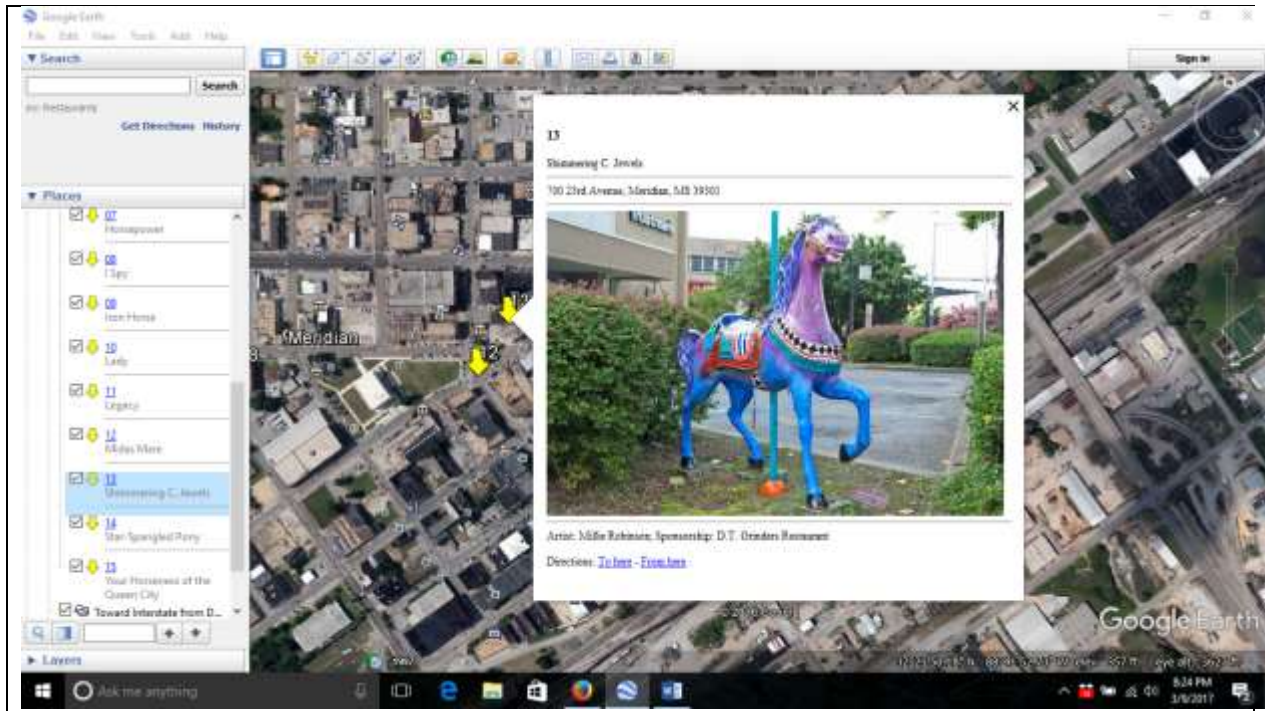


Figure 4m. Shimmering C. Jewels.

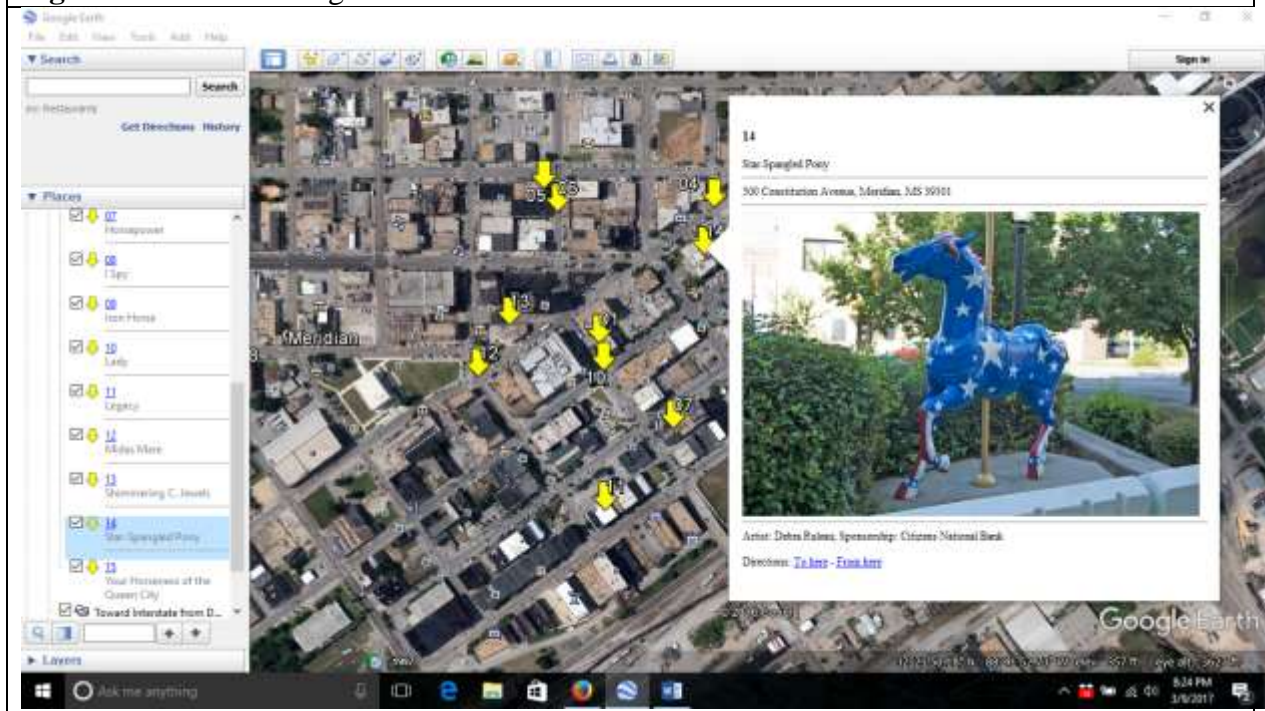


Figure 4n. Star-spangled Pony.

