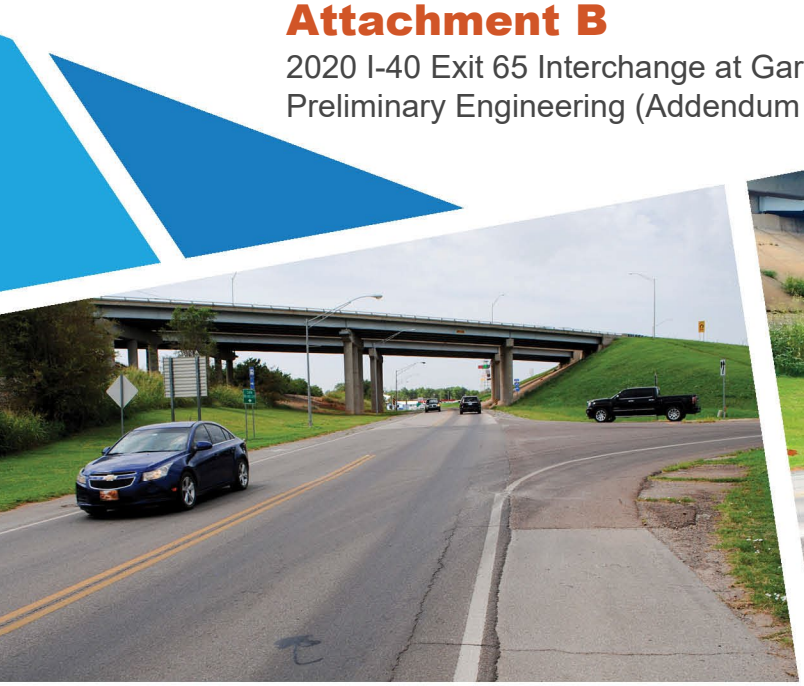
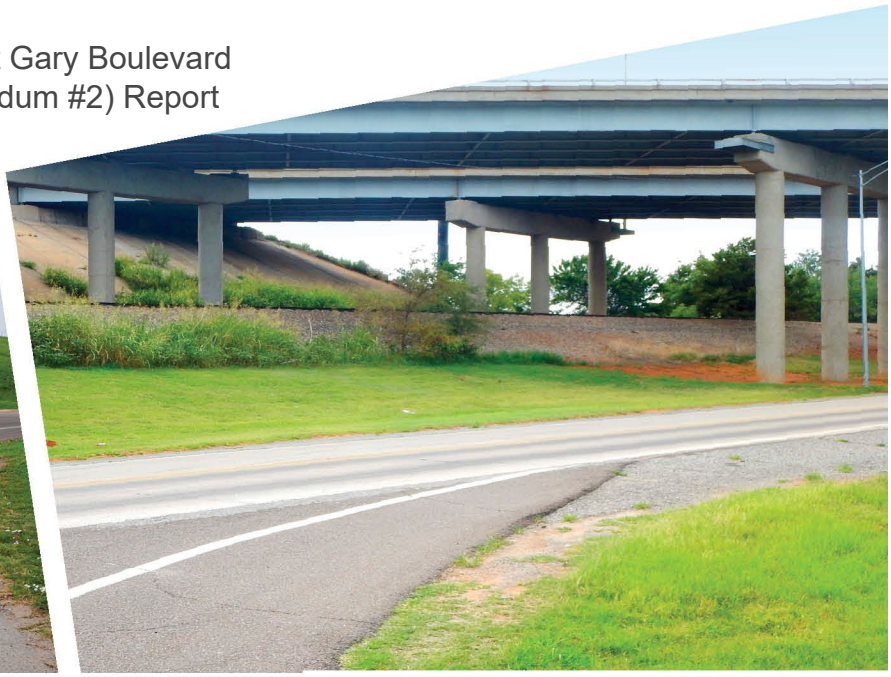
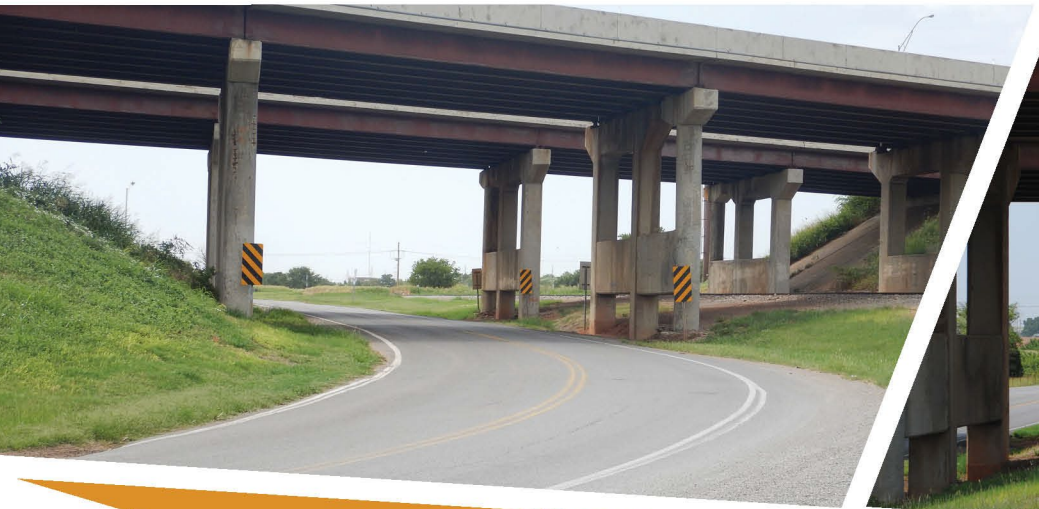
I-40 CLINTON
Mobility and Freight Improvement Project

Attachment B

2020 I-40 Exit 65 Interchange at Gary Boulevard
Preliminary Engineering (Addendum #2) Report







OKLAHOMA Transportation

BRIDGE INVESTMENT PROGRAM:
FY 2025 Bridge Project Application

November 1, 2024

I-40 Exit 65 Interchange at Gary Boulevard Preliminary Engineering (Addendum #2)

Custer County (Division V)
ODOT JP 31482(04)

OKLAHOMA Transportation

Prepared For:

Oklahoma Department of Transportation

June 2020

GARVER
GarverUSA.com

ADDENDUM #2 TO:
Preliminary Engineering Report
I-40 at Exit 65 (Gary Boulevard)

Oklahoma Department of Transportation
JP 31842(04), Division V
Custer County

Prepared for:

OKLAHOMA
DEPARTMENT OF TRANSPORTATION

Prepared by:

GARVER

6450 South Lewis Ave. Suite 300
Tulsa, OK 74136

June 2020

Garver Project No.: 17037360

Engineer's Certification

I hereby certify that this Addendum #2 to the Preliminary Engineering Study for the I-40 Exit 65 interchange at Gary Boulevard in Clinton, OK was prepared by Garver under my direct supervision for the Oklahoma Department of Transportation.

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1.0 Project Background

1.1 Addendum #2 Overview

The Oklahoma Department of Transportation (ODOT) contracted with Garver to investigate additional interchange alternatives as an addendum to both the original Preliminary Engineering Report previously submitted in March 2017 and the Addendum previously submitted in December of 2018, with the covers as shown below in **Figure 1-1** and **Figure 1-2**, respectively.

The original study investigated various impacts associated with six (6) interchange modifications:

- Design Concept 1: No-Build
- Design Concept 2: Conventional Diamond Interchange
- Design Concept 3: Divergent Diamond Interchange (DDI)
- Design Concept 4: Single Point Urban Interchange (SPUI)
- Design Concept 5: Modern Roundabout Interchange
- Design Concept 6: Rotary "Oval" Interchange

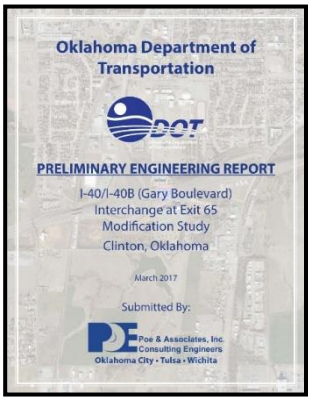


Figure 1-1: Original PE Report

The first addendum report evaluated two (2) additional alternatives:

- Alternative 7: Reduced Ramp Roundabout Interchange (Gary Boulevard Extended)
- Alternative 8: Reduced Ramp Roundabout Interchange (Gary Boulevard as Red Wheat Drive Improvement)

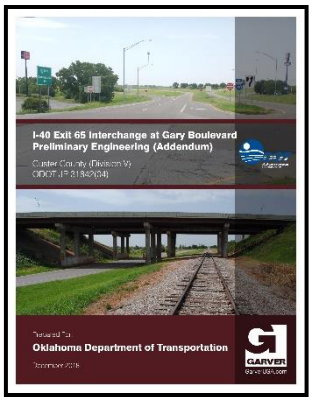


Figure 1-2: PE Report (Addendum #1)

This Addendum #2 Preliminary Engineering (PE) Report evaluates an additional two (2) general interchange configurations (Conventional Diamond and Folded Diamond) that were further subdivided into sub-alternatives, resulting in five (5) unique alternatives as summarized below:

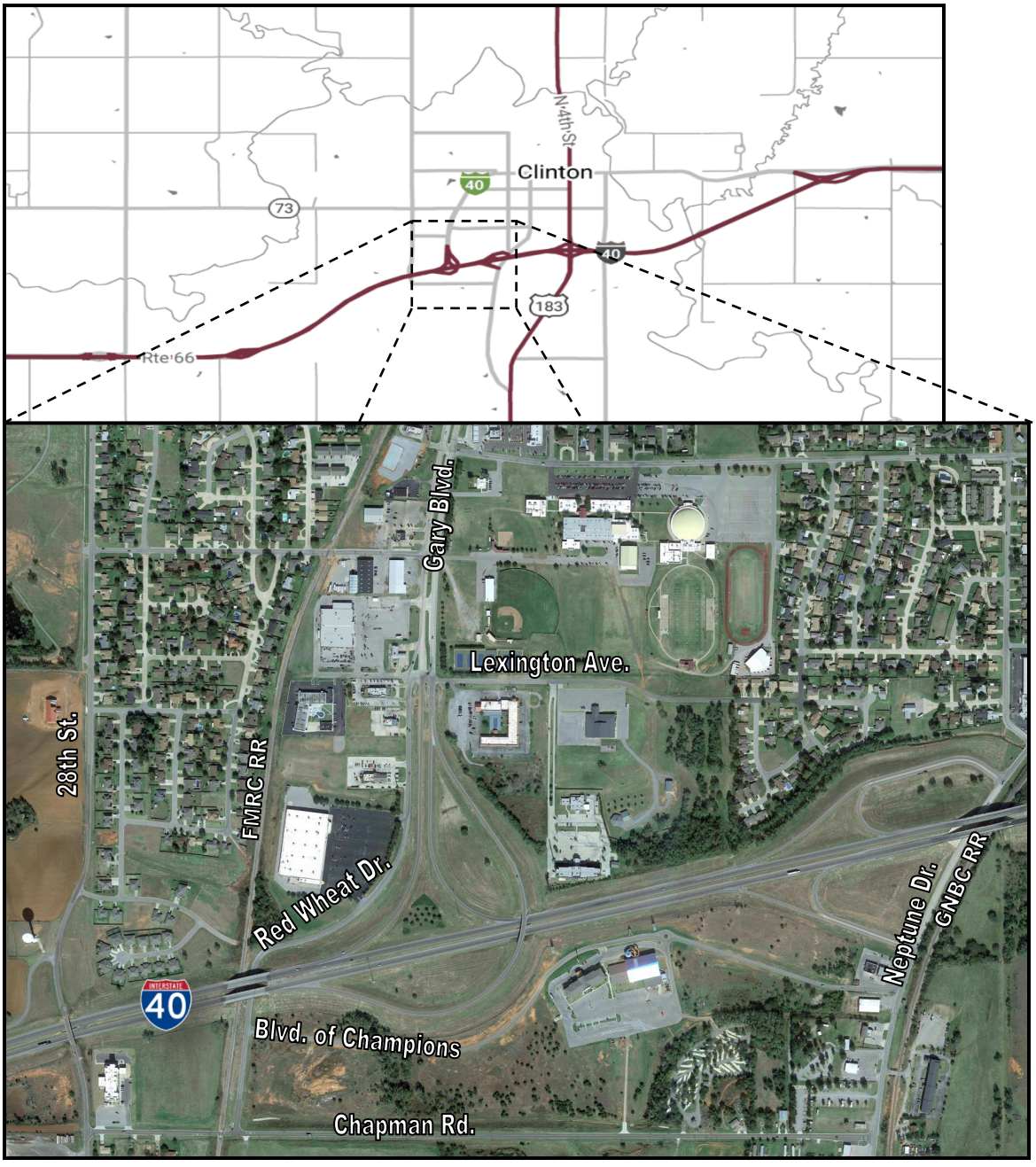
- Alternative 2: Conventional Diamond Interchange
  - 2B – 6 Ramps | Gary Under I-40
  - 2C – 5 Ramps | Gary Under I-40
  - 2D – 4 Ramps | Gary Under I-40
- Alternative 9: Folded Diamond Interchange
  - 9A – 8 Ramps | Gary Over I-40
  - 9B – 8 Ramps | Gary Under I-40

As with Alternatives 7 and 8, these five (5) new alternatives were analyzed with respect to the following categories: traffic operation and safety considerations, land use and environmental impacts, right-of-way and utility impacts, and construction cost.

1.2 Project Location

The project is located in Custer County at the interchange of I-40 and Gary Boulevard/I-40 Business, in Clinton, Oklahoma. The project extents include approximately 1.3 miles of I-40, the associated ramp movements at Gary Boulevard and Neptune Drive, approximately 0.5 miles of Gary Boulevard, frontage roads and some other local roads. See **Figure 1-3** for the **Project Location Map**.

Figure 1-3: Project Location Map



2.0 Existing Conditions

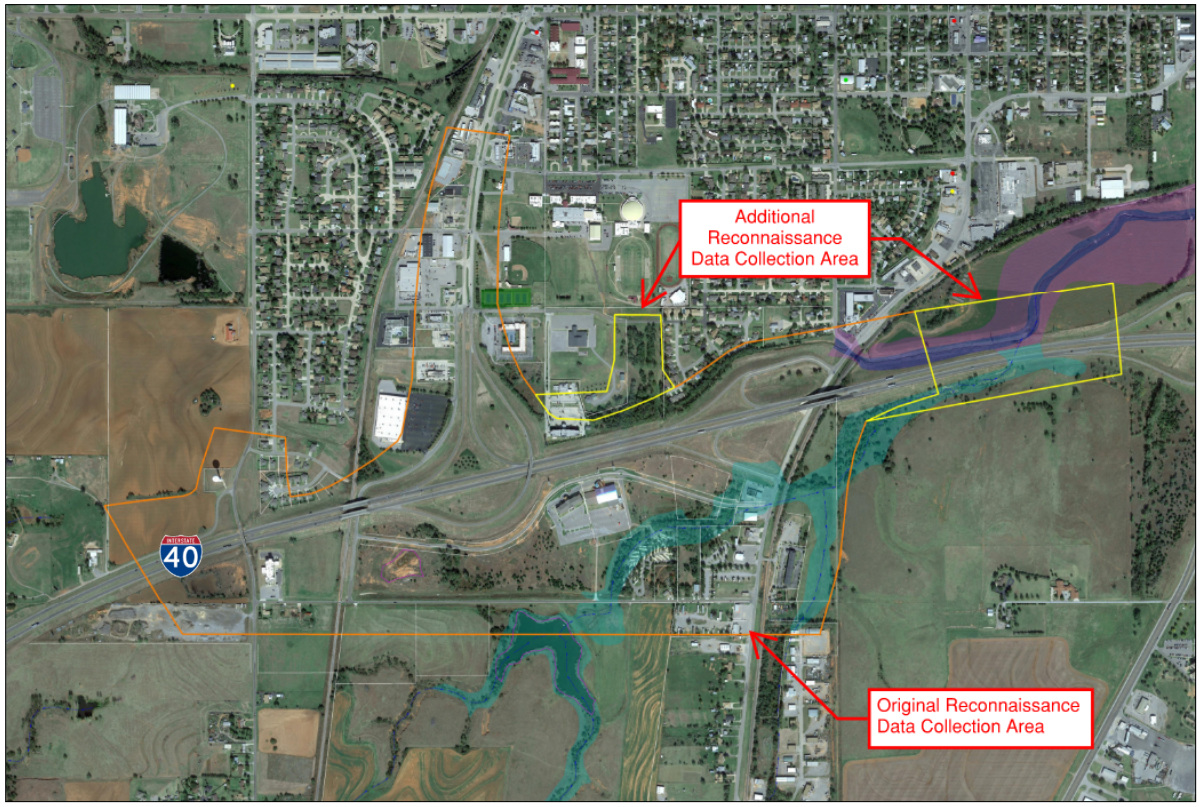
For a detailed description of the existing conditions, refer to the original "Preliminary Engineering Report" (March 2017) and the "Preliminary Engineering Report (Addendum)" (December 2018).

2.1 Environmental Considerations

Initial reconnaissance data was collected in 2015 and was updated in 2018 and 2019 to support the development of the 2017 Preliminary Engineering report and Addenda #1 and #2 (see **Figure 2-1)**. Environmental data collected included information about homes and businesses, floodplains, cultural resources, hazardous materials sites, and natural resources including streams, wetlands, and habitat for threatened and endangered species. Census data was collected and included identification of special status populations such as low-income and minority groups, as well as populations with limited English proficiency that might require language assistance during public involvement efforts.

Existing environmental constraints in the project area include a 100-year Zone A floodplain, a 100-year Zone AE floodplain, and a 100-year Zone AE floodway associated with a palustrine emergent (PEM) wetland and two unnamed streams both north and south of I-40. Potential hazardous materials sites include a Resource Conservation and Recovery Act (RCRA) site, former underground storage tank (UST), and leaking underground storage tank (LUST) sites along Red Wheat and Gary Boulevards, two closed LUST sites on Neptune Boulevard, and a historic auto shop on Chapman Road. Other environmental resources include former segments of the historic Route 66 roadway, and the historic-age Clinton High School campus. In addition, the Clinton High School tennis courts were identified as an outdoor recreation resource that was funded by the Land and Water Conservation Fund Act (LWCF Act). Per the Section 6(f)(3) of the LWCF Act, conversion or impacts to LWCF properties must receive approval from the National Park Service.

Figure 2-1: Additional Reconnaissance Data Collection Area



Demographic data from the 2016 American Community Survey can be found in PE report (Addendum #1). Updated demographic data was collected from the 2018 American Community Survey to include the reconnaissance footprint expansion. The data was collected from Census Tract 9604, Block Group 4 in Custer County (**Figure 2-2**) to assess the presence of minority, low-income, and limited-English proficient populations. **Table 2-1**, **Table 2-2,** and **Table 2-3** summarize the data, along with data from the state of Oklahoma, Custer County, and the City of Clinton for comparison.

Data suggest that the study area has a higher than average population of people of two or more races. Populations of other races are present, generally in about the same percentages as Custer County and/or City of Clinton. Hispanic individuals make up 17% of the population, which is higher than the state but lower than both Custer County and City of Clinton. Income data suggest that while there are individuals below the poverty line in the study area, they occur in smaller numbers than the state, county, or city as a whole. When looking at the English proficiency of the study area, there are small numbers of people that are considered limited English proficient. However, the numbers and percentages are small and do not suggest that translated meeting materials would be necessary.

Figure 2-2: Census Tracts and Block Groups Covering the Reconnaissance Data Collection Area

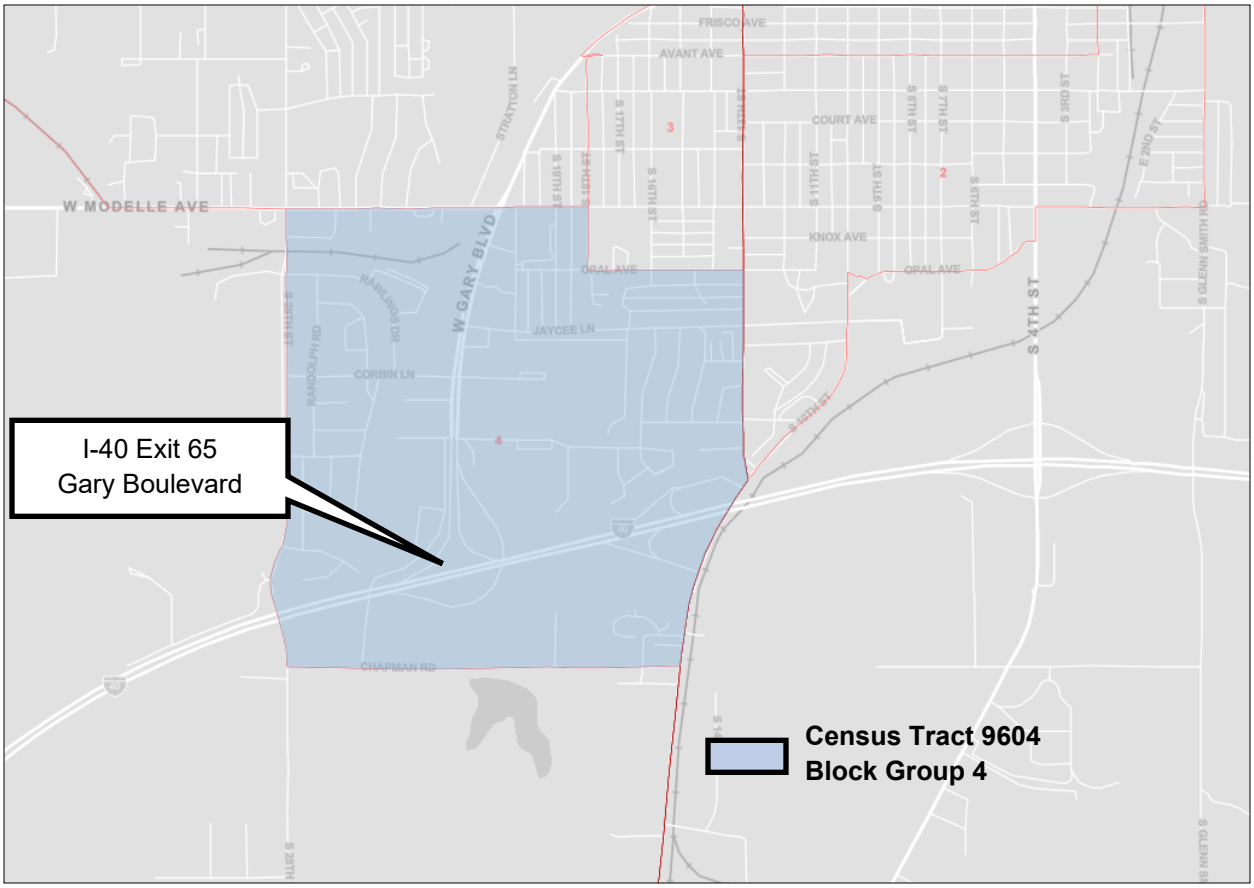


Table 2-1: Population by Race

Category	Oklahoma	Custer County	City of Clinton	Census Tract 9604 Block Group 4
Total Poulation	3,918,137	29,209	9,297	1,473
Hispanic or Latino	407,521	5,259	3,058	258
%	10.4%	18.0%	32.9%	17.5%
Not Hispanic or Latino	3,510,616	23,950	6,239	1,215
%	89.6%	82.0%	67.1%	82.5%
White alone	2,837,772	23,433	6,622	1,074
%	72.4%	80.2%	71.2%	72.9%
Black or African American alone	287,959	929	398	56
%	7.3%	3.2%	4.3%	3.8%
American Indian and Alaskan Native alone	294,676	973	462	11
%	7.5%	3.3%	5.0%	0.7%
Asian Alone	83,392	354	157	0
%	2.1%	1.2%	1.7%	0.0%
Native Hawaiian and Other Pacific Islander alone	4,471	10	0	0
%	0.1%	0.0%	0.0%	0.0%
Some Other Race alone	106,757	1,101	716	19
%	2.7%	3.8%	7.7%	1.3%
Two or More Races	303,110	2,409	942	313
%	7.7%	8.2%	10.1%	**21.2%**
Total Minorities	1,078,019	7,525	4,075	325
%	27.5%	25.8%	43.8%	22.1%

Source: 2018 American Community Survey

Table 2-2: Estimated Population with Income Below Poverty Level

Category	Oklahoma	Custer County	City of Clinton	Census Tract 9604 Block Group 4
Population of whom Poverty Status Determined	3,802,004	27,616	9,056	1,337
Poulation Below Poverty Level	607,810	4,864	1,216	97
Percent Below Poverty Level	16.0%	17.6%	13.4%	7.3%
Median Household Income	$51,424	$48,884	$47,657	$68,417

Source: 2018 American Community Survey

Table 2-3: Ability to Speak English

Category	Oklahoma	Custer County	City of Clinton	Census Tract 9604 Block Group 4
Population 5 Years and Over	3,654,145	26,984	8,241	1,451
Speak Only English	3,277,292	23,157	5,841	972
Percent	89.7%	85.8%	70.9%	67.0%
Speak English "Not Well or Not at All" (speak Spanish)	106,746	1,528	1,147	16
Percent	2.9%	5.7%	13.9%	1.1%

Source: 2018 American Community Survey

3.0 Design Criteria/Methodology

The following publications were referenced in preparation of this addendum report. Applicable tables and figures from these documents are included in **Appendix A**.

- "Oklahoma Department of Transportation Roadway Design Manual," July 1992
- "A Policy on Geometric Design of Highways and Streets (Green Book)," AASHTO, 2018
- "Roadside Design Guide," AASHTO, 2011
- "Oklahoma Department of Transportation Drainage Design Manual," 2014
- "Manual on Uniform Traffic Control Devices (MUTCD)," FHWA, 2009
- AASHTO LRFD Bridge Design Specifications, Current Edition
- UP/BNSF Guidelines for Railroad Grade Separation Projects

3.1 Roadway

The functional classification of Gary Boulevard, as discussed in the PE Study (Addendum #1), is designated as a Principal Arterial. Since this project is within the city limits of Clinton, OK, urban criteria has been used for the layout of the proposed improvements. See **Table 3-1** for the **Roadway Design Criteria** used for the design of Alternatives 2 and 9. Specific considerations for each corridor are further described below.

Table 3-1: Roadway Design Criteria

ROADWAY DESIGN CRITERIA					
Geometrics	**I-40**	**Ramps**	**W. Gary Blvd / Frontage**	**28th St**	**Other Local Roads**
Functional Class	Interstate	--	Urban Principal Arterial	Urban Other Arterial	Urban Local St
ODOT Table Ref	Table 12-1 (Page 12(3))	Brown Book Ch 10	Table 12-7 (Page 12(15))	Table 12-9 (Page 12(21))	Table 12-13 (Page 12(30))
Design Speed	70mph	50mph	40mph	35mph	Match Existing - 25mph
Clear Zone	30'	20'	16' (20' Frontage Rd)	12'	14'
Lanes					
Width	12'	15'	12'	12'	Match Existing - 12'
Cross Slope	2.00%	2.00%	2.00%	2.00%	2.00%
Shoulder					
Width	4'inside / 12'outside	2' LT, 8' RT	C&G	4'	C&G
Cross Slope	4.00%	2.00%	2.00%	2.00%	2.00%
End Conditions					
Foreslope to CZ	6:1	6:1	4:1 (6:1 Frontage Rd)	4:1	4:1
Foreslope after CZ	4:1/3:1	4:1/3:1	3:1 (4:1/3:1 Frontage Rd)	3:1	3:1
Ditch Width	8'	8'	8'	4'	4'
Backslope	3:1	3:1	3:1	3:1	3:1
Horizontal					
Min Radius	2083.4829' (2.75 deg)	1061.03295 (5.4 deg)	763.9437' (7.5 deg)	498.2242' (11.5 deg)	200'
Min Length of Curve	1125'	300'	600'	525'	375'
Vertical					
Grade, Max	4%	5%	7%	8%	8%
Grade, Min	0.50%	0.50%	0.50%	0.50%	0.40%
K-Crest	312	114	44	29	12
K-Sag	206	115	64	49	26
Drainage Design					
Design Storm	50	50	50	50	10

3.1.1 I-40

The proposed I-40 improvements maintain the existing horizontal alignment. The median remains an open section with a depressed, divided median utilizing cable barrier separation, and is improved to provide a constant width of 40 feet measured between the inside edges of travel lane. The inside shoulder and driving lanes remain at 4-foot and 12-foot, respectively. The proposed outside shoulder is improved to a full 12-foot width.

Vertically, the I-40 profile will be raised to meet both the current geometric highway standards for a design speed of 70 mph and the minimum railroad clearances based on BNSF/UP railroad crossing guidelines, per direction from ODOT, as described in the previous PE Report (Addendum #1).

3.1.2 Ramps

Adjacent to I-40, ramps are parallel style with approach curve design speeds of 50 mph for direct ramps and 30 mph for loop ramps (25 mph used at Neptune Drive loop ramps to better match existing). Acceleration and deceleration lanes accommodate the distance required for the necessary speed changes, including grade adjustments due to the I-40 profile.

3.1.3 Frontage Roads

The two limited access frontage roads both north and south of I-40 and east of Gary Boulevard are curbed facilities, designed for 40 mph with AASHTO Method 2, Low Speed Urban (LSU) criteria (**Appendix A**). When applicable, frontage roads follow the grades of the existing roadway corridors to minimize earthwork and assist in constructability.

3.1.4 Gary Boulevard

The design speed for Gary Boulevard is 40 mph in both Alternative 2 and 9. All horizontal curves are designed to accommodate normal crown (-2.00%) cross slope using Method 5 design criteria. However, between the ramp terminals and under I-40, the cross slope of Gary Boulevard is set to reverse crown (+2.00%) with the west side high. By rotating the southbound half of Gary Boulevard to reverse crown, the profiles for the ramps west of Gary Boulevard were able to utilize a maximum longitudinal grade of no more than 6.00% while also maintaining a realignment of Gary Boulevard far enough away to avoid adverse impacts to the two hotels on either side of I-40.

3.1.5 Local Roads

For this PE Report (Addendum #2) the improved local roads include Red Wheat Drive, Oliver Avenue, and Lexington Avenue. Red Wheat Drive improvements vary based on the applied alternative, but Oliver Avenue and Lexington Avenue are identical for all. The design speeds for each local road corridor are the same across all alternatives. The design speed for both Red Wheat Drive and Lexington Avenue is 25 mph. To assist with minimizing nearby property impacts, Oliver Avenue does have a 20 mph sag vertical curve directly adjacent to Gary Boulevard, but this sag curve meets the requirements for the stop controlled at grade intersections and achieves 30 mph using comfort criteria.

3.2 Bridge

As discussed in the previous PE Study (Addendum #1), the bridges were laid out to accommodate a minimum vertical clearance of 16’-9” over roadways and 23’-6” over railroads. At railroads crossings, the horizontal clearances was reduced to 30 feet each side of the railroad track centerline. Additionally, the locations of the abutments and piers were selected based on the locations of the existing substructure, cost efficiency of the superstructure, and grading of the bridge header.

4.0 Proposed Design/Improvements

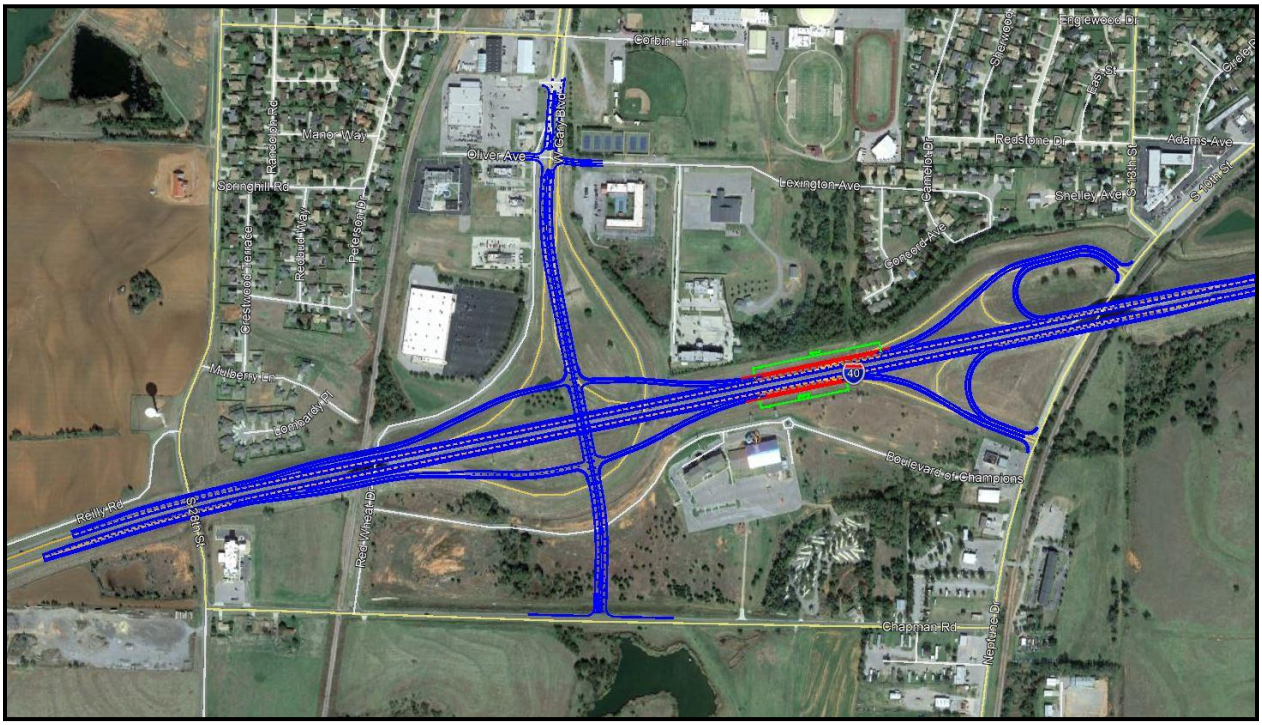
As mentioned previously in Section **1.1**, the following alternatives were investigated for this PE Report (Addendum #2):

- Alternative 2: Conventional Diamond Interchange
  - 2B – 6 Ramps | Gary Under I-40
  - 2C – 5 Ramps | Gary Under I-40
  - 2D – 4 Ramps | Gary Under I-40
- Alternative 9: Folded Diamond Interchange
  - 9A – 8 Ramps | Gary Over I-40
  - 9B – 8 Ramps | Gary Under I-40

Not included in this list is Alternative 2A. The sub-alternative 2A was partially developed, but not considered a viable solution for this report because it was primarily created to illustrate why eight (8) ramps were not feasible with a diamond interchange configuration at Gary Boulevard. A total of three (3) variations of Alternative 2A were developed to investigate the limitations due to ramp proximity regardless

of placement of the weave lanes either along the mainline or on a separate collector-distributor road. Each sub-alternative of 2A depicted where the geometric restrictions failed to meet design standards. An example exhibit from this is shown in **Figure 4-1** below, where the red linework highlights the insufficient length between adjacent entrance and exit ramps (1600 feet required, but only 511 feet attainable).

Figure 4-1: Alternative 2A.3 (Non-Viable Illustration)



The remaining Alternative 2 (2B, 2C, 2D) and Alternative 9 (9A, 9B) proposed layouts meet required minimum design standards. Due to the similarities between the two alternatives, the sections below regarding the proposed elements have been subdivided to clearly define the differences and similarities. Equivalent design aspects between all alternatives are discussed in Section **4.1**, while Sections **4.2** and **4.3** cover the unique differences between the sub-alternatives of Alternatives 2 and 9, respectively. Refer to **Appendices B-F** for detailed alignment geometric reports and **Appendix I** for detailed plan sheets.

