APPENDIX A:

SUMMARY OF MEETING WITH FLYING J MANAGEMENT

Project Memo

To: Project File

From: Scott Walker

Date: December 12, 2005

Subject: Conversation with Flying J Store Manager

This purpose of this file is to document a conversation between a store manager of the Flying J Travel Center in Walton, Kentucky on December 7, 2005 by Lindsay Walker and Scott Walker, both of Parsons Brinckerhoff.

Lindsay informed the manager that traffic counts were being conducted in the vicinity of the travel center and it was important to determine when the Flying J experienced its peak traffic. The manager, appearing certain of his response, indicated that between 10:00 AM on Tuesday through 10:00 PM on Thursday were the peak times for the travel center. He also indicated that this particular Flying J was the 3rd busiest Flying J in the United States.

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APPENDIX B:

PROJECT TEAM MEETING #1 MEETING MINUTES

Parsons Brinckerhoff Quade & Douglas, Inc.

Memorandum

TO: Scott Thomson, PE
Project Manager
Kentucky Transportation Cabinet – Central Office, Division of Planning

FROM: Frank S. (Steve) Slade, PE, PLS
Project Manager
Parsons Brinckerhoff, Inc.

DATE: August 9, 2006

SUBJECT: I-75 / KY 14 Interchange Study
Statewide Modeling MDL-1
Summary of Project Team Meeting on August 7, 2006

A Project Team Meeting for the subject project was held August 7, 2006 at the District 6 Office in Covington, Kentucky. The following people were in attendance:

NAME	REPRESENTING	E-MAIL ADDRESS
Tom Schomaker	KYTC – District 6 – Chief District Engineer	tom.schomaker@ky.gov
Jim Brannon	KYTC – District 6 – Pre-Construction	jim.brannon@ky.gov
Rob Hans	KYTC – District 6 – Planning	robert.hans@ky.gov
Mike Bezold	KYTC – District 6 – Planning	mike.bezold@ky.gov
Jimmy Wilson	KYTC – Central Office – Planning	jimmy.wilson@ky.gov
Scott Walker	Parsons Brinckerhoff	walkersc@pbworld.com
Steve Slade	Parsons Brinckerhoff	slade@pbworld.com

The purpose of the meeting was to provide an update on progress that has been made on the study and to review the current baseline data and preliminary alternates that have been developed.

The following is a summary of what was discussed at the meeting:

1. The draft purpose and need statement was discussed. It was noted that air quality improvements should be included with the statement.

2. The scope of work and the current progress for the study was discussed.

3. PB provided attendees a handout that included the draft purpose and need statement, draft of current ADT, draft of base year AM and PM turning movements, and crash data. It was noted that collection of data has not yet been completed.

4. It was discussed that the Flying J may be at or near capacity and therefore judgment should be used with respect to the traffic forecast of vehicles to and from this truck stop. It was also noted that the future development east of the interchange should be accounted for with the traffic forecast.

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5. PB presented preliminary alternates that have been developed and provided attendees a copy of the layouts. The alternates included:

   - Alternate 1 – Add an actuator on the SB off-ramp that would help clear the right turn of the intersection when the queue reaches the detector.

     This alternate was deemed to be worth further development and evaluation.

   - Alternate 2 – Re-phase the signals into a 4-phase cycle and each phase would have an extended red clearance to clear vehicles from both intersections. The two intersections would operate as one.

     Concern was expressed regarding potential conflicts of simultaneous left turns that would have to be made by KY 1292 and SB off-ramp vehicles. This alternate was deemed to be unfavorable for further evaluation. This will be discussed further with the District 6 traffic staff to see if they agree.

   - Alternate 2A – This is similar to Alternate 2 with the exception that the two existing signal controllers would be replaced with one controller and the two intersections would operate as one with one set of signal heads.

     This alternate was deemed to be unfavorable with respect to having only one set of signal heads and therefore will not be retained for further evaluation.

   - Alternate 3 – This is construction of a roundabout for vehicles on all 6 legs.

     This alternate was deemed to be desirable for further development and evaluation.