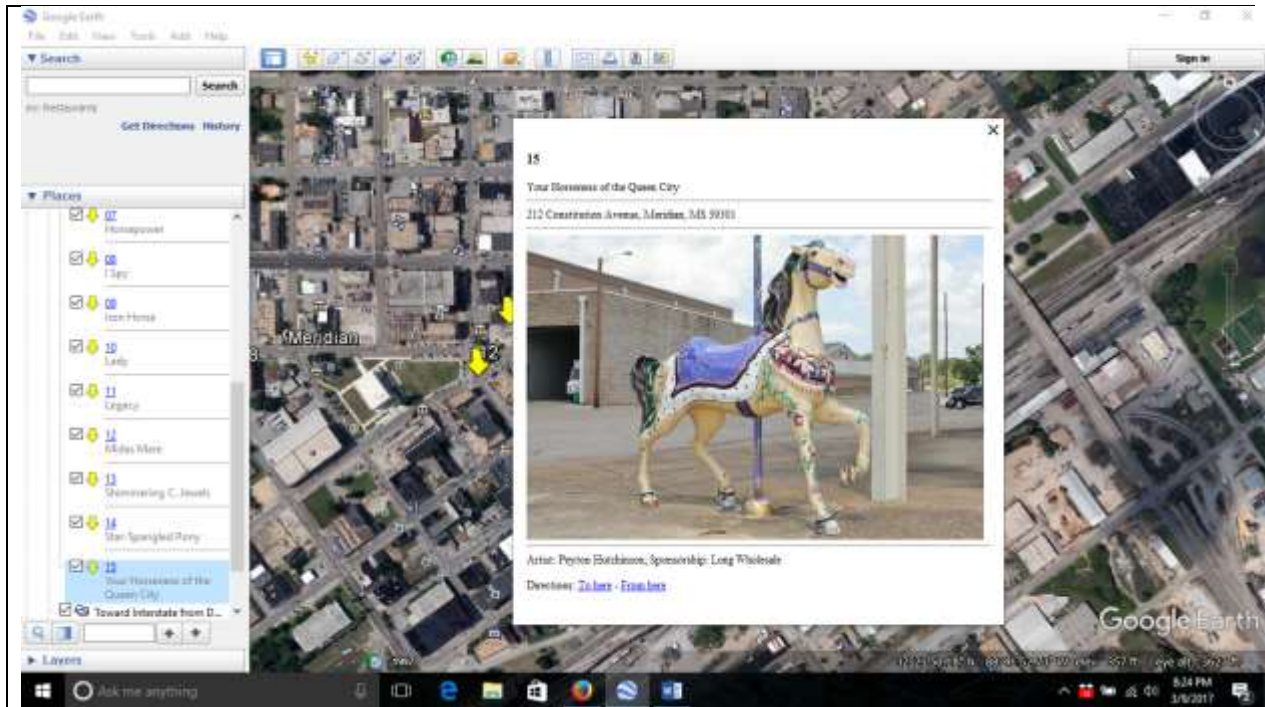


Figure 4o. Your Horseness of the Queen City.



Figure 4p. QR code linking to animation of photos of all 65 horses archived in the Lauderdale County website.
<http://www.mylovedone.com/image/solstice/sum17/AniCarouselHorses.gif>

Optimal Routing Problems: Viewing the Art Display Efficiently

In the Downtown:

To arrange a tour according to shortest time or distance, rather than according to alphabetical order based on horse name, the numbering of the horses needs to be adjusted: the pattern in Figure 3 is not the shortest route when one goes from 1 to 15 in order and then returns to 1 from 15. Finding a shortest circuit traversing a given set of locations and returning to the starting point is a famous problem in mathematics (combinatorial optimization), called ‘The Travelling Salesman Problem’. Typical phrasing of the problem is generally similar to: “*Given a list of cities and the distances between each pair of cities, what is the shortest possible route that visits each city exactly once and returns to the origin city?*” The website of William Cook (2016) offers a useful history of the problem, from the 1930s to date, associated literature links, and helpful graphics. On it, he notes that the paper from 1954 by Dantzig, Fulkerson, and Johnson is a fundamental one in laying the basis for linear programming solution methods for a large set of locations that later became critical in solving integer programming problems in theoretical computer science

(Cook, 2016; Dantzig, Fulkerson, and Johnson, 1954). One other associated seminal paper, following shortly on the heels of the 1954 paper, considered problems of optimizing flow through networks (Ford and Fulkerson, 1956). Work on the travelling salesman problem, and other network optimization problems, remains a contemporary field of active research.

Papers that employ linear programming techniques to solve the travelling salesman problem become heavy with mathematical notation very quickly and the clarity of the simply-stated nature of the problem can become quickly obfuscated. Fortunately, the modern computer tools that techniques such as these helped to spawn offer easy-to-use methods of solution. They are, however, somewhat black-box in their use. Without knowing about their theoretical underpinnings, mistakes not only in calculation but also in presented results, and their interpretations, may well arise.

A quick online search for free download-tools to solve travelling salesman problems will yield a number of results. We chose one called ‘Optimap’ because it seemed clear and easy to use. The first step was to get a set of ‘distances between pairs of cities’—or, coordinates of points. Because the horses were already mapped in Google Earth, by street address from the County website, it was a simple matter to extract the latitude and longitude coordinates, in decimal degrees, calculated in Google Earth. These, along with other information about the horses, were put into a spreadsheet in Microsoft Excel. The lat/long coordinates were converted to text format in Excel so that they could easily be copied and pasted elsewhere. Figure 5 shows the spreadsheet used for the 15 horses in the downtown.

| Nbd | Number | Name | Street Address | City | State | ZIP | Latitude | Longitude | Coords: DecDeg (Lat,Long) |
|----------|--------|----------------------------------|--|----------|-------|-------|-----------|------------|---------------------------|
| Downtown | 1 | Blue Chip | 500 22nd Avenue | Meridian | MS | 39301 | 32.364218 | -88.699913 | 32.364218, -88.699913 |
| Downtown | 2 | C. C. Rider | 2601 Davis Street | Meridian | MS | 39301 | 32.363332 | -88.704781 | 32.363332, -88.704781 |
| Downtown | 3 | Carabaker | 2701 Davis Street | Meridian | MS | 39301 | 32.362278 | -88.70492 | 32.362278, -88.70492 |
| Downtown | 4 | Carriage Horse | 8th Street and 20th Avenue | Meridian | MS | 39301 | 32.360597 | -88.698526 | 32.360597, -88.698526 |
| Downtown | 5 | Fair Filly | 821 22nd Avenue | Meridian | MS | 39301 | 32.365788 | -88.700576 | 32.365788, -88.700576 |
| Downtown | 6 | Hope's Call | 801 22nd Avenue | Meridian | MS | 39301 | 32.365553 | -88.700414 | 32.365553, -88.700414 |
| Downtown | 7 | Horsepower | 210 22nd Avenue | Meridian | MS | 39301 | 32.363349 | -88.699021 | 32.363349, -88.699021 |
| Downtown | 8 | I Spy | 2517 7th Street | Meridian | MS | 39301 | 32.363849 | -88.704248 | 32.363849, -88.704248 |
| Downtown | 9 | Iron Horse | 1901 Front Street | Meridian | MS | 39301 | 32.363989 | -88.69811 | 32.363989, -88.69811 |
| Downtown | 10 | Lady | Dumont Plaza, 22nd Avenue and 5th Street | Meridian | MS | 39301 | 32.363539 | -88.699862 | 32.363539, -88.699862 |
| Downtown | 11 | Legacy | 2216 Front Street | Meridian | MS | 39301 | 32.362517 | -88.699847 | 32.362517, -88.699847 |
| Downtown | 12 | Midan Mare | 801 23rd Avenue | Meridian | MS | 39301 | 32.363878 | -88.701376 | 32.363878, -88.701376 |
| Downtown | 13 | Shimmering C. Jewels | 700 23rd Avenue | Meridian | MS | 39301 | 32.3644 | -88.700957 | 32.3644, -88.700957 |
| Downtown | 14 | Star-Spangled Pony | 500 Constitution Avenue | Meridian | MS | 39301 | 32.365112 | -88.698645 | 32.365112, -88.698645 |
| Downtown | 15 | Your Horseness of the Queen City | 212 Constitution Avenue | Meridian | MS | 39301 | 32.363938 | -88.697962 | 32.363938, -88.697962 |

Figure 5. MS Excel spreadsheet showing lat/long coordinates for 15 downtown horses.