4.1 Alternative 2 & Alternative 9 – Equivalent Design Aspects

The following elements are the same for all proposed Alternatives.

4.1.1 Oliver Avenue / Lexington Avenue

The intersection of Oliver Avenue and Lexington Avenue with Gary Boulevard is the same on all alternatives. As with the alternatives provided in the PE Report (Addendum #1), the Oliver Avenue and Lexington Avenue intersection with Gary Boulevard is squared to the new Gary Boulevard alignment to assist in simplifying the intersection geometry and improving safety.

4.1.2 Red Wheat Drive

For all alternatives, Red Wheat Drive is replaced by the extension of Gary Boulevard to the south of Oliver Avenue and Lexington Avenue. Driveways with existing access to Red Wheat Drive now have extended driveways connected directly to Gary Boulevard. Generally, a remnant section of the existing Red Wheat Drive corridor in the northwest quadrant of the interchange will be improved to serve as a driveway access to the K-Mart property. This improved section of what is currently Red Wheat Drive terminates in a cul-de-sac just south of the parking lot and does not continue under I-40.

4.1.3 Drainage

Where applicable, existing crossing structures have been extended and were previously checked for hydraulic capacity in the previous PE Report (Addendum #1). Since there are little to no changes to drainage patterns for the new alternatives, no additional hydraulic calculations were performed.

4.1.4 Utilities

Like the previous PE Report (Addendum #1), the design intent for the numerous existing utilities along the Gary Boulevard corridor extension is to remain with only minimal amounts of fill placed as necessary to maintain positive drainage to the proposed Gary Boulevard back of curb. Proposed additional fill heights range from zero to three (0-3) feet above existing utilities.

4.1.5 Maintenance of Traffic

A suggested construction sequence overview for each alternative is included in **Appendix I**. Between the two existing interchanges for Exit 65/65A, it is important to keep at least one ramp for each movement open at all times during construction. Today, the only ramp movement that is not provided at both existing interchanges is the eastbound I-40 on ramp.

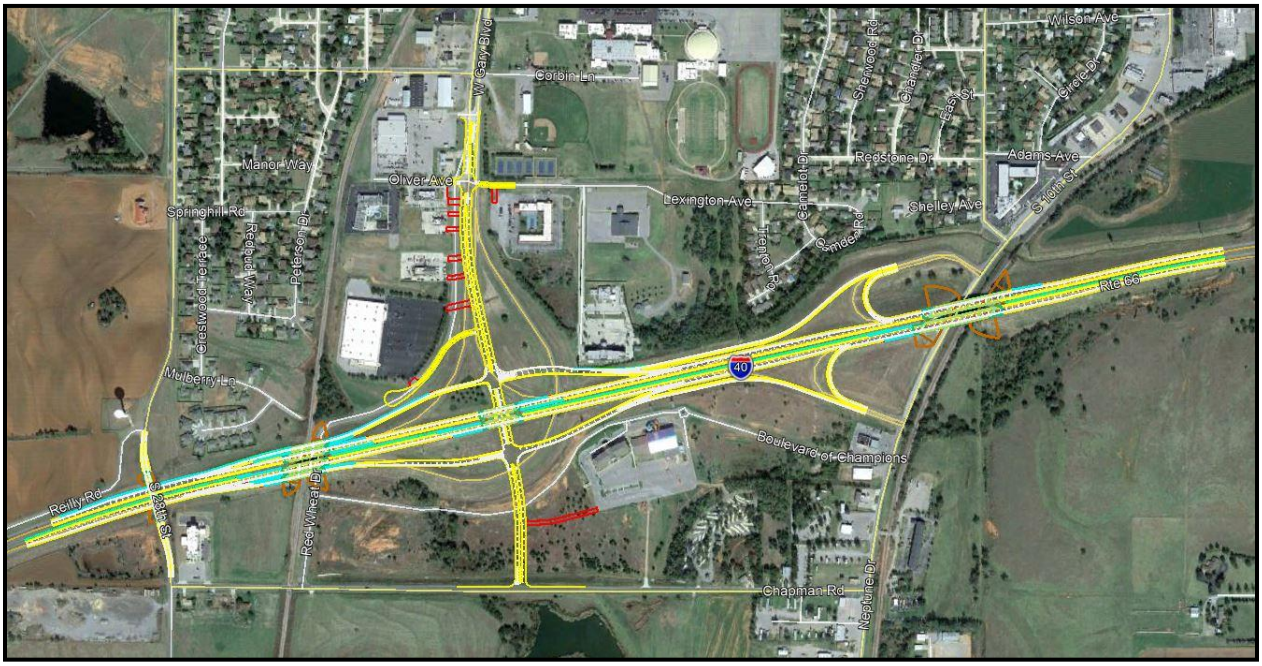
At least one lane of traffic will be maintained in both directions of I-40 at all times, utilizing crossovers to shift traffic for I-40 improvements and bridge construction. Temporary driveways will be needed along Gary Boulevard at all proposed drive locations as well as direct access temporarily to Ramada Inn from Gary Boulevard during construction of Lexington Avenue.

4.2 Alternative 2 – Unique Design Aspects

Alternative 2 is comprised of three (3) sub-alternatives: 2B, 2C, and 2D. Each has the general design configuration of a conventional diamond interchange. Unique design elements and similarities between the sub-alternatives are described below. Refer to **Appendix I** for detailed plan sheets.

4.2.1 Alternative 2B

Figure 4-2: Alternative 2B Overview



As shown in **Figure 4-2** above, Alternative 2B provides for a total of six (6) ramps between Exit 65 and 65A, with four (4) at Gary Boulevard and two (2) at Neptune Drive. Frontage roads on either side of I-40 serve as indirect access to and from I-40 for the other two (2) Neptune Drive ramp movements. Refer to **Appendix I** for detailed plan sheets.

4.2.1.1 I-40 (Alt 2B)

I-40 remains on the existing horizontal alignment but requires a modified profile to maintain a 70 mph design speed and acceptable railroad clearances over both the Farmrail Railroad (FMRC) to the west of Red Wheat Drive and Grainbelt Railroad (GNBC) to the east of Neptune Drive. Reconstruction limits on the west end of the project extend approximately 900 feet west of 28th Street, requiring the improvements to the 28th Street bridge and approach roadway. To the east, I-40 reconstruction limits tie-in approximately 1750 feet east of Neptune Drive. Near the center of the project, a new I-40 bridge is required to span over the proposed Gary Boulevard corridor, meeting the minimum vertical clearance criteria for new bridges of 16'-9".

4.2.1.2 Ramps (Alt 2B)

Four (4) new parallel-style ramps are proposed at Gary Boulevard and two (2) new parallel-style loop ramps are proposed at Neptune Drive.

West of Gary Boulevard, the ramp grades for both the on and off ramps are 5.50%. Due to the proximity of Gary Boulevard and the raised grade of I-40, these two western ramps require separate bridges over

FMRC. Once over the FMRC, the ramps merge with I-40, but extend under 28th Street to provide the necessary acceleration and deceleration distances for the new ramp geometry. East of Gary Boulevard, the ramps operate as slip ramps that fork to and from limited access frontage roads that parallel I-40.

At Neptune Drive, the existing outer ramps are no longer connected to I-40 and become one lane, one-way frontage roads. The interior loop ramps at Neptune Drive are replaced with new loop ramps that tie-in to the raised I-40 profile with a maximum grade of 5.00%, located along the eastbound loop on ramp. Both ramps at Neptune Drive have parallel acceleration/deceleration lanes that extend across the Neptune Drive bridges.

4.2.1.3 Frontage Roads (Alt 2B)

Two proposed frontage roads run generally parallel to I-40, on both the north and south side, between Gary Boulevard and Neptune Drive. These frontage roads will operate as one-way and will have limited access to local traffic beginning at Gary Boulevard and extending to a point just east of the ramp gores with I-40. For this study layout, the entire length of the frontage roads was designed to prohibit direct driveway access. Future driveway access to these frontage roads may be considered, but only at a point meeting a safe distance east of the ramp gores that discourages wrong-way frontage road travel as a shortcut to ramp access.

Reconstruction limits for both frontage roads terminate prior to Neptune Drive by tying into the existing outer ramps. Both frontage roads will be used to carry traffic to/from Gary Boulevard since direct I-40 access for the outer ramps is removed from Neptune Drive.

4.2.1.4 Gary Boulevard (Alt 2B)

Alternative 2B includes the proposed extension of Gary Boulevard to the south. Utilizing reverse curves, the proposed alignment crosses perpendicularly under I-40 in the infield area of the existing interchange, then terminates at Chapman Road.

The corridor consolidation with Red Wheat Drive in conjunction with a slightly positive skew angle of two (2) degrees at Lexington Avenue and Oliver Avenue provides for a simplified and safer intersection while minimizing adverse impacts to existing properties in the area. Commercial properties along Red Wheat Drive will maintain direct access to Gary Boulevard, and Red Wheat Drive will be removed from service southwest of the K-Mart parking lot.

4.2.1.5 Bridges (Alt 2B)

Alternative 2B will consist of nine new bridges. Six of these bridges will carry I-40 traffic; two over the FMRC, two over realigned Gary Boulevard, and two over Neptune Drive & the GNBC. The other three bridges in this alternative will consist of two ramp bridges for I-40 over the FMRC and one bridge that will span over I-40 at S. 28th Street.

The 28th Street bridge is impacted by construction, due to the addition of the on and off ramps at proposed Gary Boulevard. The existing bridge has substandard vertical clearance, but the new bridge will meet current standards. The proposed bridge has a 32-foot clear roadway with a length of 271-feet and is composed of four pre-stressed beam spans.

The typical section of the four I-40 bridges over the FMRC and Gary Boulevard will consist of a 40-foot clear roadway with a 12-foot outside shoulder, two 12-foot travel lanes, and a 4-foot inside shoulder. The eastbound I-40 Bridge over FMRC will be 229-feet long and the westbound bridge will be 227-feet long, both composed of three pre-stressed concrete beam spans. The eastbound and westbound I-40 bridges over Gary Boulevard are 200-feet long and composed of three pre-stressed concrete beam spans. The typical section of the two I-40 bridges over Neptune Drive & the GNBC will consist of having a 12-foot outside shoulder, three 12-foot travel lanes, and a 4-foot inside shoulder. Both bridges will be 470-feet long and composed of a four span steel plate girder superstructure to minimize structural depth.

The two ramp bridges over the FMRC will have a 25-foot clear roadway consisting of an 8-foot outside shoulder, one 15-foot travel lane, and a 2-foot inside shoulder. Both bridges will be 226-feet long and composed of three pre-stressed concrete beam spans.

The proposed bridges over the FMRC are approximately the same length as the existing bridges. This is due to the removal of Red Wheat Drive being offset by ODOT's desire to use 3:1 slopes on new bridges. By maintaining 30-foot horizontal clearance, the railroad was able to be crossed using a Type III pre-stressed concrete beam span while maintaining the required vertical clearance. Proposed bridge piers are located within FMRC right-of-way. It is our understanding from ODOT Rail Division that the FMRC is not anticipating future tracks.

Similarly, the bridges over Gary Boulevard use a concrete girder system for cost efficiency. The cost of fill required to raise the profile outweighed the additional cost of a steel superstructure system.

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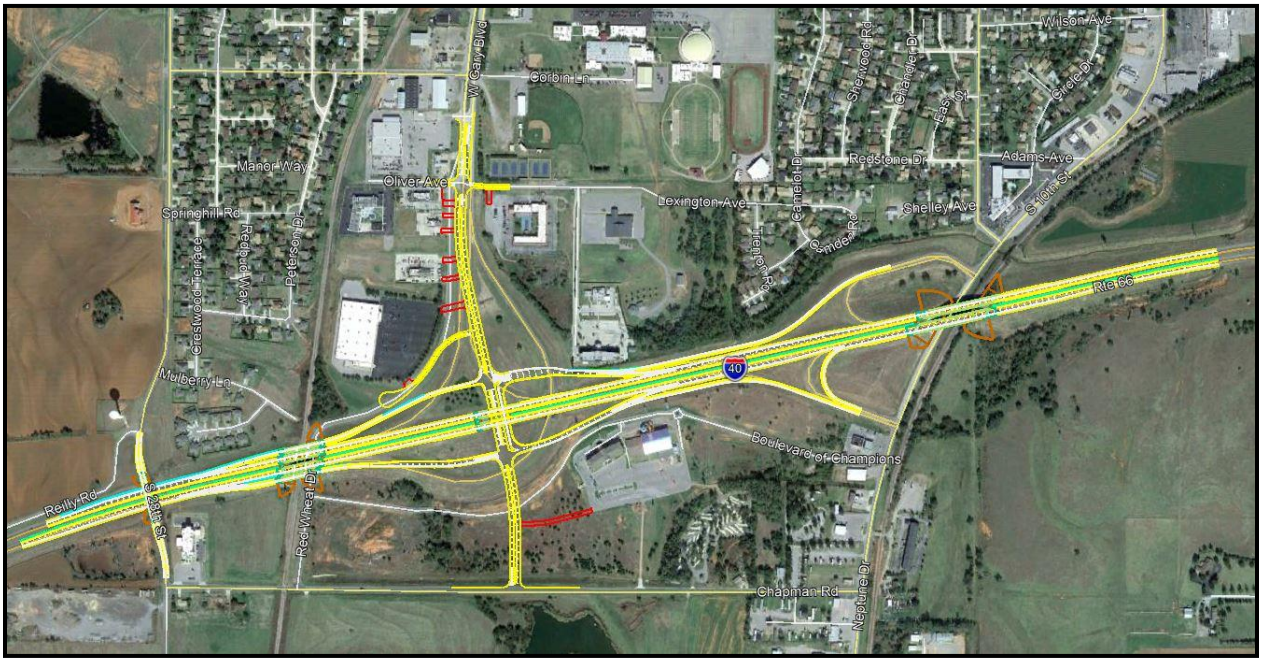
4.2.2 Alternative 2C

Figure 4-3: Alternative 2C Overview



As shown in **Figure 4-3** above, Alternative 2C provides for a total of five (5) ramps between Exit 65 and 65A, with four (4) at Gary Boulevard and one (1) at Neptune Drive. Frontage roads on either side of I-40 serve as indirect access to and from I-40 for the other three (3) Neptune Drive ramp movements. Alternative 2C is nearly identical to Alternative 2B except for the addition of a free-flow turnaround east of Gary Boulevard under I-40 and the elimination of the proposed westbound off ramp (Ramp H) at Neptune Drive. Refer to **Appendix I** for detailed plan sheets.

4.2.2.1 I-40 (Alt 2C)

For Alternative 2C, I-40 improvements are identical to Alternative 2B as discussed in Section **4.2.1.1**.

4.2.2.2 Ramps (Alt 2C)

Ramp improvements in Alternative 2C are identical to Alternative 2B as discussed in Section **4.2.1.2** with the exception of no proposed westbound loop off ramp at Neptune Drive (Ramp H).

4.2.2.3 Frontage Roads (Alt 2C)

For Alternative 2C, the limited access frontage road improvements are identical to Alternative 2B as discussed previously in Section **4.2.1.3**.

4.2.2.4 Gary Boulevard (Alt 2C)

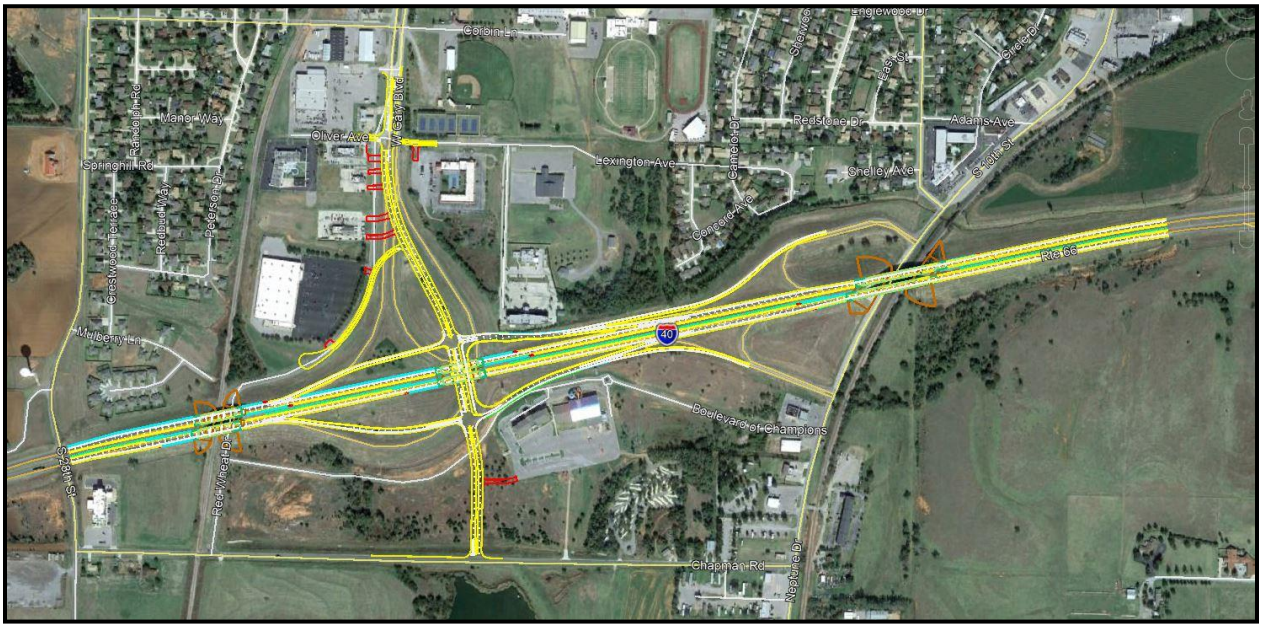
For Alternative 2C, the proposed improvements for Gary Boulevard are identical to Alternative 2B as discussed in Section **4.2.1.4**. However, due to the omission of the westbound loop off ramp at Neptune Drive, a free-flow turnaround is proposed with Alternative 2C east of Gary Boulevard to accommodate westbound I-40 traffic exiting to Neptune Drive. Instead of taking the existing loop, westbound interstate traffic destined for Neptune Drive will exit at Gary Boulevard, take the free-flow turnaround, and utilize the south frontage road to reach Neptune Drive.

4.2.2.5 Bridges (Alt 2C)

Alternative 2C bridges are nearly identical to Alternative 2B, with two exceptions. The first being the lengths of the two I-40 bridges over Gary Boulevard. Both bridges will be 241-feet long. They were increased in length to accommodate the proposed free-flow turnaround east of Gary Boulevard. The other exception is the westbound I-40 bridge over Neptune Road and the GNBC. Since the westbound loop off ramp (Ramp H) is omitted from Alternative 2C, the parallel deceleration lane is not necessary for this bridge. Therefore, in Alternative 2C, this bridge is reduced from three lanes to two lanes.

4.2.3 Alternative 2D

Figure 4-4: Alternative 2D Overview



As shown in **Figure 4-4** above, Alternative 2D provides for a total of four (4) ramps between Exit 65 and 65A, with four (4) at Gary Boulevard and zero (0) at Neptune Drive. Frontage roads on either side of I-40 serve as indirect access to and from I-40 for the four (4) Neptune Drive ramp movements. Refer to **Appendix I** for detailed plan sheets.

4.2.3.1 I-40 (Alt 2D)

For Alternative 2D, I-40 improvements are identical to Alternative 2B as discussed in Section **4.2.1.1**, with the only exception being the limits of improvement on the west end tie in just to the east of the 28th Street bridge which allows for the 28th Street corridor and bridge to remain in place as-is.

4.2.3.2 Ramps (Alt 2D)

At Neptune Drive, ramp improvements for Alternative 2D are similar to Alternative 2C, except the eastbound on ramp (Ramp G) is eliminated, leaving no loop ramps to/from I-40 at Neptune Drive. As with Alternative 2C, the outer ramps at Neptune Drive are also no longer connected to I-40 and are instead tied to the new limited access frontage roads, which provide one-way access to/from Gary Boulevard and ultimately connect to I-40.

At Gary Boulevard, the west ramps are slightly steeper than in Alternatives 2B and 2C, with a maximum of 6.00% longitudinal grade for both the westbound on ramp and eastbound off ramp. These steeper grades combined with the horizontal shift of Gary Boulevard allow the west ramps to tie in to I-40 without needing separate bridges over FMRC, as was required in Alternative 2B and 2C. East of Gary Boulevard, the ramps operate as slip ramps that fork to and from limited access frontage roads that parallel I-40, similar to Alternative 2B and 2C.

4.2.3.3 Frontage Roads (Alt 2D)

For Alternative 2D, the limited access frontage road improvements are similar to Alternative 2B as discussed previously in Section **4.2.1.3**, with the exception of the minor modifications required due to the horizontal shift in Gary Boulevard.

4.2.3.4 Gary Boulevard (Alt 2D)

Alternative 2D includes the proposed extension of Gary Boulevard to the south. Utilizing reverse curves, the proposed alignment crosses perpendicularly under I-40 in the infield area of the existing interchange, then terminates at Chapman Road.

Compared with Alternative 2B and 2C, the Gary Boulevard horizontal alignment for Alternative 2D is shifted east approximately 250 feet. This is possible because of the elimination of the loop ramps from Neptune Drive. Since the minimum ramp spacing constraint is no longer a limiting factor, the new limiting factors for the Gary Boulevard alignment are the two hotels on the north and south side of I-40. For Alternative 2D, Gary Boulevard is shifted as close to the hotels as feasible to develop the west ramps from Gary Boulevard without needing separate bridges over FMRC.

As with Alternative 2C, a free-flow turnaround is provided on the east side of Gary Boulevard to accommodate westbound I-40 traffic exiting to Neptune Drive. In Alternative 2D, this turnaround additionally serves Neptune Drive traffic accessing eastbound I-40. Therefore, both ramp movements (westbound off ramp and eastbound on ramp) are provided to Neptune Drive without the need to stop at the Gary Boulevard intersections.

As with Alternatives 2B and 2C, the corridor consolidation with Red Wheat Drive in conjunction with a slightly positive skew angle of two (2) degrees at Lexington Avenue and Oliver Avenue provides for a simplified and safer intersection while minimizing adverse impacts to existing properties in the area. Commercial properties along Red Wheat Drive will maintain direct access to Gary Boulevard, and Red Wheat Drive will be removed from service southwest of the K-Mart parking lot.

4.2.3.5 Bridges (Alt 2D)

Alternative 2D will consist of six new bridges that carry I-40 traffic: two over the FMRC, two over realigned Gary Boulevard, and two over Neptune Drive & the GNBC. The typical section for the two bridges over the FMRC will consist of a 52-foot clear roadway with a 12-foot outside shoulder, three 12-foot travel lanes, and a 4-foot inside shoulder. Both bridges will be 227-feet long and composed of three pre-stressed concrete beam spans. The two bridges over realigned Gary Boulevard will consist of a 40-foot clear roadway with a 12-foot outside shoulder, two 12-foot travel lanes, and a 4-foot inside shoulder. Both bridges will be 236-feet long and composed of three pre-stressed concrete beam spans. The two bridges over Neptune Drive & the GNBC will consist of a 40-foot clear roadway with a 12-foot outside shoulder, two 12-foot travel lanes, and a 4-foot insider shoulder. Both bridges will be 470-feet long and composed of four steel plate girder spans to minimize structural depth.

The proposed bridges over the FMRC are approximately the same length as the existing bridges. This is due to the removal of Red Wheat Drive being offset by ODOT's desire to use 3:1 slopes on new bridges. By maintaining 30-foot horizontal clearance, the railroad was able to be crossed using a Type III pre-stressed concrete beam span while maintaining the required vertical clearance. Proposed bridge piers are located within FMRC right-of-way. It is our understanding from ODOT Rail Division that the FMRC is not anticipating future tracks.

Similarly, the bridges over Gary Boulevard use a concrete girder system for cost efficiency. The cost of fill required to raise the profile outweighed the additional cost of a steel superstructure system.

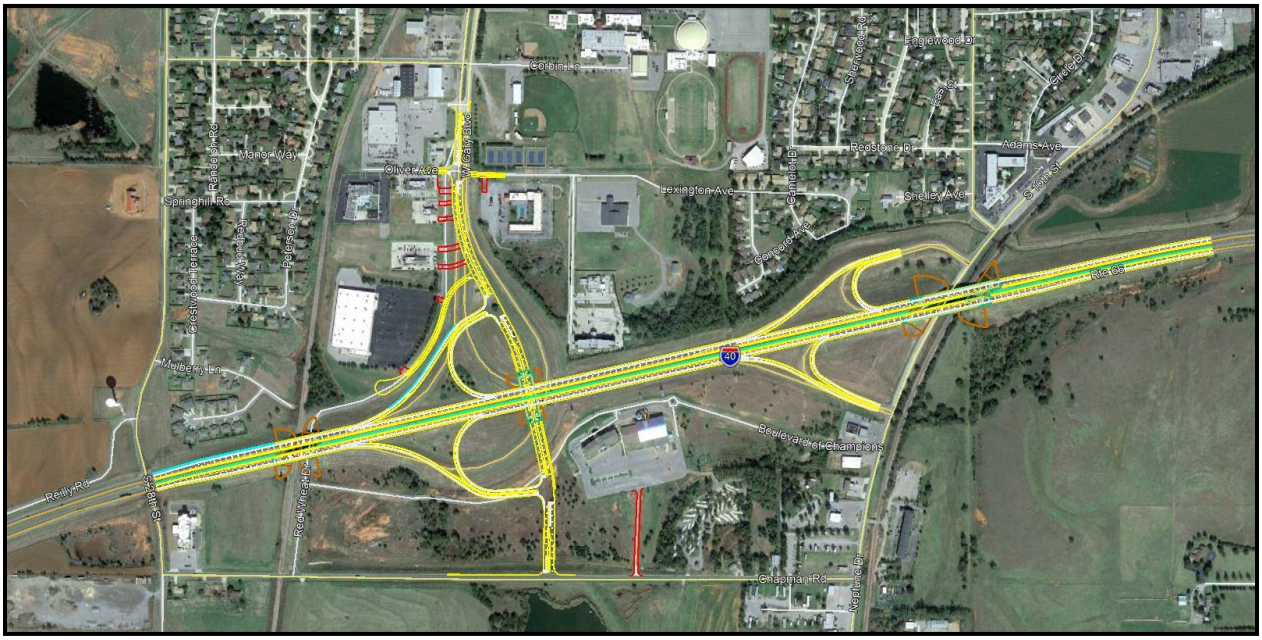
The 28th Street bridge was not impacted by the proposed ramp improvements, and therefore is not being replaced as part of this alternative.

4.3 Alternative 9 – Unique Design Aspects

Alternative 9 is comprised of two (2) sub-alternatives: 9A and 9B. Each has the general design configuration of a folded diamond interchange. Unique design elements and similarities between the sub-alternatives are described below. Refer to **Appendix I** for detailed plan sheets.

4.3.1 Alternative 9A

Figure 4-5: Alternative 9A Overview



As shown in **Figure 4-5** above, Alternative 9A provides for a total of eight (8) ramps between Exit 65 and 65A, with four (4) at Gary Boulevard and four (4) at Neptune Drive. Refer to **Appendix I** for detailed plan sheets.

4.3.1.1 I-40 (Alt 9A)

Alternative 9A I-40 improvements are identical to Alternative 2D as discussed in Section **4.2.3.1**. This is the only alternative in which I-40 crosses underneath Gary Boulevard.

4.3.1.2 Ramps (Alt 9A)

At Neptune Drive, all four ramp movements are retained in generally the existing folded diamond configuration. The proposed ramp improvements shift the gores for each movement slightly to the east of their existing locations to provide adequate ramp spacing from the Gary Boulevard ramps. The proposed longitudinal grades are also increased due to the I-40 profile raise required over the GNBC. The maximum grade between these Neptune Drive ramps is 5.40%, which is located on the westbound on ramp (Ramp E) and occurs at the proposed tie-in to match existing pavement. The maximum loop grades are 4.50% and 4.90% for eastbound on ramp (Ramp G) and westbound off ramp (Ramp H), respectively. Both loop ramps at Neptune Drive have parallel acceleration/deceleration lanes that extend across the Neptune Drive bridges.

At Gary Boulevard, four ramps are feasible due to the folded diamond interchange configuration. By shifting the conventionally east ramps to the west side of Gary Boulevard, the minimum distances are met for consecutive entrance and exit ramps between Gary Boulevard and Neptune Drive interchange ramps.

Since Gary Boulevard is above I-40 in this alternative and the I-40 profile grade increases west of Gary Boulevard, the maximum proposed longitudinal ramp grade is no more than 4.00%. The parallel acceleration/deceleration lanes for the outer ramps extend across the FMRC bridges but stop short of 28th Street.

4.3.1.3 Frontage Roads (Alt 9A)

No frontage roads are necessary for this alternative because all proposed ramp movements have direct access to I-40.

4.3.1.4 Gary Boulevard (Alt 9A)

Alternative 9A includes the proposed extension of Gary Boulevard to the south. As with the other alternatives, Gary Boulevard similarly utilizes reverse curves, perpendicularly crosses I-40, and terminates at Chapman Road. However, in Alternative 9A, the Gary Boulevard profile is over I-40 rather than under like the other alternatives, with a maximum grade of 5.00% applied on the approach grade south of I-40. With the folded diamond configuration, no ramps are needed east of Gary Boulevard which allows for the proposed alignment to be shifted further east the same 250 feet as mentioned in section **4.2.3.4** for Alternative 2D.

As with the Alternative 2 configurations, the corridor consolidation with Red Wheat Drive in conjunction with a slightly positive skew angle of two (2) degrees at Lexington Avenue and Oliver Avenue provides for a simplified and safer intersection while minimizing adverse impacts to existing properties in the area. Commercial properties along Red Wheat Drive will maintain direct access to Gary Boulevard, and Red Wheat Drive will be removed from service southwest of the K-Mart parking lot.

4.3.1.5 Bridges (Alt 9A)

Alternative 9A will consist of five new bridges. Four of these bridges will carry I-40 traffic, two over the FMRC and two over Neptune Drive and the GNBC. The other bridge will span over I-40 at the realigned Gary Boulevard.

The typical section for the I-40 bridges over the FMRC and GNBC will have a 52-foot clear roadway and consist of a 12-foot outside shoulder, three 12-foot travel lanes, and a 4-foot inside shoulder. The I-40 bridges over the FMRC have a length of 227-feet and are composed of three pre-stressed concrete beam spans. The two bridges over Neptune Drive & the GNBC will be 470-feet long, composed of four steel plate girder spans to minimize structural depth.

The realigned Gary Boulevard bridge spanning over I-40 will have a 66-foot clear roadway, consisting of two 8’-8” sidewalks on each side, one 14-foot travel lane on each side, one 12-foot travel lane on each side, and a 14-foot turning lane in the middle. The bridge will be 271-feet long and will have a four span steel rolled beam superstructure to minimize structural depth.

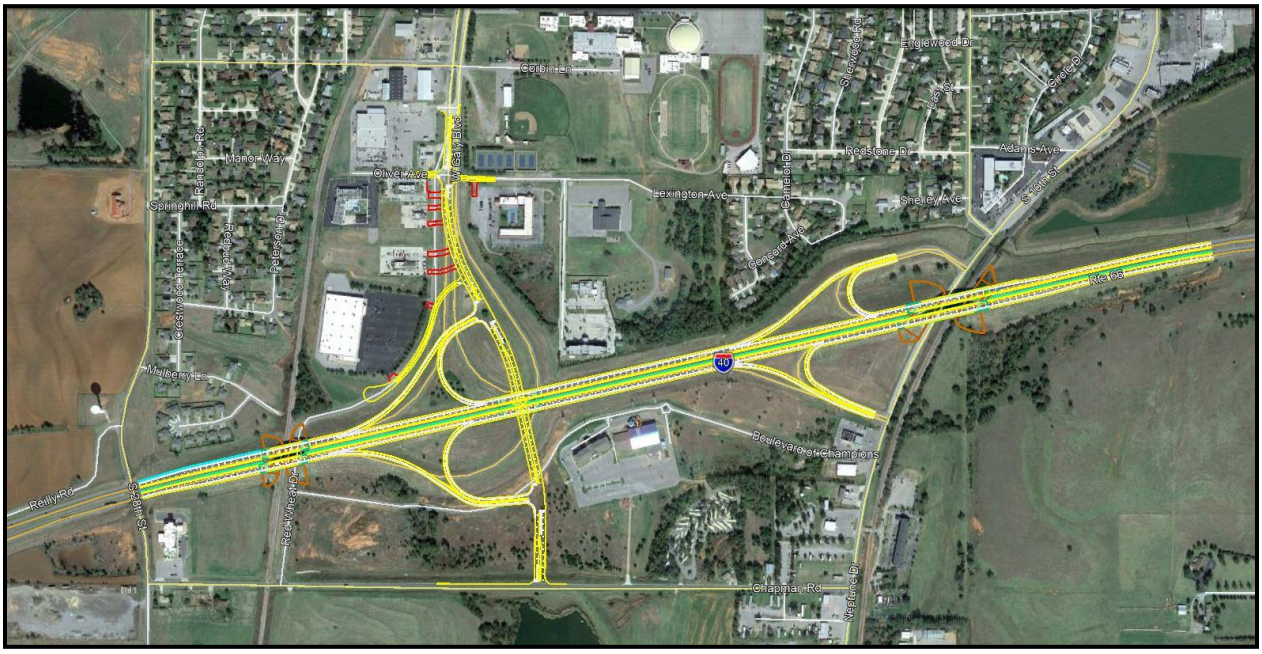
The proposed bridges over the FMRC are approximately the same length as the existing bridges. This is due to the removal of Red Wheat Drive being offset by ODOT’s desire to use 3:1 slopes on new bridges. By maintaining a 30-foot horizontal clearance, the railroad was able to be crossed using a Type III pre-stressed concrete beam span while maintaining the required vertical clearance. Proposed bridge piers

are located within FMRC right-of-way. It is our understanding from ODOT Rail Division that the FMRC is not anticipating future tracks.

The 28th Street bridge was not impacted by the proposed ramp improvements, and therefore is not being replaced as part of this alternative.

4.3.2 Alternative 9B

Figure 4-6: Alternative 9B Overview



As shown in **Figure 4-6** above, Alternative 9B provides for a total of eight (8) ramps between Exit 65 and 65A, with four (4) at Gary Boulevard and four (4) at Neptune Drive. Refer to **Appendix I** for detailed plan sheets.

4.3.2.1 I-40 (Alt 9B)

Aside from Gary Boulevard going under I-40 for Alternative 9B, the I-40 improvements are identical to Alternative 9A as discussed previously in Section **4.3.1.1**. The only difference to I-40 itself is the addition of the span bridges over Gary Boulevard.

4.3.2.2 Ramps (Alt 9B)

The horizontal geometry for Alternative 9B ramps is exactly the same as Alternative 9A, as discussed previously in Section **4.3.1.2**. Moreover, both the horizontal and vertical proposed improvements to the Neptune Drive interchange are identical to Alternative 9A.

The only difference in the proposed ramp design between Alternatives 9A and 9B is the vertical profile grades at the Gary Boulevard interchange due to the location of the proposed corridor being positioned below I-40 in Alternative 9B. At Gary Boulevard, the maximum ramp longitudinal grade is 6.00% located along the eastbound off ramp (Ramp B).

4.3.2.3 Frontage Roads (Alt 9B)

As with Alternative 9A, no frontage roads are necessary for Alternative 9B because all proposed ramp movements have direct access to I-40.