   - Alternate 4 – This is for construction of a spur ramp off of the SB off-ramp that would intersect KY 1292 and be primarily for trucks heading toward the Flying J and for trucks heading back north to the landfill. The SB off and on ramps would be reconstructed and shifted to the east to provide more room between the intersections. A slip ramp to the SB on-ramp would also be constructed for trucks and other vehicles leaving the Flying J.

     Concern was expressed regarding the tie-in of the spur ramp to KY 1292 and that this may just push the queue problem to this area. The potential need for a signal at this intersection was also considered undesirable. Therefore, this alternate will not be retained for further development and evaluation.

   - Alternate 5 – This is for construction of aligning KY 14 that runs east and west with the KY 14 that runs to the south and then realigning KY 2954 to intersect with KY 14. KY 1292 would be realigned to intersect with KY 2954 further to the west. The SB on and off ramps would be reconstructed and shifted to the east.

     It was discussed that it is more desirable to have KY 1292 intersect KY 14 as in Alternate 6 and therefore this alternate will not be retained for further evaluation in favor of keeping Alternate 6.

- Alternate 5A – This is the same as Alternate 5 except that the SB on and off ramps would not be reconstructed toward the east.

  This alternate will not be retained for further evaluation in favor of keeping Alternate 6.

- Alternate 6 – This is for construction of aligning KY 14 that runs east and west with the KY 14 that runs to the south and then realigning KY 1292 to intersect with KY 14. KY 2954 would intersect with KY 1292. The SB on and off ramps would be reconstructed and shifted to the east.

  This alternate was deemed to be desirable for further development and evaluation.

- Alternate 6A – This is the same as Alternate 6 except that the SB on and off ramps would not be reconstructed toward the east.

  This alternate will not be retained for further evaluation in favor of keeping Alternate 6.

6. The next Project Team Meeting is scheduled for September 26, 2006. The baseline VISSIM model will be presented along with further development of the selected alternates and the respective VISSIM modeling and analysis of improvements derived.

7. It was agreed that the current schedule can be revised such that the final report will be submitted by the end of the year.

cc: All Attendees

APPENDIX C:

PROJECT TEAM MEETING #2 MEETING MINUTES

Parsons Brinckerhoff Quade & Douglas, Inc.

Memorandum

TO: Scott Thomson, PE
Project Manager
Kentucky Transportation Cabinet – Central Office, Division of Planning

Rob Hans, PE
Branch Manager for Planning
Kentucky Transportation Cabinet – District 6

FROM: Steve Slade, PE, PLS
Project Manager
Parsons Brinckerhoff, Inc.

DATE: October 16, 2006

SUBJECT: I-75 / KY 14 Interchange Study
Project ID: 06-206.00
Statewide Modeling MDL-1
Summary of Project Team Meeting on September 26, 2006

A Project Team Meeting for the subject project was held September 26, 2006 at the KYTC District 6 Office in Covington, Kentucky. The following people were in attendance:

NAME	REPRESENTING	E-MAIL ADDRESS
Tom Schomaker	KYTC – District 6 – Chief District Engineer	tom.schomaker@ky.gov
Jim Brannon	KYTC – District 6 – Pre-Construction	jim.brannon@ky.gov
Rob Hans	KYTC – District 6 – Planning	robert.hans@ky.gov
Mike Bezold	KYTC – District 6 – Planning	mike.bezold@ky.gov
Bill Madden	KYTC – District 6 – Traffic	billf.madden@ky.gov
Mike Yeager	KYTC – District 6 – Traffic	mike.yeager@ky.gov
Stacee Hans	KYTC – District 6 – Environmental	stacee.hans@ky.gov
Brad Eldridge	KYTC – Central Office - Design	brad.eldridge@ky.gov
Jimmy Wilson	KYTC – Central Office – Planning	jimmy.wilson@ky.gov
Scott Thomson	KYTC – Central Office – Planning	scott.thomson@ky.gov
Brent Sweger	KYTC – Central Office – Planning	brent.sweger@ky.gov
Bob Koehler	OKI	rkoehler@oki.org
Adam Kirk	Kentucky Transportation Center	akirk@engr.uky.edu
Steve Slade	Parsons Brinckerhoff	slade@pbworld.com
Don MacLean	Parsons Brinckerhoff	maclean@pbworld.com
Arlen Sandlin	Parsons Brinckerhoff	sandlin@pbworld.com
Scott Walker	Parsons Brinckerhoff	walkersc@pbworld.com

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The purpose of the meeting was to present the Level 2 alternates that had been developed by PB along with the results of the respective traffic analyses.