In Figure 6, the lat/long coordinates, in text format, are copied and pasted into the ‘bulk add’ field in Optimap. Once the button, ‘Add list of locations’ is clicked (Figure 6), the locations appear in the map, with the same numbering pattern as in Figure 3.

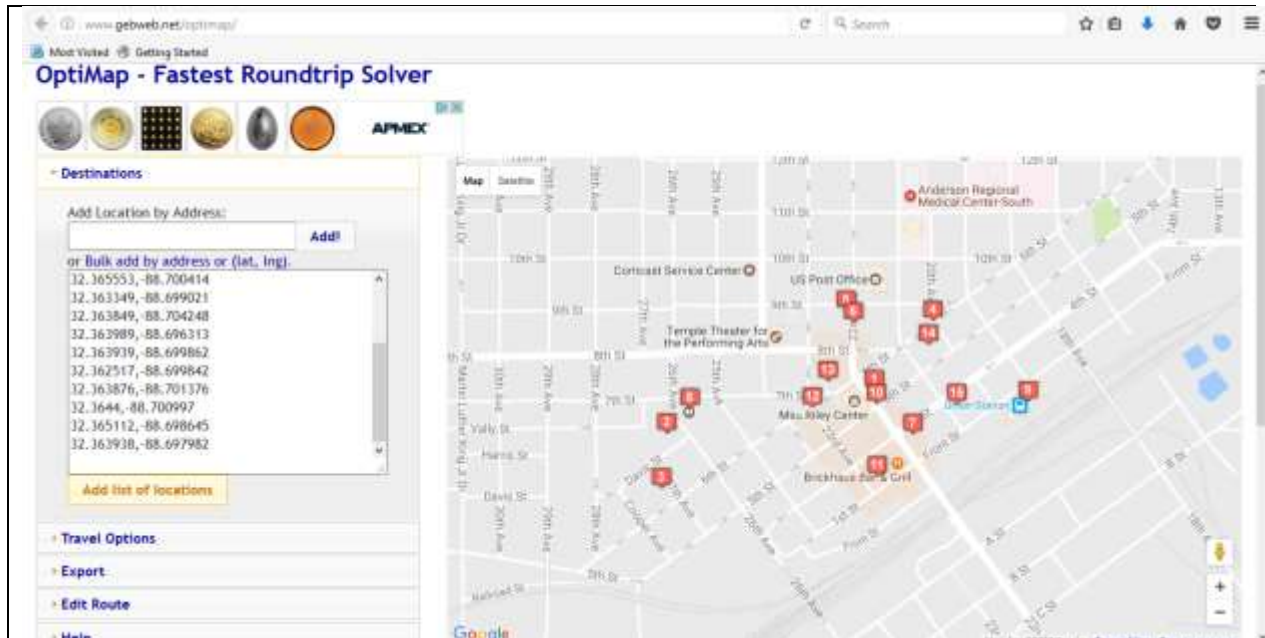


Figure 6. Add the list of horse location, then click the ‘Add list of locations’ button to map the locations.

The travel options button permits the selection of various kinds of tours. Then, when the ‘Calculate Fastest Roundtrip’ button is clicked (Figure 7), the computer works for a few seconds and then produces the optimal route. It takes a few seconds because first it calculates a route and then it checks that indeed the route calculated is in fact the shortest among all possible candidates for the shortest route.

This particular package gives ‘best’ routes for 15 or fewer points and gives a close-to-optimal (if not optimal) for larger distributions. It chooses the first point in the list of lat/long coordinates as the starting point (we kept it as the first one in the alphabetical list for purposes of ease in making comparisons). Follow the new numbering of location markers to run along the optimal route. The software also calculates route distance and route traversal time. The optimal route for a tour of 15 horses is shown in Figure 8.

Route existence is easier to determine than route uniqueness (as optimal); the degree of difficulty of the latter increases rapidly with more points in the distribution. One needs to know this idea in order to interpret the results and determine the level of confidence that should be placed in results. In this case, the software claims it produces the optimal route.

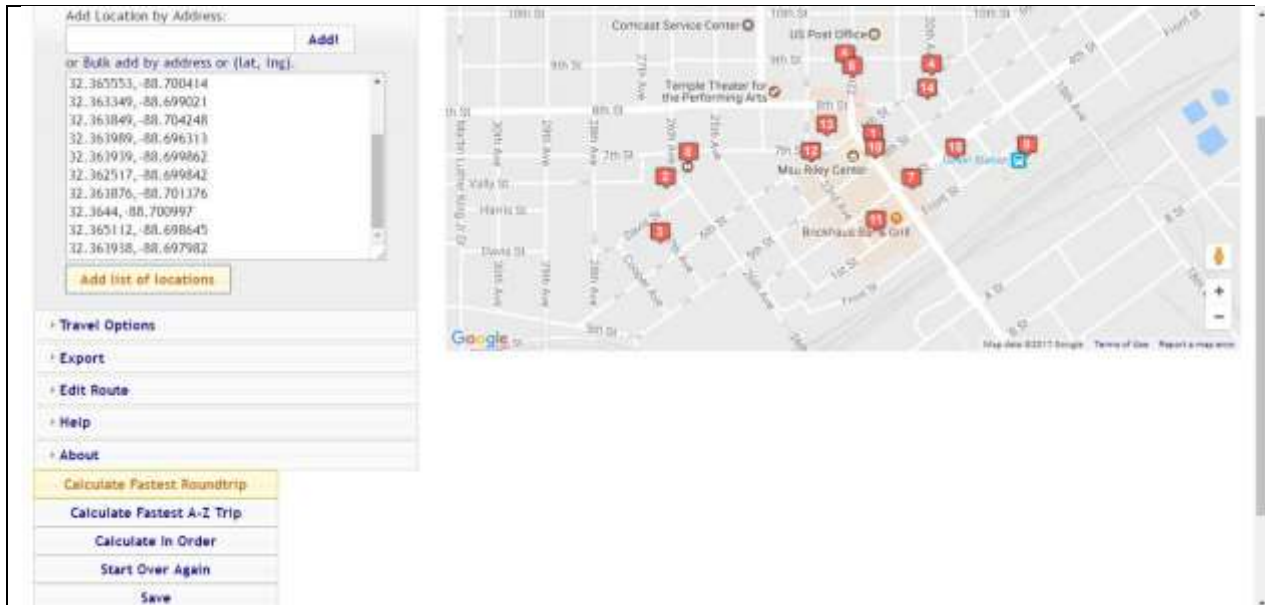


Figure 7. Click on the ‘Calculate Fastest Roundtrip’ button to create the optimal route on the 15 given points.