4.3.2.4 Gary Boulevard (Alt 9B)

Horizontally, the Alternative 9B Gary Boulevard alignment is identical to Alternative 9A. As with the other alternatives, Gary Boulevard similarly utilizes reverse curves, perpendicularly crosses I-40, and terminates at Chapman Road. Vertically however, in Alternative 9B, the Gary Boulevard profile is positioned under I-40 rather than above as proposed in Alternative 9A, with a maximum longitudinal grade of only 2.20%.

With the folded diamond configuration, no ramps are needed east of Gary Boulevard which allows for the proposed alignment to be shifted further east the same 250 feet as mentioned in Section **4.2.3.4** for Alternative 2D.

As with the Alternative 2 configurations, the corridor consolidation with Red Wheat Drive in conjunction with a slightly positive skew angle of two (2) degrees at Lexington Avenue and Oliver Avenue provides for a simplified and safer intersection while minimizing adverse impacts to existing properties in the area. Commercial properties along Red Wheat Drive will maintain direct access to Gary Boulevard, and Red Wheat Drive will be removed from service southwest of the K-Mart parking lot.

4.3.2.5 Bridges (Alt 9B)

Alternative 9B will consist of six new bridges that carry I-40 traffic: two over the FMRC, two over realigned Gary Boulevard, and two over Neptune Drive & the GNBC. The I-40 bridges over the FMRC, Gary Boulevard, and GNBC have a 52-foot clear roadway consisting of a 12-foot outside shoulder, three 12-foot travel lanes, and a 4-foot inside shoulder. The I-40 bridges over FMRC will be 227-feet long and composed of three pre-stressed concrete beam spans. The two bridges over realigned Gary Boulevard will be 198-feet long composed of three pre-stressed concrete beam spans. The two bridges over Neptune Drive and the GNBC will be 470-feet long composed of four steel plate girder spans to minimize structural depth.

The proposed bridges over the FMRC are approximately the same length as the existing bridges. This is due to the removal of Red Wheat Drive being offset by ODOT's desire to use 3:1 slopes on new bridges. By maintaining a 30-foot horizontal clearance, the railroad was able to be crossed using a Type III pre-stressed concrete beam span while maintaining the required vertical clearance. Proposed bridge piers are located within FMRC right-of-way. It is our understanding from ODOT Rail Division that the FMRC is not anticipating future tracks.

Similarly, the bridges over Gary Boulevard use a concrete girder system for cost efficiency. The cost of fill required to raise the profile outweighed the additional cost of a steel system.

The 28th Street bridge was not impacted by the proposed ramp improvements, and therefore is not being replaced as part of this alternative.

5.0 Evaluation of Alternatives

5.1 Traffic Analysis

The traffic volume, safety, and operational analyses of Alternatives 2 & 9 are described in detail, separate from this report. Final Traffic Volume Maps were submitted via ProjectWise on May 12, 2020 and the Traffic Operational Analysis Memo was uploaded to ProjectWise on June 4, 2020. These more recent uploads apply to Alternatives 2 & 9 only. For information on the previous Alternatives 7 & 8, see the report titled "EC-1962 I-40 Exit 65 Clinton, OK Traffic Study", submitted on November 2018, with the cover as shown in **Figure 5-1**.

Figure 5-1: Traffic Study

5.2 Environmental Analysis

5.2.1 Methodology

Potential impacts to environmental resources were assessed by overlaying the footprints of the proposed alternatives on maps showing environmental constraints. Resources that fell within the footprints of the proposed alternatives were considered "impacts" and were quantified and documented in the project matrix in **Table 6-1**.

5.2.2 Results of Environmental Analysis

5.2.2.1 Alternative 2B (Conventional Diamond Interchange – 6 Ramps and Gary Boulevard Under I-40)

Section **4.2.1** outlines the detailed plans for Alternative 2B. This alternative will require 0.016 acre of temporary right-of-way from the Clinton High School property near the existing tennis courts. This temporary right-of-way is required to tie Lexington Avenue on the west into the improved Gary Boulevard. This temporary impact is not anticipated to require Section 4(f) or 6(f) coordination. Impacts (1.573 acres) to the 100-year Zone A floodplain will occur where the new ramp will be constructed north of the Boulevard of Champions and south of I-40 in the east section of the study area between Neptune Drive and US-183. Alternative 2B will impact the 100-year Zone AE floodplain (0.071 acre) and floodway (3.024 acres) north of I-40 in the east section of the study area between Neptune Drive and US-183. A small section of stream will be impacted south of I-40 and a larger section of stream (416.53 feet) will be impacted north of I-40. The entire linear palustrine emergent (PEM) wetland will be impacted (0.105 acre) by Alternative 2B.

One of the existing driveways at McDonalds will be removed at the intersection of Oliver Avenue and Red Wheat Drive, where the existing driveway is located very close to the intersection. Businesses on the west side of Gary Boulevard that currently have access to Red Wheat Drive will connect directly to Gary Boulevard. Alternative 2B will construct a new access driveway from the new Gary Boulevard extension to the southwest corner of the Holiday Inn Express/Water Zoo property. The Boulevard of Champions will no longer extend west of the Water Zoo property. All other businesses will maintain access in their existing locations. There are no commercial or residential relocations and there will be no impacts to commercial properties, churches, or hazardous waste sites for Alternative 2B.

5.2.2.2 Alternative 2C (Conventional Diamond Interchange – 5 Ramps and Gary Boulevard Under I-40)

Alternative 2C and 2B have very similar footprints and impacts. The differences lie primarily east of the I-40 & Gary Boulevard interchange. With the exception of minor reductions in floodplain impacts, the impacts of Alternative 2C are the same as Alternative 2B.

5.2.2.3 Alternative 2D (Conventional Diamond Interchange – 4 Ramps and Gary Boulevard Under I-40)

The alignment for Gary Boulevard in Alternative 2D is slightly east of the alignment in Alternatives 2B/C. Both ramps at Neptune Drive are removed in Alternative 2D and construction ends at S. 28th Street on the west end, reducing the footprint. Impacts of Alternative 2D on environmental resources are similar to, but slightly lower than Alternatives 2B and 2C.

5.2.2.4 Alternatives 9A and 9B (Folded Diamond Interchange – 8 Ramps)

As previously discussed in Section **4.3.2**, Alternatives 9A and 9B are the same horizontally and only different where Gary Boulevard will go over I-40 in Alternative 9A and under I-40 in Alternative 9B. Impacts to the environmental constraints identified within the study area are the same for both alternatives. Impacts to environmental resources are similar to the Alternative 2 options.

5.3 Utility Relocation Costs

To avoid adverse impacts to businesses, the design intent for estimated utility relocations was treated more like a local government project. This approach included the allowance of up to three (3) feet of additional fill on top of existing buried utility lines to minimize the need for unnecessary utility relocation where minor grading was needed to maintain positive drainage, particularly across the removed Red Wheat Drive corridor.

ODOT Utility Division provided the utility costs on June 30, 2020, including a 15% contingency as shown in **Appendix G** and summarized in **Table 5-1**.

Table 5-1: Summary of Utility Costs

SUMMARY OF UTILITY COSTS	
Alternative	**Utility Cost**
Alternative 2B - Diamond (6 Ramp)	$ 842,562.00
Alternative 2C - Diamond (5 Ramp w/Turnaround)	$ 842,562.00
Alternative 2D - Diamond (4 Ramp w/Turnaround)	$ 842,562.00
Alternative 9A - Folded Diamond (Gary Over I-40)	$ 849,349.00
Alternative 9B - Folded Diamond (Gary Under I-40)	$ 849,349.00

Includes 15% Contingency

5.4 Right-of-Way Costs

5.4.1 Methodology

Right-of-way (ROW) impacts were calculated based on the estimated ROW limits associated with the development of each alternative. These limits were established to provide adequate ROW for proposed and temporary construction while accommodating locations of estimated utility relocations. The guidelines below were used to establish ROW boundaries.

- Provide utility relocation offsets based on ODOT ROW & Utility Division Guidelines
- Provide 10 feet of additional width from mainline construction perimeter
- Minimize acquisition of building structures on improved parcels
- Minimize environmental impacts (i.e. ponds, streams, etc.)
- Utilize existing property lines and section lines as tie-in locations where applicable

The estimated ROW limits for each alternative were submitted to ODOT Right-of-Way Division via ProjectWise on May 15, 2020. Following a request made on May 19, 2020, areas for permanent and temporary ROW as well as reduced linework layouts were submitted via email on May 20, 2020. ODOT Right-of-Way Division provided the ROW cost estimates on June 4, 2020, including a 10% contingency as shown in **Appendix G** and summarized below in **Table 5-2**.

5.4.2 Cost Summary

Table 5-2: Summary of Right-of-Way Costs

SUMMARY OF RIGHT OF WAY COSTS	
Alternative	**Right of Way Cost**
Alternative 2B - Diamond (6 Ramp)	$ 2,285,000.00
Alternative 2C - Diamond (5 Ramp w/Turnaround)	$ 2,281,000.00
Alternative 2D - Diamond (4 Ramp w/Turnaround)	$ 2,478,000.00
Alternative 9A - Folded Diamond (Gary Over I-40)	$ 2,219,000.00
Alternative 9B - Folded Diamond (Gary Under I-40)	$ 2,079,000.00

Includes 10% Contingency

5.5 Construction Costs

5.5.1 Methodology

Preliminary construction cost estimates were calculated and itemized to include major construction items associated with roadway, bridge, and drainage infrastructure. Lighting improvements were not included in the construction estimate. Proposed and temporary construction quantities were calculated based on the assumed pavement design shown in the typical sections included in **Appendix I**. Each alternative includes a contingency of 20% to account for additional final design related items and to be consistent with the previous construction estimates. The complete itemized construction cost estimate breakdown is included in **Appendix H**.

For program planning purposes, the construction costs were split based on the funding responsibility for specific limits of the project. The City portions for each alternative were estimated based on the permanent construction associated with the improvements to Gary Boulevard (outside the limits of the ramp terminals), Oliver/Lexington Avenue, Red Wheat Drive, and the driveways. All other construction costs are covered in the ODOT portion. The construction costs listed in **Table 5-3** are the total combined portions for both ODOT and the City.

5.5.2 Cost Summary

Table 5-3: Summary of Construction Costs

SUMMARY OF CONSTRUCTION COSTS	
Alternative	**Construction Cost**
Alternative 2B - Diamond (6 Ramp)	$ 58,243,000.00
Alternative 2C - Diamond (5 Ramp w/Turnaround)	$ 56,605,000.00
Alternative 2D - Diamond (4 Ramp w/Turnaround)	$ 46,834,000.00
Alternative 9A - Folded Diamond (Gary Over I-40)	$ 54,417,000.00
Alternative 9B - Folded Diamond (Gary Under I-40)	$ 48,277,000.00

Includes 20% Contingency

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6.0 Summary and Conclusion

6.1 Summary of Analysis

The intent of this Addendum #2 to both the original Preliminary Engineering Report previously submitted in March 2017 and the Addendum previously submitted in December of 2018 was to investigate and compare two additional alternatives (five sub-alternatives) at the I-40 and Gary Boulevard interchange based on construction costs, right-of-way impacts, utility relocations, and environmental impacts. The **Project Summary Matrix** shown in **Table 6-1** tabulates the aforementioned costs and impacts for the two additional alternatives (five sub-alternatives) included in this Addendum #2 report.

Excluding considerations of environmental impacts, the combined estimated costs for construction, right-of-way acquisition, and utility relocation are listed below:

- Alternative 2B (construction + right of way + utilities) = $61.4 M
- Alternative 2C (construction + right of way + utilities) = $59.7 M
- Alternative 2D (construction + right of way + utilities) = $50.2 M
- Alternative 9A (construction + right of way + utilities) = $57.5 M
- Alternative 9B (construction + right of way + utilities) = $51.2 M

(See Project Summary Matrix Next Page)

6.2 Project Summary Matrix (Table 6-1)

Table 6-1: Project Summary Matrix

Custer Co. JP No. 31482(04), I-40 Interchange Modification at Exit 65, Project Summary Matrix

	Alternative Name and Description	Construction Cost (1)	Right-of-Way Cost (2)	Utility Relocation Cost (3)	Total Bridge Area (SQ FT)	Number of Commerical Relocations	Number of Commerical Impacts	Number of Residential Relocations	Tennis Court Impacts (AC) (4)	Hazardous Material Sites	Floodplain 100 yr Zone A (AC)	Floodplain 100 yr Zone AE (AC)	Floodplain 100 yr Zone AE Floodway (AC)	Wetlands (AC) (w/in R/W) (5)	Streams Channelization (FT) (6)
1	Alternative 2B	$ 58.24 M	$ 2.29 M	$ 0.84 M	110,633	0	0	0	0.016	0	1.573	0.071	3.024	0.105	416.53
2	Alternative 2C	$ 56.61 M	$ 2.28 M	$ 0.84 M	108,513	0	0	0	0.016	0	1.573	0.067	2.993	0.105	416.53
3	Alternative 2D	$ 46.83 M	$ 2.48 M	$ 0.84 M	85,845	0	0	0	0.016	0	0.983	0.067	2.993	0.105	351.61
4	Alternative 9A	$ 54.42 M	$ 2.22 M	$ 0.85 M	100,238	0	0	0	0.016	0	2.173	0.071	3.024	0.105	392.89
5	Alternative 9B	$ 48.28 M	$ 2.08 M	$ 0.85 M	98,638	0	0	0	0.016	0	2.173	0.071	3.024	0.105	392.89

(1) 20% Contingency
(2) 10% Contingency, ODOT Estimate
(3) 15% Contingency, ODOT Estimate
(4) Impacts calculated for park property within Proposed Temporary ROW.
(5) Impacts calculated for wetlands within the construction perimeter.
(6) Impacts calculated for streams within the construction perimeter.

APPENDIX A

DESIGN CRITERIA REFERENCES

Table 12-1
GEOMETRIC DESIGN CRITERIA FOR FREEWAYS
(New Construction/Reconstruction)

Design Element			Manual Section	Rural	Urban			
Standard Designation			--	RF	UF			
Design Year (Geometrics)			5.3	20 years	20 years			
* Design Speed (mph) (1a)			5.2	70 (1b)	55-70			
Access Control			5.4	Full Control	Full Control			
Level of Service			5.3	Desirable: B Minimum: C	Desirable: C Minimum: D			
* Lane Width			8.1	12′	12′			
Shoulder	Type		8.1	Paved	Paved			
	* Width (2c)		8.1	Right: 10′ (2a) Left: 4′ (2a & 2b)	Right: 10′ (2a) Left: 4′ (2a & 2b)			
Cross Slope	* Travel Lane		8.1	2% Typical	2% Typical			
	Shoulder		8.1	3% - 4% Typical	3% - 4% Typical			
Auxiliary Lanes	Lane Width		8.1	12′	12′			
	Shoulder Width		8.1	Desirable: Full Shoulder Width Minimum: 6′	Desirable: Full Shoulder Width Minimum: 6′			
Median Width (3)	With Barrier		8.2	N/A	4 lanes: 10′ min.; 14′ des. (3a); >4 lanes: 22′ min.			
	Without Barrier		8.2	46′ Recommended; 64′ Desirable	46′ Recommended			
Right-of-Way Width			8.6	(4)	(4)			
Clear Zone			11.2	See Section 11.2	See Section 11.2			
Side Slopes	Cut (5)	Fore Slope	8.3	6:1	6:1			
		Ditch Width	8.3	8′	8′			
		Back Slope	8.3	4:1	4:1			
	Fill	0′-4′ Height	8.3	6:1	6:1			
		4′-10′ Height	8.3	6:1 to clear zone; 4:1 to toe	6:1 to clear zone; 4:1 to toe			
		>10′ Height	8.3	6:1 to clear zone; 3:1 to toe	6:1 to clear zone; 3:1 to toe			
				70 mph	55 mph	60 mph	65 mph	70 mph
* Desirable Stopping Sight Distance (6)			5.7	850′	550′	650′	725′	850′
Decision Sight Distance			5.7	See Section 5.7	See Section 5.7			
* Maximum Degree of Curvature	e_{max} = 0.06		6.1	2°45′	5°15′	4°15′	3°30′	2°45′
	e_{max} = 0.08		6.1	3°00′	6°00′	4°45′	3°45′	3°00′
* Superelevation Rate			6.2	See Section 6.2	See Section 6.2			
* Vertical Curvature for Desirable SSD	Crest		7.2	K=540	K=220	K=310	K=400	K=540
	Sag		7.2	K=220	K=130	K=160	K=180	K=220
* Maximum Grade (7)	Level		7.1	3%	3.5%	3%	3%	3%
	Rolling		7.1	4%	4.5%	4%	4%	4%
	Mountainous		7.1	5%	6%	6%	5.5%	5%
Minimum Grade			7.1	Desirable: 0.5% Minimum: 0%	Desirable: 0.5% Minimum: 0%			
* New/Reconstructed Bridges	Structural Capacity (8)		--	HS-20/OK Overload Truck	HS-20/OK Overload Truck			
	Width		8.4	Full Approach Roadway Width	Full Approach Roadway Width			
* Existing Bridges to Remain in Place	Structural Capacity		--	HS-20 (Inventory Rating)	HS-20 (Inventory Rating)			
	Width (9)		8.4	2 lanes: 28′ 3 lanes: 40′	2 lanes: 28′ 3 lanes: 40′			
* Vertical Clearance (10)	New/Replaced Bridges		7.4	16′-9″	16′-9″			
	Existing Bridges		7.4	14′-6″	14′-6″			

* Controlling design criteria (See Section 5.8)

GEOMETRIC DESIGN CRITERIA FOR FREEWAYS
(New Construction/Reconstruction)

Footnotes to Table 12-1

1. Design Speed. The following will apply:

   a. The design speed should equal or exceed the anticipated posted or regulatory speed limit after construction.
   b. In rolling terrain, a design speed of 65 mph will be acceptable. This is allowed by the AASHTO *A Policy on Design Standards -- Interstate System.*

2. Shoulder Width. The following will apply:

   a. Both Shoulders. When the volume of trucks exceeds 250 DDHV, both the right and left shoulders will be 12'.
   b. Left Shoulder. With three or more lanes in one direction, use a 10' shoulder.
   c. Barriers. All shoulder widths should desirably be increased by 2' when a barrier is present.

3. Median Width. The median width will depend upon many factors. These include the type of median (depressed or flush), the required depth of ditch, the acceptable median slopes, the available right-of-way, the anticipated ultimate development of the facility (i.e., planned addition of travel lanes) and field conditions. In addition, the following will apply:

   a. Where light poles, glare screens, etc., will be mounted on the median barrier, the desirable median width is 22' - 26'.

   b. Additional median width may be necessary to meet horizontal sight distance criteria on horizontal curves. See Section 6.5.

   c. When the volume of trucks exceeds 250 DDHV, the minimum median width is 26'.

4. Right-of-Way Width. The minimum ROW width will be the sum of the travel lane width plus the outside shoulder widths plus the median width plus the necessary width for fill and cut slopes and clear zones. Desirably, the ROW width will accommodate the anticipated ultimate development of the facility plus utility requirements.

5. Cut Slopes. Typical values in table apply to earth cuts. See Section 8.3 for rock cuts.

6. Desirable Stopping Sight Distance. Values in table are desirable SSD criteria for passenger cars on level grades. See Section 6.5 for the application of the SSD to horizontal curves.

7. Maximum Grades. Grades 1% steeper may be used in restricted urban areas where development precludes the use of flatter grades. Grades 1% steeper may also be used for one-way downgrades at all sites except in mountainous terrain.

8. Structural Capacity (New/Reconstructed Bridges). The Alternate Military Loading will also apply to the Interstate system. The Oklahoma Overload Truck applies only to State highways.

9. Width (Existing Bridges to Remain in Place). For bridge widths wider than the widths in the table, the bridge should be evaluated for widening to full approach roadway width only if one of the condition codes from the NBIS inspection report is less than 5 (deck, superstructure or substructure) or the approach roadway width is widened.

10. Minimum Vertical Clearance. The vertical clearances apply to the freeway passing under a bridge. The following also apply:

    a. Sign Truss/Pedestrian Bridge. The minimum clearance is 17'-9" for a freeway passing beneath a new sign truss or pedestrian bridge and 17'-0" for a freeway passing beneath an existing pedestrian bridge.

    b. Railroads. The Planning Division (Rail Planning Branch) will determine the vertical clearance for railroads passing beneath a freeway. The typical clearance will be 23'-0". An allowance should also be made for future ballasting.

Table 12-7
GEOMETRIC DESIGN CRITERIA FOR URBAN PRINCIPAL ARTERIALS
(New Construction/Reconstruction)

Design Element			Manual Section	2-Lane		Multilane	
				With Curb	Without Curb	With Curb	Without Curb
Standard Designation			–	UPA-1	UPA-2	UPA-3	UPA-4
Design Year (Geometrics)			5.3	20 years		20 years	
* Design Speed (mph) (1)			5.2	40-50		40-60	
Access Control			5.4	Control by Regulation		Control by Regulation/Partial Control	
Level of Service			5.3	Desirable: C Minimum: D		Desirable: C Minimum: D	
* Lane Width (2)			8.1	Desirable: 12′ Minimum: 11′		Desirable: 12′ Minimum: 11′	
Shoulder/Curb Offset		Type	8.1	Paved		Paved	
		* Width	8.1	2′ Min. (3a)	Des.: 8′ Min: 6′	Right: 2′ Left: 2′ (3a)	Right: 6′(3b) Left: 4′
Cross Slope		* Travel Lane	8.1	2% Typical		2% Typical (4)	
		Shoulder/Curb Offset	8.1	Same as adjacent T.L.	2%-4% Typical	Same as adjacent T.L.	2%-4% Typical
Auxiliary Lanes		Lane Width	8.1	Desirable: Same as Travel Lane; Minimum: 11′		Desirable: Same as Travel Lane; Minimum: 11′	
		Shoulder/Curb Offset	8.1	2′ Min. (5)	4′ Min.	2′ Min. (5)	4′ Min.
TWLT Lane Width				NA		14′ (6)	
Parking Lane Width (7)				Desirable: 12′ Minimum: 10′		Desirable: 12′ Minimum: 10′	
Median Width			8.2	NA		(8)	
Right-of-Way Width			8.6	(9)		(9)	
Clear Zone			11.2	1.5′ (10)	See Section 11.2	1.5′ (10)	See Section 11.2
Side Slopes	Cut (11)	Fore Slope	8.3	NA	4:1	NA	4:1
		Ditch Width	8.3	NA	8′	NA	8′
		Back Slope	8.3	3:1	3:1	3:1	3:1
	Fill (12)	0′-4′ Height	8.3	3:1	3:1	3:1	3:1
		4′-10′ Height	8.3	3:1	3:1	3:1	3:1
		> 10′ Height	8.3	3:1	3:1	3:1	3:1
* Desirable Stopping Sight Distance (13)			5.7	40 mph	45 mph	50 mph	60 mph
				325′	400′	475′	650′
Intersection Sight Distance			9.2	See Section 9.2			
Decision Sight Distance			5.7	See Section 5.7			
* Maximum Degree of Curvature		emax=0.04	6.1	11°30′	8°30′	NA	NA
		emax=0.06	6.1	12°45′	9°15′	6°45′	4°15′
* Superelevation Rate			6.2	See Section 6.2			
* Vertical Curvature for Desirable SSD		Crest	7.2	K=80	K=120	K=160	K=310
		Sag	7.2	K=70	K=90	K=110	K=160
* Maximum Grade		Level	7.1	7%	6.5%	6%	5%
		Rolling	7.1	8%	7.5%	7%	6%
		Mountainous	7.1	10%	9.5%	9%	8%
Minimum Grade			7.1	Desirable: 0.5% Minimum: Curbed: 0.4%; Uncurbed: 0%			
* New/Reconstructed Bridges		Structural Capacity (14)	–	HS-20/OK Overload Truck			
		Width	8.4	Full Approach Roadway Width			
* Existing Bridges to Remain in Place		Structural Capacity	–	HS-20 (Inventory Rating)			
		Width (15)	8.4	Uncurbed Section: Travelway + 4′ Curbed Section: Site Specific			
* Vertical Clearance (16)		New/Replaced Bridges	7.4	16′-9″			
		Existing Bridges	7.4	14′-6″			

* Controlling design criteria (See Section 5.8)

GEOMETRIC DESIGN CRITERIA FOR URBAN PRINCIPAL ARTERIALS
(New Construction/Reconstruction)

Footnotes to Table 12-7

1. Design Speed. The design speed should equal or exceed the anticipated posted or regulatory speed limit after construction.

2. Lane Widths. For highways on the National Network or on reasonable access routes, the minimum lane width is 12′. Where truck volume ≥10%, lane widths should be 12′.

3. Shoulder/Curb Offset. The following will apply:

   a. Where the design speed is 45 mph or less on facilities with curbs, the curb offset (for both left and right) may be 1′ minimum for barrier curbs and may be zero for mountable curbs.

   b. Where partial control of access is used, the right shoulder width will be 8′.

4. Travel Lane Cross Slope (Multilane). On curbed multilane facilities, the typical cross slope is 3% for any travel lanes adjacent to the curb.

5. Auxiliary Lane Shoulder/Curb Offset. Widths adjacent to auxiliary lanes will typically be 4′ or equal to the width adjacent to the travel lane, whichever is less.

6. TWLT Lane Width. In industrial areas with large trucks turning frequently, the desirable TWLT lane width is 16′.

7. Parking Lanes. Where the parking lane will be used as a travel lane during peak hours or may be converted to a travel lane in the future, the width should be 12′ plus a 1′ offset to the curb (if present). The cross slope of the parking lane will be the same as that of the adjacent travel lane.

8. Median Width. The median width will depend upon many factors. These include the type of median (depressed, flush or raised), the required depth of ditch, the acceptable median slopes, the available right-of-way, the anticipated ultimate development of the facility (i.e., planned addition of travel lanes) and field conditions. In addition, the following will apply where a median barrier is warranted:

   a. Where light poles, glare screens, etc., will be mounted on a median barrier, the desirable median width is 22′ - 26′.

   b. Additional median width may be necessary to meet horizontal sight distance criteria on horizontal curves. See Section 6.5.

9. Right-of-Way Width. The minimum ROW width will be the sum of the travel lane width plus the outside shoulder widths plus the median width plus the necessary width for fill and cut slopes and clear zones. Desirably, the ROW width will accommodate the anticipated ultimate development of the facility plus utility requirements.

10. Clear Zone (Curbed Facilities). Desirably, the clear zone will be 10′ from the edge of travel lane, if this yields a greater clear distance than the 1.5′ from the gutter line. The 1.5′ minimum is measured from the gutter line and applies regardless of the shoulder or curb offset width.

11. Cut Slopes. Typical values in table apply to earth cuts. See Section 8.3 for rock cuts. On facilities with curbs, it is desirable to provide a 6′ sodded "shelf" between the curb and the toe of the back slope or an 8′ shelf where a sidewalk is present. See Section 8.3.

12. Fill Slopes. On facilities with curbs, it is desirable to provide a 6′ sodded "shelf" between the curb and the break in the fill slope or an 8′ shelf where a sidewalk is present. See Section 8.3.

13. Desirable Stopping Sight Distance. Values in table are desirable SSD criteria for passenger cars on level grades. See Section 6.5 for the application of the SSD to horizontal curves.

14. Structural Capacity (New/Reconstructed Bridges). The Oklahoma Overload Truck applies only to State highways.

15. Width (Existing Bridges to Remain in Place). On State highways, the minimum width is 28′ for uncurbed sections. On all facilities, for bridge widths wider than the widths in the table, the bridge should be evaluated for widening to full approach roadway width only if one of the condition codes from the NBIS inspection report is less than 5 (deck, superstructure or substructure) or the approach roadway width is widened.

16. Minimum Vertical Clearance. The vertical clearances apply to the arterial passing under a bridge. The following also apply:

    a. Sign Truss/Pedestrian Bridge. The minimum clearance is 17'-9" for an arterial passing beneath a new sign truss or pedestrian bridge and 17'-0" for an arterial passing beneath an existing pedestrian bridge.

    b. Railroads. The Planning Division (Rail Planning Branch) will determine the vertical clearance for railroads passing beneath an arterial. The typical clearance will be 23'-0". An allowance should also be made for future ballasting.

Table 12-13
GEOMETRIC DESIGN CRITERIA FOR URBAN LOCAL STREETS**
(New Construction/Reconstruction)

Design Element			Manual Section	With Curb			Without Curb		
Standard Designation			–	UL-1			UL-2		
Design Year (Geometrics)			5.3	Desirable: 20 years Minimum: 10 years					
* Design Speed (mph) (1)			5.2	20-30					
Access Control			5.4	Control by Regulation					
Level of Service			5.3	D					
* Lane Width (2)			8.1	Desirable: 12' Minimum: 10'					
Shoulder/Curb Offset	Type		8.1	Paved			Chip Seal, Gravel or Dirt		
	* Width		8.1	2' Min. (3)			Desirable: 4' Minimum: 2'		
Cross Slope	* Travel Lane		8.1	Paved/Chip Seal: 2% Gravel: 2%-4% Dirt: 4%-6%					
	Shoulder/Curb Offset		8.1	Same as adjacent T.L.			Gravel: 4%-6% Sod: 6%-8%		
Parking Lane Width (4)			17.1	7' Typical					
Right-of-Way Width			8.6	(5)					
Clear Zone			11.2	1.5' (6)			See Section 11.2		
Side Slopes	Cut (7)	Fore Slope	8.3	NA			3:1		
		Ditch Width	8.3	NA			4'		
		Back Slope	8.3	2:1			3:1		
	Fill (8)	0'-4' Height	8.3	3:1			3:1		
		4'-10' Height	8.3	3:1			3:1		
		> 10' Height	8.3	3:1			3:1		
* Minimum Stopping Sight Distance (9)			5.7	20 mph 125'			30 mph 200'		
Intersection Sight Distance			9.2	See Section 9.2					
Decision Sight Distance			5.7	See Section 5.7					
* Maximum Degree of Curvature	emax=0.04		6.1	72°45'			24°45'		
	emax=0.06		6.1	77°00'			26°45'		
* Superelevation Rate			6.2	See Section 6.2					
* Vertical Curvature for Minimum SSD	Crest		7.2	K=10			K=30		
	Sag		7.2	K=20			K=40		
* Maximum Grade	Residential		7.1	15%					
	Commercial/Industrial		7.1	Desirable: 5% Maximum: 8%					
Minimum Grade			7.1	Desirable: 0.5% Minimum: Curbed: 0.4%; Uncurbed: 0%					
* New/Reconstructed Bridges	Structural Capacity		–	AADT < 50	AADT 50-250	AADT 250-400	DHV 100-200	DHV 200-400	DHV > 400
				HS-20					
	Width (10)		8.4	Travelway + 4'			Travelway + 6'		App Rd Wid
* Existing Bridges to Remain in Place	Structural Capacity		–	HS-10	HS-15				
	Width (11)		8.4	20'		22'		24'	28'
* Vertical Clearance (12)	New/Replaced Bridges		7.4	16'-9"					
	Existing Bridges		7.4	14'-6"					

* Controlling design criteria (See Section 5.8)

** Table will only apply where State and/or Federal funds are used.

GEOMETRIC DESIGN CRITERIA FOR URBAN LOCAL STREETS
(New Construction/Reconstruction)

Footnotes to Table 12-13

1. Design Speed. The design speed should equal or exceed the anticipated posted or regulatory speed limit after construction.

2. Lane Widths. In industrial areas, lane widths should desirably be 12′. Where right-of-way is restricted, lane widths may be 11′ in industrial areas and commercial areas and may be 9′ in residential areas.

3. Shoulder/Curb Offset. The curb offset may be 1′ minimum for barrier curbs and may be zero for mountable curbs.

4. Parking Lanes. In industrial or commercial areas, the minimum parking lane width is 9′. The cross slope of the parking lane will generally be the same as that of the adjacent travel lane.

5. Right-of-Way Width. The minimum ROW width will be the sum of the travel lane width plus the outside shoulder widths plus the necessary width for fill and cut slopes and clear zones.

6. Clear Zone (Curbed Facilities). Desirably, the clear zone will be 10′ from the edge of travel lane, if this yields a greater clear distance than the 1.5′ from the gutter line. The 1.5′ minimum is measured from the gutter line and applies regardless of the shoulder or curb offset width.

7. Cut Slopes. Typical values in table apply to earth cuts. See Section 8.3 for rock cuts. On facilities with curbs, it is desirable to provide a 6′ sodded "shelf" between the curb and the toe of the back slope or an 8′ shelf where a sidewalk is present. See Section 8.3.

8. Fill Slopes. On facilities with curbs, it is desirable to provide a 6′ sodded "shelf" between the curb and the break in the fill slope or an 8′ shelf where a sidewalk is present. See Section 8.3.

9. Minimum Stopping Sight Distance. Values in table are minimum SSD criteria for passenger cars on level grades. See Section 6.5 for the application of the SSD to horizontal curves.

10. Width (New and Reconstructed Bridges). Widths of bridges more than 100′ will be analyzed individually.

11. Width (Existing Bridges to Remain in Place). For bridges of more than 100′ in length, the values in the table do not apply. The acceptability of these bridges will be assessed individually.

12. Minimum Vertical Clearance. The vertical clearances apply to the local street passing under a bridge. The Planning Division (Rail Planning Branch) will determine the vertical clearance for railroads passing beneath a local street. The typical clearance will be 23′-0″. An allowance should also be made for future ballasting.

Table 3-9. Minimum Radii for Design Superelevation Rates, Design Speeds, and e_{max} = 6%

U.S. Customary															
e (%)	V_d = 15 mph	V_d = 20 mph	V_d = 25 mph	V_d = 30 mph	V_d = 35 mph	V_d = 40 mph	V_d = 45 mph	V_d = 50 mph	V_d = 55 mph	V_d = 60 mph	V_d = 65 mph	V_d = 70 mph	V_d = 75 mph	V_d = 80 mph
	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)
NC	868	1580	2290	3130	4100	5230	6480	7870	9410	11100	12600	14100	15700	17400
RC	614	1120	1630	2240	2950	3770	4680	5700	6820	8060	9130	10300	11500	12900
2.2	543	991	1450	2000	2630	3370	4190	5100	6110	7230	8200	9240	10400	11600
2.4	482	884	1300	1790	2360	3030	3770	4600	5520	6540	7430	8380	9420	10600
2.6	430	791	1170	1610	2130	2740	3420	4170	5020	5950	6770	7660	8620	9670
2.8	384	709	1050	1460	1930	2490	3110	3800	4580	5440	6200	7030	7930	8910
3.0	341	635	944	1320	1760	2270	2840	3480	4200	4990	5710	6490	7330	8260
3.2	300	566	850	1200	1600	2080	2600	3200	3860	4600	5280	6010	6810	7680
3.4	256	498	761	1080	1460	1900	2390	2940	3560	4250	4890	5580	6340	7180
3.6	209	422	673	972	1320	1740	2190	2710	3290	3940	4540	5210	5930	6720
3.8	176	358	583	864	1190	1590	2010	2490	3040	3650	4230	4860	5560	6320
4.0	151	309	511	766	1070	1440	1840	2300	2810	3390	3950	4550	5220	5950
4.2	131	270	452	684	960	1310	1680	2110	2590	3140	3680	4270	4910	5620
4.4	116	238	402	615	868	1190	1540	1940	2400	2920	3440	4010	4630	5320
4.6	102	212	360	555	788	1090	1410	1780	2210	2710	3220	3770	4380	5040
4.8	91	189	324	502	718	995	1300	1640	2050	2510	3000	3550	4140	4790
5.0	82	169	292	456	654	911	1190	1510	1890	2330	2800	3330	3910	4550
5.2	73	152	264	413	595	833	1090	1390	1750	2160	2610	3120	3690	4320
5.4	65	136	237	373	540	759	995	1280	1610	1990	2420	2910	3460	4090
5.6	58	121	212	335	487	687	903	1160	1470	1830	2230	2700	3230	3840
5.8	51	106	186	296	431	611	806	1040	1320	1650	2020	2460	2970	3560
6.0	39	81	144	231	340	485	643	833	1060	1330	1660	2040	2500	3050

e_{max}. The recommended design values for f that are applicable to low-speed streets and highways are shown as a dashed line in Figure 3-4. The radii for the full range of superelevation rates were calculated using Method 2 (i.e., the simplified curve equation) using f values from Figure 3-4 are tabulated in Table 3-13 and graphed in Figure 3-7.