Each Project Team member was provided a copy of the presentation prepared by PB. The following is a summary of what was discussed at the meeting:

1. The key points of the purpose and need statement were discussed. Improving air quality was noted as one of the more important aspects of this project along with improving congestion.

2. The schedule for the study was discussed. As a result of the preliminary work of Level 1 alternates at the beginning of the project, the schedule has been adjusted so that the Final Report would be submitted before the end of 2006, two months earlier than the original completion date of February, 2007.

3. Current traffic volumes within the study area were discussed. This included both ADT and turning movement counts.

4. Traffic forecasts were developed as part of this project. During the forecasting process, emphasis was placed on the forecasts of both cars and trucks. The forecasts included the assumption that the Flying J may be at or near capacity. In order to reflect the current and future development east of the interchange, growth rates were increased and turning movement percentages were adjusted in the east. It was noted that the focus of growth near Walton is east of the study area with less emphasis on the west.

5. Crash information was presented to the Project Team. KY 14 and old KY 2954 currently have crash rates higher than similar roads in Kentucky. Angle crashes and rear end collisions were the two most common types of crashes.

6. Since some attendees were unable to attend the August 7, 2006 Project Team Meeting, a summary of Level 1 alternates was presented. The summary included a brief explanation of each of the six alternates as well as the reasoning for keeping or removing alternates from the Level 2 Analysis.

7. VISSIM was the traffic simulation software package used for the traffic analysis. The software allows a common methodology for comparing various types of alternates. The model for this project was calibrated using existing traffic volumes and field observations of current traffic conditions. The VISSIM simulation for Year 2030 No Build was shown to the Project Team. In this scenario, traffic volumes were shown queuing onto the interstate, despite optimized signal timings.

8. Three of the Level 1 alternates were carried forward to the Level 2 analysis and presented to the Project Team. In addition, the VISSIM model was shown for each alternate. For consistency, the VISSIM simulation was for the afternoon peak in the year 2030, which presented the worst case scenario for this design year.

   Each of the Level 2 alternates is discussed in more detail below:

- Alternate 1 (also Level 1 Alternate 1) – An actuator on the SB off-ramp would be added in order to help clear the right turn of the intersection when the queue reaches the detector. While not affecting traffic operations on the ramp, the actuator would serve as a safety measure to prevent queuing onto mainline I-75. In addition, a northbound right turn lane was added along KY 14 just south of the KY 14 / KY 1292 / Old KY 2954 intersection. The signal phasing was adjusted to allow for a simultaneous right turn onto KY 14 toward I-75 while vehicles were making the westbound left turn on KY 14.

  The VISSIM model shown to the Project Team presented a similar scenario as the No Build scenario. While a bit reduced, the queuing remained on the SB off-ramp. In addition, queues on the other approaches were slightly longer than in the No Build scenario.

- Alternate 2 (Level 1 Alternate 6) – This alternate aligns KY 14 that runs east and west with the KY 14 that runs to the south and then realigning KY 1292 to intersect with KY 14. KY 2954 would intersect with KY 1292. The SB on and off ramps would be reconstructed and shifted to the east. It is not anticipated that additional R/W would be needed for the shift of the ramps. In addition, the automobile entrance into the Flying J would be reconstructed as a right-in / right-out configuration.

  With respect to the VISSIM model, Alternate 2 tested very well. Queues on all approaches were significantly reduced as a result of fewer signal phases as well as coordinated traffic signals. The Project Team indicated that the reconfiguration may cause problems for the few vehicles wishing to make a left turn into the Flying J off of KY 2954. Additional study of variations or sub-alternatives for Alternate 2 will be necessary as noted below in Section 12.

- Alternate 3 (also Level 1 Alternate 3) – This is construction of a roundabout for vehicles on all 6 legs. Special consideration was given to the diameter of the roundabout as well as the approach radii in order to accommodate six legs as well as the large volume of trucks entering / exiting the roundabout. The software package AutoTURN was used to verify the requirements for trucks.