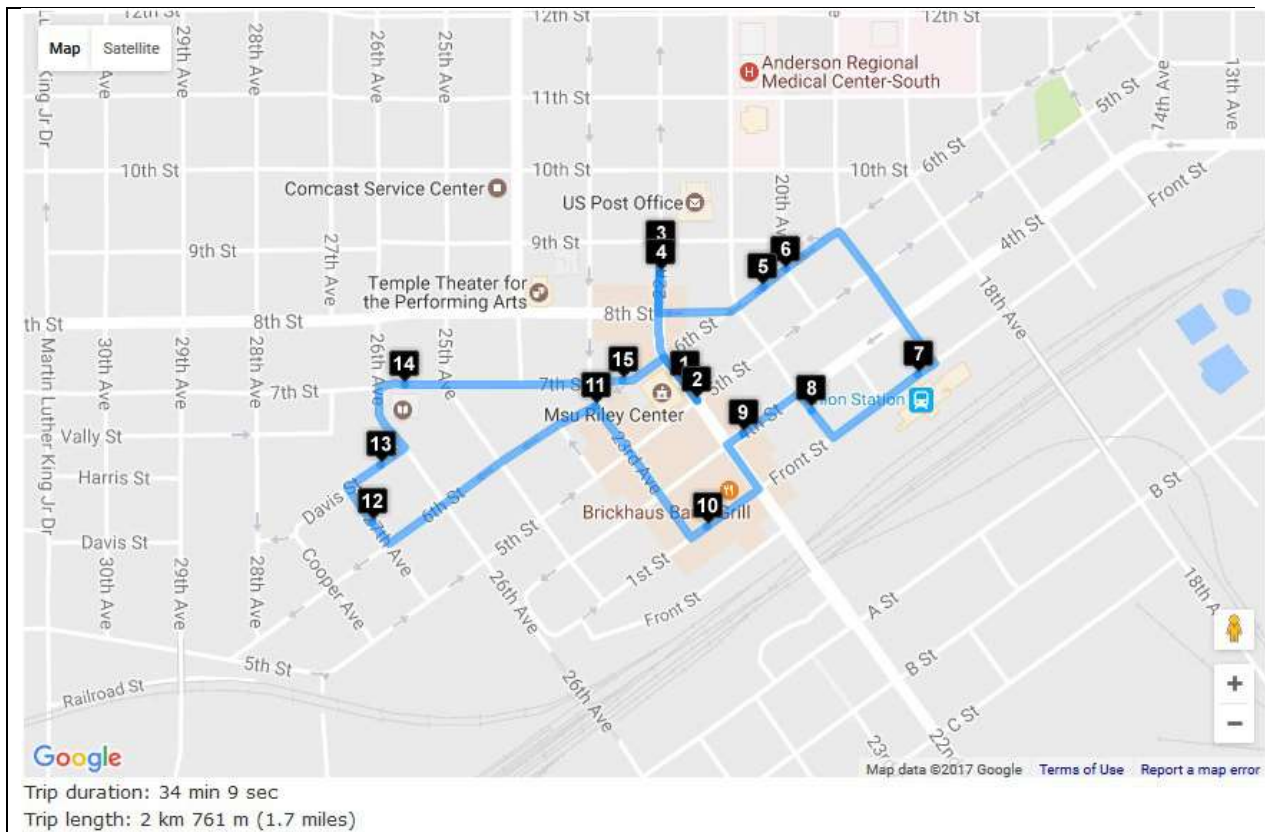


Figure 8. Optimal tour route for visiting downtown horses, calculated in Optimap.

To the North...

The remainder of the 65 horses were mapped in Google Earth (as in Figure 3) and associated entries entered into a spreadsheet (as in Figure 6). The County website organized the horses within neighborhoods. We showed the detail for the downtown neighborhood. The procedure is identical for each of the remaining neighborhoods. Thus, we display only the resulting final route map. Figure 9 shows a travelling salesman solution, using Optimap, for the distribution of horses to the North of downtown, out past the Northwood Country Club to the business district along North Hills Street and beyond.