The factors that often make superelevation impractical on low-speed streets in urban areas also make marginal superelevation improvements impractical when reconstructing low-speed streets. Therefore, low-speed streets in urban areas may retain their existing cross slope unless the curve has an unacceptable history of curve-related crashes. In such cases, consideration should be given to providing superelevation meeting Table 3-13 and, if practical, high-friction surface courses should also be provided.

Table 3-13. Minimum Radii and Superelevation for Low-Speed Streets in Urban Areas

U.S. Customary							
e (%)	V_d = 15 mph	V_d = 20 mph	V_d = 25 mph	V_d = 30 mph	V_d = 35 mph	V_d = 40 mph	V_d = 45 mph
	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)
−6.0	58	127	245	429	681	1067	1500
−5.0	56	121	231	400	628	970	1350
−4.0	54	116	219	375	583	889	1227
−3.0	52	111	208	353	544	821	1125
−2.8	51	110	206	349	537	808	1107
−2.6	51	109	204	345	530	796	1089
−2.4	51	108	202	341	524	784	1071
−2.2	50	108	200	337	517	773	1055
−2.0	50	107	198	333	510	762	1039
−1.5	49	105	194	324	495	736	1000
0	47	99	181	300	454	667	900
1.5	45	94	170	279	419	610	818
2.0	44	92	167	273	408	593	794
2.2	44	91	165	270	404	586	785
2.4	44	91	164	268	400	580	776
2.6	43	90	163	265	396	573	767
2.8	43	89	161	263	393	567	758
3.0	43	89	160	261	389	561	750
3.2	43	88	159	259	385	556	742
3.4	42	88	158	256	382	550	734
3.6	42	87	157	254	378	544	726
3.8	42	87	155	252	375	539	718
4.0	42	86	154	250	371	533	711
4.2	41	85	153	248	368	528	703
4.4	41	85	152	246	365	523	696
4.6	41	84	151	244	361	518	689
4.8	41	84	150	242	358	513	682
5.0	41	83	149	240	355	508	675
5.2	40	83	148	238	352	503	668

c) For roadways with low volumes, it may not be practical to apply even the minimum values found in Table 3-1. Refer to Chapter 12 additional considerations for low volume roadways and Chapter 10 for additional guidance for urban applications.

d) When design speeds are greater than the values provided, the designer may provide clear-zone distances greater than those shown in Table 3-1.

U.S. Customary Units

Design Speed (mph)	Design ADT	Foreslopes			Backslopes		
		1V:6H or flatter	1V:5H to 1V:4H	1V:3H	1V:3H	1V:5H to 1V:4H	1V:6H or flatter
≤40	UNDER 750[c]	7–10	7–10	[b]	7–10	7–10	7–10
	750–1500	10–12	12–14	[b]	12–14	12–14	12–14
	1500–6000	12–14	14–16	[b]	14–16	14–16	14–16
	OVER 6000	14–16	16–18	[b]	16–18	16–18	16–18
45–50	UNDER 750[c]	10–12	12–14	[b]	8–10	8–10	10–12
	750–1500	14–16	16–20	[b]	10–12	12–14	14–16
	1500–6000	16–18	20–26	[b]	12–14	14–16	16–18
	OVER 6000	20–22	24–28	[b]	14–16	18–20	20–22
55	UNDER 750[c]	12–14	14–18	[b]	8–10	10–12	10–12
	750–1500	16–18	20–24	[b]	10–12	14–16	16–18
	1500–6000	20–22	24–30	[b]	14–16	16–18	20–22
	OVER 6000	22–24	26–32[a]	[b]	16–18	20–22	22–24
60	UNDER 750[c]	16–18	20–24	[b]	10–12	12–14	14–16
	750–1500	20–24	26–32[a]	[b]	12–14	16–18	20–22
	1500–6000	26–30	32–40[a]	[b]	14–18	18–22	24–26
	OVER 6000	30–32[a]	36–44[a]	[b]	20–22	24–26	26–28
65–70[d]	UNDER 750[c]	18–20	20–26	[b]	10–12	14–16	14–16
	750–1500	24–26	28–36[a]	[b]	12–16	18–20	20–22
	1500–6000	28–32[a]	34–42[a]	[b]	16–20	22–24	26–28
	OVER 6000	30–34[a]	38–46[a]	[b]	22–24	26–30	28–30

Notes:

a) When a site-specific investigation indicates a high probability of continuing crashes or when such occurrences are indicated by crash history, the designer may provide clear-zone distances greater than the clear zone shown in Table 3-1. Clear zones may be limited to 30 ft for practicality and to provide a consistent roadway template if previous experience with similar projects or designs indicates satisfactory performance.

b) Because recovery is less likely on the unshielded, traversable 1V:3H fill slopes, fixed objects should not be present in the vicinity of the toe of these slopes. Recovery of high-speed vehicles that encroach beyond the edge of the shoulder may be expected to occur beyond the toe of slope. Determination of the width of the recovery area at the toe of slope should consider right-of-way availability, environmental concerns, economic factors, safety needs, and crash histories. Also, the distance between the edge of the through traveled lane and the beginning of the 1V:3H slope should influence the recovery area provided at the toe of slope. While the application may be limited by several factors, the foreslope parameters that may enter into determining a maximum desirable recovery area are illustrated in Figure 3-2. A 10-ft recovery area at the toe of slope should be provided for all traversable, non recoverable fill slopes.

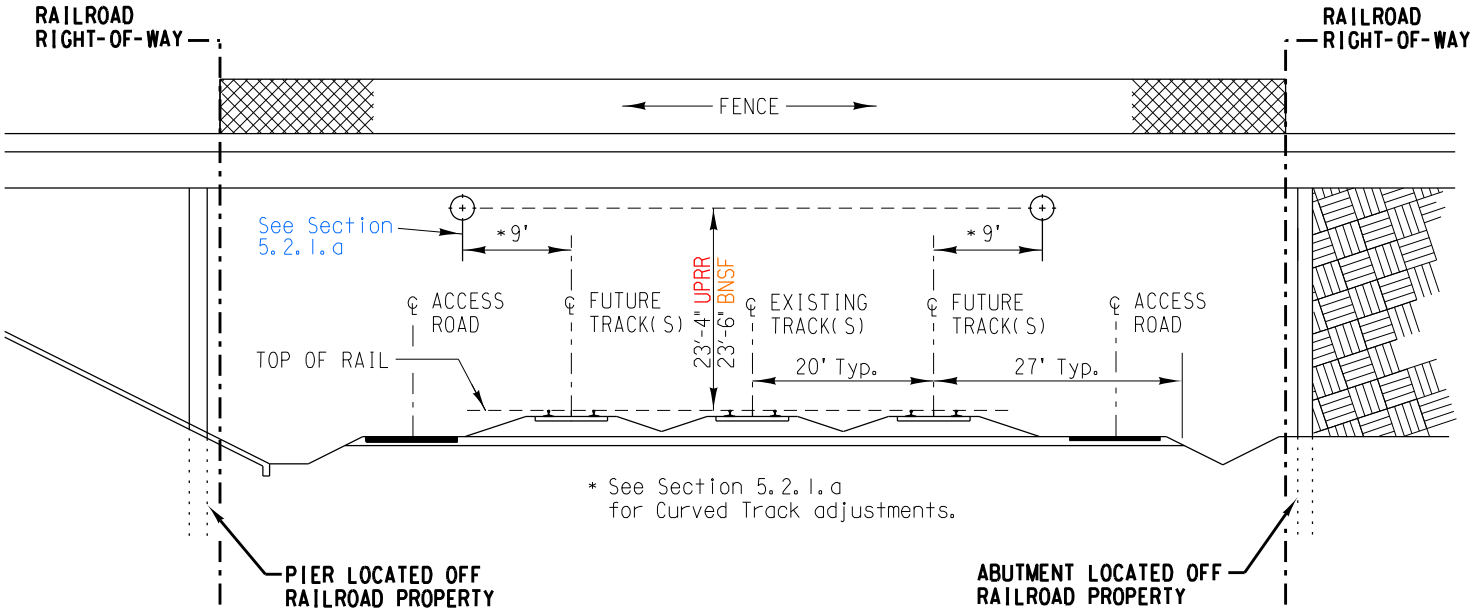
c) For roadways with low volumes it may not be practical to apply even the minimum values found in Table 3-1. Refer to Chapter 12 for additional considerations for low volume roadways and Chapter 10 for additional guidance for urban applications.

d) When design speeds are greater than the values provided, the designer may provide clear-zone distances greater than those shown in Table 3-1.

The designer may choose to modify the clear-zone distances in Table 3-1 with adjustment factors to account for horizontal curvature, as shown in Table 3-2. These modifications normally are considered only when crash histories indicate such a need, when a specific site investigation shows a definitive crash potential that could be significantly lessened by increasing the clear zone width, and when such increases are cost-effective. Horizontal curves, particularly for high-speed facilities, are usually superelevated to increase safety and provide a more comfortable ride. Increased banking on curves where the superelevation is inadequate is an alternate method of increasing roadway safety within a horizontal curve, except where snow and ice conditions limit the use of increased superelevation.

UNION PACIFIC RAILROAD - BNSF RAILWAY

GUIDELINES FOR RAILROAD GRADE SEPARATION PROJECTS



The above depiction is for example purposes only. The individual dimensions are the minimum required. Project specific design plans require the review and prior approval by the Railroad.

It is the intent of the Railroad to maintain the right-of-way free of permanent obstructions such as overhead bridge piers, earth fills and drainage facilities which do not support Railroad infrastructure. Permanent obstructions restrict the Railroad's ability to perform maintenance and expand service to existing and future customers. Keeping the right-of-way unobstructed is not a betterment for the Railroad, it is a necessity.

BRIDGE STANDARDS

GRADE SEPARATION GUIDELINES

COVER PAGE

FILE OWNER: UPRR	DATE: 1/05/16
AUTHORED BY: R. FRIESEN	CHECKED BY: A. HURST

APPENDIX B

ALTERNATIVE 2B GEOMETRICS

Project Name: Add 2_I-40 Mainline
Description:
Horizontal Alignment Name: I-40 Survey
Description: v3_I-40
Style: Default

	STATION	EASTING	NORTHING
Element: Circular			
PC (5002)	3401+63.0000	1668517.2610	179652.5796
PI ( )	3428+22.7579	1670437.5540	181492.9020
CC (5001)		1675124.5508	172758.1723
PT (5004)	3453+51.0241	1673032.7119	182075.5400
Radius:	9549.3000		
Delta:	31^07'41.2793" Right		
Degree of Curvature(Arc):	0^35'59.9992"		
Length:	5188.0241		
Tangent:	2659.7578		
Chord:	5124.4545		
Middle Ordinate:	350.1630		
External:	363.4918		
Tangent Direction:	N 46^13'05.6199" E		
Radial Direction:	S 43^46'54.3801" E		
Chord Direction:	N 61^46'56.2589" E		
Radial Direction:	S 12^39'13.1008" E		
Tangent Direction:	N 77^20'46.8992" E		
Element: Linear			
PT (5004)	3453+51.0241	1673032.7119	182075.5400
PI (5005)	3503+41.1825	1677901.6700	183168.6680
Tangent Direction:	N 77^20'46.9011" E		
Tangent Length:	4990.1585		
Element: Linear			
PI (5005)	3503+41.1825	1677901.6700	183168.6680
PC (6)	3513+70.7030	1678906.1856	183394.1914
Tangent Direction:	N 77^20'46.9000" E		
Tangent Length:	1029.5205		
Element: Circular			
PC (6)	3513+70.7030	1678906.1856	183394.1914
PI ( )	3531+15.0638	1680608.1796	183776.3055
CC ( )		1681259.5126	172912.1162
PT ( )	3548+29.2410	1682343.6356	183600.2744
Radius:	10743.0000		
Delta:	18^26'43.6737" Right		
Degree of Curvature(Arc):	0^31'59.9926"		
Length:	3458.5380		
Tangent:	1744.3608		
Chord:	3443.6220		
Middle Ordinate:	138.8774		
External:	140.6962		
Tangent Direction:	N 77^20'46.9000" E		
Radial Direction:	S 12^39'13.1000" E		
Chord Direction:	N 86^34'08.7369" E		
Radial Direction:	S 5^47'30.5737" W		
Tangent Direction:	S 84^12'29.4263" E		

```
            Project Name: Add 2_Ramps
             Description:
Horizontal Alignment Name: Ramp A_2B_2C
             Description:
                   Style: Default
                                    STATION       EASTING      NORTHING

Element: Linear
            POB (       2)       1000+00.0000  1672007.6492   181830.9955
             PC (       3)       1003+01.7965  1672290.6302   181935.8901
        Tangent Direction: N 69^39'41.0597" E
           Tangent Length:           301.7965

Non-collinear

Element: Circular
             PC (       3)       1003+01.7965  1672290.6302   181935.8901
             PI (        )       1005+18.5206  1672497.7064   181999.8333
             CC (       4)                     1675124.9790   172757.0231
             PT (      10)       1007+35.1711  1672707.4557   182054.3729
                  Radius:          9606.5151
                   Delta:      2^35'05.1357" Right
  Degree of Curvature(Arc):      0^35'47.1346"
                  Length:           433.3746
                 Tangent:           216.7241
                   Chord:           433.3378
          Middle Ordinate:             2.4437
                 External:             2.4443
        Tangent Direction: N 72^50'23.2723" E
         Radial Direction: S 17^09'36.7277" E
          Chord Direction: N 74^07'55.8402" E
         Radial Direction: S 14^34'31.5920" E
        Tangent Direction: N 75^25'28.4080" E

Element: Linear
             PT (      10)       1007+35.1711  1672707.4557   182054.3729
             PC (       5)       1008+93.1066  1672860.3083   182094.1181
        Tangent Direction: N 75^25'28.4080" E
           Tangent Length:           157.9355

Element: Circular
             PC (       5)       1008+93.1066  1672860.3083   182094.1181
             PI (        )       1009+61.6897  1672926.6842   182111.3773
             CC (      13)                     1672139.3711   184866.7099
             PT (      14)       1010+30.2466  1672992.1582   182131.7931
                  Radius:          2864.7890
                   Delta:      2^44'34.0797" Left
  Degree of Curvature(Arc):      1^59'59.9999"
                  Length:           137.1400
                 Tangent:            68.5831
                   Chord:           137.1269
          Middle Ordinate:             0.8206
                 External:             0.8208
        Tangent Direction: N 75^25'28.4080" E
         Radial Direction: S 14^34'31.5920" E
          Chord Direction: N 74^03'11.3682" E
         Radial Direction: S 17^19'05.6717" E
        Tangent Direction: N 72^40'54.3283" E

Element: Linear
             PT (      14)       1010+30.2466  1672992.1582   182131.7931
             PC (       6)       1012+48.4008  1673200.4226   182196.7330
        Tangent Direction: N 72^40'54.3283" E
           Tangent Length:           218.1542

Element: Circular
             PC (       6)       1012+48.4008  1673200.4226   182196.7330
             PI (        )       1013+65.0803  1673311.8126   182231.4660
             CC (      11)                     1674053.2097   179461.8161
             PT (      12)       1014+81.6310  1673425.6583   182257.0255
                  Radius:          2864.7890
                   Delta:      4^39'52.5724" Right
  Degree of Curvature(Arc):      1^59'59.9999"
                  Length:           233.2302
                 Tangent:           116.6795
                   Chord:           233.1658
          Middle Ordinate:             2.3732
                 External:             2.3751
        Tangent Direction: N 72^40'54.3283" E
```

```
          Radial Direction: S 17^19'05.6717" E
           Chord Direction: N 75^00'50.6145" E
          Radial Direction: S 12^39'13.0993" E
         Tangent Direction: N 77^20'46.9007" E

Element: Linear
              PT (      12)       1014+81.6310  1673425.6583   182257.0255
              PC (       7)       1017+52.5447  1673689.9921   182316.3709
         Tangent Direction: N 77^20'46.9007" E
            Tangent Length:           270.9137

Element: Circular
              PC (       7)       1017+52.5447  1673689.9921   182316.3709
              PI (        )       1018+92.8631  1673826.9024   182347.1086
              CC (      15)                     1673438.9715   183434.4547
              PT (      16)       1020+31.7913  1673952.3511   182409.9724
                     Radius:          1145.9156
                      Delta:     13^57'44.3782" Left
   Degree of Curvature(Arc):      4^59'59.9998"
                    Length:           279.2465
                   Tangent:           140.3184
                     Chord:           278.5561
           Middle Ordinate:             8.4956
                  External:             8.5591
         Tangent Direction: N 77^20'46.9007" E
          Radial Direction: S 12^39'13.0993" E
           Chord Direction: N 70^21'54.7116" E
          Radial Direction: S 26^36'57.4775" E
         Tangent Direction: N 63^23'02.5225" E

Element: Linear
              PT (      16)       1020+31.7913  1673952.3511   182409.9724
              PC (       8)       1024+10.1294  1674290.5966   182579.4710
         Tangent Direction: N 63^23'02.5225" E
            Tangent Length:           378.3382

Element: Circular
              PC (       8)       1024+10.1294  1674290.5966   182579.4710
              PI (        )       1025+50.4478  1674416.0453   182642.3348
              CC (      17)                     1674803.9762   181554.9887
              PT (      18)       1026+89.3760  1674552.9556   182673.0725
                     Radius:          1145.9156
                      Delta:     13^57'44.3782" Right
   Degree of Curvature(Arc):      4^59'59.9998"
                    Length:           279.2465
                   Tangent:           140.3184
                     Chord:           278.5561
           Middle Ordinate:             8.4956
                  External:             8.5591
         Tangent Direction: N 63^23'02.5225" E
          Radial Direction: S 26^36'57.4775" E
           Chord Direction: N 70^21'54.7116" E
          Radial Direction: S 12^39'13.0993" E
         Tangent Direction: N 77^20'46.9007" E

Element: Linear
              PT (      18)       1026+89.3760  1674552.9556   182673.0725
             POE (       9)       1029+24.1382  1674782.0159   182724.4987
         Tangent Direction: N 77^20'46.9007" E
            Tangent Length:           234.7622
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(19)	2000+00.0000	1671755.3949	181646.3275
PC	(20)	2002+98.6577	1672040.1397	181736.4208
Tangent Direction:		N 72^26'33.4023" E		
Tangent Length:		298.6577		
Non-collinear				
Element: Circular				
PC	(20)	2002+98.6577	1672040.1397	181736.4208
PI	( )	2006+59.7463	1672381.6377	181853.7412
CC	(4)		1675124.9790	172757.0232
PCC	(221)	2010+20.4870	1672731.0601	181944.7850
Radius:		9494.5151		
Delta:		4^21'21.4729" Right		
Degree of Curvature(Arc):		0^36'12.4628"		
Length:		721.8293		
Tangent:		361.0886		
Chord:		721.6555		
Middle Ordinate:		6.8589		
External:		6.8639		
Tangent Direction:		N 71^02'24.1010" E		
Radial Direction:		S 18^57'35.8990" E		
Chord Direction:		N 73^13'04.8374" E		
Radial Direction:		S 14^36'14.4261" E		
Tangent Direction:		N 75^23'45.5739" E		
Element: Circular				
PCC	(221)	2010+20.4870	1672731.0601	181944.7850
PI	( )	2011+45.4688	1672852.0039	181976.2976
CC	(222)		1673308.9156	179726.9994
PT	(223)	2012+70.2033	1672975.6574	181994.4714
Radius:		2291.8312		
Delta:		6^14'34.4657" Right		
Degree of Curvature(Arc):		2^29'59.9999"		
Length:		249.7163		
Tangent:		124.9818		
Chord:		249.5928		
Middle Ordinate:		3.4003		
External:		3.4053		
Tangent Direction:		N 75^23'45.5739" E		
Radial Direction:		S 14^36'14.4261" E		
Chord Direction:		N 78^31'02.8067" E		
Radial Direction:		S 8^21'39.9604" E		
Tangent Direction:		N 81^38'20.0396" E		
Element: Linear				
PT	(223)	2012+70.2033	1672975.6574	181994.4714
PC	(224)	2014+88.8101	1673191.9406	182026.2593
Tangent Direction:		N 81^38'20.0396" E		
Tangent Length:		218.6067		
Element: Circular				
PC	(224)	2014+88.8101	1673191.9406	182026.2593
PI	( )	2015+96.1737	1673298.1632	182041.8712
CC	(225)		1672775.3678	184860.5992
PT	(226)	2017+03.4370	1673402.9192	182065.3899
Radius:		2864.7890		
Delta:		4^17'33.1382" Left		
Degree of Curvature(Arc):		1^59'59.9999"		
Length:		214.6269		
Tangent:		107.3637		
Chord:		214.5767		
Middle Ordinate:		2.0097		
External:		2.0111		
Tangent Direction:		N 81^38'20.0396" E		
Radial Direction:		S 8^21'39.9604" E		
Chord Direction:		N 79^29'33.4705" E		
Radial Direction:		S 12^39'13.0986" E		
Tangent Direction:		N 77^20'46.9014" E		
Element: Linear				

```
            PT (     226)       2017+03.4370  1673402.9192   182065.3899
            PC (      24)       2020+03.4370  1673695.6328   182131.1069
        Tangent Direction: N 77^20'46.9014" E
           Tangent Length:           300.0000

Element: Circular
            PC (      24)       2020+03.4370  1673695.6328   182131.1069
            PI (       )       2021+63.6338  1673851.9389   182166.1991
            CC (      25)                     1674009.4085   180733.5023
            PT (      30)       2023+22.5048  1674012.1354   182165.8942
                  Radius:          1432.3945
                   Delta:     12^45'45.7727" Right
  Degree of Curvature(Arc):      3^59'59.9999"
                  Length:           319.0679
                 Tangent:           160.1969
                   Chord:           318.4086
          Middle Ordinate:             8.8749
                 External:             8.9303
        Tangent Direction: N 77^20'46.9014" E
         Radial Direction: S 12^39'13.0986" E
          Chord Direction: N 83^43'39.7878" E
         Radial Direction: S  0^06'32.6741" W
        Tangent Direction: S 89^53'27.3259" E

Element: Linear
            PT (      30)       2023+22.5048  1674012.1354   182165.8942
            PC (      31)       2027+53.8880  1674443.5178   182165.0729
        Tangent Direction: S 89^53'27.3259" E
           Tangent Length:           431.3831

Element: Circular
            PC (      31)       2027+53.8880  1674443.5178   182165.0729
            PI (       )       2028+82.0455  1674571.6751   182164.8289
            CC (      32)                     1674445.6993   183310.9864
            PT (      33)       2030+09.1423  1674696.7199   182192.9027
                  Radius:          1145.9156
                   Delta:     12^45'45.7727" Left
  Degree of Curvature(Arc):      4^59'59.9998"
                  Length:           255.2543
                 Tangent:           128.1575
                   Chord:           254.7269
          Middle Ordinate:             7.0999
                 External:             7.1442
        Tangent Direction: S 89^53'27.3259" E
         Radial Direction: S  0^06'32.6741" W
          Chord Direction: N 83^43'39.7878" E
         Radial Direction: S 12^39'13.0986" E
        Tangent Direction: N 77^20'46.9014" E

Element: Linear
            PT (      33)       2030+09.1423  1674696.7199   182192.9027
           POE (      26)       2032+08.8164  1674891.5443   182236.6427
        Tangent Direction: N 77^20'46.9014" E
           Tangent Length:           199.6741
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp C_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(34)	3000+00.0000	1674888.2585	182251.2784
PC	(35)	3001+47.0307	1675031.7181	182283.4864
Tangent Direction:		N 77^20'46.9011" E		
Tangent Length:		147.0307		
Element: Circular				
PC	(35)	3001+47.0307	1675031.7181	182283.4864
PI	( )	3002+85.9726	1675167.2854	182313.9226
CC	(39)		1674780.6975	183401.5702
PT	(41)	3004+23.5647	1675291.6506	182375.8755
Radius:		1145.9156		
Delta:		13^49'36.1158" Left		
Degree of Curvature(Arc):		4^59'59.9998"		
Length:		276.5340		
Tangent:		138.9419		
Chord:		275.8635		
Middle Ordinate:		8.3316		
External:		8.3926		
Tangent Direction:		N 77^20'46.9011" E		
Radial Direction:		S 12^39'13.0989" E		
Chord Direction:		N 70^25'58.8432" E		
Radial Direction:		S 26^28'49.2148" E		
Tangent Direction:		N 63^31'10.7852" E		
Element: Linear				
PT	(41)	3004+23.5647	1675291.6506	182375.8755
PC	(36)	3008+02.0508	1675630.4288	182544.6389
Tangent Direction:		N 63^31'10.7852" E		
Tangent Length:		378.4861		
Element: Circular				
PC	(36)	3008+02.0508	1675630.4288	182544.6389
PI	( )	3010+33.6207	1675837.7041	182647.8938
CC	(42)		1676482.0172	180835.1479
PT	(43)	3012+62.9408	1676063.6496	182698.6207
Radius:		1909.8593		
Delta:		13^49'36.1155" Right		
Degree of Curvature(Arc):		3^00'00.0001"		
Length:		460.8900		
Tangent:		231.5699		
Chord:		459.7724		
Middle Ordinate:		13.8860		
External:		13.9877		
Tangent Direction:		N 63^31'10.7852" E		
Radial Direction:		S 26^28'49.2148" E		
Chord Direction:		N 70^25'58.8430" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT	(43)	3012+62.9408	1676063.6496	182698.6207
PI	(37)	3019+17.8641	1676702.6663	182842.0861
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		654.9234		
Element: Linear				
PI	(37)	3019+17.8641	1676702.6663	182842.0861
POE	(38)	3022+18.1040	1676992.7512	182919.5117
Tangent Direction:		N 75^03'20.7046" E		
Tangent Length:		300.2399		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp D_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(44)	4000+00.0000	1674785.3018	182709.8630
PC	(45)	4001+47.0307	1674928.7614	182742.0711
Tangent Direction:		N 77^20'46.9011" E		
Tangent Length:		147.0307		
Element: Circular				
PC	(45)	4001+47.0307	1674928.7614	182742.0711
PI	( )	4002+85.9726	1675064.3288	182772.5073
CC	(51)		1675179.7820	181623.9874
PT	(52)	4004+23.5647	1675203.2416	182769.6628
Radius:		1145.9156		
Delta:		13^49'36.1158" Right		
Degree of Curvature(Arc):		4^59'59.9998"		
Length:		276.5340		
Tangent:		138.9419		
Chord:		275.8635		
Middle Ordinate:		8.3316		
External:		8.3926		
Tangent Direction:		N 77^20'46.9011" E		
Radial Direction:		S 12^39'13.0989" E		
Chord Direction:		N 84^15'34.9590" E		
Radial Direction:		S 1^10'23.0169" W		
Tangent Direction:		S 88^49'36.9831" E		
Element: Linear				
PT	(52)	4004+23.5647	1675203.2416	182769.6628
PC	(47)	4008+02.0508	1675581.6484	182761.9143
Tangent Direction:		S 88^49'36.9831" E		
Tangent Length:		378.4861		
Element: Circular				
PC	(47)	4008+02.0508	1675581.6484	182761.9143
PI	( )	4010+33.6207	1675813.1697	182757.1735
CC	(53)		1675620.7477	184671.3734
PT	(54)	4012+62.9408	1676039.1153	182807.9005
Radius:		1909.8593		
Delta:		13^49'36.1162" Left		
Degree of Curvature(Arc):		3^00'00.0001"		
Length:		460.8900		
Tangent:		231.5699		
Chord:		459.7724		
Middle Ordinate:		13.8860		
External:		13.9877		
Tangent Direction:		S 88^49'36.9831" E		
Radial Direction:		S 1^10'23.0169" W		
Chord Direction:		N 84^15'34.9588" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT	(54)	4012+62.9408	1676039.1153	182807.9005
PI	(48)	4022+18.1040	1676971.0796	183017.1355
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		955.1632		
Element: Linear				
PI	(48)	4022+18.1040	1676971.0796	183017.1355
POE	(50)	4025+18.3439	1677266.4219	183071.1440
Tangent Direction:		N 79^38'13.0969" E		
Tangent Length:		300.2399		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp G_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(206)	7000+00.0000	1677210.1990	182530.5889
PI	(55)	7000+80.0457	1677135.8803	182560.3219
Tangent Direction:		N 68^11'41.8846" W		
Tangent Length:		80.0457		
Element: Linear				
PI	(55)	7000+80.0457	1677135.8803	182560.3219
PC	(56)	7001+33.6707	1677085.4473	182578.5469
Tangent Direction:		N 70^07'53.7642" W		
Tangent Length:		53.6250		
Element: Circular				
PC	(56)	7001+33.6707	1677085.4473	182578.5469
PI	( )	7007+67.9229	1676488.9485	182794.1044
CC	(59)		1677148.3215	182752.5349
PT	(60)	7006+09.8563	1677107.7960	182933.0417
Radius:		185.0000		
Delta:		147^28'40.6647" Right		
Degree of Curvature(Arc):		30^58'14.4899"		
Length:		476.1856		
Tangent:		634.2522		
Chord:		355.1985		
Middle Ordinate:		133.1975		
External:		475.6821		
Tangent Direction:		N 70^07'53.7642" W		
Radial Direction:		N 19^52'06.2358" E		
Chord Direction:		N 3^36'26.5682" E		
Radial Direction:		S 12^39'13.0995" E		
Tangent Direction:		N 77^20'46.9005" E		
Element: Linear				
PT	(60)	7006+09.8563	1677107.7960	182933.0417
PI	(57)	7020+14.6101	1678478.4313	183240.7625
Tangent Direction:		N 77^20'46.9005" E		
Tangent Length:		1404.7538		
Element: Linear				
PI	(57)	7020+14.6101	1678478.4313	183240.7625
POE	(58)	7023+14.8500	1678768.5163	183318.1881
Tangent Direction:		N 75^03'20.7039" E		
Tangent Length:		300.2399		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp H_2B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(205)	8000+00.0000	1677407.2241	183425.6263
PI	(87)	8000+50.0416	1677359.5923	183410.2844
Tangent Direction:	S 72^08'47.7558" W			
Tangent Length:		50.0416		
Element: Linear				
PI	(87)	8000+50.0416	1677359.5923	183410.2844
PC	(88)	8001+03.6666	1677307.9218	183395.9386
Tangent Direction:	S 74^28'59.5234" W			
Tangent Length:		53.6250		
Element: Circular				
PC	(88)	8001+03.6666	1677307.9218	183395.9386
PI	( )	8002+48.0142	1677168.8354	183357.3226
CC	(93)		1677347.5149	183253.3329
PCC	(121)	8003+32.4466	1677203.9645	183217.3149
Radius:		148.0000		
Delta:		88^34'06.3113" Left		
Degree of Curvature(Arc):		38^42'48.1123"		
Length:		228.7800		
Tangent:		144.3475		
Chord:		206.6725		
Middle Ordinate:		42.0490		
External:		58.7371		
Tangent Direction:	S 74^28'59.5234" W			
Radial Direction:	N 15^31'00.4766" W			
Chord Direction:	S 30^11'56.3677" W			
Radial Direction:	S 75^54'53.2121" W			
Tangent Direction:	S 14^05'06.7879" E			
Element: Circular				
PCC	(121)	8003+32.4466	1677203.9645	183217.3149
PI	( )	8004+76.7941	1677239.0936	183077.3072
CC	(93)		1677347.5149	183253.3329
PT	(89)	8005+61.2265	1677379.9353	183108.9275
Radius:		148.0000		
Delta:		88^34'06.3113" Left		
Degree of Curvature(Arc):		38^42'48.1123"		
Length:		228.7800		
Tangent:		144.3475		
Chord:		206.6725		
Middle Ordinate:		42.0490		
External:		58.7371		
Tangent Direction:	S 14^05'06.7879" E			
Radial Direction:	S 75^54'53.2121" W			
Chord Direction:	S 58^22'09.9436" E			
Radial Direction:	S 12^39'13.0993" E			
Tangent Direction:	N 77^20'46.9007" E			
Element: Linear				
PT	(89)	8005+61.2265	1677379.9353	183108.9275
PI	(90)	8010+83.3816	1677889.4083	183223.3091
Tangent Direction:	N 77^20'46.9007" E			
Tangent Length:		522.1551		
Element: Linear				
PI	(90)	8010+83.3816	1677889.4083	183223.3091
PI	(91)	8013+49.4040	1678148.9696	183281.5831
Tangent Direction:	N 77^20'46.9000" E			
Tangent Length:		266.0223		
Element: Linear				
PI	(91)	8013+49.4040	1678148.9696	183281.5831
POE	(92)	8016+49.6439	1678444.3119	183335.5916
Tangent Direction:	N 79^38'13.0962" E			
Tangent Length:		300.2399		

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: North FR_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC (	1)	100+00.0000	1675495.7795	182778.6758
PI (	)	101+73.6774	1675669.4205	182775.1202
CC (	2)		1675525.1039	184210.7701
PT (	6)	103+45.6675	1675838.8797	182813.1654
Radius:		1432.3945		
Delta:		13^49'36.1162" Left		
Degree of Curvature(Arc):		3^59'59.9999"		
Length:		345.6675		
Tangent:		173.6774		
Chord:		344.8293		
Middle Ordinate:		10.4145		
External:		10.4908		
Tangent Direction:		S 88^49'36.9831" E		
Radial Direction:		S 1^10'23.0169" W		
Chord Direction:		N 84^15'34.9588" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT (	6)	103+45.6675	1675838.8797	182813.1654
PC (	49)	110+24.0442	1676500.7801	182961.7684
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		678.3768		
Element: Circular				
PC (	49)	110+24.0442	1676500.7801	182961.7684
PI (	)	112+15.6356	1676687.7181	183003.7378
CC (	50)		1676333.4330	183707.1575
PT (	52)	113+99.4835	1676832.7265	183128.9569
Radius:		763.9437		
Delta:		28^09'28.6175" Left		
Degree of Curvature(Arc):		7^30'00.0009"		
Length:		375.4393		
Tangent:		191.5914		
Chord:		371.6725		
Middle Ordinate:		22.9478		
External:		23.6585		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		N 63^16'02.5920" E		
Radial Direction:		S 40^48'41.7167" E		
Tangent Direction:		N 49^11'18.2833" E		
Element: Linear				
PT (	52)	113+99.4835	1676832.7265	183128.9569
PC (	51)	116+23.8826	1677002.5659	183275.6182
Tangent Direction:		N 49^11'18.2833" E		
Tangent Length:		224.3991		
Element: Circular				
PC (	51)	116+23.8826	1677002.5659	183275.6182
PI (	)	117+95.3079	1677132.3113	183387.6573
CC (	53)		1677501.8594	182697.4176
PT (	24)	119+61.1465	1677297.4885	183433.5171
Radius:		763.9437		
Delta:		25^17'41.2401" Right		
Degree of Curvature(Arc):		7^30'00.0009"		
Length:		337.2638		
Tangent:		171.4253		
Chord:		334.5316		
Middle Ordinate:		18.5363		
External:		18.9973		
Tangent Direction:		N 49^11'18.2833" E		
Radial Direction:		S 40^48'41.7167" E		
Chord Direction:		N 61^50'08.9033" E		
Radial Direction:		S 15^31'00.4766" E		
Tangent Direction:		N 74^28'59.5234" E		
Element: Linear				
PT (	24)	119+61.1465	1677297.4885	183433.5171
PI (	21)	120+14.7714	1677349.1589	183447.8629