  The Feasibility / Constructability Report prepared by PB and presented to Project Team members on August 18, 2006 was noted. This report indicated there are potential issues with the roundabout from a design and safety standpoint during both construction and maintenance of traffic. While the roundabout is still a feasible alternate from a design perspective, special consideration should be given to these concerns during the next phase of design, if it should be carried forward.

  The VISSIM model indicated a shut-down of the roundabout nearly halfway through the analysis periods. This was a result of the high volume of trucks entering the roundabout. The result was an impact on nearly all approaches. Also, the additional queuing has a negative effect on the KY 14 intersection with the NB ramps.

9. Results of the traffic analysis were presented. Alternate 2 provided the best overall improvement for the study area for Year 2030. This included a maximum of a level of service (LOS) LOS D for all intersections as well as reduced queues. Alternate 1 and

Alternate 3 produced failing LOS in Year 2030. The failure of the roundabout in Alternate 3 also caused the NB off-ramp to experience LOS F in Year 2030 for both AM and PM.

10. The ranking of the alternates as well as the construction costs were presented in an evaluation matrix. The construction costs (shown below) are planning level estimates in 2006 dollars and include a 25% contingency. The costs do not include right of way or utility relocation costs. The overall rankings indicate that Alternate 2 provides the best improvements with respect to the Purpose and Need for this project.

    - Alternate 1 – $150,000
    - Alternate 2 – $3,200,000
    - Alternate 3 – $2,600,000

11. Two additional alternates proposed by Brent Sweger were presented to the Project Team. These alternates were provided after PB had conducted its traffic analysis for this project. These included:

    - Sweger Alternate 1: This included the realignment of the SB off-ramp onto KY 1292. A new T-intersection or roundabout would be constructed as this new intersection. The KY 14 / KY 1292 / old KY 2954 intersection would be constructed with a new signal system or a roundabout.

    - Sweger Alternate 2: This includes the realignment of KY 1292 along the old roadbed so that it intersections with old KY 2954 at the bottom on the hill. In addition, the SB off-ramps would be shifted to old KY 1292 to allow for a through movement to the Flying J.

12. Upon completion of the presentation, the Project Team discussed the alternates. Key points included:

    - The addition of the NB right turn lane in Alternate 1 and retiming of the traffic signals could provide some reduction in delays at the intersections. Given the $150,000 cost estimate of this alternate, current CMAQ funds could be used for this short term improvement.

    - There was discussion regarding the proposed right-in / right-out entrance at the Flying J off of KY 14 as part of the short term improvement. It was noted that any change to the entrance would require right-of-way acquisition, which would require additional funding. However, a concrete median along KY 14 may eliminate this issue, and could be considered with the short term improvement.

    - With respect to a long-term solution, the Project Team agreed (as a whole) that Alternate 2 would provide the optimal long-term solution to the study area. With this alternate there are less constructability concerns and traffic can more easily be maintained during construction without road closures and significant detours. It was noted that additional investigation into KY 1292 and KY 2954 realignments should be conducted during the next design phase of this project. Variations of this alternate could include:

- Realignment of KY 1292 along the old roadbed with an intersection of KY 2954 at the bottom of the hill and west of the truck stop. KY 2954 would then be realigned to intersect with the realignment of KY 14.

- Realignment of KY 1292 with it being relocated just west of The Bank of Kentucky to intersect KY 2954. This intersection, however, would be in an area of KY 2954 that has a grade of ~6%, which may be undesirable.

- The segment of KY 2954 could be removed and relocated along the old KY 1292 roadbed and then intersect with KY 1292 just north of the project area.

13. A two-lane roundabout was suggested as a possible solution to the congestion shown in the one-lane roundabout modeled in Alternate 3. One of the legs could also possibly be eliminated. Concern, however, was expressed over the high volume of trucks that will utilize the roundabout, which would possibly use the extra lane as part of its turn maneuver. It was also noted that a two-lane roundabout alternate may not result in any better operation of traffic than Alternate 2 and would still be left with the constructability and maintenance of traffic issues.

14. The Project Team requested that all alternates should be included in the final report. In addition, the alternates should be not be renumbered in the report (i.e., Level 2 Alternate 2 should be remain as the original Alternate 6). The report should also include the reasons why the Level 1 alternates were removed from consideration.