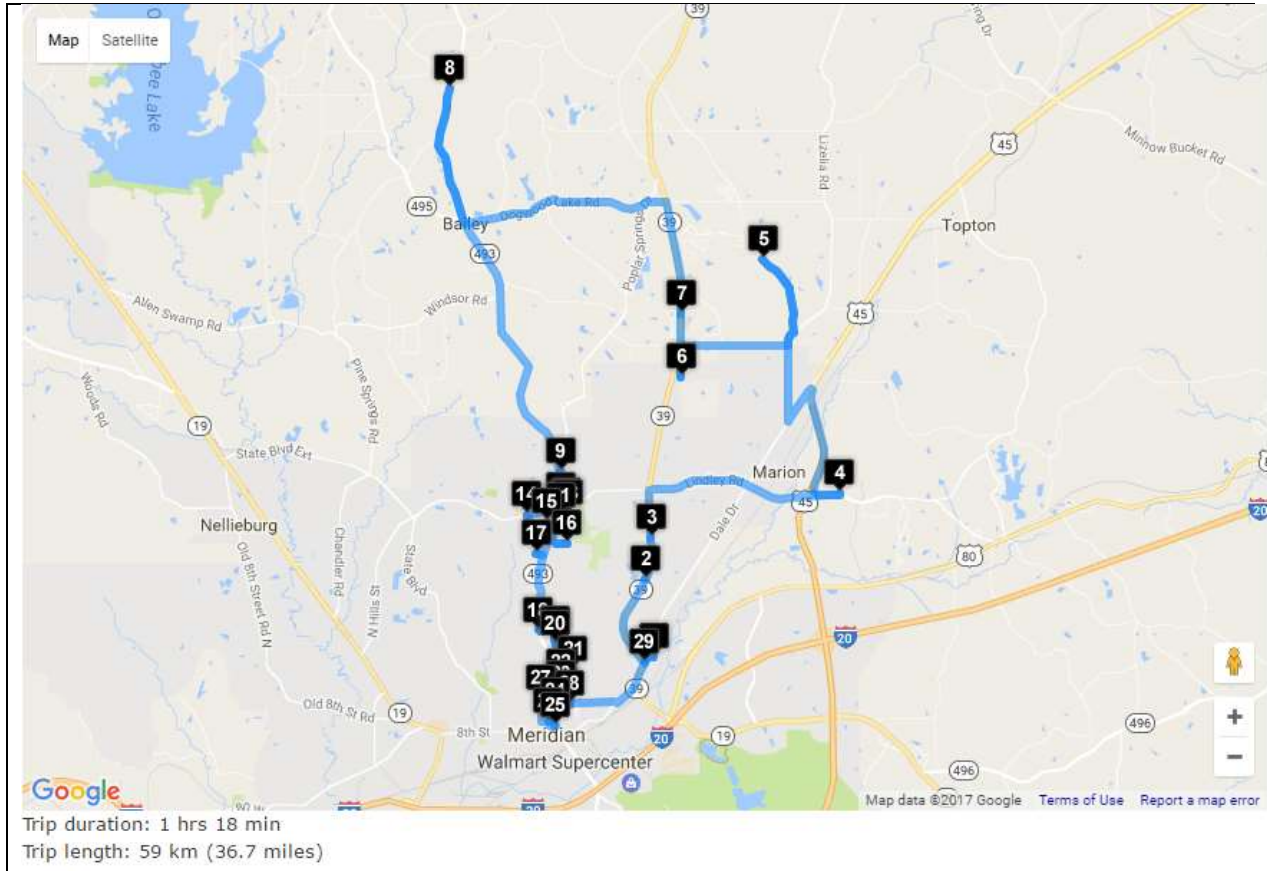
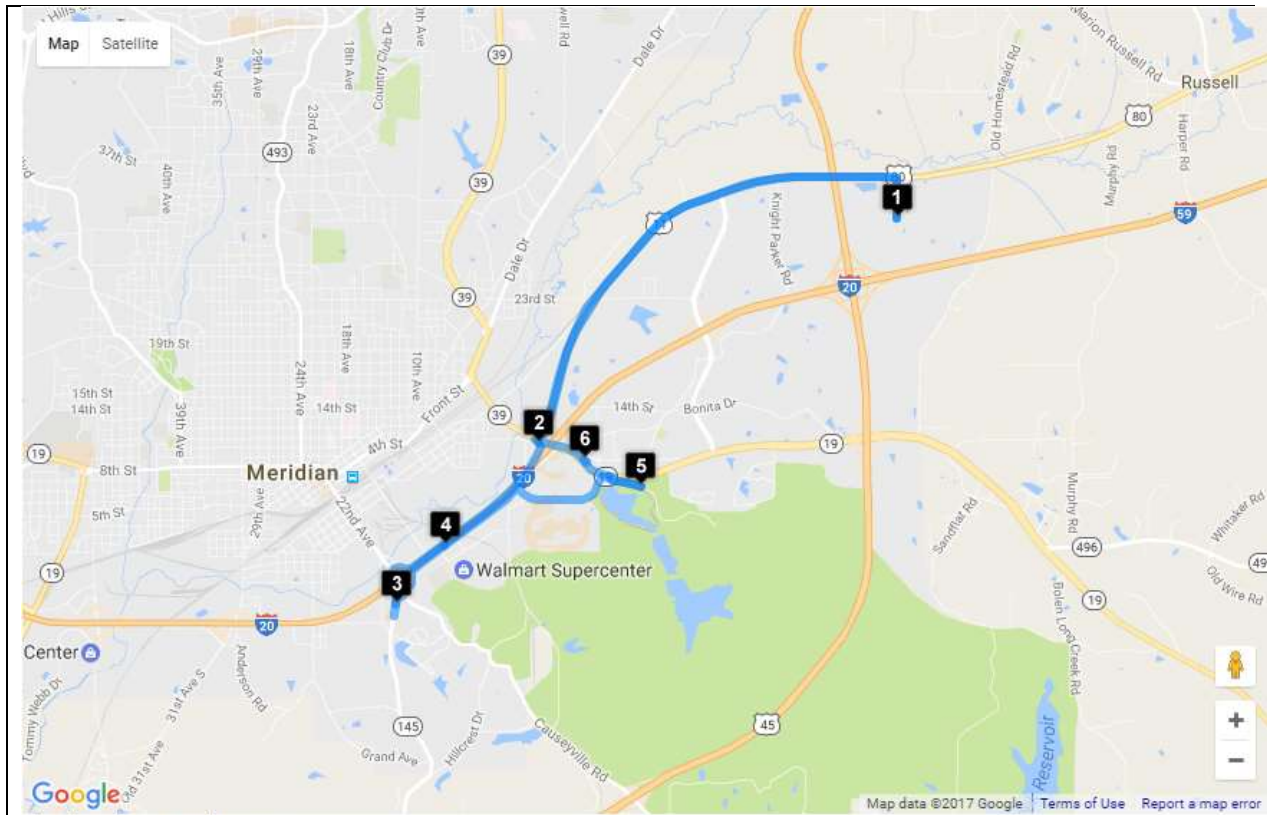


Figure 9. A travelling salesman solution for a tour of sidewalk horses to the north of downtown Meridian.

There were 29 horse locations in this distribution, so the resulting tour is only ‘close-to-optimal’ since the software guarantees ‘optimal’ for 15 or fewer locations.

To the South...

Figure 10 shows the optimal route for a tour of the six horse locations to the South of downtown Meridian.



Trip duration: 28 min 22 sec
Trip length: 20 km (12.6 miles)

Figure 10. Optimal route for a tour of horse locations to the South of downtown.

To the West...

Figure 11 shows an optimal route for a tour of horse locations to the West of downtown Meridian.