Tangent Direction: N 74^28'59.5234" E
Tangent Length: 53.6250

Element: Linear

PI (21)	120+14.7714	1677349.1589	183447.8629
POE (47)	120+64.8067	1677397.8387	183459.4302

Tangent Direction: N 76^37'59.8349" E
Tangent Length: 50.0352

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: South FR_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC (	11)	200+00.0000	1675591.0572	182508.2677
PI (	)	201+38.9419	1675715.4224	182570.2206
CC (	12)		1676102.0103	181482.5731
PT (	15)	202+76.5340	1675850.9897	182600.6568
Radius:		1145.9156		
Delta:		13^49'36.1155" Right		
Degree of Curvature(Arc):		4^59'59.9998"		
Length:		276.5340		
Tangent:		138.9419		
Chord:		275.8635		
Middle Ordinate:		8.3316		
External:		8.3926		
Tangent Direction:		N 63^31'10.7852" E		
Radial Direction:		S 26^28'49.2148" E		
Chord Direction:		N 70^25'58.8430" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT (	15)	202+76.5340	1675850.9897	182600.6568
PC (	25)	207+06.0070	1676270.0317	182694.7358
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		429.4730		
Element: Circular				
PC (	25)	207+06.0070	1676270.0317	182694.7358
PI (	)	209+44.7520	1676502.9781	182747.0345
CC (	26)		1676449.3321	181896.1046
PT (	28)	211+70.6075	1676727.5120	182665.8944
Radius:		818.5111		
Delta:		32^31'19.3351" Right		
Degree of Curvature(Arc):		7^00'00.0011"		
Length:		464.6005		
Tangent:		238.7450		
Chord:		458.3885		
Middle Ordinate:		32.7437		
External:		34.1082		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		S 86^23'33.4317" E		
Radial Direction:		S 19^52'06.2358" W		
Tangent Direction:		S 70^07'53.7642" E		
Element: Linear				
PT (	28)	211+70.6075	1676727.5120	182665.8944
PI (	27)	215+90.5479	1677122.4558	182523.1731
Tangent Direction:		S 70^07'53.7642" E		
Tangent Length:		419.9404		
Element: Linear				
PI (	27)	215+90.5479	1677122.4558	182523.1731
POE (	48)	216+70.6119	1677198.7816	182498.9943
Tangent Direction:		S 72^25'21.5285" E		
Tangent Length:		80.0640		

Project Name: Add 2_Gary Blvd
Description:
Horizontal Alignment Name: Gary Blvd_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB (	8)	100+00.0000	1674956.5539	181264.0458
PC (	9)	104+47.1329	1674959.3037	181711.1702
Tangent Direction:	N 0^21'08.5277" E			
Tangent Length:	447.1329			
Element: Circular				
PC (	9)	104+47.1329	1674959.3037	181711.1702
PI (	)	106+64.8353	1674960.6426	181928.8685
CC (	11)		1673049.4805	181722.9158
PT (	12)	108+80.6664	1674912.9534	182141.2834
Radius:	1909.8593			
Delta:	13^00'21.6266" Left			
Degree of Curvature(Arc):	3^00'00.0001"			
Length:	433.5336			
Tangent:	217.7024			
Chord:	432.6034			
Middle Ordinate:	12.2882			
External:	12.3678			
Tangent Direction:	N 0^21'08.5277" E			
Radial Direction:	S 89^38'51.4723" E			
Chord Direction:	N 6^09'02.2856" W			
Radial Direction:	N 77^20'46.9011" E			
Tangent Direction:	N 12^39'13.0989" W			
Element: Linear				
PT (	12)	108+80.6664	1674912.9534	182141.2834
PC (	10)	120+89.4440	1674648.1625	183320.7023
Tangent Direction:	N 12^39'13.0989" W			
Tangent Length:	1208.7776			
Element: Circular				
PC (	10)	120+89.4440	1674648.1625	183320.7023
PI (	)	123+75.4113	1674585.5194	183599.7240
CC (	13)		1676511.6354	183739.0699
PT (	14)	126+57.1610	1674607.3484	183884.8570
Radius:	1909.8593			
Delta:	17^01'53.4340" Right			
Degree of Curvature(Arc):	3^00'00.0001"			
Length:	567.7170			
Tangent:	285.9673			
Chord:	565.6291			
Middle Ordinate:	21.0559			
External:	21.2906			
Tangent Direction:	N 12^39'13.0989" W			
Radial Direction:	N 77^20'46.9011" E			
Chord Direction:	N 4^08'16.3819" W			
Radial Direction:	S 85^37'19.6650" E			
Tangent Direction:	N 4^22'40.3350" E			
Element: Linear				
PT (	14)	126+57.1610	1674607.3484	183884.8570
POE (	56)	134+16.9624	1674665.3471	184642.4415
Tangent Direction:	N 4^22'40.3350" E			
Tangent Length:	759.8014			

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: 28th St_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB (	17)	10+00.0000	1672690.5883	181300.0302
PC (	)	11+65.7475	1672691.0328	181465.7771
Tangent Direction:	N 0^09'13.0858" E			
Tangent Length:	165.7475			
Element: Circular				
PC (	)	11+65.7475	1672691.0328	181465.7771
PI (	)	12+44.4032	1672691.2437	181544.4325
CC (	22)		1672118.0770	181467.3134
PT (	23)	13+22.0816	1672670.2506	181620.2349
Radius:	572.9578			
Delta:	15^38'00.3025" Left			
Degree of Curvature(Arc):	9^59'59.9997"			
Length:	156.3342			
Tangent:	78.6557			
Chord:	155.8497			
Middle Ordinate:	5.3238			
External:	5.3737			
Tangent Direction:	N 0^09'13.0858" E			
Radial Direction:	S 89^50'46.9142" E			
Chord Direction:	N 7^39'47.0654" W			
Radial Direction:	N 74^31'12.7833" E			
Tangent Direction:	N 15^28'47.2167" W			
Element: Linear				
PT (	23)	13+22.0816	1672670.2506	181620.2349
PC (	19)	18+35.4948	1672533.2215	182115.0238
Tangent Direction:	N 15^28'47.2167" W			
Tangent Length:	513.4131			
Element: Circular				
PC (	19)	18+35.4948	1672533.2215	182115.0238
PI (	)	19+38.3038	1672505.7819	182214.1034
CC (	24)		1673085.3951	182267.9453
PT (	25)	20+38.9477	1672514.5019	182316.5420
Radius:	572.9578			
Delta:	20^20'43.0695" Right			
Degree of Curvature(Arc):	9^59'59.9997"			
Length:	203.4530			
Tangent:	102.8090			
Chord:	202.3858			
Middle Ordinate:	9.0069			
External:	9.1507			
Tangent Direction:	N 15^28'47.2167" W			
Radial Direction:	N 74^31'12.7833" E			
Chord Direction:	N 5^18'25.6819" W			
Radial Direction:	S 85^08'04.1472" E			
Tangent Direction:	N 4^51'55.8528" E			
Element: Linear				
PT (	25)	20+38.9477	1672514.5019	182316.5420
PC (	20)	21+09.4294	1672520.4800	182386.7697
Tangent Direction:	N 4^51'55.8528" E			
Tangent Length:	70.4817			
Element: Circular				
PC (	20)	21+09.4294	1672520.4800	182386.7697
PI (	)	21+62.1688	1672524.9532	182439.3190
CC (	26)		1673308.9925	182319.6484
PT (	21)	22+14.7524	1672536.3600	182490.8100
Radius:	791.3642			
Delta:	7^37'31.8520" Right			
Degree of Curvature(Arc):	7^14'24.4601"			
Length:	105.3229			
Tangent:	52.7393			
Chord:	105.2452			
Middle Ordinate:	1.7515			
External:	1.7554			
Tangent Direction:	N 4^51'55.8528" E			
Radial Direction:	S 85^08'04.1472" E			
Chord Direction:	N 8^40'41.7789" E			

Radial Direction: S 77^30'32.2951" E
Tangent Direction: N 12^29'27.7049" E

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Lexington Ave_2B_2C_2D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	( )	10+00.0000	1674375.0800	183999.1000
PC	( )	11+04.0505	1674479.1293	183998.5947
Tangent Direction:		S 89^43'18.3134" E		
Tangent Length:		104.0505		
Element: Circular				
PC	( )	11+04.0505	1674479.1293	183998.5947
PI	( )	11+31.8023	1674506.8808	183998.4599
CC	( )		1674476.5998	183477.7301
PT	( )	11+59.5017	1674534.4608	183995.3771
Radius:		520.8707		
Delta:		6^05'58.6485" Right		
Degree of Curvature(Arc):		11^00'00.0017"		
Length:		55.4511		
Tangent:		27.7518		
Chord:		55.4249		
Middle Ordinate:		0.7377		
External:		0.7388		
Tangent Direction:		S 89^43'18.3134" E		
Radial Direction:		S 0^16'41.6866" W		
Chord Direction:		S 86^40'18.9892" E		
Radial Direction:		S 6^22'40.3350" W		
Tangent Direction:		S 83^37'19.6650" E		
Element: Linear				
PT	( )	11+59.5017	1674534.4608	183995.3771
PC	( )	13+81.1245	1674754.7119	183970.7581
Tangent Direction:		S 83^37'19.6650" E		
Tangent Length:		221.6228		
Element: Circular				
PC	( )	13+81.1245	1674754.7119	183970.7581
PI	( )	14+08.0913	1674781.5119	183967.7625
CC	( )		1674812.5729	184488.4051
PT	(18)	14+35.0101	1674808.4779	183967.5505
Radius:		520.8707		
Delta:		5^55'38.7071" Left		
Degree of Curvature(Arc):		11^00'00.0017"		
Length:		53.8856		
Tangent:		26.9669		
Chord:		53.8616		
Middle Ordinate:		0.6967		
External:		0.6976		
Tangent Direction:		S 83^37'19.6650" E		
Radial Direction:		S 6^22'40.3350" W		
Chord Direction:		S 86^35'09.0185" E		
Radial Direction:		S 0^27'01.6279" W		
Tangent Direction:		S 89^32'58.3721" E		
Element: Linear				
PT	( )	14+35.0101	1674808.4779	183967.5505
POE	( )	15+66.6551	1674940.1189	183966.5155
Tangent Direction:		S 89^32'58.3721" E		
Tangent Length:		131.6451		

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Red Wheat_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	( )	0+00.0000	1674035.4664	182579.4555
PC	( )	0+89.7392	1674124.0790	182593.6305
Tangent Direction:		N 80^54'42.0746" E		
Tangent Length:		89.7392		
Element: Circular				
PC	( )	0+89.7392	1674124.0790	182593.6305
PI	( )	1+81.2180	1674214.4093	182608.0801
CC	( )		1674076.6920	182889.8643
PCC	( )	2+67.3229	1674281.3080	182670.4735
Radius:		300.0000		
Delta:		33^54'57.5469" Left		
Degree of Curvature(Arc):		19^05'54.9354"		
Length:		177.5837		
Tangent:		91.4787		
Chord:		175.0023		
Middle Ordinate:		13.0443		
External:		13.6373		
Tangent Direction:		N 80^54'42.0746" E		
Radial Direction:		S 9^05'17.9254" E		
Chord Direction:		N 63^57'13.3011" E		
Radial Direction:		S 43^00'15.4724" E		
Tangent Direction:		N 46^59'44.5276" E		
Element: Circular				
PCC	( )	2+67.3229	1674281.3080	182670.4735
PI	( )	3+97.7777	1674376.7099	182759.4506
CC	( )		1673723.0398	183269.0528
PRC	( )	5+26.0563	1674439.7252	182873.6764
Radius:		818.5111		
Delta:		18^06'40.8257" Left		
Degree of Curvature(Arc):		6^59'59.9998"		
Length:		258.7334		
Tangent:		130.4548		
Chord:		257.6576		
Middle Ordinate:		10.2020		
External:		10.3308		
Tangent Direction:		N 46^59'44.5276" E		
Radial Direction:		S 43^00'15.4724" E		
Chord Direction:		N 37^56'24.1148" E		
Radial Direction:		S 61^06'56.2981" E		
Tangent Direction:		N 28^53'03.7019" E		
Element: Circular				
PRC	( )	5+26.0563	1674439.7252	182873.6764
PI	( )	6+61.0768	1674504.9460	182991.8998
CC	( )		1674702.4042	182728.7633
PT	( )	7+79.8028	1674636.6871	183021.4770
Radius:		300.0000		
Delta:		48^27'43.1992" Right		
Degree of Curvature(Arc):		19^05'54.9354"		
Length:		253.7464		
Tangent:		135.0205		
Chord:		246.2499		
Middle Ordinate:		26.4305		
External:		28.9841		
Tangent Direction:		N 28^53'03.7019" E		
Radial Direction:		S 61^06'56.2981" E		
Chord Direction:		N 53^06'55.3015" E		
Radial Direction:		S 12^39'13.0989" E		
Tangent Direction:		N 77^20'46.9011" E		
Element: Linear				
PT	( )	7+79.8028	1674636.6871	183021.4770
POE	( )	8+56.5468	1674711.5672	183038.2883
Tangent Direction:		N 77^20'46.9011" E		
Tangent Length:		76.7440		

Project Name: Add 2_I-40 Mainline
Description:
Horizontal Alignment Name: I-40 Survey
Description: v3_I-40
Style: Default
Vertical Alignment Name: VA_Ultimate
Description: Final design includes Neptune
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	3440+00.0000	1618.1005
	PC	3441+75.0000	1620.9005
Tangent Grade:		1.6000	
Tangent Length:		175.0000	
Element: Parabola			
	PC	3441+75.0000	1620.9005
	PI	3443+00.0000	1622.9005
	PT	3444+25.0000	1624.5880
Length:		250.0000	
Stopping Sight Distance:		4441.6010	
Entrance Grade:		1.6000	
Exit Grade:		1.3500	
r = (g2 - g1) / L:		-0.1000	
K = l / (g2 - g1):		1000.0000	
Middle Ordinate:		-0.0781	
Element: Linear			
	PT	3444+25.0000	1624.5880
	PC	3446+25.0000	1627.2880
Tangent Grade:		1.3500	
Tangent Length:		200.0000	
Element: Parabola			
	PC	3446+25.0000	1627.2880
	PI	3447+50.0000	1628.9755
	PT	3448+75.0000	1630.9005
Length:		250.0000	
Headlight Sight Distance:		4716.8453	
Entrance Grade:		1.3500	
Exit Grade:		1.5400	
r = (g2 - g1) / L:		0.0760	
K = l / (g2 - g1):		1315.7895	
Middle Ordinate:		0.0594	
Element: Linear			
	PT	3448+75.0000	1630.9005
	PC	3449+70.0000	1632.3635
Tangent Grade:		1.5400	
Tangent Length:		95.0000	
Element: Parabola			
	PC	3449+70.0000	1632.3635
	PI	3450+75.0000	1633.9805
	PT	3451+80.0000	1636.0805
Length:		210.0000	
Headlight Sight Distance:		1704.9350	
Entrance Grade:		1.5400	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		0.2190	
K = l / (g2 - g1):		456.5225	
Middle Ordinate:		0.1207	
Element: Linear			
	PT	3451+80.0000	1636.0805
	PC	3451+83.5487	1636.1514
Tangent Grade:		2.0000	
Tangent Length:		3.5487	
Element: Parabola			
	PC	3451+83.5487	1636.1514
	PI	3458+33.5487	1649.1514
	PT	3464+83.5487	1628.3514
	HIGH	3456+83.5486	1641.1514
Length:		1300.0000	
Stopping Sight Distance:		734.5578	
Entrance Grade:		2.0000	
Exit Grade:		-3.2000	

```
      r = ( g2 - g1 ) / L:          -0.4000
      K = l / ( g2 - g1 ):         250.0000
          Middle Ordinate:          -8.4500

Element: Linear
                          PT     3464+83.5487        1628.3514
                          PC     3479+93.0000        1580.0490
              Tangent Grade:          -3.2000
             Tangent Length:       1509.4513

Element: Parabola
                          PC     3479+93.0000        1580.0490
                          PI     3487+63.0000        1555.4090
                          PT     3495+33.0000        1577.3540
                         LOW     3488+07.5454        1567.0163
                    Length:        1540.0000
  Headlight Sight Distance:         993.4034
            Entrance Grade:          -3.2000
                Exit Grade:           2.8500
      r = ( g2 - g1 ) / L:           0.3929
      K = l / ( g2 - g1 ):         254.5455
          Middle Ordinate:          11.6462

Element: Linear
                          PT     3495+33.0000        1577.3540
                          PC     3495+45.0000        1577.6960
              Tangent Grade:           2.8500
             Tangent Length:          12.0000

Element: Parabola
                          PC     3495+45.0000        1577.6960
                          PI     3503+70.0000        1601.2085
                          PT     3511+95.0000        1569.8585
                        HIGH     3502+52.1429        1587.7728
                    Length:        1650.0000
   Stopping Sight Distance:         731.7911
            Entrance Grade:           2.8500
                Exit Grade:          -3.8000
      r = ( g2 - g1 ) / L:          -0.4030
      K = l / ( g2 - g1 ):         248.1203
          Middle Ordinate:         -13.7156

Element: Linear
                          PT     3511+95.0000        1569.8585
                          PC     3516+50.0000        1552.5685
              Tangent Grade:          -3.8000
             Tangent Length:         455.0000

Element: Parabola
                          PC     3516+50.0000        1552.5685
                          PI     3518+25.0000        1545.9185
                          PT     3520+00.0000        1541.1935
                    Length:         350.0000
  Headlight Sight Distance:        1218.1193
            Entrance Grade:          -3.8000
                Exit Grade:          -2.7000
      r = ( g2 - g1 ) / L:           0.3143
      K = l / ( g2 - g1 ):         318.1818
          Middle Ordinate:           0.4813
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp A_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	1007+04.1600	1633.6269
	PI	1007+24.2600	1633.9524
Tangent Grade:		1.6194	
Tangent Length:		20.1000	
Element: Linear			
	PI	1007+24.2600	1633.9524
	PI	1007+44.3600	1634.2868
Tangent Grade:		1.6637	
Tangent Length:		20.1000	
Element: Linear			
	PI	1007+44.3600	1634.2868
	PI	1007+64.4600	1634.5570
Tangent Grade:		1.3443	
Tangent Length:		20.1000	
Element: Linear			
	PI	1007+64.4600	1634.5570
	PI	1007+84.5500	1634.8289
Tangent Grade:		1.3534	
Tangent Length:		20.0900	
Element: Linear			
	PI	1007+84.5500	1634.8289
	PI	1008+04.6400	1635.1086
Tangent Grade:		1.3922	
Tangent Length:		20.0900	
Element: Linear			
	PI	1008+04.6400	1635.1086
	PI	1008+24.7300	1635.3952
Tangent Grade:		1.4266	
Tangent Length:		20.0900	
Element: Linear			
	PI	1008+24.7300	1635.3952
	PI	1008+44.8200	1635.6879
Tangent Grade:		1.4569	
Tangent Length:		20.0900	
Element: Linear			
	PI	1008+44.8200	1635.6879
	PI	1008+64.9100	1635.9857
Tangent Grade:		1.4823	
Tangent Length:		20.0900	
Element: Linear			
	PI	1008+64.9100	1635.9857
	PI	1008+85.0000	1636.2880
Tangent Grade:		1.5047	
Tangent Length:		20.0900	
Element: Linear			
	PI	1008+85.0000	1636.2880
	PI	1009+05.0400	1636.5856
Tangent Grade:		1.4850	
Tangent Length:		20.0400	
Element: Linear			
	PI	1009+05.0400	1636.5856
	PI	1009+25.0500	1636.8856
Tangent Grade:		1.4993	
Tangent Length:		20.0100	
Element: Linear			
	PI	1009+25.0500	1636.8856
	PI	1009+45.0600	1637.2319

Tangent Grade: 1.7306
Tangent Length: 20.0100

Element: Linear
PI 1009+45.0600 1637.2319
PI 1009+65.0700 1637.5579
Tangent Grade: 1.6292
Tangent Length: 20.0100

Element: Linear
PI 1009+65.0700 1637.5579
PI 1009+85.0900 1637.8636
Tangent Grade: 1.5270
Tangent Length: 20.0200

Element: Linear
PI 1009+85.0900 1637.8636
PI 1010+05.1100 1638.1578
Tangent Grade: 1.4695
Tangent Length: 20.0200

Element: Linear
PI 1010+05.1100 1638.1578
PI 1010+25.1400 1638.5118
Tangent Grade: 1.7673
Tangent Length: 20.0300

Element: Linear
PI 1010+25.1400 1638.5118
PI 1010+45.2600 1638.7601
Tangent Grade: 1.2341
Tangent Length: 20.1200

Element: Linear
PI 1010+45.2600 1638.7601
PI 1010+65.3700 1638.9882
Tangent Grade: 1.1343
Tangent Length: 20.1100

Element: Linear
PI 1010+65.3700 1638.9882
PI 1010+85.4300 1639.2021
Tangent Grade: 1.0663
Tangent Length: 20.0600

Element: Linear
PI 1010+85.4300 1639.2021
PI 1011+05.4900 1639.3987
Tangent Grade: 0.9801
Tangent Length: 20.0600

Element: Linear
PI 1011+05.4900 1639.3987
PI 1011+25.5600 1639.5784
Tangent Grade: 0.8954
Tangent Length: 20.0700

Element: Linear
PI 1011+25.5600 1639.5784
PI 1011+45.6300 1639.7431
Tangent Grade: 0.8206
Tangent Length: 20.0700

Element: Linear
PI 1011+45.6300 1639.7431
PI 1011+65.7000 1639.8918
Tangent Grade: 0.7409
Tangent Length: 20.0700

Element: Linear
PI 1011+65.7000 1639.8918
PI 1011+85.7600 1640.0245
Tangent Grade: 0.6615
Tangent Length: 20.0600

Element: Linear
PI 1011+85.7600 1640.0245
PI 1012+05.8300 1640.1412
Tangent Grade: 0.5815

```
          Tangent Length:           20.0700

Element: Linear
                        PI      1012+05.8300         1640.1412
                        PI      1012+25.9000         1640.2419
           Tangent Grade:            0.5017
          Tangent Length:           20.0700

Element: Linear
                        PI      1012+25.9000         1640.2419
                        PI      1012+45.9600         1640.3266
           Tangent Grade:            0.4222
          Tangent Length:           20.0600

Element: Linear
                        PI      1012+45.9600         1640.3266
                        PI      1012+61.6868         1640.3991
           Tangent Grade:            0.4613
          Tangent Length:           15.7268

Element: Linear
                        PI      1012+61.6868         1640.3991
                        PC      1014+20.0000         1641.3490
           Tangent Grade:            0.6000
          Tangent Length:          158.3132

Element: Parabola
                        PC      1014+20.0000         1641.3490
                        PI      1016+95.0000         1642.9990
                        PT      1019+70.0000         1627.8740
                      HIGH      1014+74.0984         1641.5113
                   Length:          550.0000
  Stopping Sight Distance:          441.1359
          Entrance Grade:            0.6000
              Exit Grade:           -5.5000
     r = ( g2 - g1 ) / L:           -1.1091
     K = l / ( g2 - g1 ):           90.1639
         Middle Ordinate:           -4.1938

Element: Linear
                        PT      1019+70.0000         1627.8740
                        PC      1025+75.0000         1594.5990
           Tangent Grade:           -5.5000
          Tangent Length:          605.0000

Element: Parabola
                        PC      1025+75.0000         1594.5990
                        PI      1027+00.0000         1587.7240
                        PT      1028+25.0000         1585.2240
                   Length:          250.0000
 Headlight Sight Distance:          364.2857
          Entrance Grade:           -5.5000
              Exit Grade:           -2.0000
     r = ( g2 - g1 ) / L:            1.4000
     K = l / ( g2 - g1 ):           71.4286
         Middle Ordinate:            1.0938