15. PB will proceed with development of the final report with a draft to be submitted by the middle of November.

cc: All Attendees
Michael Loyselle – FHWA
Bernadette Dupont - FHWA

APPENDIX D:

FEASIBILITY / CONSTRUCTABILITY REPORT

I-75 / KY 14 INTERCHANGE STUDY
Alternate 3
Issues Regarding Constructability of a Roundabout

Alternate No. 3 provides for the construction of a single-lane roundabout at the I-75 Southbound Ramps / KY 14 / KY 1292 / KY 2954 intersection. There are several issues that may be a concern with construction of a roundabout at this location. The following is a discussion of the issues affecting the constructability of this alternate.

ROUNDABOUT DIAMETER AND VERTICAL ALIGNMENT

"Roundabouts: An Informational Guide" published by the Federal Highway Administration provides in-depth detail and information regarding the design and construction of modern roundabouts. The diameter of a modern roundabout is a critical design feature. The guide recommends a roundabout diameter of 115-130' for a rural single-lane roundabout for a WB-67 design vehicle (double-trailer truck). This size would be typical of a roundabout in a location with relatively flat grades, 90 degree intersection angles, and no more than four legs.

Due to the requirement to geometrically accommodate six legs within a roundabout on this alternate, the diameter must be increased significantly. The diameter of the roundabout required as a result of the existing geometrics of the six legs is approximately 275-300'. This results in a very large roundabout in an area where the existing approaches are already steep. As a result, the required large roundabout diameter could result in significant reconstruction of the approach roads on this project.

Most modern roundabouts are constructed with approaches that have relatively flat existing grades. In areas with a fair amount of grade through the existing intersection, the roundabout must be "tilted" about its center to accommodate the approaching grades on the main route. In this case, the KY 14 approach from the east will enter the roundabout on its high side, progress downgrade to the low point of the roundabout near the KY 2954 approach, and travel upgrade back to the KY 14 approach on the east end. The high volume of trucks at this location traveling downgrade and turning could possibly present a risk of overturning compared to a roundabout constructed on a flatter grade.

ROUNDABOUT AND APPROACH ROAD GRADES

According to the guide on roundabouts, "It is generally not desirable to locate roundabouts in locations where grades through the intersection are greater than four percent." The grades within the study area along KY 14 are currently at this limit while grades on two of the approach roads exceed four percent. Figure 1 on the following page shows the approximate existing grades of the roadways within the study area.

In a case of an intersection with steep approach grades of this nature, the guide suggests that the intersection should be relocated or the vertical alignment modified. In this case, the intersections cannot be relocated without major reconstruction and the ability to modify the existing grades is limited due to the close proximity of the bridge over I-75 and the desire to maintain traffic during construction. The need to provide a solution to the traffic issues within the study area while maintaining traffic and limiting the amount of reconstruction that takes place limits the ability to modify the existing geometrics. Therefore, a roundabout alternate needs to fit the existing geometrics of the area as best as possible.

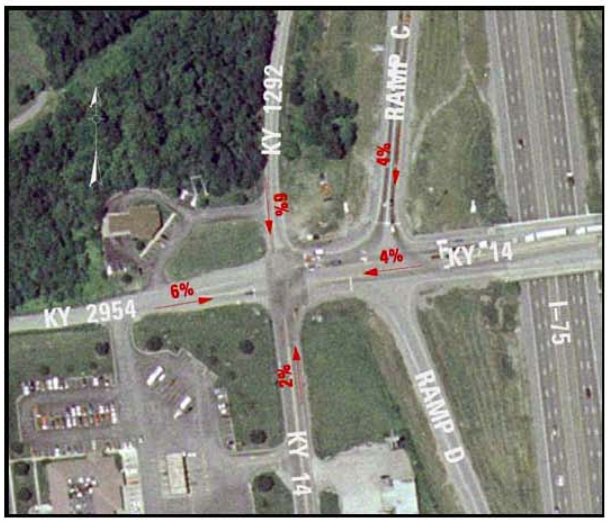

Figure 1 – Existing Grades in Project Study Area

CONCEPTUAL DESIGN OF ROUNDABOUT ALTERNATES

Before analyzing and modeling the traffic improvements that a roundabout may provide it was prudent to evaluate geometrics of a roundabout to ensure that one could physically fit at the intersection. Three conceptual designs have been developed – Alternates 3, 3A, and 3B. The layouts and approximate limits of construction of these alternates are shown on Figures 2, 3, and 4. It should be noted that limited mapping and terrain data was available for development of approximate existing and proposed roadway profiles. The following is a description of each alternate and the respective issues and concerns.