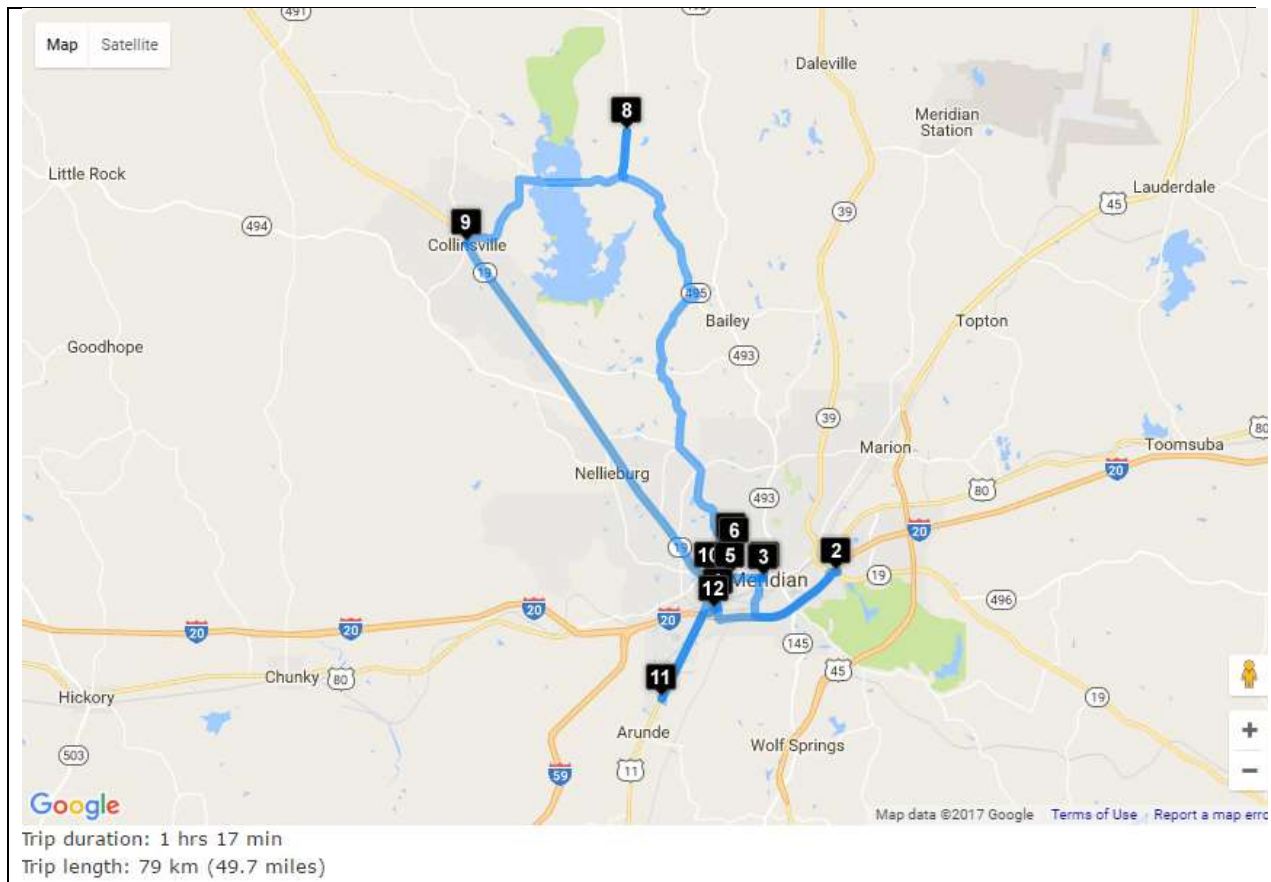
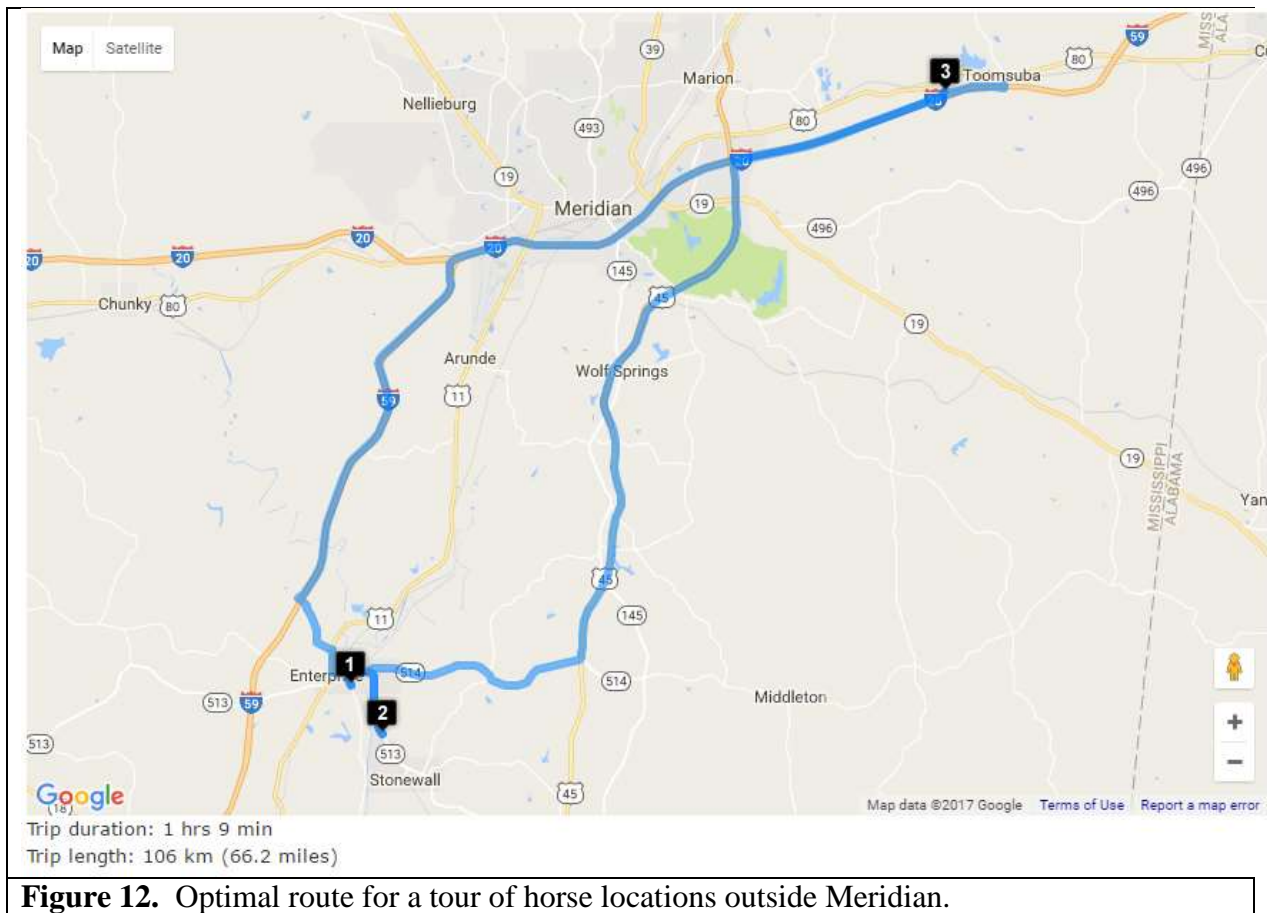


Figure 11. Optimal route for a tour of horse locations to the West of downtown.

Surrounding Areas...

Figure 12 shows an optimal route for a tour of horse locations outside Meridian.



Putting It All Together: The Whole Is Less than the Sum of its Parts

Optimap permits the use of up to 100 locations for finding optimal or close-to-optimal routes. When all 65 points were used, the map in Figure 13 shows a close-to-optimal route for the entire distribution. Calculation of that route, on a modest, but modern, laptop pc computer took about 45 minutes, given extensive checking and comparisons of numerous candidate routes.