Element: Linear
                        PT      1028+25.0000         1585.2240
                       POE      1029+24.1382         1583.2413
           Tangent Grade:           -2.0000
          Tangent Length:           99.1382
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	2008+95.1400	1630.4930
	PI	2009+15.0200	1630.8010
Tangent Grade:		1.5493	
Tangent Length:		19.8800	
Element: Linear			
	PI	2009+15.0200	1630.8010
	PI	2009+34.9030	1631.1090
Tangent Grade:		1.5491	
Tangent Length:		19.8830	
Element: Linear			
	PI	2009+34.9030	1631.1090
	PI	2009+54.7900	1631.4170
Tangent Grade:		1.5488	
Tangent Length:		19.8870	
Element: Linear			
	PI	2009+54.7900	1631.4170
	PI	2009+74.6700	1631.7261
Tangent Grade:		1.5548	
Tangent Length:		19.8800	
Element: Linear			
	PI	2009+74.6700	1631.7261
	PI	2009+94.5500	1632.0429
Tangent Grade:		1.5936	
Tangent Length:		19.8800	
Element: Linear			
	PI	2009+94.5500	1632.0429
	PI	2010+14.4400	1632.2846
Tangent Grade:		1.2152	
Tangent Length:		19.8900	
Element: Linear			
	PI	2010+14.4400	1632.2846
	PI	2010+34.2600	1632.5186
Tangent Grade:		1.1806	
Tangent Length:		19.8200	
Element: Linear			
	PI	2010+34.2600	1632.5186
	PI	2010+54.0700	1632.7978
Tangent Grade:		1.4094	
Tangent Length:		19.8100	
Element: Linear			
	PI	2010+54.0700	1632.7978
	PI	2010+73.8700	1633.1391
Tangent Grade:		1.7237	
Tangent Length:		19.8000	
Element: Linear			
	PI	2010+73.8700	1633.1391
	PI	2010+93.6700	1633.4880
Tangent Grade:		1.7621	
Tangent Length:		19.8000	
Element: Linear			
	PI	2010+93.6700	1633.4880
	PI	2011+13.4700	1633.8430
Tangent Grade:		1.7929	
Tangent Length:		19.8000	
Element: Linear			
	PI	2011+13.4700	1633.8430
	PI	2011+33.2700	1634.2041

```
            Tangent Grade:            1.8237
           Tangent Length:           19.8000

Element: Linear
                        PI      2011+33.2700         1634.2041
                        PI      2011+53.0700         1634.5714
            Tangent Grade:            1.8551
           Tangent Length:           19.8000

Element: Linear
                        PI      2011+53.0700         1634.5714
                        PI      2011+72.8800         1634.9449
            Tangent Grade:            1.8854
           Tangent Length:           19.8100

Element: Linear
                        PI      2011+72.8800         1634.9449
                        PI      2011+92.6800         1635.3137
            Tangent Grade:            1.8626
           Tangent Length:           19.8000

Element: Linear
                        PI      2011+92.6800         1635.3137
                        PI      2012+12.4900         1635.6652
            Tangent Grade:            1.7744
           Tangent Length:           19.8100

Element: Linear
                        PI      2012+12.4900         1635.6652
                        PI      2012+32.3100         1635.9980
            Tangent Grade:            1.6791
           Tangent Length:           19.8200

Element: Linear
                        PI      2012+32.3100         1635.9980
                        PI      2012+52.1300         1636.3740
            Tangent Grade:            1.8971
           Tangent Length:           19.8200

Element: Linear
                        PI      2012+52.1300         1636.3740
                        PI      2012+71.9600         1636.7609
            Tangent Grade:            1.9511
           Tangent Length:           19.8300

Element: Linear
                        PI      2012+71.9600         1636.7609
                        PI      2012+91.9000         1637.1169
            Tangent Grade:            1.7854
           Tangent Length:           19.9400

Element: Linear
                        PI      2012+91.9000         1637.1169
                        PI      2013+11.8400         1637.4673
            Tangent Grade:            1.7573
           Tangent Length:           19.9400

Element: Linear
                        PI      2013+11.8400         1637.4673
                        PI      2013+31.7700         1637.8363
            Tangent Grade:            1.8515
           Tangent Length:           19.9300

Element: Linear
                        PI      2013+31.7700         1637.8363
                        PI      2013+51.7500         1638.1517
            Tangent Grade:            1.5786
           Tangent Length:           19.9800

Element: Linear
                        PI      2013+51.7500         1638.1517
                        PI      2013+71.7900         1638.4531
            Tangent Grade:            1.5040
           Tangent Length:           20.0400

Element: Linear
                        PI      2013+71.7900         1638.4531
                        PI      2013+91.8300         1638.7401
            Tangent Grade:            1.4321
```

```
          Tangent Length:           20.0400

Element: Linear
                        PI      2013+91.8300         1638.7401
                        PI      2014+11.8800         1639.0121
           Tangent Grade:            1.3566
          Tangent Length:           20.0500

Element: Linear
                        PI      2014+11.8800         1639.0121
                        PI      2014+31.9400         1639.2654
           Tangent Grade:            1.2627
          Tangent Length:           20.0600

Element: Linear
                        PI      2014+31.9400         1639.2654
                        PI      2014+49.6841         1639.4754
           Tangent Grade:            1.1835
          Tangent Length:           17.7441

Element: Linear
                        PI      2014+49.6841         1639.4754
                        PC      2015+90.0000         1640.9487
           Tangent Grade:            1.0500
          Tangent Length:          140.3159

Element: Parabola
                        PC      2015+90.0000         1640.9487
                        PI      2018+80.0000         1643.9937
                        PT      2021+70.0000         1628.0437
                      HIGH      2016+82.9771         1641.4369
                    Length:          580.0000
  Stopping Sight Distance:          437.1689
          Entrance Grade:            1.0500
              Exit Grade:           -5.5000
     r = ( g2 - g1 ) / L:           -1.1293
     K = l / ( g2 - g1 ):           88.5496
         Middle Ordinate:           -4.7488

Element: Linear
                        PT      2021+70.0000         1628.0437
                        PC      2028+75.0000         1589.2687
           Tangent Grade:           -5.5000
          Tangent Length:          705.0000

Element: Parabola
                        PC      2028+75.0000         1589.2687
                        PI      2030+00.0000         1582.3937
                        PT      2031+25.0000         1579.8937
                    Length:          250.0000
 Headlight Sight Distance:          364.2857
          Entrance Grade:           -5.5000
              Exit Grade:           -2.0000
     r = ( g2 - g1 ) / L:            1.4000
     K = l / ( g2 - g1 ):           71.4286
         Middle Ordinate:            1.0938

Element: Linear
                        PT      2031+25.0000         1579.8937
                        PI      2031+75.8164         1578.8774
           Tangent Grade:           -2.0000
          Tangent Length:           50.8164

Element: Linear
                        PI      2031+75.8164         1578.8774
                       POE      2032+08.8164         1578.2174
           Tangent Grade:           -2.0000
          Tangent Length:           33.0000
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp C_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	3000+00.0000	1578.2635
	PC	3001+50.0000	1575.2635
Tangent Grade:		-2.0000	
Tangent Length:		150.0000	
Element: Parabola			
	PC	3001+50.0000	1575.2635
	PI	3002+50.0000	1573.2635
	PT	3003+50.0000	1573.7635
	LOW	3003+10.0000	1573.6635
Length:		200.0000	
Headlight Sight Distance:		600.0000	
Entrance Grade:		-2.0000	
Exit Grade:		0.5000	
r = (g2 - g1) / L:		1.2500	
K = l / (g2 - g1):		80.0000	
Middle Ordinate:		0.6250	
Element: Linear			
	PT	3003+50.0000	1573.7635
	PC	3007+25.0000	1575.6385
Tangent Grade:		0.5000	
Tangent Length:		375.0000	
Element: Parabola			
	PC	3007+25.0000	1575.6385
	PI	3008+50.0000	1576.2635
	PT	3009+75.0000	1573.7635
	HIGH	3007+75.0000	1575.7635
Length:		250.0000	
Stopping Sight Distance:		556.6601	
Entrance Grade:		0.5000	
Exit Grade:		-2.0000	
r = (g2 - g1) / L:		-1.0000	
K = l / (g2 - g1):		100.0000	
Middle Ordinate:		-0.7813	
Element: Linear			
	PT	3009+75.0000	1573.7635
	PI	3009+99.2341	1573.2789
Tangent Grade:		-2.0000	
Tangent Length:		24.2341	
Element: Linear			
	PI	3009+99.2341	1573.2789
	PI	3010+19.3400	1572.8482
Tangent Grade:		-2.1419	
Tangent Length:		20.1059	
Element: Linear			
	PI	3010+19.3400	1572.8482
	PI	3010+39.3000	1572.4340
Tangent Grade:		-2.0752	
Tangent Length:		19.9600	
Element: Linear			
	PI	3010+39.3000	1572.4340
	PI	3010+59.2500	1572.0313
Tangent Grade:		-2.0185	
Tangent Length:		19.9500	
Element: Linear			
	PI	3010+59.2500	1572.0313
	PI	3010+79.1800	1571.6401
Tangent Grade:		-1.9629	
Tangent Length:		19.9300	
Element: Linear			

PI 3010+79.1800 1571.6401
PI 3010+99.1000 1571.2604
Tangent Grade: -1.9061
Tangent Length: 19.9200

Element: Linear
PI 3010+99.1000 1571.2604
PI 3011+19.0000 1570.8922
Tangent Grade: -1.8503
Tangent Length: 19.9000

Element: Linear
PI 3011+19.0000 1570.8922
PI 3011+38.8900 1570.5354
Tangent Grade: -1.7939
Tangent Length: 19.8900

Element: Linear
PI 3011+38.8900 1570.5354
PI 3011+58.7700 1570.1902
Tangent Grade: -1.7364
Tangent Length: 19.8800

Element: Linear
PI 3011+58.7700 1570.1902
PI 3011+78.6500 1569.8565
Tangent Grade: -1.6786
Tangent Length: 19.8800

Element: Linear
PI 3011+78.6500 1569.8565
PI 3011+98.5200 1569.5344
Tangent Grade: -1.6210
Tangent Length: 19.8700

Element: Linear
PI 3011+98.5200 1569.5344
PI 3012+18.3900 1569.2238
Tangent Grade: -1.5632
Tangent Length: 19.8700

Element: Linear
PI 3012+18.3900 1569.2238
PI 3012+38.2600 1568.9429
Tangent Grade: -1.4137
Tangent Length: 19.8700

Element: Linear
PI 3012+38.2600 1568.9429
PI 3012+58.1300 1568.7525
Tangent Grade: -0.9582
Tangent Length: 19.8700

Element: Linear
PI 3012+58.1300 1568.7525
PI 3012+78.1000 1568.5717
Tangent Grade: -0.9054
Tangent Length: 19.9700

Element: Linear
PI 3012+78.1000 1568.5717
PI 3012+98.1000 1568.4047
Tangent Grade: -0.8350
Tangent Length: 20.0000

Element: Linear
PI 3012+98.1000 1568.4047
PI 3013+18.1000 1568.1552
Tangent Grade: -1.2475
Tangent Length: 20.0000

Element: Linear
PI 3013+18.1000 1568.1552
PI 3013+38.1000 1567.9214
Tangent Grade: -1.1690
Tangent Length: 20.0000

Element: Linear
PI 3013+38.1000 1567.9214

POE	3013+58.1000	1567.7033
Tangent Grade:	-1.0905	
Tangent Length:	20.0000	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp D_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	4000+00.0000	1582.9860
	PC	4001+25.0000	1580.4860
Tangent Grade:		-2.0000	
Tangent Length:		125.0000	
Element: Parabola			
	PC	4001+25.0000	1580.4860
	PI	4002+75.0000	1577.4860
	PT	4004+25.0000	1578.6110
	LOW	4003+43.1818	1578.3042
Length:		300.0000	
Headlight Sight Distance:		612.5000	
Entrance Grade:		-2.0000	
Exit Grade:		0.7500	
r = (g2 - g1) / L:		0.9167	
K = l / (g2 - g1):		109.0909	
Middle Ordinate:		1.0313	
Element: Linear			
	PT	4004+25.0000	1578.6110
	PC	4004+75.0000	1578.9860
Tangent Grade:		0.7500	
Tangent Length:		50.0000	
Element: Parabola			
	PC	4004+75.0000	1578.9860
	PI	4006+25.0000	1580.1110
	PT	4007+75.0000	1577.3360
	HIGH	4005+61.5385	1579.3105
Length:		300.0000	
Stopping Sight Distance:		565.0578	
Entrance Grade:		0.7500	
Exit Grade:		-1.8500	
r = (g2 - g1) / L:		-0.8667	
K = l / (g2 - g1):		115.3846	
Middle Ordinate:		-0.9750	
Element: Linear			
	PT	4007+75.0000	1577.3360
	PI	4010+33.7832	1572.5485
Tangent Grade:		-1.8500	
Tangent Length:		258.7832	
Element: Linear			
	PI	4010+33.7832	1572.5485
	PI	4010+39.3000	1572.4340
Tangent Grade:		-2.0752	
Tangent Length:		5.5168	
Element: Linear			
	PI	4010+39.3000	1572.4340
	PI	4010+59.2500	1572.0313
Tangent Grade:		-2.0185	
Tangent Length:		19.9500	
Element: Linear			
	PI	4010+59.2500	1572.0313
	PI	4010+79.1800	1571.6401
Tangent Grade:		-1.9629	
Tangent Length:		19.9300	
Element: Linear			
	PI	4010+79.1800	1571.6401
	PI	4010+99.1000	1571.2604
Tangent Grade:		-1.9061	
Tangent Length:		19.9200	
Element: Linear			

PI 4010+99.1000 1571.2604
PI 4011+19.0000 1570.8922
Tangent Grade: -1.8503
Tangent Length: 19.9000

Element: Linear
PI 4011+19.0000 1570.8922
PI 4011+38.8900 1570.5354
Tangent Grade: -1.7939
Tangent Length: 19.8900

Element: Linear
PI 4011+38.8900 1570.5354
PI 4011+58.7700 1570.1902
Tangent Grade: -1.7364
Tangent Length: 19.8800

Element: Linear
PI 4011+58.7700 1570.1902
PI 4011+78.6500 1569.8565
Tangent Grade: -1.6786
Tangent Length: 19.8800

Element: Linear
PI 4011+78.6500 1569.8565
PI 4011+98.5200 1569.5344
Tangent Grade: -1.6210
Tangent Length: 19.8700

Element: Linear
PI 4011+98.5200 1569.5344
PI 4012+18.3900 1569.2238
Tangent Grade: -1.5632
Tangent Length: 19.8700

Element: Linear
PI 4012+18.3900 1569.2238
PI 4012+38.2600 1568.9429
Tangent Grade: -1.4137
Tangent Length: 19.8700

Element: Linear
PI 4012+38.2600 1568.9429
PI 4012+58.1300 1568.7525
Tangent Grade: -0.9582
Tangent Length: 19.8700

Element: Linear
PI 4012+58.1300 1568.7525
PI 4012+78.1000 1568.5717
Tangent Grade: -0.9054
Tangent Length: 19.9700

Element: Linear
PI 4012+78.1000 1568.5717
PI 4012+98.1000 1568.4047
Tangent Grade: -0.8350
Tangent Length: 20.0000

Element: Linear
PI 4012+98.1000 1568.4047
PI 4013+18.1000 1568.1552
Tangent Grade: -1.2475
Tangent Length: 20.0000

Element: Linear
PI 4013+18.1000 1568.1552
PI 4013+38.1000 1567.9214
Tangent Grade: -1.1690
Tangent Length: 20.0000

Element: Linear
PI 4013+38.1000 1567.9214
PI 4013+58.1000 1567.7033
Tangent Grade: -1.0905
Tangent Length: 20.0000

Element: Linear
PI 4013+58.1000 1567.7033

POE	4013+78.1000	1567.5010
Tangent Grade:	-1.0115	
Tangent Length:	20.0000	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp G_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	7000+80.0457	1553.3435
	PC	7001+30.0000	1555.1918
Tangent Grade:		3.7000	
Tangent Length:		49.9543	
Element: Parabola			
	PC	7001+30.0000	1555.1918
	PI	7001+80.0000	1557.0418
	PT	7002+30.0000	1559.5418
Length:		100.0000	
Headlight Sight Distance:		355.7274	
Entrance Grade:		3.7000	
Exit Grade:		5.0000	
r = (g2 - g1) / L:		1.3000	
K = l / (g2 - g1):		76.9231	
Middle Ordinate:		0.1625	
Element: Linear			
	PT	7002+30.0000	1559.5418
	PC	7003+80.0000	1567.0418
Tangent Grade:		5.0000	
Tangent Length:		150.0000	
Element: Parabola			
	PC	7003+80.0000	1567.0418
	PI	7004+30.0000	1569.5418
	PT	7004+80.0000	1571.2668
Length:		100.0000	
Stopping Sight Distance:		746.2260	
Entrance Grade:		5.0000	
Exit Grade:		3.4500	
r = (g2 - g1) / L:		-1.5500	
K = l / (g2 - g1):		64.5161	
Middle Ordinate:		-0.1938	
Element: Linear			
	PT	7004+80.0000	1571.2668
	PI	7005+15.9271	1572.5063
Tangent Grade:		3.4500	
Tangent Length:		35.9271	
Element: Linear			
	PI	7005+15.9271	1572.5063
	PI	7005+18.3157	1572.5855
Tangent Grade:		3.3153	
Tangent Length:		2.3887	
Element: Linear			
	PI	7005+18.3157	1572.5855
	PI	7005+28.6757	1572.9289
Tangent Grade:		3.3147	
Tangent Length:		10.3600	
Element: Linear			
	PI	7005+28.6757	1572.9289
	PI	7005+38.7557	1573.2643
Tangent Grade:		3.3274	
Tangent Length:		10.0800	
Element: Linear			
	PI	7005+38.7557	1573.2643
	PI	7005+48.5057	1573.6053
Tangent Grade:		3.4974	
Tangent Length:		9.7500	
Element: Linear			
	PI	7005+48.5057	1573.6053
	PI	7005+58.1157	1573.9385

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            Tangent Grade:            3.4672
           Tangent Length:            9.6100

Element: Linear
                       PI      7005+58.1157         1573.9385
                       PI      7005+67.6257         1574.2644
            Tangent Grade:            3.4269
           Tangent Length:            9.5100

Element: Linear
                       PI      7005+67.6257         1574.2644
                       PI      7005+77.0657         1574.5833
            Tangent Grade:            3.3782
           Tangent Length:            9.4400

Element: Linear
                       PI      7005+77.0657         1574.5833
                       PI      7005+86.4557         1574.9133
            Tangent Grade:            3.5144
           Tangent Length:            9.3900

Element: Linear
                       PI      7005+86.4557         1574.9133
                       PI      7005+95.8257         1575.2876
            Tangent Grade:            3.9947
           Tangent Length:            9.3700

Element: Linear
                       PI      7005+95.8257         1575.2876
                       PI      7006+05.1857         1575.6542
            Tangent Grade:            3.9167
           Tangent Length:            9.3600

Element: Linear
                       PI      7006+05.1857         1575.6542
                       PI      7006+14.8857         1576.0030
            Tangent Grade:            3.5959
           Tangent Length:            9.7000

Element: Linear
                       PI      7006+14.8857         1576.0030
                       PI      7006+24.8857         1576.3548
            Tangent Grade:            3.5180
           Tangent Length:           10.0000

Element: Linear
                       PI      7006+24.8857         1576.3548
                       PI      7006+34.8857         1576.7095
            Tangent Grade:            3.5470
           Tangent Length:           10.0000

Element: Linear
                       PI      7006+34.8857         1576.7095
                       PI      7006+44.8857         1577.0645
            Tangent Grade:            3.5500
           Tangent Length:           10.0000

Element: Linear
                       PI      7006+44.8857         1577.0645
                       PI      7006+54.8857         1577.4005
            Tangent Grade:            3.3600
           Tangent Length:           10.0000

Element: Linear
                       PI      7006+54.8857         1577.4005
                      POE      7006+64.8857         1577.6774
            Tangent Grade:            2.7690
           Tangent Length:           10.0000
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp H_2B
Description:
Style: Default
Vertical Alignment Name: VA_2B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	8000+50.0416	1564.6510
	PC	8001+50.0416	1568.9010
Tangent Grade:		4.2500	
Tangent Length:		100.0000	
Element: Parabola			
	PC	8001+50.0416	1568.9010
	PI	8003+00.0416	1575.2760
	PT	8004+50.0416	1579.7010
Length:		300.0000	
Stopping Sight Distance:		980.1156	
Entrance Grade:		4.2500	
Exit Grade:		2.9500	
r = (g2 - g1) / L:		-0.4333	
K = l / (g2 - g1):		230.7692	
Middle Ordinate:		-0.4875	
Element: Linear			
	PT	8004+50.0416	1579.7010
	PI	8004+90.4428	1580.8928
Tangent Grade:		2.9500	
Tangent Length:		40.4012	
Element: Linear			
	PI	8004+90.4428	1580.8928
	PI	8004+96.3316	1581.0817
Tangent Grade:		3.2074	
Tangent Length:		5.8888	
Element: Linear			
	PI	8004+96.3316	1581.0817
	PI	8005+06.0916	1581.3829
Tangent Grade:		3.0861	
Tangent Length:		9.7600	
Element: Linear			
	PI	8005+06.0916	1581.3829
	PI	8005+15.6616	1581.6651
Tangent Grade:		2.9488	
Tangent Length:		9.5700	
Element: Linear			
	PI	8005+15.6616	1581.6651
	PI	8005+25.0816	1581.9290
Tangent Grade:		2.8015	
Tangent Length:		9.4200	
Element: Linear			
	PI	8005+25.0816	1581.9290
	PI	8005+34.4016	1582.1753
Tangent Grade:		2.6427	
Tangent Length:		9.3200	
Element: Linear			
	PI	8005+34.4016	1582.1753
	PI	8005+43.6516	1582.4648
Tangent Grade:		3.1297	
Tangent Length:		9.2500	
Element: Linear			
	PI	8005+43.6516	1582.4648
	PI	8005+52.8816	1582.7438
Tangent Grade:		3.0228	
Tangent Length:		9.2300	
Element: Linear			
	PI	8005+52.8816	1582.7438
	PI	8005+62.1916	1582.9978

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            Tangent Grade:            2.7282
           Tangent Length:            9.3100

Element: Linear
                       PI      8005+62.1916         1582.9978
                       PI      8005+72.1916         1583.2399
            Tangent Grade:            2.4210
           Tangent Length:           10.0000

Element: Linear
                       PI      8005+72.1916         1583.2399
                       PI      8005+82.1916         1583.4780
            Tangent Grade:            2.3810
           Tangent Length:           10.0000

Element: Linear
                       PI      8005+82.1916         1583.4780
                       PI      8005+92.1916         1583.7120
            Tangent Grade:            2.3400
           Tangent Length:           10.0000

Element: Linear
                       PI      8005+92.1916         1583.7120
                       PI      8006+02.1916         1583.9420
            Tangent Grade:            2.3000
           Tangent Length:           10.0000

Element: Linear
                       PI      8006+02.1916         1583.9420
                       PI      8006+12.1916         1584.1115
            Tangent Grade:            1.6950
           Tangent Length:           10.0000

Element: Linear
                       PI      8006+12.1916         1584.1115
                       PI      8006+22.1916         1584.2635
            Tangent Grade:            1.5200
           Tangent Length:           10.0000

Element: Linear
                       PI      8006+22.1916         1584.2635
                       PI      8006+32.1916         1584.4115
            Tangent Grade:            1.4800
           Tangent Length:           10.0000

Element: Linear
                       PI      8006+32.1916         1584.4115
                      POE      8006+42.1916         1584.5554
            Tangent Grade:            1.4390
           Tangent Length:           10.0000
```

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: North FR_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	100+00.0000	1577.9781
	PI	100+14.0000	1577.7784
Tangent Grade:		-1.4263	
Tangent Length:		14.0000	
Element: Linear			
	PI	100+14.0000	1577.7784
	PI	100+23.8900	1577.6254
Tangent Grade:		-1.5470	
Tangent Length:		9.8900	
Element: Linear			
	PI	100+23.8900	1577.6254
	PI	100+33.7900	1577.4624
Tangent Grade:		-1.6465	
Tangent Length:		9.9000	
Element: Linear			
	PI	100+33.7900	1577.4624
	PI	100+43.6900	1577.2893
Tangent Grade:		-1.7485	
Tangent Length:		9.9000	
Element: Linear			
	PI	100+43.6900	1577.2893
	PI	100+53.5900	1577.1062
Tangent Grade:		-1.8495	
Tangent Length:		9.9000	
Element: Linear			
	PI	100+53.5900	1577.1062
	PI	100+63.5000	1576.9141
Tangent Grade:		-1.9384	
Tangent Length:		9.9100	
Element: Linear			
	PI	100+63.5000	1576.9141
	PI	100+73.4100	1576.7195
Tangent Grade:		-1.9637	
Tangent Length:		9.9100	
Element: Linear			
	PI	100+73.4100	1576.7195
	PI	100+83.3200	1576.5235
Tangent Grade:		-1.9778	
Tangent Length:		9.9100	
Element: Linear			
	PI	100+83.3200	1576.5235
	PI	100+93.2200	1576.3265
Tangent Grade:		-1.9899	
Tangent Length:		9.9000	
Element: Linear			
	PI	100+93.2200	1576.3265
	PI	101+03.1200	1576.1292
Tangent Grade:		-1.9929	
Tangent Length:		9.9000	
Element: Linear			
	PI	101+03.1200	1576.1292
	PI	101+13.0100	1575.9315
Tangent Grade:		-1.9990	
Tangent Length:		9.8900	
Element: Linear			
	PI	101+13.0100	1575.9315
	PI	101+22.9100	1575.7335

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            Tangent Grade:           -2.0000
           Tangent Length:            9.9000

Element: Linear
                        PI       101+22.9100         1575.7335
                        PI       101+32.8000         1575.5352
            Tangent Grade:           -2.0051
           Tangent Length:            9.8900

Element: Linear
                        PI       101+32.8000         1575.5352
                        PI       101+42.6900         1575.3365
            Tangent Grade:           -2.0091
           Tangent Length:            9.8900

Element: Linear
                        PI       101+42.6900         1575.3365
                        PI       101+52.5700         1575.1375
            Tangent Grade:           -2.0142
           Tangent Length:            9.8800

Element: Linear
                        PI       101+52.5700         1575.1375
                        PI       101+62.4600         1574.9382
            Tangent Grade:           -2.0152
           Tangent Length:            9.8900

Element: Linear
                        PI       101+62.4600         1574.9382
                        PI       101+72.3400         1574.7385
            Tangent Grade:           -2.0213
           Tangent Length:            9.8800

Element: Linear
                        PI       101+72.3400         1574.7385
                        PI       101+82.2200         1574.5386
            Tangent Grade:           -2.0233
           Tangent Length:            9.8800

Element: Linear
                        PI       101+82.2200         1574.5386
                        PI       101+92.0900         1574.3383
            Tangent Grade:           -2.0294
           Tangent Length:            9.8700

Element: Linear
                        PI       101+92.0900         1574.3383
                        PI       102+01.9700         1574.1376
            Tangent Grade:           -2.0314
           Tangent Length:            9.8800

Element: Linear
                        PI       102+01.9700         1574.1376
                        PI       102+11.8400         1573.9367
            Tangent Grade:           -2.0355
           Tangent Length:            9.8700

Element: Linear
                        PI       102+11.8400         1573.9367
                        PI       102+21.7000         1573.7354
            Tangent Grade:           -2.0416
           Tangent Length:            9.8600

Element: Linear
                        PI       102+21.7000         1573.7354
                        PI       102+31.5700         1573.5338
            Tangent Grade:           -2.0426
           Tangent Length:            9.8700

Element: Linear
                        PI       102+31.5700         1573.5338
                        PI       102+41.4300         1573.3319
            Tangent Grade:           -2.0477
           Tangent Length:            9.8600

Element: Linear
                        PI       102+41.4300         1573.3319
                        PI       102+51.2900         1573.1296
            Tangent Grade:           -2.0517
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          Tangent Length:            9.8600

Element: Linear
                        PI       102+51.2900         1573.1296
                        PI       102+61.1400         1572.9271
           Tangent Grade:           -2.0558
          Tangent Length:            9.8500

Element: Linear
                        PI       102+61.1400         1572.9271
                        PI       102+71.0000         1572.7242
           Tangent Grade:           -2.0578
          Tangent Length:            9.8600

Element: Linear
                        PI       102+71.0000         1572.7242
                        PI       102+80.8400         1572.5210
           Tangent Grade:           -2.0650
          Tangent Length:            9.8400

Element: Linear
                        PI       102+80.8400         1572.5210
                        PI       102+90.6900         1572.3174
           Tangent Grade:           -2.0670
          Tangent Length:            9.8500

Element: Linear
                        PI       102+90.6900         1572.3174
                        PI       103+00.5300         1572.1136
           Tangent Grade:           -2.0711
          Tangent Length:            9.8400

Element: Linear
                        PI       103+00.5300         1572.1136
                        PI       103+10.3700         1571.9094
           Tangent Grade:           -2.0752
          Tangent Length:            9.8400

Element: Linear
                        PI       103+10.3700         1571.9094
                        PI       103+20.2100         1571.6925
           Tangent Grade:           -2.2043
          Tangent Length:            9.8400

Element: Linear
                        PI       103+20.2100         1571.6925
                        PI       103+30.0400         1571.4727
           Tangent Grade:           -2.2360
          Tangent Length:            9.8300

Element: Linear
                        PI       103+30.0400         1571.4727
                        PI       103+39.8700         1571.2526
           Tangent Grade:           -2.2391
          Tangent Length:            9.8300

Element: Linear
                        PI       103+39.8700         1571.2526
                        PI       103+49.3224         1571.0413
           Tangent Grade:           -2.2356
          Tangent Length:            9.4524

Element: Linear
                        PI       103+49.3224         1571.0413
                        PC       105+50.0000         1566.9274
           Tangent Grade:           -2.0500
          Tangent Length:          200.6776

Element: Parabola
                        PC       105+50.0000         1566.9274
                        PI       108+00.0000         1561.8024
                        PT       110+50.0000         1565.0524
                       LOW       108+55.9701         1563.7912
                    Length:          500.0000
  Headlight Sight Distance:          648.4375
          Entrance Grade:           -2.0500
              Exit Grade:            1.3000
      r = ( g2 - g1 ) / L:           0.6700
      K = l / ( g2 - g1 ):         149.2537
```

Middle Ordinate:		2.0937	

Element: Linear

	PT	110+50.0000	1565.0524
	PC	115+95.0000	1572.1374
Tangent Grade:		1.3000	
Tangent Length:		545.0000	

Element: Parabola

	PC	115+95.0000	1572.1374
	PI	117+95.0000	1574.7374
	PT	119+95.0000	1565.6374
	HIGH	116+83.8889	1572.7152
Length:		400.0000	
Stopping Sight Distance:		384.1564	
Entrance Grade:		1.3000	
Exit Grade:		-4.5500	
r = (g2 - g1) / L:		-1.4625	
K = l / (g2 - g1):		68.3761	
Middle Ordinate:		-2.9250	

Element: Linear

	PT	119+95.0000	1565.6374
	POE	120+17.4668	1564.6152
Tangent Grade:		-4.5500	
Tangent Length:		22.4668	

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: South FR_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	200+00.0000	1575.4336
	PI	200+09.2900	1575.4480
Tangent Grade:		0.1546	
Tangent Length:		9.2900	
Element: Linear			
	PI	200+09.2900	1575.4480
	PI	200+19.1600	1575.4555
Tangent Grade:		0.0760	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+19.1600	1575.4555
	PI	200+29.0300	1575.4513
Tangent Grade:		-0.0426	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+29.0300	1575.4513
	PI	200+38.9100	1575.4354
Tangent Grade:		-0.1609	
Tangent Length:		9.8800	
Element: Linear			
	PI	200+38.9100	1575.4354
	PI	200+48.7800	1575.4077
Tangent Grade:		-0.2806	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+48.7800	1575.4077
	PI	200+58.6600	1575.3687
Tangent Grade:		-0.3947	
Tangent Length:		9.8800	
Element: Linear			
	PI	200+58.6600	1575.3687
	PI	200+68.5300	1575.3189
Tangent Grade:		-0.5046	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+68.5300	1575.3189
	PI	200+78.4100	1575.2585
Tangent Grade:		-0.6113	
Tangent Length:		9.8800	
Element: Linear			
	PI	200+78.4100	1575.2585
	PI	200+88.2800	1575.1874
Tangent Grade:		-0.7204	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+88.2800	1575.1874
	PI	200+98.1500	1575.1057
Tangent Grade:		-0.8278	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+98.1500	1575.1057
	PI	201+08.0200	1575.0132
Tangent Grade:		-0.9372	
Tangent Length:		9.8700	
Element: Linear			
	PI	201+08.0200	1575.0132
	PI	201+17.8900	1574.9101

```
            Tangent Grade:           -1.0446
           Tangent Length:            9.8700

Element: Linear
                        PI       201+17.8900         1574.9101
                        PI       201+27.7500         1574.7963
            Tangent Grade:           -1.1542
           Tangent Length:            9.8600

Element: Linear
                        PI       201+27.7500         1574.7963
                        PI       201+37.6200         1574.6719
            Tangent Grade:           -1.2604
           Tangent Length:            9.8700

Element: Linear
                        PI       201+37.6200         1574.6719
                        PI       201+47.4800         1574.5368
            Tangent Grade:           -1.3702
           Tangent Length:            9.8600

Element: Linear
                        PI       201+47.4800         1574.5368
                        PI       201+57.3500         1574.3910
            Tangent Grade:           -1.4772
           Tangent Length:            9.8700

Element: Linear
                        PI       201+57.3500         1574.3910
                        PI       201+67.2100         1574.2345
            Tangent Grade:           -1.5872
           Tangent Length:            9.8600

Element: Linear
                        PI       201+67.2100         1574.2345
                        PI       201+77.0700         1574.0674
            Tangent Grade:           -1.6947
           Tangent Length:            9.8600

Element: Linear
                        PI       201+77.0700         1574.0674
                        PI       201+86.9200         1573.8896
            Tangent Grade:           -1.8051
           Tangent Length:            9.8500

Element: Linear
                        PI       201+86.9200         1573.8896
                        PI       201+96.7800         1573.7011
            Tangent Grade:           -1.9118
           Tangent Length:            9.8600

Element: Linear
                        PI       201+96.7800         1573.7011
                        PI       202+06.6400         1573.5020
            Tangent Grade:           -2.0193
           Tangent Length:            9.8600

Element: Linear
                        PI       202+06.6400         1573.5020
                        PI       202+16.4930         1573.2922
            Tangent Grade:           -2.1293
           Tangent Length:            9.8530

Element: Linear
                        PI       202+16.4930         1573.2922
                        PI       202+26.3400         1573.0730
            Tangent Grade:           -2.2261
           Tangent Length:            9.8470

Element: Linear
                        PI       202+26.3400         1573.0730
                        PI       202+36.1900         1572.8519
            Tangent Grade:           -2.2447
           Tangent Length:            9.8500

Element: Linear
                        PI       202+36.1900         1572.8519
                        PI       202+46.0400         1572.6301
            Tangent Grade:           -2.2518
```

```
          Tangent Length:            9.8500

Element: Linear
                        PI       202+46.0400         1572.6301
                        PI       202+55.8800         1572.3976
           Tangent Grade:           -2.3628
          Tangent Length:            9.8400

Element: Linear
                        PI       202+55.8800         1572.3976
                        PI       202+65.7300         1572.1545
           Tangent Grade:           -2.4680
          Tangent Length:            9.8500

Element: Linear
                        PI       202+65.7300         1572.1545
                        PI       202+75.5700         1571.9308
           Tangent Grade:           -2.2734
          Tangent Length:            9.8400

Element: Linear
                        PI       202+75.5700         1571.9308
                        PI       202+85.5200         1571.6971
           Tangent Grade:           -2.3487
          Tangent Length:            9.9500

Element: Linear
                        PI       202+85.5200         1571.6971
                        PI       202+95.4700         1571.4744
           Tangent Grade:           -2.2382
          Tangent Length:            9.9500

Element: Linear
                        PI       202+95.4700         1571.4744
                        PI       203+05.4100         1571.2528
           Tangent Grade:           -2.2294
          Tangent Length:            9.9400

Element: Linear
                        PI       203+05.4100         1571.2528
                        PI       203+15.3400         1571.0323
           Tangent Grade:           -2.2205
          Tangent Length:            9.9300

Element: Linear
                        PI       203+15.3400         1571.0323
                        PI       203+25.2500         1570.8128
           Tangent Grade:           -2.2149
          Tangent Length:            9.9100

Element: Linear
                        PI       203+25.2500         1570.8128
                        PI       203+35.1600         1570.6043
           Tangent Grade:           -2.1039
          Tangent Length:            9.9100

Element: Linear
                        PI       203+35.1600         1570.6043
                        PI       203+45.0600         1570.3970
           Tangent Grade:           -2.0939
          Tangent Length:            9.9000

Element: Linear
                        PI       203+45.0600         1570.3970
                        PI       203+48.2572         1570.3335
           Tangent Grade:           -1.9858
          Tangent Length:            3.1972

Element: Linear
                        PI       203+48.2572         1570.3335
                        PC       204+25.0000         1568.5684
           Tangent Grade:           -2.3000
          Tangent Length:           76.7428

Element: Parabola
                        PC       204+25.0000         1568.5684
                        PI       205+50.0000         1565.6934
                        PT       206+75.0000         1566.0684
                       LOW       206+46.1538         1566.0252
```

Length:		250.0000	
Headlight Sight Distance:		617.6471	
Entrance Grade:		-2.3000	
Exit Grade:		0.3000	
r = (g2 - g1) / L:		1.0400	
K = l / (g2 - g1):		96.1538	
Middle Ordinate:		0.8125	

Element: Linear

PT	206+75.0000	1566.0684
PC	211+40.0000	1567.4634
Tangent Grade:	0.3000	
Tangent Length:	465.0000	

Element: Parabola

PC	211+40.0000	1567.4634
PI	212+75.0000	1567.8684
PRC	214+10.0000	1561.1184
HIGH	211+55.2830	1567.4863
Length:	270.0000	
Stopping Sight Distance:	338.6133	
Entrance Grade:	0.3000	
Exit Grade:	-5.0000	
r = (g2 - g1) / L:	-1.9630	
K = l / (g2 - g1):	50.9434	
Middle Ordinate:	-1.7888	

Element: Parabola

PRC	214+10.0000	1561.1184
PI	215+00.0000	1556.6184
PT	215+90.0000	1553.2884
Length:	180.0000	
Headlight Sight Distance:	580.0911	
Entrance Grade:	-5.0000	
Exit Grade:	-3.7000	
r = (g2 - g1) / L:	0.7222	
K = l / (g2 - g1):	138.4615	
Middle Ordinate:	0.2925	

Element: Linear

PT	215+90.0000	1553.2884
POE	215+90.5478	1553.2682
Tangent Grade:	-3.7000	
Tangent Length:	0.5478	

Project Name: Add 2_Gary Blvd
Description:
Horizontal Alignment Name: Gary Blvd_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	101+00.7450	1581.7366
	PI	101+14.4468	1581.4626
Tangent Grade:		-2.0000	
Tangent Length:		13.7019	
Element: Linear			
	PI	101+14.4468	1581.4626
	PC	107+05.0000	1578.5098
Tangent Grade:		-0.5000	
Tangent Length:		590.5532	
Element: Parabola			
	PC	107+05.0000	1578.5098
	PI	111+05.0000	1576.5098
	PT	115+05.0000	1583.7098
	LOW	108+78.9130	1578.0750
Length:		800.0000	
Headlight Sight Distance:		2036.3636	
Entrance Grade:		-0.5000	
Exit Grade:		1.8000	
r = (g2 - g1) / L:		0.2875	
K = l / (g2 - g1):		347.8261	
Middle Ordinate:		2.3000	
Element: Linear			
	PT	115+05.0000	1583.7098
	PC	117+00.0000	1587.2198
Tangent Grade:		1.8000	
Tangent Length:		195.0000	
Element: Parabola			
	PC	117+00.0000	1587.2198
	PI	118+00.0000	1589.0198
	PT	119+00.0000	1590.0198
Length:		200.0000	
Stopping Sight Distance:		1448.9378	
Entrance Grade:		1.8000	
Exit Grade:		1.0000	
r = (g2 - g1) / L:		-0.4000	
K = l / (g2 - g1):		250.0000	
Middle Ordinate:		-0.2000	
Element: Linear			
	PT	119+00.0000	1590.0198
	PC	131+19.0175	1602.2100
Tangent Grade:		1.0000	
Tangent Length:		1219.0175	
Element: Parabola			
	PC	131+19.0175	1602.2100
	PI	132+19.0175	1603.2100
	PT	133+19.0175	1603.6100
Length:		200.0000	
Stopping Sight Distance:		1898.5838	
Entrance Grade:		1.0000	
Exit Grade:		0.4000	
r = (g2 - g1) / L:		-0.3000	
K = l / (g2 - g1):		333.3333	
Middle Ordinate:		-0.1500	
Element: Linear			
	PT	133+19.0175	1603.6100
	POE	133+69.0175	1603.8100
Tangent Grade:		0.4000	
Tangent Length:		50.0000	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: 28th St_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	11+39.7700	1635.3889
	PC	14+15.0000	1648.7375
Tangent Grade:		4.8500	
Tangent Length:		275.2300	
Element: Parabola			
	PC	14+15.0000	1648.7375
	PI	16+65.0000	1660.8625
	PT	19+15.0000	1649.6125
	HIGH	16+74.3583	1655.0270
Length:		500.0000	
Stopping Sight Distance:		339.7310	
Entrance Grade:		4.8500	
Exit Grade:		-4.5000	
r = (g2 - g1) / L:		-1.8700	
K = l / (g2 - g1):		53.4759	
Middle Ordinate:		-5.8437	
Element: Linear			
	PT	19+15.0000	1649.6125
	POE	21+09.4300	1640.8632
Tangent Grade:		-4.5000	
Tangent Length:		194.4300	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Lexington Ave_2B_2C_2D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	10+00.0000	1601.1576
	PC	11+00.0000	1598.2561
Tangent Grade:		-2.9016	
Tangent Length:		100.0000	
Element: Parabola			
	PC	11+00.0000	1598.2561
	PI	11+50.0000	1596.8053
	PT	12+00.0000	1597.8053
	LOW	11+59.1969	1597.3972
Length:		100.0000	
Headlight Sight Distance:		141.2240	
Entrance Grade:		-2.9016	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		4.9016	
K = l / (g2 - g1):		20.4016	
Middle Ordinate:		0.6127	
Element: Linear			
	PT	12+00.0000	1597.8053
	PI	12+40.6625	1598.6185
Tangent Grade:		2.0000	
Tangent Length:		40.6625	
Element: Linear			
	PI	12+40.6625	1598.6185
	PC	12+77.5000	1597.8818
Tangent Grade:		-2.0000	
Tangent Length:		36.8375	
Element: Parabola			
	PC	12+77.5000	1597.8818
	PI	13+15.0000	1597.1318
	PT	13+52.5000	1595.3318
Length:		75.0000	
Stopping Sight Distance:		422.9108	
Entrance Grade:		-2.0000	
Exit Grade:		-4.8000	
r = (g2 - g1) / L:		-3.7333	
K = l / (g2 - g1):		26.7857	
Middle Ordinate:		-0.2625	
Element: Linear			
	PT	13+52.5000	1595.3318
	PC	13+62.0000	1594.8758
Tangent Grade:		-4.8000	
Tangent Length:		9.5000	
Element: Parabola			
	PC	13+62.0000	1594.8758
	PI	14+52.0000	1590.5558
	PT	15+42.0000	1592.3558
	LOW	14+89.0588	1591.8264
Length:		180.0000	
Headlight Sight Distance:		159.1690	
Entrance Grade:		-4.8000	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		3.7778	
K = l / (g2 - g1):		26.4706	
Middle Ordinate:		1.5300	
Element: Linear			
	PT	15+42.0000	1592.3558
	POE	15+50.0000	1592.5158
Tangent Grade:		2.0000	
Tangent Length:		8.0000	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Red Wheat_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	0+44.9700	1607.9750
	PC	2+50.0000	1603.8744
Tangent Grade:		-2.0000	
Tangent Length:		205.0300	
Element: Parabola			
	PC	2+50.0000	1603.8744
	PI	3+00.0000	1602.8744
	PT	3+50.0000	1600.5244
Length:		100.0000	
Stopping Sight Distance:		449.6853	
Entrance Grade:		-2.0000	
Exit Grade:		-4.7000	
r = (g2 - g1) / L:		-2.7000	
K = l / (g2 - g1):		37.0370	
Middle Ordinate:		-0.3375	
Element: Linear			
	PT	3+50.0000	1600.5244
	PC	5+00.0000	1593.4744
Tangent Grade:		-4.7000	
Tangent Length:		150.0000	
Element: Parabola			
	PC	5+00.0000	1593.4744
	PI	6+50.0000	1586.4244
	PT	8+00.0000	1587.9244
	LOW	7+47.3684	1587.6612
Length:		300.0000	
Headlight Sight Distance:		263.9657	
Entrance Grade:		-4.7000	
Exit Grade:		1.0000	
r = (g2 - g1) / L:		1.9000	
K = l / (g2 - g1):		52.6316	
Middle Ordinate:		2.1375	
Element: Linear			
	PT	8+00.0000	1587.9244
	POE	8+23.5468	1588.1598
Tangent Grade:		1.0000	
Tangent Length:		23.5468	

APPENDIX C

ALTERNATIVE 2C GEOMETRICS

Project Name: Add 2_I-40 Mainline
Description:
Horizontal Alignment Name: I-40 Survey
Description: v3_I-40
Style: Default

	STATION	EASTING	NORTHING
Element: Circular			
PC (5002)	3401+63.0000	1668517.2610	179652.5796
PI ( )	3428+22.7579	1670437.5540	181492.9020
CC (5001)		1675124.5508	172758.1723
PT (5004)	3453+51.0241	1673032.7119	182075.5400
Radius:	9549.3000		
Delta:	31^07'41.2793" Right		
Degree of Curvature(Arc):	0^35'59.9992"		
Length:	5188.0241		
Tangent:	2659.7578		
Chord:	5124.4545		
Middle Ordinate:	350.1630		
External:	363.4918		
Tangent Direction:	N 46^13'05.6199" E		
Radial Direction:	S 43^46'54.3801" E		
Chord Direction:	N 61^46'56.2589" E		
Radial Direction:	S 12^39'13.1008" E		
Tangent Direction:	N 77^20'46.8992" E		
Element: Linear			
PT (5004)	3453+51.0241	1673032.7119	182075.5400
PI (5005)	3503+41.1825	1677901.6700	183168.6680
Tangent Direction:	N 77^20'46.9011" E		
Tangent Length:	4990.1585		
Element: Linear			
PI (5005)	3503+41.1825	1677901.6700	183168.6680
PC (6)	3513+70.7030	1678906.1856	183394.1914
Tangent Direction:	N 77^20'46.9000" E		
Tangent Length:	1029.5205		
Element: Circular			
PC (6)	3513+70.7030	1678906.1856	183394.1914
PI ( )	3531+15.0638	1680608.1796	183776.3055
CC ( )		1681259.5126	172912.1162
PT ( )	3548+29.2410	1682343.6356	183600.2744
Radius:	10743.0000		
Delta:	18^26'43.6737" Right		
Degree of Curvature(Arc):	0^31'59.9926"		
Length:	3458.5380		
Tangent:	1744.3608		
Chord:	3443.6220		
Middle Ordinate:	138.8774		
External:	140.6962		
Tangent Direction:	N 77^20'46.9000" E		
Radial Direction:	S 12^39'13.1000" E		
Chord Direction:	N 86^34'08.7369" E		
Radial Direction:	S 5^47'30.5737" W		
Tangent Direction:	S 84^12'29.4263" E		