Alternate 3

- Large roundabout diameter of 292'.
- Proposed grade of the roundabout is approximately 4 feet above existing ground at the KY 2954 approach.
- Roundabout vertical alignment may be undesirable with large volume of truck traffic.
- KY 1292 and KY 2954 must be raised approximately 8 feet, possibly requiring temporary closure during construction.
- Ramp C must be raised approximately 9 feet, possibly requiring retaining walls and temporary closure during construction.
- Ramp D must be raised approximately 6 feet, possibly requiring temporary closure during construction.

Alternate 3A

As a result of the issues associated with Alternate 3, Alternate 3A was developed to determine if a southward shift of the roundabout could reduce the adverse impacts of Alternate 3.

- Large roundabout diameter of 260' (less than Alternate 3).
- Proposed grade of the roundabout is approximately 4 feet above existing ground at the KY 2954 approach.
- Roundabout vertical alignment may be undesirable with large volume of truck traffic.
- KY 1292 and KY 2954 must be raised approximately 8 feet, possibly requiring temporary closure during construction.

- KY 14 must be raised approximately 5 feet, possibly requiring temporary closure during construction.
- Ramp C must be raised approximately 2 feet, an improvement over Alternate 3.
- Ramp D must be raised approximately 6 feet, possibly requiring temporary closure during construction.

Shifting the entire roundabout southward minimizes construction required along Ramp C. However, only minimal improvements to the required grade changes on the remainder of the approaches are realized with this configuration.

Alternate 3B

A significant factor affecting the grades required along the approach roads is the short length around the roundabout and the inability to provide significant grade changes across the roundabout in order to minimize the amount of construction that needs to take place on the approach roads. A roundabout or similar type facility of greater length would allow a greater amount of grade change to take place across its length. This led to study of an elongated roundabout situated with its long axis running east to west along KY 2954 and KY 14.

- Outside radius of 75' may need to be enlarged to accommodate truck traffic without requiring significant lane width (this would have a negative impact on approach road vertical alignments).
- Proposed grade of the roundabout is approximately 2 feet above existing ground at the KY 2954 approach.
- Roundabout vertical alignment may be undesirable with large volume of truck traffic.
- KY 1292, KY 2954, and Ramp C must be raised approximately 2 feet, an improvement over the previous alternates.
- Ramp D must be raised approximately 6 feet, likely requiring temporary closure during construction.
- Construction of such a facility could enhance driver confusion associated with these types of intersections.

CONCLUSIONS AND RECOMMENDATION

Due to the significant grades and number of approaches at this location, the design and construction of a roundabout may be difficult to accomplish in a manner that provides a safe intersection and has the ability to maintain traffic during construction. Particular care will need to be paid to safety. Given the nature of the existing geometrics a downgrade turning movement along the roundabout could be a concern with trucks being susceptible to overturning.

In addition, on Ramp C in particular, trucks approaching the intersection may be required to yield to allow circulatory traffic to clear the roundabout. Ramp C will likely require a short increase in grade before tying to the proposed roundabout. This could create an issue with trucks having difficulty getting restarted on the steep grade.

While not infeasible, there appears to be significant obstacles associated with the design and construction of a roundabout alternative. Particular attention will need to be paid during preliminary design in maximizing safety through the intersection due to the high volume of trucks. Preliminary design will need to be an involved and iterative process using more detailed field survey data to try to develop a roundabout alternative that minimizes the amount of construction required along the approach roads and maintain traffic on all approaches during construction. In addition, preliminary design will need to evaluate or research actual

susceptibility of overturning possibilities of large trucks traversing along the roundabout as well as the area of the path that is needed for a large truck wheel base.

With respect to this scoping study phase of this project, it recommended that traffic modeling and cost estimation for a roundabout alternate be completed and be based upon Alternate 3A. The traffic benefits derived from the modeling are basically independent of the actual configuration of the roundabout. While Alternate 3B appears to minimize the lengths of approach roads that must be reconstructed, it is possible that the radii would need to be increased. It is possible that some variation of Alternate 3B could be developed through a more detailed iterative design process; however, Alternate 3A will result in a more conservative estimate of costs and impacts.