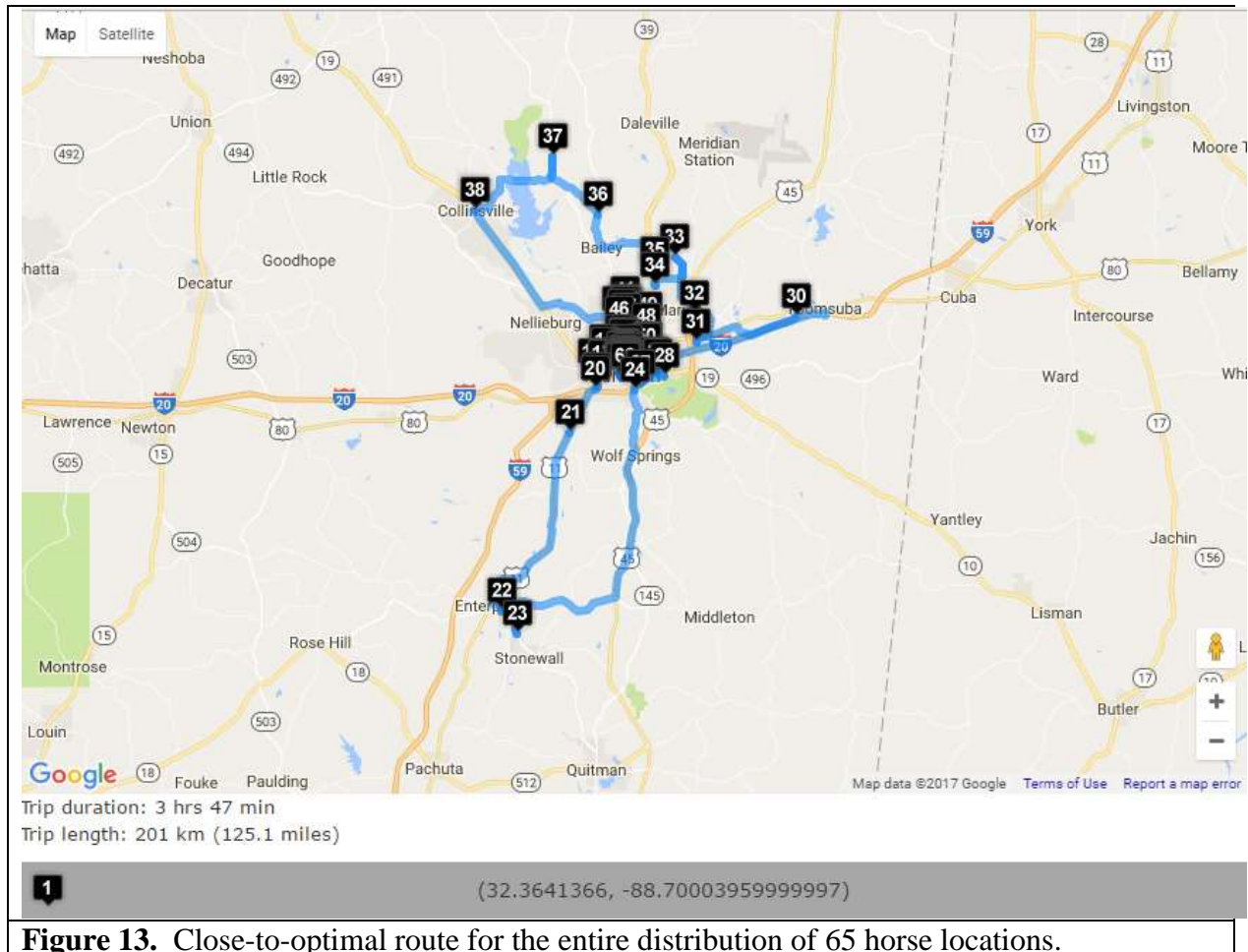


Figure 13. Close-to-optimal route for the entire distribution of 65 horse locations.

Was that effort worth it? Might it have been easier simply to piece together each of the neighborhood routes to form the larger route? The answer is simple—it might have been easier but the route generated would not have been either optimal or close-to-optimal! Visual comparisons show the difference at a glance—compare the view of the West in Figure 14 that is derived from zooming in on Figure 13 to the optimal route of the west in Figure 11.

Visual comparisons appeal to some of us (but not to others). A more systematic numerical approach is shown in Figure 15, based on distances and times calculated for the whole and for each of the parts (neighborhoods). The distance in kilometers for the whole is 201 km and for the sum of the neighborhood networks it is 266.761; the time traversal for the whole is 227 minutes and for the sum of the neighborhood networks it is 286.51.

Indeed, it's no surprise—the whole is less than the sum of its parts! Crossing back across downtown cuts off distance in integrating the various parts (neighborhood circuits) into the whole (Figure 16). A corollary to this observation is, equally, that a part extracted from the whole may well not be optimal...compare the downtown network in Figure 16 with the optimal downtown network of Figure 8.

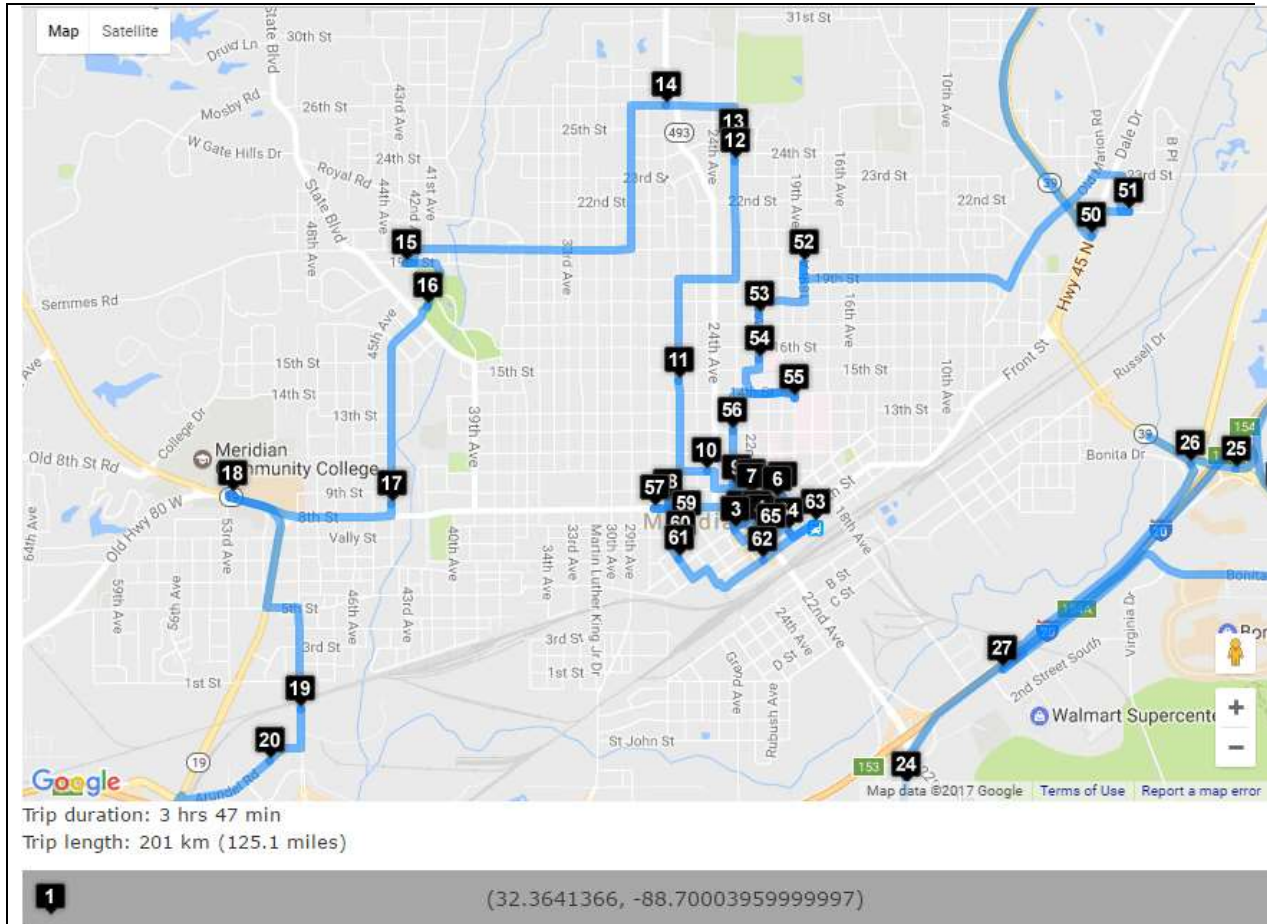


Figure 14. Compare the West route here, derived from Figure 13, to the optimal West route in Figure 11.