```
            Project Name: Add 2_Ramps
             Description:
Horizontal Alignment Name: Ramp A_2B_2C
             Description:
                   Style: Default
                                    STATION       EASTING      NORTHING

Element: Linear
            POB (       2)       1000+00.0000  1672007.6492   181830.9955
             PC (       3)       1003+01.7965  1672290.6302   181935.8901
        Tangent Direction: N 69^39'41.0597" E
           Tangent Length:           301.7965

Non-collinear

Element: Circular
             PC (       3)       1003+01.7965  1672290.6302   181935.8901
             PI (        )       1005+18.5206  1672497.7064   181999.8333
             CC (       4)                     1675124.9790   172757.0231
             PT (      10)       1007+35.1711  1672707.4557   182054.3729
                  Radius:          9606.5151
                   Delta:      2^35'05.1357" Right
  Degree of Curvature(Arc):      0^35'47.1346"
                  Length:           433.3746
                 Tangent:           216.7241
                   Chord:           433.3378
          Middle Ordinate:             2.4437
                 External:             2.4443
        Tangent Direction: N 72^50'23.2723" E
         Radial Direction: S 17^09'36.7277" E
          Chord Direction: N 74^07'55.8402" E
         Radial Direction: S 14^34'31.5920" E
        Tangent Direction: N 75^25'28.4080" E

Element: Linear
             PT (      10)       1007+35.1711  1672707.4557   182054.3729
             PC (       5)       1008+93.1066  1672860.3083   182094.1181
        Tangent Direction: N 75^25'28.4080" E
           Tangent Length:           157.9355

Element: Circular
             PC (       5)       1008+93.1066  1672860.3083   182094.1181
             PI (        )       1009+61.6897  1672926.6842   182111.3773
             CC (      13)                     1672139.3711   184866.7099
             PT (      14)       1010+30.2466  1672992.1582   182131.7931
                  Radius:          2864.7890
                   Delta:      2^44'34.0797" Left
  Degree of Curvature(Arc):      1^59'59.9999"
                  Length:           137.1400
                 Tangent:            68.5831
                   Chord:           137.1269
          Middle Ordinate:             0.8206
                 External:             0.8208
        Tangent Direction: N 75^25'28.4080" E
         Radial Direction: S 14^34'31.5920" E
          Chord Direction: N 74^03'11.3682" E
         Radial Direction: S 17^19'05.6717" E
        Tangent Direction: N 72^40'54.3283" E

Element: Linear
             PT (      14)       1010+30.2466  1672992.1582   182131.7931
             PC (       6)       1012+48.4008  1673200.4226   182196.7330
        Tangent Direction: N 72^40'54.3283" E
           Tangent Length:           218.1542

Element: Circular
             PC (       6)       1012+48.4008  1673200.4226   182196.7330
             PI (        )       1013+65.0803  1673311.8126   182231.4660
             CC (      11)                     1674053.2097   179461.8161
             PT (      12)       1014+81.6310  1673425.6583   182257.0255
                  Radius:          2864.7890
                   Delta:      4^39'52.5724" Right
  Degree of Curvature(Arc):      1^59'59.9999"
                  Length:           233.2302
                 Tangent:           116.6795
                   Chord:           233.1658
          Middle Ordinate:             2.3732
                 External:             2.3751
        Tangent Direction: N 72^40'54.3283" E
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          Radial Direction: S 17^19'05.6717" E
           Chord Direction: N 75^00'50.6145" E
          Radial Direction: S 12^39'13.0993" E
         Tangent Direction: N 77^20'46.9007" E

Element: Linear
              PT (      12)       1014+81.6310  1673425.6583   182257.0255
              PC (       7)       1017+52.5447  1673689.9921   182316.3709
         Tangent Direction: N 77^20'46.9007" E
            Tangent Length:           270.9137

Element: Circular
              PC (       7)       1017+52.5447  1673689.9921   182316.3709
              PI (        )       1018+92.8631  1673826.9024   182347.1086
              CC (      15)                     1673438.9715   183434.4547
              PT (      16)       1020+31.7913  1673952.3511   182409.9724
                     Radius:          1145.9156
                      Delta:     13^57'44.3782" Left
   Degree of Curvature(Arc):      4^59'59.9998"
                    Length:           279.2465
                   Tangent:           140.3184
                     Chord:           278.5561
           Middle Ordinate:             8.4956
                  External:             8.5591
         Tangent Direction: N 77^20'46.9007" E
          Radial Direction: S 12^39'13.0993" E
           Chord Direction: N 70^21'54.7116" E
          Radial Direction: S 26^36'57.4775" E
         Tangent Direction: N 63^23'02.5225" E

Element: Linear
              PT (      16)       1020+31.7913  1673952.3511   182409.9724
              PC (       8)       1024+10.1294  1674290.5966   182579.4710
         Tangent Direction: N 63^23'02.5225" E
            Tangent Length:           378.3382

Element: Circular
              PC (       8)       1024+10.1294  1674290.5966   182579.4710
              PI (        )       1025+50.4478  1674416.0453   182642.3348
              CC (      17)                     1674803.9762   181554.9887
              PT (      18)       1026+89.3760  1674552.9556   182673.0725
                     Radius:          1145.9156
                      Delta:     13^57'44.3782" Right
   Degree of Curvature(Arc):      4^59'59.9998"
                    Length:           279.2465
                   Tangent:           140.3184
                     Chord:           278.5561
           Middle Ordinate:             8.4956
                  External:             8.5591
         Tangent Direction: N 63^23'02.5225" E
          Radial Direction: S 26^36'57.4775" E
           Chord Direction: N 70^21'54.7116" E
          Radial Direction: S 12^39'13.0993" E
         Tangent Direction: N 77^20'46.9007" E

Element: Linear
              PT (      18)       1026+89.3760  1674552.9556   182673.0725
             POE (       9)       1029+24.1382  1674782.0159   182724.4987
         Tangent Direction: N 77^20'46.9007" E
            Tangent Length:           234.7622
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(19)	2000+00.0000	1671755.3949	181646.3275
PC	(20)	2002+98.6577	1672040.1397	181736.4208
Tangent Direction:		N 72^26'33.4023" E		
Tangent Length:		298.6577		
Non-collinear				
Element: Circular				
PC	(20)	2002+98.6577	1672040.1397	181736.4208
PI	( )	2006+59.7463	1672381.6377	181853.7412
CC	(4)		1675124.9790	172757.0232
PCC	(221)	2010+20.4870	1672731.0601	181944.7850
Radius:		9494.5151		
Delta:		4^21'21.4729" Right		
Degree of Curvature(Arc):		0^36'12.4628"		
Length:		721.8293		
Tangent:		361.0886		
Chord:		721.6555		
Middle Ordinate:		6.8589		
External:		6.8639		
Tangent Direction:		N 71^02'24.1010" E		
Radial Direction:		S 18^57'35.8990" E		
Chord Direction:		N 73^13'04.8374" E		
Radial Direction:		S 14^36'14.4261" E		
Tangent Direction:		N 75^23'45.5739" E		
Element: Circular				
PCC	(221)	2010+20.4870	1672731.0601	181944.7850
PI	( )	2011+45.4688	1672852.0039	181976.2976
CC	(222)		1673308.9156	179726.9994
PT	(223)	2012+70.2033	1672975.6574	181994.4714
Radius:		2291.8312		
Delta:		6^14'34.4657" Right		
Degree of Curvature(Arc):		2^29'59.9999"		
Length:		249.7163		
Tangent:		124.9818		
Chord:		249.5928		
Middle Ordinate:		3.4003		
External:		3.4053		
Tangent Direction:		N 75^23'45.5739" E		
Radial Direction:		S 14^36'14.4261" E		
Chord Direction:		N 78^31'02.8067" E		
Radial Direction:		S 8^21'39.9604" E		
Tangent Direction:		N 81^38'20.0396" E		
Element: Linear				
PT	(223)	2012+70.2033	1672975.6574	181994.4714
PC	(224)	2014+88.8101	1673191.9406	182026.2593
Tangent Direction:		N 81^38'20.0396" E		
Tangent Length:		218.6067		
Element: Circular				
PC	(224)	2014+88.8101	1673191.9406	182026.2593
PI	( )	2015+96.1737	1673298.1632	182041.8712
CC	(225)		1672775.3678	184860.5992
PT	(226)	2017+03.4370	1673402.9192	182065.3899
Radius:		2864.7890		
Delta:		4^17'33.1382" Left		
Degree of Curvature(Arc):		1^59'59.9999"		
Length:		214.6269		
Tangent:		107.3637		
Chord:		214.5767		
Middle Ordinate:		2.0097		
External:		2.0111		
Tangent Direction:		N 81^38'20.0396" E		
Radial Direction:		S 8^21'39.9604" E		
Chord Direction:		N 79^29'33.4705" E		
Radial Direction:		S 12^39'13.0986" E		
Tangent Direction:		N 77^20'46.9014" E		
Element: Linear				

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            PT (     226)       2017+03.4370  1673402.9192   182065.3899
            PC (      24)       2020+03.4370  1673695.6328   182131.1069
        Tangent Direction: N 77^20'46.9014" E
           Tangent Length:           300.0000

Element: Circular
            PC (      24)       2020+03.4370  1673695.6328   182131.1069
            PI (       )       2021+63.6338  1673851.9389   182166.1991
            CC (      25)                     1674009.4085   180733.5023
            PT (      30)       2023+22.5048  1674012.1354   182165.8942
                  Radius:          1432.3945
                   Delta:     12^45'45.7727" Right
  Degree of Curvature(Arc):      3^59'59.9999"
                  Length:           319.0679
                 Tangent:           160.1969
                   Chord:           318.4086
          Middle Ordinate:             8.8749
                 External:             8.9303
        Tangent Direction: N 77^20'46.9014" E
         Radial Direction: S 12^39'13.0986" E
          Chord Direction: N 83^43'39.7878" E
         Radial Direction: S  0^06'32.6741" W
        Tangent Direction: S 89^53'27.3259" E

Element: Linear
            PT (      30)       2023+22.5048  1674012.1354   182165.8942
            PC (      31)       2027+53.8880  1674443.5178   182165.0729
        Tangent Direction: S 89^53'27.3259" E
           Tangent Length:           431.3831

Element: Circular
            PC (      31)       2027+53.8880  1674443.5178   182165.0729
            PI (       )       2028+82.0455  1674571.6751   182164.8289
            CC (      32)                     1674445.6993   183310.9864
            PT (      33)       2030+09.1423  1674696.7199   182192.9027
                  Radius:          1145.9156
                   Delta:     12^45'45.7727" Left
  Degree of Curvature(Arc):      4^59'59.9998"
                  Length:           255.2543
                 Tangent:           128.1575
                   Chord:           254.7269
          Middle Ordinate:             7.0999
                 External:             7.1442
        Tangent Direction: S 89^53'27.3259" E
         Radial Direction: S  0^06'32.6741" W
          Chord Direction: N 83^43'39.7878" E
         Radial Direction: S 12^39'13.0986" E
        Tangent Direction: N 77^20'46.9014" E

Element: Linear
            PT (      33)       2030+09.1423  1674696.7199   182192.9027
           POE (      26)       2032+08.8164  1674891.5443   182236.6427
        Tangent Direction: N 77^20'46.9014" E
           Tangent Length:           199.6741
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp C_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(34)	3000+00.0000	1674888.2585	182251.2784
PC	(35)	3001+47.0307	1675031.7181	182283.4864
Tangent Direction:		N 77^20'46.9011" E		
Tangent Length:		147.0307		
Element: Circular				
PC	(35)	3001+47.0307	1675031.7181	182283.4864
PI	( )	3002+85.9726	1675167.2854	182313.9226
CC	(39)		1674780.6975	183401.5702
PT	(41)	3004+23.5647	1675291.6506	182375.8755
Radius:		1145.9156		
Delta:		13^49'36.1158" Left		
Degree of Curvature(Arc):		4^59'59.9998"		
Length:		276.5340		
Tangent:		138.9419		
Chord:		275.8635		
Middle Ordinate:		8.3316		
External:		8.3926		
Tangent Direction:		N 77^20'46.9011" E		
Radial Direction:		S 12^39'13.0989" E		
Chord Direction:		N 70^25'58.8432" E		
Radial Direction:		S 26^28'49.2148" E		
Tangent Direction:		N 63^31'10.7852" E		
Element: Linear				
PT	(41)	3004+23.5647	1675291.6506	182375.8755
PC	(36)	3008+02.0508	1675630.4288	182544.6389
Tangent Direction:		N 63^31'10.7852" E		
Tangent Length:		378.4861		
Element: Circular				
PC	(36)	3008+02.0508	1675630.4288	182544.6389
PI	( )	3010+33.6207	1675837.7041	182647.8938
CC	(42)		1676482.0172	180835.1479
PT	(43)	3012+62.9408	1676063.6496	182698.6207
Radius:		1909.8593		
Delta:		13^49'36.1155" Right		
Degree of Curvature(Arc):		3^00'00.0001"		
Length:		460.8900		
Tangent:		231.5699		
Chord:		459.7724		
Middle Ordinate:		13.8860		
External:		13.9877		
Tangent Direction:		N 63^31'10.7852" E		
Radial Direction:		S 26^28'49.2148" E		
Chord Direction:		N 70^25'58.8430" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT	(43)	3012+62.9408	1676063.6496	182698.6207
PI	(37)	3019+17.8641	1676702.6663	182842.0861
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		654.9234		
Element: Linear				
PI	(37)	3019+17.8641	1676702.6663	182842.0861
POE	(38)	3022+18.1040	1676992.7512	182919.5117
Tangent Direction:		N 75^03'20.7046" E		
Tangent Length:		300.2399		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp D_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(44)	4000+00.0000	1674785.3018	182709.8630
PC	(45)	4001+47.0307	1674928.7614	182742.0711
Tangent Direction:		N 77^20'46.9011" E		
Tangent Length:		147.0307		
Element: Circular				
PC	(45)	4001+47.0307	1674928.7614	182742.0711
PI	( )	4002+85.9726	1675064.3288	182772.5073
CC	(51)		1675179.7820	181623.9874
PT	(52)	4004+23.5647	1675203.2416	182769.6628
Radius:		1145.9156		
Delta:		13^49'36.1158" Right		
Degree of Curvature(Arc):		4^59'59.9998"		
Length:		276.5340		
Tangent:		138.9419		
Chord:		275.8635		
Middle Ordinate:		8.3316		
External:		8.3926		
Tangent Direction:		N 77^20'46.9011" E		
Radial Direction:		S 12^39'13.0989" E		
Chord Direction:		N 84^15'34.9590" E		
Radial Direction:		S 1^10'23.0169" W		
Tangent Direction:		S 88^49'36.9831" E		
Element: Linear				
PT	(52)	4004+23.5647	1675203.2416	182769.6628
PC	(47)	4008+02.0508	1675581.6484	182761.9143
Tangent Direction:		S 88^49'36.9831" E		
Tangent Length:		378.4861		
Element: Circular				
PC	(47)	4008+02.0508	1675581.6484	182761.9143
PI	( )	4010+33.6207	1675813.1697	182757.1735
CC	(53)		1675620.7477	184671.3734
PT	(54)	4012+62.9408	1676039.1153	182807.9005
Radius:		1909.8593		
Delta:		13^49'36.1162" Left		
Degree of Curvature(Arc):		3^00'00.0001"		
Length:		460.8900		
Tangent:		231.5699		
Chord:		459.7724		
Middle Ordinate:		13.8860		
External:		13.9877		
Tangent Direction:		S 88^49'36.9831" E		
Radial Direction:		S 1^10'23.0169" W		
Chord Direction:		N 84^15'34.9588" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT	(54)	4012+62.9408	1676039.1153	182807.9005
PI	(48)	4022+18.1040	1676971.0796	183017.1355
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		955.1632		
Element: Linear				
PI	(48)	4022+18.1040	1676971.0796	183017.1355
POE	(50)	4025+18.3439	1677266.4219	183071.1440
Tangent Direction:		N 79^38'13.0969" E		
Tangent Length:		300.2399		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp G_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(206)	7000+00.0000	1677210.1990	182530.5889
PI	(55)	7000+80.0457	1677135.8803	182560.3219
Tangent Direction:		N 68^11'41.8846" W		
Tangent Length:		80.0457		
Element: Linear				
PI	(55)	7000+80.0457	1677135.8803	182560.3219
PC	(56)	7001+33.6707	1677085.4473	182578.5469
Tangent Direction:		N 70^07'53.7642" W		
Tangent Length:		53.6250		
Element: Circular				
PC	(56)	7001+33.6707	1677085.4473	182578.5469
PI	( )	7007+67.9229	1676488.9485	182794.1044
CC	(59)		1677148.3215	182752.5349
PT	(60)	7006+09.8563	1677107.7960	182933.0417
Radius:		185.0000		
Delta:		147^28'40.6647" Right		
Degree of Curvature(Arc):		30^58'14.4899"		
Length:		476.1856		
Tangent:		634.2522		
Chord:		355.1985		
Middle Ordinate:		133.1975		
External:		475.6821		
Tangent Direction:		N 70^07'53.7642" W		
Radial Direction:		N 19^52'06.2358" E		
Chord Direction:		N 3^36'26.5682" E		
Radial Direction:		S 12^39'13.0995" E		
Tangent Direction:		N 77^20'46.9005" E		
Element: Linear				
PT	(60)	7006+09.8563	1677107.7960	182933.0417
PI	(57)	7020+14.6101	1678478.4313	183240.7625
Tangent Direction:		N 77^20'46.9005" E		
Tangent Length:		1404.7538		
Element: Linear				
PI	(57)	7020+14.6101	1678478.4313	183240.7625
POE	(58)	7023+14.8500	1678768.5163	183318.1881
Tangent Direction:		N 75^03'20.7039" E		
Tangent Length:		300.2399		

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: North FR_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC (	1)	100+00.0000	1675495.7795	182778.6758
PI (	)	101+73.6774	1675669.4205	182775.1202
CC (	2)		1675525.1039	184210.7701
PT (	6)	103+45.6675	1675838.8797	182813.1654
Radius:		1432.3945		
Delta:		13^49'36.1162" Left		
Degree of Curvature(Arc):		3^59'59.9999"		
Length:		345.6675		
Tangent:		173.6774		
Chord:		344.8293		
Middle Ordinate:		10.4145		
External:		10.4908		
Tangent Direction:		S 88^49'36.9831" E		
Radial Direction:		S 1^10'23.0169" W		
Chord Direction:		N 84^15'34.9588" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT (	6)	103+45.6675	1675838.8797	182813.1654
PC (	49)	110+24.0442	1676500.7801	182961.7684
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		678.3768		
Element: Circular				
PC (	49)	110+24.0442	1676500.7801	182961.7684
PI (	)	112+15.6356	1676687.7181	183003.7378
CC (	50)		1676333.4330	183707.1575
PT (	52)	113+99.4835	1676832.7265	183128.9569
Radius:		763.9437		
Delta:		28^09'28.6175" Left		
Degree of Curvature(Arc):		7^30'00.0009"		
Length:		375.4393		
Tangent:		191.5914		
Chord:		371.6725		
Middle Ordinate:		22.9478		
External:		23.6585		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		N 63^16'02.5920" E		
Radial Direction:		S 40^48'41.7167" E		
Tangent Direction:		N 49^11'18.2833" E		
Element: Linear				
PT (	52)	113+99.4835	1676832.7265	183128.9569
PC (	51)	116+23.8826	1677002.5659	183275.6182
Tangent Direction:		N 49^11'18.2833" E		
Tangent Length:		224.3991		
Element: Circular				
PC (	51)	116+23.8826	1677002.5659	183275.6182
PI (	)	117+95.3079	1677132.3113	183387.6573
CC (	53)		1677501.8594	182697.4176
PT (	24)	119+61.1465	1677297.4885	183433.5171
Radius:		763.9437		
Delta:		25^17'41.2401" Right		
Degree of Curvature(Arc):		7^30'00.0009"		
Length:		337.2638		
Tangent:		171.4253		
Chord:		334.5316		
Middle Ordinate:		18.5363		
External:		18.9973		
Tangent Direction:		N 49^11'18.2833" E		
Radial Direction:		S 40^48'41.7167" E		
Chord Direction:		N 61^50'08.9033" E		
Radial Direction:		S 15^31'00.4766" E		
Tangent Direction:		N 74^28'59.5234" E		
Element: Linear				
PT (	24)	119+61.1465	1677297.4885	183433.5171
PI (	21)	120+14.7714	1677349.1589	183447.8629

Tangent Direction: N 74^28'59.5234" E
Tangent Length: 53.6250

Element: Linear

PI (21)	120+14.7714	1677349.1589	183447.8629
POE (47)	120+64.8067	1677397.8387	183459.4302

Tangent Direction: N 76^37'59.8349" E
Tangent Length: 50.0352

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: South FR_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC (	11)	200+00.0000	1675591.0572	182508.2677
PI (	)	201+38.9419	1675715.4224	182570.2206
CC (	12)		1676102.0103	181482.5731
PT (	15)	202+76.5340	1675850.9897	182600.6568
Radius:		1145.9156		
Delta:		13^49'36.1155" Right		
Degree of Curvature(Arc):		4^59'59.9998"		
Length:		276.5340		
Tangent:		138.9419		
Chord:		275.8635		
Middle Ordinate:		8.3316		
External:		8.3926		
Tangent Direction:		N 63^31'10.7852" E		
Radial Direction:		S 26^28'49.2148" E		
Chord Direction:		N 70^25'58.8430" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT (	15)	202+76.5340	1675850.9897	182600.6568
PC (	25)	207+06.0070	1676270.0317	182694.7358
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		429.4730		
Element: Circular				
PC (	25)	207+06.0070	1676270.0317	182694.7358
PI (	)	209+44.7520	1676502.9781	182747.0345
CC (	26)		1676449.3321	181896.1046
PT (	28)	211+70.6075	1676727.5120	182665.8944
Radius:		818.5111		
Delta:		32^31'19.3351" Right		
Degree of Curvature(Arc):		7^00'00.0011"		
Length:		464.6005		
Tangent:		238.7450		
Chord:		458.3885		
Middle Ordinate:		32.7437		
External:		34.1082		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		S 86^23'33.4317" E		
Radial Direction:		S 19^52'06.2358" W		
Tangent Direction:		S 70^07'53.7642" E		
Element: Linear				
PT (	28)	211+70.6075	1676727.5120	182665.8944
PI (	27)	215+90.5479	1677122.4558	182523.1731
Tangent Direction:		S 70^07'53.7642" E		
Tangent Length:		419.9404		
Element: Linear				
PI (	27)	215+90.5479	1677122.4558	182523.1731
POE (	48)	216+70.6119	1677198.7816	182498.9943
Tangent Direction:		S 72^25'21.5285" E		
Tangent Length:		80.0640		

Project Name: Add 2_Gary Blvd
Description:
Horizontal Alignment Name: Gary Blvd_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB (	8)	100+00.0000	1674956.5539	181264.0458
PC (	9)	104+47.1329	1674959.3037	181711.1702
Tangent Direction:	N 0^21'08.5277" E			
Tangent Length:	447.1329			
Element: Circular				
PC (	9)	104+47.1329	1674959.3037	181711.1702
PI (	)	106+64.8353	1674960.6426	181928.8685
CC (	11)		1673049.4805	181722.9158
PT (	12)	108+80.6664	1674912.9534	182141.2834
Radius:	1909.8593			
Delta:	13^00'21.6266" Left			
Degree of Curvature(Arc):	3^00'00.0001"			
Length:	433.5336			
Tangent:	217.7024			
Chord:	432.6034			
Middle Ordinate:	12.2882			
External:	12.3678			
Tangent Direction:	N 0^21'08.5277" E			
Radial Direction:	S 89^38'51.4723" E			
Chord Direction:	N 6^09'02.2856" W			
Radial Direction:	N 77^20'46.9011" E			
Tangent Direction:	N 12^39'13.0989" W			
Element: Linear				
PT (	12)	108+80.6664	1674912.9534	182141.2834
PC (	10)	120+89.4440	1674648.1625	183320.7023
Tangent Direction:	N 12^39'13.0989" W			
Tangent Length:	1208.7776			
Element: Circular				
PC (	10)	120+89.4440	1674648.1625	183320.7023
PI (	)	123+75.4113	1674585.5194	183599.7240
CC (	13)		1676511.6354	183739.0699
PT (	14)	126+57.1610	1674607.3484	183884.8570
Radius:	1909.8593			
Delta:	17^01'53.4340" Right			
Degree of Curvature(Arc):	3^00'00.0001"			
Length:	567.7170			
Tangent:	285.9673			
Chord:	565.6291			
Middle Ordinate:	21.0559			
External:	21.2906			
Tangent Direction:	N 12^39'13.0989" W			
Radial Direction:	N 77^20'46.9011" E			
Chord Direction:	N 4^08'16.3819" W			
Radial Direction:	S 85^37'19.6650" E			
Tangent Direction:	N 4^22'40.3350" E			
Element: Linear				
PT (	14)	126+57.1610	1674607.3484	183884.8570
POE (	56)	134+16.9624	1674665.3471	184642.4415
Tangent Direction:	N 4^22'40.3350" E			
Tangent Length:	759.8014			

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: 28th St_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB (	17)	10+00.0000	1672690.5883	181300.0302
PC (	)	11+65.7475	1672691.0328	181465.7771
Tangent Direction:	N 0^09'13.0858" E			
Tangent Length:	165.7475			
Element: Circular				
PC (	)	11+65.7475	1672691.0328	181465.7771
PI (	)	12+44.4032	1672691.2437	181544.4325
CC (	22)		1672118.0770	181467.3134
PT (	23)	13+22.0816	1672670.2506	181620.2349
Radius:	572.9578			
Delta:	15^38'00.3025" Left			
Degree of Curvature(Arc):	9^59'59.9997"			
Length:	156.3342			
Tangent:	78.6557			
Chord:	155.8497			
Middle Ordinate:	5.3238			
External:	5.3737			
Tangent Direction:	N 0^09'13.0858" E			
Radial Direction:	S 89^50'46.9142" E			
Chord Direction:	N 7^39'47.0654" W			
Radial Direction:	N 74^31'12.7833" E			
Tangent Direction:	N 15^28'47.2167" W			
Element: Linear				
PT (	23)	13+22.0816	1672670.2506	181620.2349
PC (	19)	18+35.4948	1672533.2215	182115.0238
Tangent Direction:	N 15^28'47.2167" W			
Tangent Length:	513.4131			
Element: Circular				
PC (	19)	18+35.4948	1672533.2215	182115.0238
PI (	)	19+38.3038	1672505.7819	182214.1034
CC (	24)		1673085.3951	182267.9453
PT (	25)	20+38.9477	1672514.5019	182316.5420
Radius:	572.9578			
Delta:	20^20'43.0695" Right			
Degree of Curvature(Arc):	9^59'59.9997"			
Length:	203.4530			
Tangent:	102.8090			
Chord:	202.3858			
Middle Ordinate:	9.0069			
External:	9.1507			
Tangent Direction:	N 15^28'47.2167" W			
Radial Direction:	N 74^31'12.7833" E			
Chord Direction:	N 5^18'25.6819" W			
Radial Direction:	S 85^08'04.1472" E			
Tangent Direction:	N 4^51'55.8528" E			
Element: Linear				
PT (	25)	20+38.9477	1672514.5019	182316.5420
PC (	20)	21+09.4294	1672520.4800	182386.7697
Tangent Direction:	N 4^51'55.8528" E			
Tangent Length:	70.4817			
Element: Circular				
PC (	20)	21+09.4294	1672520.4800	182386.7697
PI (	)	21+62.1688	1672524.9532	182439.3190
CC (	26)		1673308.9925	182319.6484
PT (	21)	22+14.7524	1672536.3600	182490.8100
Radius:	791.3642			
Delta:	7^37'31.8520" Right			
Degree of Curvature(Arc):	7^14'24.4601"			
Length:	105.3229			
Tangent:	52.7393			
Chord:	105.2452			
Middle Ordinate:	1.7515			
External:	1.7554			
Tangent Direction:	N 4^51'55.8528" E			
Radial Direction:	S 85^08'04.1472" E			
Chord Direction:	N 8^40'41.7789" E			

Radial Direction: S 77^30'32.2951" E
Tangent Direction: N 12^29'27.7049" E

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Lexington Ave_2B_2C_2D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	( )	10+00.0000	1674375.0800	183999.1000
PC	( )	11+04.0505	1674479.1293	183998.5947
Tangent Direction:		S 89^43'18.3134" E		
Tangent Length:		104.0505		
Element: Circular				
PC	( )	11+04.0505	1674479.1293	183998.5947
PI	( )	11+31.8023	1674506.8808	183998.4599
CC	( )		1674476.5998	183477.7301
PT	( )	11+59.5017	1674534.4608	183995.3771
Radius:		520.8707		
Delta:		6^05'58.6485" Right		
Degree of Curvature(Arc):		11^00'00.0017"		
Length:		55.4511		
Tangent:		27.7518		
Chord:		55.4249		
Middle Ordinate:		0.7377		
External:		0.7388		
Tangent Direction:		S 89^43'18.3134" E		
Radial Direction:		S 0^16'41.6866" W		
Chord Direction:		S 86^40'18.9892" E		
Radial Direction:		S 6^22'40.3350" W		
Tangent Direction:		S 83^37'19.6650" E		
Element: Linear				
PT	( )	11+59.5017	1674534.4608	183995.3771
PC	( )	13+81.1245	1674754.7119	183970.7581
Tangent Direction:		S 83^37'19.6650" E		
Tangent Length:		221.6228		
Element: Circular				
PC	( )	13+81.1245	1674754.7119	183970.7581
PI	( )	14+08.0913	1674781.5119	183967.7625
CC	( )		1674812.5729	184488.4051
PT	(18)	14+35.0101	1674808.4779	183967.5505
Radius:		520.8707		
Delta:		5^55'38.7071" Left		
Degree of Curvature(Arc):		11^00'00.0017"		
Length:		53.8856		
Tangent:		26.9669		
Chord:		53.8616		
Middle Ordinate:		0.6967		
External:		0.6976		
Tangent Direction:		S 83^37'19.6650" E		
Radial Direction:		S 6^22'40.3350" W		
Chord Direction:		S 86^35'09.0185" E		
Radial Direction:		S 0^27'01.6279" W		
Tangent Direction:		S 89^32'58.3721" E		
Element: Linear				
PT	( )	14+35.0101	1674808.4779	183967.5505
POE	( )	15+66.6551	1674940.1189	183966.5155
Tangent Direction:		S 89^32'58.3721" E		
Tangent Length:		131.6451		

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Red Wheat_2B_2C
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	( )	0+00.0000	1674035.4664	182579.4555
PC	( )	0+89.7392	1674124.0790	182593.6305
Tangent Direction:		N 80^54'42.0746" E		
Tangent Length:		89.7392		
Element: Circular				
PC	( )	0+89.7392	1674124.0790	182593.6305
PI	( )	1+81.2180	1674214.4093	182608.0801
CC	( )		1674076.6920	182889.8643
PCC	( )	2+67.3229	1674281.3080	182670.4735
Radius:		300.0000		
Delta:		33^54'57.5469" Left		
Degree of Curvature(Arc):		19^05'54.9354"		
Length:		177.5837		
Tangent:		91.4787		
Chord:		175.0023		
Middle Ordinate:		13.0443		
External:		13.6373		
Tangent Direction:		N 80^54'42.0746" E		
Radial Direction:		S 9^05'17.9254" E		
Chord Direction:		N 63^57'13.3011" E		
Radial Direction:		S 43^00'15.4724" E		
Tangent Direction:		N 46^59'44.5276" E		
Element: Circular				
PCC	( )	2+67.3229	1674281.3080	182670.4735
PI	( )	3+97.7777	1674376.7099	182759.4506
CC	( )		1673723.0398	183269.0528
PRC	( )	5+26.0563	1674439.7252	182873.6764
Radius:		818.5111		
Delta:		18^06'40.8257" Left		
Degree of Curvature(Arc):		6^59'59.9998"		
Length:		258.7334		
Tangent:		130.4548		
Chord:		257.6576		
Middle Ordinate:		10.2020		
External:		10.3308		
Tangent Direction:		N 46^59'44.5276" E		
Radial Direction:		S 43^00'15.4724" E		
Chord Direction:		N 37^56'24.1148" E		
Radial Direction:		S 61^06'56.2981" E		
Tangent Direction:		N 28^53'03.7019" E		
Element: Circular				
PRC	( )	5+26.0563	1674439.7252	182873.6764
PI	( )	6+61.0768	1674504.9460	182991.8998
CC	( )		1674702.4042	182728.7633
PT	( )	7+79.8028	1674636.6871	183021.4770
Radius:		300.0000		
Delta:		48^27'43.1992" Right		
Degree of Curvature(Arc):		19^05'54.9354"		
Length:		253.7464		
Tangent:		135.0205		
Chord:		246.2499		
Middle Ordinate:		26.4305		
External:		28.9841		
Tangent Direction:		N 28^53'03.7019" E		
Radial Direction:		S 61^06'56.2981" E		
Chord Direction:		N 53^06'55.3015" E		
Radial Direction:		S 12^39'13.0989" E		
Tangent Direction:		N 77^20'46.9011" E		
Element: Linear				
PT	( )	7+79.8028	1674636.6871	183021.4770
POE	( )	8+56.5468	1674711.5672	183038.2883
Tangent Direction:		N 77^20'46.9011" E		
Tangent Length:		76.7440		