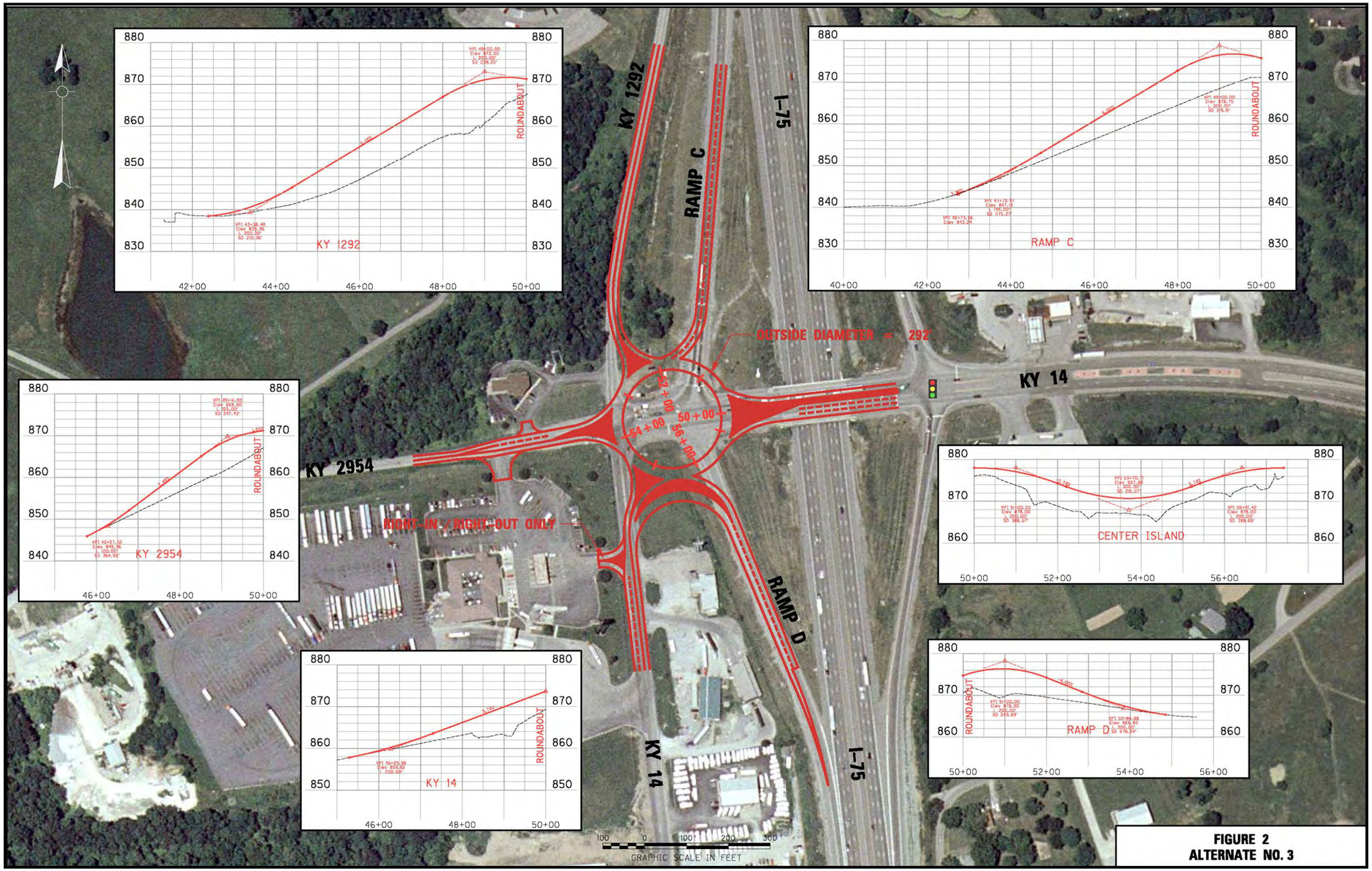

FIGURE 2
ALTERNATE NO. 3