Figure 15. Comparisons between the ‘whole’ and its ‘parts’.

| Neighborhood | Time in Minutes | Distance in Kilometers |
|--------------|-----------------|------------------------|
| Downtown | 34.15 | 2.761 |
| North | 78 | 59 |
| South | 28.36 | 20 |
| West | 77 | 79 |
| Surrounding | 69 | 106 |

| Circuit | Time in Minutes | Distance in Kilometers |
|-----------------------------|-----------------|------------------------|
| Sum of Parts--Neighborhoods | 286.51 | 266.761 |
| The Whole--All 65 at Once | 227 | 201 |

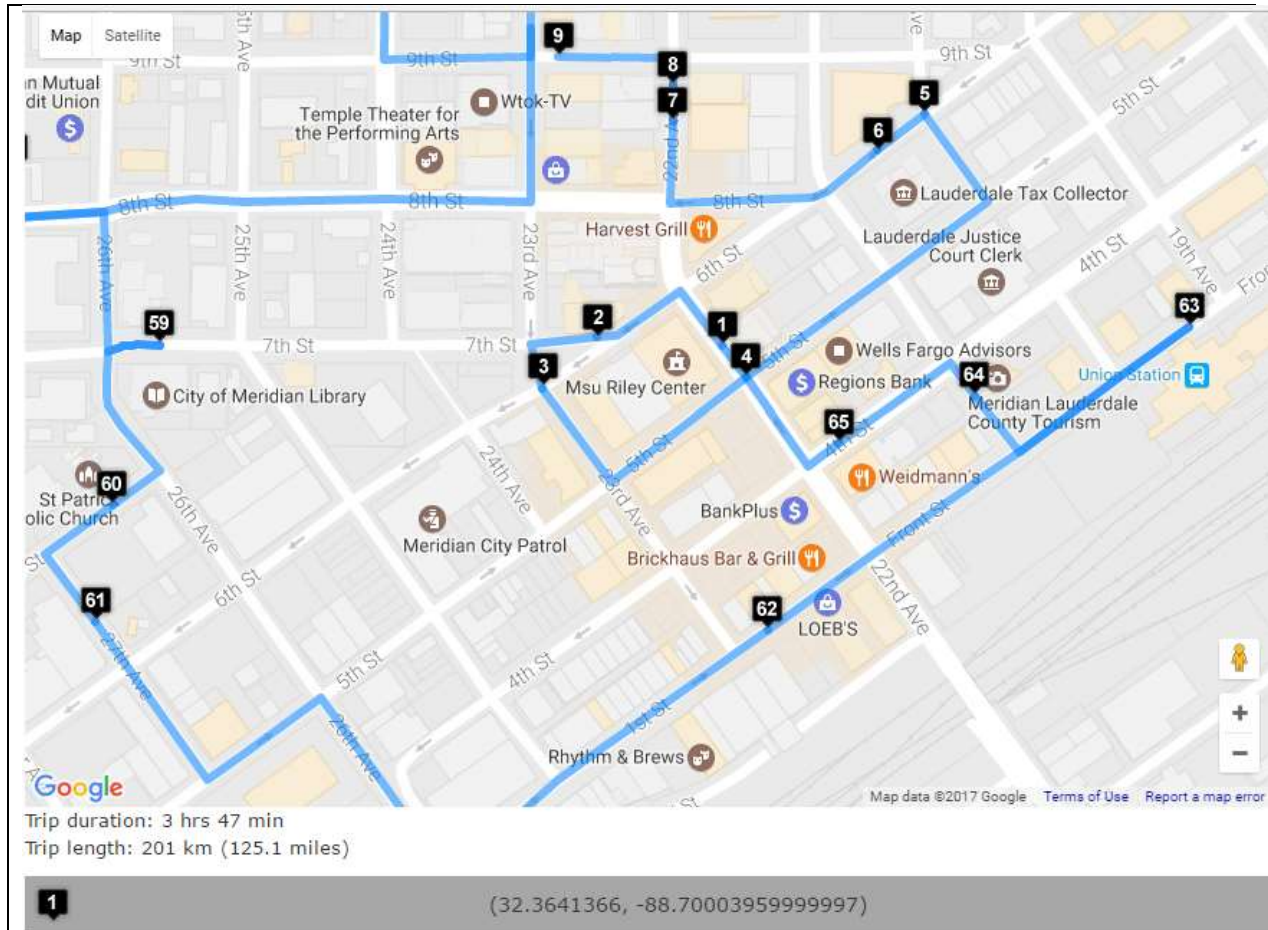


Figure 16. Downtown network extracted from the whole is non-optimal; compare to Figure 8.

Summary of Results

One simple result involved mapping all the horse locations on a single map (not readily available elsewhere). In addition to needing it to visualize circuits, that activity also has some community service benefit. The map and files are available to local folks to use as they wish, as is the associated kmz file showing all horse locations in Google Earth in relation to default layers in that program.

A broader result is to create optimal or close-to-optimal routes for tours, by neighborhood and for the entire distribution of horse locations. Again, when printed out, these tour routes might see use by the local community, by Pokemon Go players, and by visitors to the city of Meridian and to the new State of Mississippi Arts and Entertainment Experience in the Meridian downtown.

The deepest result is to reinforce, once again, that it is important to understand the theory behind easy-to-use software. Because we knew about the travelling salesman problem, and about network analysis in general, we knew to look at questions involving the suitability of piecing networks together: either assembling them or disassembling them. Once again the relation of the whole to the sum of its parts became important.

References

- Charleton, J. H. (October 1985). "[National Register of Historic Places Inventory-Nomination: Highland Park Dentzel Carousel & Shelter Building](#)" (pdf). National Park Service. Last accessed March 10, 2017.
- Cook, W. "The Travelling Salesman Problem." Last updated December, 2016. Last accessed April 12, 2017. <http://www.math.uwaterloo.ca/tsp/index.html>
- Dantzig, G.; Fulkerson, R.; and, Johnson, S. (1954). "Solution of a large-scale traveling-salesman problem", *Operations Research* **2**, 393-410.
- Dentzel Carousel and Shelter Building. https://en.wikipedia.org/wiki/Highland_Park_Dentzel_Carousel_and_Shelter_Building Last modified: April 2, 2017. Last accessed: April 5, 2017.
- Ford, L. R.; Fulkerson, D. R. (1956). "Maximal flow through a network". *Canadian Journal of Mathematics*. **8**: 399–404.
- Highland Park Dentzel Carousel and Shelter Building - Meridian,MS - U.S. National Register of Historic Places on Waymarking.com . 2017. <http://www.waymarking.com/waymarks/WM1DYF> Last accessed March 10, 2017.
- Kerski, Joseph. [Famous Boots of Wimberley, Texas: A Story Map](#). May 24, 2016. Last accessed May 3, 2017.
- Mary Poppins Merry-Go Round Scene. You Tube. October 9, 2016. <https://www.youtube.com/watch?v=ridzPEt8jHk>
- Meridian/Lauderdale County Tourism Bureau. Take a Carousel Tour. <http://www.visitmeridian.com/index.cfm/play/around-town-carousels-abound/take-a-carousel-tour/> Last accessed March 10, 2017.
- Meridian/Lauderdale County Tourism Bureau. Around Town Carousels Abound. <http://www.visitmeridian.com/index.cfm/play/around-town-carousels-abound/> Last accessed March 10, 2017.
- National Park Service. 1979. National Register of Historic Places Inventory—Nomination Form. <https://www.apps.mdah.ms.gov/nom/prop/17099.pdf>