Project Name: Add 2_I-40 Mainline
Description:
Horizontal Alignment Name: I-40 Survey
Description: v3_I-40
Style: Default
Vertical Alignment Name: VA_Ultimate
Description: Final design includes Neptune
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	3440+00.0000	1618.1005
	PC	3441+75.0000	1620.9005
Tangent Grade:		1.6000	
Tangent Length:		175.0000	
Element: Parabola			
	PC	3441+75.0000	1620.9005
	PI	3443+00.0000	1622.9005
	PT	3444+25.0000	1624.5880
Length:		250.0000	
Stopping Sight Distance:		4441.6010	
Entrance Grade:		1.6000	
Exit Grade:		1.3500	
r = (g2 - g1) / L:		-0.1000	
K = l / (g2 - g1):		1000.0000	
Middle Ordinate:		-0.0781	
Element: Linear			
	PT	3444+25.0000	1624.5880
	PC	3446+25.0000	1627.2880
Tangent Grade:		1.3500	
Tangent Length:		200.0000	
Element: Parabola			
	PC	3446+25.0000	1627.2880
	PI	3447+50.0000	1628.9755
	PT	3448+75.0000	1630.9005
Length:		250.0000	
Headlight Sight Distance:		4716.8453	
Entrance Grade:		1.3500	
Exit Grade:		1.5400	
r = (g2 - g1) / L:		0.0760	
K = l / (g2 - g1):		1315.7895	
Middle Ordinate:		0.0594	
Element: Linear			
	PT	3448+75.0000	1630.9005
	PC	3449+70.0000	1632.3635
Tangent Grade:		1.5400	
Tangent Length:		95.0000	
Element: Parabola			
	PC	3449+70.0000	1632.3635
	PI	3450+75.0000	1633.9805
	PT	3451+80.0000	1636.0805
Length:		210.0000	
Headlight Sight Distance:		1704.9350	
Entrance Grade:		1.5400	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		0.2190	
K = l / (g2 - g1):		456.5225	
Middle Ordinate:		0.1207	
Element: Linear			
	PT	3451+80.0000	1636.0805
	PC	3451+83.5487	1636.1514
Tangent Grade:		2.0000	
Tangent Length:		3.5487	
Element: Parabola			
	PC	3451+83.5487	1636.1514
	PI	3458+33.5487	1649.1514
	PT	3464+83.5487	1628.3514
	HIGH	3456+83.5486	1641.1514
Length:		1300.0000	
Stopping Sight Distance:		734.5578	
Entrance Grade:		2.0000	
Exit Grade:		-3.2000	

```
      r = ( g2 - g1 ) / L:          -0.4000
      K = l / ( g2 - g1 ):         250.0000
          Middle Ordinate:          -8.4500

Element: Linear
                          PT     3464+83.5487        1628.3514
                          PC     3479+93.0000        1580.0490
              Tangent Grade:          -3.2000
             Tangent Length:       1509.4513

Element: Parabola
                          PC     3479+93.0000        1580.0490
                          PI     3487+63.0000        1555.4090
                          PT     3495+33.0000        1577.3540
                         LOW     3488+07.5454        1567.0163
                    Length:        1540.0000
  Headlight Sight Distance:         993.4034
            Entrance Grade:          -3.2000
                Exit Grade:           2.8500
      r = ( g2 - g1 ) / L:           0.3929
      K = l / ( g2 - g1 ):         254.5455
          Middle Ordinate:          11.6462

Element: Linear
                          PT     3495+33.0000        1577.3540
                          PC     3495+45.0000        1577.6960
              Tangent Grade:           2.8500
             Tangent Length:          12.0000

Element: Parabola
                          PC     3495+45.0000        1577.6960
                          PI     3503+70.0000        1601.2085
                          PT     3511+95.0000        1569.8585
                        HIGH     3502+52.1429        1587.7728
                    Length:        1650.0000
   Stopping Sight Distance:         731.7911
            Entrance Grade:           2.8500
                Exit Grade:          -3.8000
      r = ( g2 - g1 ) / L:          -0.4030
      K = l / ( g2 - g1 ):         248.1203
          Middle Ordinate:         -13.7156

Element: Linear
                          PT     3511+95.0000        1569.8585
                          PC     3516+50.0000        1552.5685
              Tangent Grade:          -3.8000
             Tangent Length:         455.0000

Element: Parabola
                          PC     3516+50.0000        1552.5685
                          PI     3518+25.0000        1545.9185
                          PT     3520+00.0000        1541.1935
                    Length:         350.0000
  Headlight Sight Distance:        1218.1193
            Entrance Grade:          -3.8000
                Exit Grade:          -2.7000
      r = ( g2 - g1 ) / L:           0.3143
      K = l / ( g2 - g1 ):         318.1818
          Middle Ordinate:           0.4813
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp A_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	1007+04.1600	1633.6269
	PI	1007+24.2600	1633.9524
Tangent Grade:		1.6194	
Tangent Length:		20.1000	
Element: Linear			
	PI	1007+24.2600	1633.9524
	PI	1007+44.3600	1634.2868
Tangent Grade:		1.6637	
Tangent Length:		20.1000	
Element: Linear			
	PI	1007+44.3600	1634.2868
	PI	1007+64.4600	1634.5570
Tangent Grade:		1.3443	
Tangent Length:		20.1000	
Element: Linear			
	PI	1007+64.4600	1634.5570
	PI	1007+84.5500	1634.8289
Tangent Grade:		1.3534	
Tangent Length:		20.0900	
Element: Linear			
	PI	1007+84.5500	1634.8289
	PI	1008+04.6400	1635.1086
Tangent Grade:		1.3922	
Tangent Length:		20.0900	
Element: Linear			
	PI	1008+04.6400	1635.1086
	PI	1008+24.7300	1635.3952
Tangent Grade:		1.4266	
Tangent Length:		20.0900	
Element: Linear			
	PI	1008+24.7300	1635.3952
	PI	1008+44.8200	1635.6879
Tangent Grade:		1.4569	
Tangent Length:		20.0900	
Element: Linear			
	PI	1008+44.8200	1635.6879
	PI	1008+64.9100	1635.9857
Tangent Grade:		1.4823	
Tangent Length:		20.0900	
Element: Linear			
	PI	1008+64.9100	1635.9857
	PI	1008+85.0000	1636.2880
Tangent Grade:		1.5047	
Tangent Length:		20.0900	
Element: Linear			
	PI	1008+85.0000	1636.2880
	PI	1009+05.0400	1636.5856
Tangent Grade:		1.4850	
Tangent Length:		20.0400	
Element: Linear			
	PI	1009+05.0400	1636.5856
	PI	1009+25.0500	1636.8856
Tangent Grade:		1.4993	
Tangent Length:		20.0100	
Element: Linear			
	PI	1009+25.0500	1636.8856
	PI	1009+45.0600	1637.2319

Tangent Grade: 1.7306
Tangent Length: 20.0100

Element: Linear
PI 1009+45.0600 1637.2319
PI 1009+65.0700 1637.5579
Tangent Grade: 1.6292
Tangent Length: 20.0100

Element: Linear
PI 1009+65.0700 1637.5579
PI 1009+85.0900 1637.8636
Tangent Grade: 1.5270
Tangent Length: 20.0200

Element: Linear
PI 1009+85.0900 1637.8636
PI 1010+05.1100 1638.1578
Tangent Grade: 1.4695
Tangent Length: 20.0200

Element: Linear
PI 1010+05.1100 1638.1578
PI 1010+25.1400 1638.5118
Tangent Grade: 1.7673
Tangent Length: 20.0300

Element: Linear
PI 1010+25.1400 1638.5118
PI 1010+45.2600 1638.7601
Tangent Grade: 1.2341
Tangent Length: 20.1200

Element: Linear
PI 1010+45.2600 1638.7601
PI 1010+65.3700 1638.9882
Tangent Grade: 1.1343
Tangent Length: 20.1100

Element: Linear
PI 1010+65.3700 1638.9882
PI 1010+85.4300 1639.2021
Tangent Grade: 1.0663
Tangent Length: 20.0600

Element: Linear
PI 1010+85.4300 1639.2021
PI 1011+05.4900 1639.3987
Tangent Grade: 0.9801
Tangent Length: 20.0600

Element: Linear
PI 1011+05.4900 1639.3987
PI 1011+25.5600 1639.5784
Tangent Grade: 0.8954
Tangent Length: 20.0700

Element: Linear
PI 1011+25.5600 1639.5784
PI 1011+45.6300 1639.7431
Tangent Grade: 0.8206
Tangent Length: 20.0700

Element: Linear
PI 1011+45.6300 1639.7431
PI 1011+65.7000 1639.8918
Tangent Grade: 0.7409
Tangent Length: 20.0700

Element: Linear
PI 1011+65.7000 1639.8918
PI 1011+85.7600 1640.0245
Tangent Grade: 0.6615
Tangent Length: 20.0600

Element: Linear
PI 1011+85.7600 1640.0245
PI 1012+05.8300 1640.1412
Tangent Grade: 0.5815

```
          Tangent Length:           20.0700

Element: Linear
                        PI      1012+05.8300         1640.1412
                        PI      1012+25.9000         1640.2419
           Tangent Grade:            0.5017
          Tangent Length:           20.0700

Element: Linear
                        PI      1012+25.9000         1640.2419
                        PI      1012+45.9600         1640.3266
           Tangent Grade:            0.4222
          Tangent Length:           20.0600

Element: Linear
                        PI      1012+45.9600         1640.3266
                        PI      1012+61.6868         1640.3991
           Tangent Grade:            0.4613
          Tangent Length:           15.7268

Element: Linear
                        PI      1012+61.6868         1640.3991
                        PC      1014+20.0000         1641.3490
           Tangent Grade:            0.6000
          Tangent Length:          158.3132

Element: Parabola
                        PC      1014+20.0000         1641.3490
                        PI      1016+95.0000         1642.9990
                        PT      1019+70.0000         1627.8740
                      HIGH      1014+74.0984         1641.5113
                   Length:          550.0000
  Stopping Sight Distance:          441.1359
          Entrance Grade:            0.6000
              Exit Grade:           -5.5000
     r = ( g2 - g1 ) / L:           -1.1091
     K = l / ( g2 - g1 ):           90.1639
         Middle Ordinate:           -4.1938

Element: Linear
                        PT      1019+70.0000         1627.8740
                        PC      1025+75.0000         1594.5990
           Tangent Grade:           -5.5000
          Tangent Length:          605.0000

Element: Parabola
                        PC      1025+75.0000         1594.5990
                        PI      1027+00.0000         1587.7240
                        PT      1028+25.0000         1585.2240
                   Length:          250.0000
 Headlight Sight Distance:          364.2857
          Entrance Grade:           -5.5000
              Exit Grade:           -2.0000
     r = ( g2 - g1 ) / L:            1.4000
     K = l / ( g2 - g1 ):           71.4286
         Middle Ordinate:            1.0938

Element: Linear
                        PT      1028+25.0000         1585.2240
                       POE      1029+24.1382         1583.2413
           Tangent Grade:           -2.0000
          Tangent Length:           99.1382
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	2008+95.1400	1630.4930
	PI	2009+15.0200	1630.8010
Tangent Grade:		1.5493	
Tangent Length:		19.8800	
Element: Linear			
	PI	2009+15.0200	1630.8010
	PI	2009+34.9030	1631.1090
Tangent Grade:		1.5491	
Tangent Length:		19.8830	
Element: Linear			
	PI	2009+34.9030	1631.1090
	PI	2009+54.7900	1631.4170
Tangent Grade:		1.5488	
Tangent Length:		19.8870	
Element: Linear			
	PI	2009+54.7900	1631.4170
	PI	2009+74.6700	1631.7261
Tangent Grade:		1.5548	
Tangent Length:		19.8800	
Element: Linear			
	PI	2009+74.6700	1631.7261
	PI	2009+94.5500	1632.0429
Tangent Grade:		1.5936	
Tangent Length:		19.8800	
Element: Linear			
	PI	2009+94.5500	1632.0429
	PI	2010+14.4400	1632.2846
Tangent Grade:		1.2152	
Tangent Length:		19.8900	
Element: Linear			
	PI	2010+14.4400	1632.2846
	PI	2010+34.2600	1632.5186
Tangent Grade:		1.1806	
Tangent Length:		19.8200	
Element: Linear			
	PI	2010+34.2600	1632.5186
	PI	2010+54.0700	1632.7978
Tangent Grade:		1.4094	
Tangent Length:		19.8100	
Element: Linear			
	PI	2010+54.0700	1632.7978
	PI	2010+73.8700	1633.1391
Tangent Grade:		1.7237	
Tangent Length:		19.8000	
Element: Linear			
	PI	2010+73.8700	1633.1391
	PI	2010+93.6700	1633.4880
Tangent Grade:		1.7621	
Tangent Length:		19.8000	
Element: Linear			
	PI	2010+93.6700	1633.4880
	PI	2011+13.4700	1633.8430
Tangent Grade:		1.7929	
Tangent Length:		19.8000	
Element: Linear			
	PI	2011+13.4700	1633.8430
	PI	2011+33.2700	1634.2041

```
            Tangent Grade:            1.8237
           Tangent Length:           19.8000

Element: Linear
                        PI      2011+33.2700         1634.2041
                        PI      2011+53.0700         1634.5714
            Tangent Grade:            1.8551
           Tangent Length:           19.8000

Element: Linear
                        PI      2011+53.0700         1634.5714
                        PI      2011+72.8800         1634.9449
            Tangent Grade:            1.8854
           Tangent Length:           19.8100

Element: Linear
                        PI      2011+72.8800         1634.9449
                        PI      2011+92.6800         1635.3137
            Tangent Grade:            1.8626
           Tangent Length:           19.8000

Element: Linear
                        PI      2011+92.6800         1635.3137
                        PI      2012+12.4900         1635.6652
            Tangent Grade:            1.7744
           Tangent Length:           19.8100

Element: Linear
                        PI      2012+12.4900         1635.6652
                        PI      2012+32.3100         1635.9980
            Tangent Grade:            1.6791
           Tangent Length:           19.8200

Element: Linear
                        PI      2012+32.3100         1635.9980
                        PI      2012+52.1300         1636.3740
            Tangent Grade:            1.8971
           Tangent Length:           19.8200

Element: Linear
                        PI      2012+52.1300         1636.3740
                        PI      2012+71.9600         1636.7609
            Tangent Grade:            1.9511
           Tangent Length:           19.8300

Element: Linear
                        PI      2012+71.9600         1636.7609
                        PI      2012+91.9000         1637.1169
            Tangent Grade:            1.7854
           Tangent Length:           19.9400

Element: Linear
                        PI      2012+91.9000         1637.1169
                        PI      2013+11.8400         1637.4673
            Tangent Grade:            1.7573
           Tangent Length:           19.9400

Element: Linear
                        PI      2013+11.8400         1637.4673
                        PI      2013+31.7700         1637.8363
            Tangent Grade:            1.8515
           Tangent Length:           19.9300

Element: Linear
                        PI      2013+31.7700         1637.8363
                        PI      2013+51.7500         1638.1517
            Tangent Grade:            1.5786
           Tangent Length:           19.9800

Element: Linear
                        PI      2013+51.7500         1638.1517
                        PI      2013+71.7900         1638.4531
            Tangent Grade:            1.5040
           Tangent Length:           20.0400

Element: Linear
                        PI      2013+71.7900         1638.4531
                        PI      2013+91.8300         1638.7401
            Tangent Grade:            1.4321
```

```
          Tangent Length:           20.0400

Element: Linear
                        PI      2013+91.8300         1638.7401
                        PI      2014+11.8800         1639.0121
           Tangent Grade:            1.3566
          Tangent Length:           20.0500

Element: Linear
                        PI      2014+11.8800         1639.0121
                        PI      2014+31.9400         1639.2654
           Tangent Grade:            1.2627
          Tangent Length:           20.0600

Element: Linear
                        PI      2014+31.9400         1639.2654
                        PI      2014+49.6841         1639.4754
           Tangent Grade:            1.1835
          Tangent Length:           17.7441

Element: Linear
                        PI      2014+49.6841         1639.4754
                        PC      2015+90.0000         1640.9487
           Tangent Grade:            1.0500
          Tangent Length:          140.3159

Element: Parabola
                        PC      2015+90.0000         1640.9487
                        PI      2018+80.0000         1643.9937
                        PT      2021+70.0000         1628.0437
                      HIGH      2016+82.9771         1641.4369
                    Length:          580.0000
  Stopping Sight Distance:          437.1689
          Entrance Grade:            1.0500
              Exit Grade:           -5.5000
     r = ( g2 - g1 ) / L:           -1.1293
     K = l / ( g2 - g1 ):           88.5496
         Middle Ordinate:           -4.7488

Element: Linear
                        PT      2021+70.0000         1628.0437
                        PC      2028+75.0000         1589.2687
           Tangent Grade:           -5.5000
          Tangent Length:          705.0000

Element: Parabola
                        PC      2028+75.0000         1589.2687
                        PI      2030+00.0000         1582.3937
                        PT      2031+25.0000         1579.8937
                    Length:          250.0000
 Headlight Sight Distance:          364.2857
          Entrance Grade:           -5.5000
              Exit Grade:           -2.0000
     r = ( g2 - g1 ) / L:            1.4000
     K = l / ( g2 - g1 ):           71.4286
         Middle Ordinate:            1.0938

Element: Linear
                        PT      2031+25.0000         1579.8937
                        PI      2031+75.8164         1578.8774
           Tangent Grade:           -2.0000
          Tangent Length:           50.8164

Element: Linear
                        PI      2031+75.8164         1578.8774
                       POE      2032+08.8164         1578.2174
           Tangent Grade:           -2.0000
          Tangent Length:           33.0000
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp C_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	3000+00.0000	1578.2635
	PC	3001+50.0000	1575.2635
Tangent Grade:		-2.0000	
Tangent Length:		150.0000	
Element: Parabola			
	PC	3001+50.0000	1575.2635
	PI	3002+50.0000	1573.2635
	PT	3003+50.0000	1573.7635
	LOW	3003+10.0000	1573.6635
Length:		200.0000	
Headlight Sight Distance:		600.0000	
Entrance Grade:		-2.0000	
Exit Grade:		0.5000	
r = (g2 - g1) / L:		1.2500	
K = l / (g2 - g1):		80.0000	
Middle Ordinate:		0.6250	
Element: Linear			
	PT	3003+50.0000	1573.7635
	PC	3007+25.0000	1575.6385
Tangent Grade:		0.5000	
Tangent Length:		375.0000	
Element: Parabola			
	PC	3007+25.0000	1575.6385
	PI	3008+50.0000	1576.2635
	PT	3009+75.0000	1573.7635
	HIGH	3007+75.0000	1575.7635
Length:		250.0000	
Stopping Sight Distance:		556.6601	
Entrance Grade:		0.5000	
Exit Grade:		-2.0000	
r = (g2 - g1) / L:		-1.0000	
K = l / (g2 - g1):		100.0000	
Middle Ordinate:		-0.7813	
Element: Linear			
	PT	3009+75.0000	1573.7635
	PI	3009+99.2341	1573.2789
Tangent Grade:		-2.0000	
Tangent Length:		24.2341	
Element: Linear			
	PI	3009+99.2341	1573.2789
	PI	3010+19.3400	1572.8482
Tangent Grade:		-2.1419	
Tangent Length:		20.1059	
Element: Linear			
	PI	3010+19.3400	1572.8482
	PI	3010+39.3000	1572.4340
Tangent Grade:		-2.0752	
Tangent Length:		19.9600	
Element: Linear			
	PI	3010+39.3000	1572.4340
	PI	3010+59.2500	1572.0313
Tangent Grade:		-2.0185	
Tangent Length:		19.9500	
Element: Linear			
	PI	3010+59.2500	1572.0313
	PI	3010+79.1800	1571.6401
Tangent Grade:		-1.9629	
Tangent Length:		19.9300	
Element: Linear			

PI 3010+79.1800 1571.6401
PI 3010+99.1000 1571.2604
Tangent Grade: -1.9061
Tangent Length: 19.9200

Element: Linear
PI 3010+99.1000 1571.2604
PI 3011+19.0000 1570.8922
Tangent Grade: -1.8503
Tangent Length: 19.9000

Element: Linear
PI 3011+19.0000 1570.8922
PI 3011+38.8900 1570.5354
Tangent Grade: -1.7939
Tangent Length: 19.8900

Element: Linear
PI 3011+38.8900 1570.5354
PI 3011+58.7700 1570.1902
Tangent Grade: -1.7364
Tangent Length: 19.8800

Element: Linear
PI 3011+58.7700 1570.1902
PI 3011+78.6500 1569.8565
Tangent Grade: -1.6786
Tangent Length: 19.8800

Element: Linear
PI 3011+78.6500 1569.8565
PI 3011+98.5200 1569.5344
Tangent Grade: -1.6210
Tangent Length: 19.8700

Element: Linear
PI 3011+98.5200 1569.5344
PI 3012+18.3900 1569.2238
Tangent Grade: -1.5632
Tangent Length: 19.8700

Element: Linear
PI 3012+18.3900 1569.2238
PI 3012+38.2600 1568.9429
Tangent Grade: -1.4137
Tangent Length: 19.8700

Element: Linear
PI 3012+38.2600 1568.9429
PI 3012+58.1300 1568.7525
Tangent Grade: -0.9582
Tangent Length: 19.8700

Element: Linear
PI 3012+58.1300 1568.7525
PI 3012+78.1000 1568.5717
Tangent Grade: -0.9054
Tangent Length: 19.9700

Element: Linear
PI 3012+78.1000 1568.5717
PI 3012+98.1000 1568.4047
Tangent Grade: -0.8350
Tangent Length: 20.0000

Element: Linear
PI 3012+98.1000 1568.4047
PI 3013+18.1000 1568.1552
Tangent Grade: -1.2475
Tangent Length: 20.0000

Element: Linear
PI 3013+18.1000 1568.1552
PI 3013+38.1000 1567.9214
Tangent Grade: -1.1690
Tangent Length: 20.0000

Element: Linear
PI 3013+38.1000 1567.9214

POE	3013+58.1000	1567.7033
Tangent Grade:	-1.0905	
Tangent Length:	20.0000	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp D_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	4000+00.0000	1582.9860
	PC	4001+25.0000	1580.4860
Tangent Grade:		-2.0000	
Tangent Length:		125.0000	
Element: Parabola			
	PC	4001+25.0000	1580.4860
	PI	4002+75.0000	1577.4860
	PT	4004+25.0000	1578.6110
	LOW	4003+43.1818	1578.3042
Length:		300.0000	
Headlight Sight Distance:		612.5000	
Entrance Grade:		-2.0000	
Exit Grade:		0.7500	
r = (g2 - g1) / L:		0.9167	
K = l / (g2 - g1):		109.0909	
Middle Ordinate:		1.0313	
Element: Linear			
	PT	4004+25.0000	1578.6110
	PC	4004+75.0000	1578.9860
Tangent Grade:		0.7500	
Tangent Length:		50.0000	
Element: Parabola			
	PC	4004+75.0000	1578.9860
	PI	4006+25.0000	1580.1110
	PT	4007+75.0000	1577.3360
	HIGH	4005+61.5385	1579.3105
Length:		300.0000	
Stopping Sight Distance:		565.0578	
Entrance Grade:		0.7500	
Exit Grade:		-1.8500	
r = (g2 - g1) / L:		-0.8667	
K = l / (g2 - g1):		115.3846	
Middle Ordinate:		-0.9750	
Element: Linear			
	PT	4007+75.0000	1577.3360
	PI	4010+33.7832	1572.5485
Tangent Grade:		-1.8500	
Tangent Length:		258.7832	
Element: Linear			
	PI	4010+33.7832	1572.5485
	PI	4010+39.3000	1572.4340
Tangent Grade:		-2.0752	
Tangent Length:		5.5168	
Element: Linear			
	PI	4010+39.3000	1572.4340
	PI	4010+59.2500	1572.0313
Tangent Grade:		-2.0185	
Tangent Length:		19.9500	
Element: Linear			
	PI	4010+59.2500	1572.0313
	PI	4010+79.1800	1571.6401
Tangent Grade:		-1.9629	
Tangent Length:		19.9300	
Element: Linear			
	PI	4010+79.1800	1571.6401
	PI	4010+99.1000	1571.2604
Tangent Grade:		-1.9061	
Tangent Length:		19.9200	
Element: Linear			

PI 4010+99.1000 1571.2604
PI 4011+19.0000 1570.8922
Tangent Grade: -1.8503
Tangent Length: 19.9000

Element: Linear
PI 4011+19.0000 1570.8922
PI 4011+38.8900 1570.5354
Tangent Grade: -1.7939
Tangent Length: 19.8900

Element: Linear
PI 4011+38.8900 1570.5354
PI 4011+58.7700 1570.1902
Tangent Grade: -1.7364
Tangent Length: 19.8800

Element: Linear
PI 4011+58.7700 1570.1902
PI 4011+78.6500 1569.8565
Tangent Grade: -1.6786
Tangent Length: 19.8800

Element: Linear
PI 4011+78.6500 1569.8565
PI 4011+98.5200 1569.5344
Tangent Grade: -1.6210
Tangent Length: 19.8700

Element: Linear
PI 4011+98.5200 1569.5344
PI 4012+18.3900 1569.2238
Tangent Grade: -1.5632
Tangent Length: 19.8700

Element: Linear
PI 4012+18.3900 1569.2238
PI 4012+38.2600 1568.9429
Tangent Grade: -1.4137
Tangent Length: 19.8700

Element: Linear
PI 4012+38.2600 1568.9429
PI 4012+58.1300 1568.7525
Tangent Grade: -0.9582
Tangent Length: 19.8700

Element: Linear
PI 4012+58.1300 1568.7525
PI 4012+78.1000 1568.5717
Tangent Grade: -0.9054
Tangent Length: 19.9700

Element: Linear
PI 4012+78.1000 1568.5717
PI 4012+98.1000 1568.4047
Tangent Grade: -0.8350
Tangent Length: 20.0000

Element: Linear
PI 4012+98.1000 1568.4047
PI 4013+18.1000 1568.1552
Tangent Grade: -1.2475
Tangent Length: 20.0000

Element: Linear
PI 4013+18.1000 1568.1552
PI 4013+38.1000 1567.9214
Tangent Grade: -1.1690
Tangent Length: 20.0000

Element: Linear
PI 4013+38.1000 1567.9214
PI 4013+58.1000 1567.7033
Tangent Grade: -1.0905
Tangent Length: 20.0000

Element: Linear
PI 4013+58.1000 1567.7033

POE	4013+78.1000	1567.5010
Tangent Grade:	-1.0115	
Tangent Length:	20.0000	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp G_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	7000+80.0457	1553.3435
	PC	7001+30.0000	1555.1918
Tangent Grade:		3.7000	
Tangent Length:		49.9543	
Element: Parabola			
	PC	7001+30.0000	1555.1918
	PI	7001+80.0000	1557.0418
	PT	7002+30.0000	1559.5418
Length:		100.0000	
Headlight Sight Distance:		355.7274	
Entrance Grade:		3.7000	
Exit Grade:		5.0000	
r = (g2 - g1) / L:		1.3000	
K = l / (g2 - g1):		76.9231	
Middle Ordinate:		0.1625	
Element: Linear			
	PT	7002+30.0000	1559.5418
	PC	7003+80.0000	1567.0418
Tangent Grade:		5.0000	
Tangent Length:		150.0000	
Element: Parabola			
	PC	7003+80.0000	1567.0418
	PI	7004+30.0000	1569.5418
	PT	7004+80.0000	1571.2668
Length:		100.0000	
Stopping Sight Distance:		746.2260	
Entrance Grade:		5.0000	
Exit Grade:		3.4500	
r = (g2 - g1) / L:		-1.5500	
K = l / (g2 - g1):		64.5161	
Middle Ordinate:		-0.1938	
Element: Linear			
	PT	7004+80.0000	1571.2668
	PI	7005+15.9271	1572.5063
Tangent Grade:		3.4500	
Tangent Length:		35.9271	
Element: Linear			
	PI	7005+15.9271	1572.5063
	PI	7005+18.3157	1572.5855
Tangent Grade:		3.3153	
Tangent Length:		2.3887	
Element: Linear			
	PI	7005+18.3157	1572.5855
	PI	7005+28.6757	1572.9289
Tangent Grade:		3.3147	
Tangent Length:		10.3600	
Element: Linear			
	PI	7005+28.6757	1572.9289
	PI	7005+38.7557	1573.2643
Tangent Grade:		3.3274	
Tangent Length:		10.0800	
Element: Linear			
	PI	7005+38.7557	1573.2643
	PI	7005+48.5057	1573.6053
Tangent Grade:		3.4974	
Tangent Length:		9.7500	
Element: Linear			
	PI	7005+48.5057	1573.6053
	PI	7005+58.1157	1573.9385

```
            Tangent Grade:            3.4672
           Tangent Length:            9.6100

Element: Linear
                       PI      7005+58.1157         1573.9385
                       PI      7005+67.6257         1574.2644
            Tangent Grade:            3.4269
           Tangent Length:            9.5100

Element: Linear
                       PI      7005+67.6257         1574.2644
                       PI      7005+77.0657         1574.5833
            Tangent Grade:            3.3782
           Tangent Length:            9.4400

Element: Linear
                       PI      7005+77.0657         1574.5833
                       PI      7005+86.4557         1574.9133
            Tangent Grade:            3.5144
           Tangent Length:            9.3900

Element: Linear
                       PI      7005+86.4557         1574.9133
                       PI      7005+95.8257         1575.2876
            Tangent Grade:            3.9947
           Tangent Length:            9.3700

Element: Linear
                       PI      7005+95.8257         1575.2876
                       PI      7006+05.1857         1575.6542
            Tangent Grade:            3.9167
           Tangent Length:            9.3600

Element: Linear
                       PI      7006+05.1857         1575.6542
                       PI      7006+14.8857         1576.0030
            Tangent Grade:            3.5959
           Tangent Length:            9.7000

Element: Linear
                       PI      7006+14.8857         1576.0030
                       PI      7006+24.8857         1576.3548
            Tangent Grade:            3.5180
           Tangent Length:           10.0000

Element: Linear
                       PI      7006+24.8857         1576.3548
                       PI      7006+34.8857         1576.7095
            Tangent Grade:            3.5470
           Tangent Length:           10.0000

Element: Linear
                       PI      7006+34.8857         1576.7095
                       PI      7006+44.8857         1577.0645
            Tangent Grade:            3.5500
           Tangent Length:           10.0000

Element: Linear
                       PI      7006+44.8857         1577.0645
                       PI      7006+54.8857         1577.4005
            Tangent Grade:            3.3600
           Tangent Length:           10.0000

Element: Linear
                       PI      7006+54.8857         1577.4005
                      POE      7006+64.8857         1577.6774
            Tangent Grade:            2.7690
           Tangent Length:           10.0000
```

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: North FR_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	100+00.0000	1577.9781
	PI	100+14.0000	1577.7784
Tangent Grade:		-1.4263	
Tangent Length:		14.0000	
Element: Linear			
	PI	100+14.0000	1577.7784
	PI	100+23.8900	1577.6254
Tangent Grade:		-1.5470	
Tangent Length:		9.8900	
Element: Linear			
	PI	100+23.8900	1577.6254
	PI	100+33.7900	1577.4624
Tangent Grade:		-1.6465	
Tangent Length:		9.9000	
Element: Linear			
	PI	100+33.7900	1577.4624
	PI	100+43.6900	1577.2893
Tangent Grade:		-1.7485	
Tangent Length:		9.9000	
Element: Linear			
	PI	100+43.6900	1577.2893
	PI	100+53.5900	1577.1062
Tangent Grade:		-1.8495	
Tangent Length:		9.9000	
Element: Linear			
	PI	100+53.5900	1577.1062
	PI	100+63.5000	1576.9141
Tangent Grade:		-1.9384	
Tangent Length:		9.9100	
Element: Linear			
	PI	100+63.5000	1576.9141
	PI	100+73.4100	1576.7195
Tangent Grade:		-1.9637	
Tangent Length:		9.9100	
Element: Linear			
	PI	100+73.4100	1576.7195
	PI	100+83.3200	1576.5235
Tangent Grade:		-1.9778	
Tangent Length:		9.9100	
Element: Linear			
	PI	100+83.3200	1576.5235
	PI	100+93.2200	1576.3265
Tangent Grade:		-1.9899	
Tangent Length:		9.9000	
Element: Linear			
	PI	100+93.2200	1576.3265
	PI	101+03.1200	1576.1292
Tangent Grade:		-1.9929	
Tangent Length:		9.9000	
Element: Linear			
	PI	101+03.1200	1576.1292
	PI	101+13.0100	1575.9315
Tangent Grade:		-1.9990	
Tangent Length:		9.8900	
Element: Linear			
	PI	101+13.0100	1575.9315
	PI	101+22.9100	1575.7335

```
            Tangent Grade:           -2.0000
           Tangent Length:            9.9000

Element: Linear
                        PI      101+22.9100         1575.7335
                        PI      101+32.8000         1575.5352
            Tangent Grade:           -2.0051
           Tangent Length:            9.8900

Element: Linear
                        PI      101+32.8000         1575.5352
                        PI      101+42.6900         1575.3365
            Tangent Grade:           -2.0091
           Tangent Length:            9.8900

Element: Linear
                        PI      101+42.6900         1575.3365
                        PI      101+52.5700         1575.1375
            Tangent Grade:           -2.0142
           Tangent Length:            9.8800

Element: Linear
                        PI      101+52.5700         1575.1375
                        PI      101+62.4600         1574.9382
            Tangent Grade:           -2.0152
           Tangent Length:            9.8900

Element: Linear
                        PI      101+62.4600         1574.9382
                        PI      101+72.3400         1574.7385
            Tangent Grade:           -2.0213
           Tangent Length:            9.8800

Element: Linear
                        PI      101+72.3400         1574.7385
                        PI      101+82.2200         1574.5386
            Tangent Grade:           -2.0233
           Tangent Length:            9.8800

Element: Linear
                        PI      101+82.2200         1574.5386
                        PI      101+92.0900         1574.3383
            Tangent Grade:           -2.0294
           Tangent Length:            9.8700

Element: Linear
                        PI      101+92.0900         1574.3383
                        PI      102+01.9700         1574.1376
            Tangent Grade:           -2.0314
           Tangent Length:            9.8800

Element: Linear
                        PI      102+01.9700         1574.1376
                        PI      102+11.8400         1573.9367
            Tangent Grade:           -2.0355
           Tangent Length:            9.8700

Element: Linear
                        PI      102+11.8400         1573.9367
                        PI      102+21.7000         1573.7354
            Tangent Grade:           -2.0416
           Tangent Length:            9.8600

Element: Linear
                        PI      102+21.7000         1573.7354
                        PI      102+31.5700         1573.5338
            Tangent Grade:           -2.0426
           Tangent Length:            9.8700

Element: Linear
                        PI      102+31.5700         1573.5338
                        PI      102+41.4300         1573.3319
            Tangent Grade:           -2.0477
           Tangent Length:            9.8600

Element: Linear
                        PI      102+41.4300         1573.3319
                        PI      102+51.2900         1573.1296
            Tangent Grade:           -2.0517
```

```
          Tangent Length:            9.8600

Element: Linear
                        PI       102+51.2900         1573.1296
                        PI       102+61.1400         1572.9271
           Tangent Grade:           -2.0558
          Tangent Length:            9.8500

Element: Linear
                        PI       102+61.1400         1572.9271
                        PI       102+71.0000         1572.7242
           Tangent Grade:           -2.0578
          Tangent Length:            9.8600

Element: Linear
                        PI       102+71.0000         1572.7242
                        PI       102+80.8400         1572.5210
           Tangent Grade:           -2.0650
          Tangent Length:            9.8400

Element: Linear
                        PI       102+80.8400         1572.5210
                        PI       102+90.6900         1572.3174
           Tangent Grade:           -2.0670
          Tangent Length:            9.8500

Element: Linear
                        PI       102+90.6900         1572.3174
                        PI       103+00.5300         1572.1136
           Tangent Grade:           -2.0711
          Tangent Length:            9.8400

Element: Linear
                        PI       103+00.5300         1572.1136
                        PI       103+10.3700         1571.9094
           Tangent Grade:           -2.0752
          Tangent Length:            9.8400

Element: Linear
                        PI       103+10.3700         1571.9094
                        PI       103+20.2100         1571.6925
           Tangent Grade:           -2.2043
          Tangent Length:            9.8400

Element: Linear
                        PI       103+20.2100         1571.6925
                        PI       103+30.0400         1571.4727
           Tangent Grade:           -2.2360
          Tangent Length:            9.8300

Element: Linear
                        PI       103+30.0400         1571.4727
                        PI       103+39.8700         1571.2526
           Tangent Grade:           -2.2391
          Tangent Length:            9.8300

Element: Linear
                        PI       103+39.8700         1571.2526
                        PI       103+49.3224         1571.0413
           Tangent Grade:           -2.2356
          Tangent Length:            9.4524

Element: Linear
                        PI       103+49.3224         1571.0413
                        PC       105+50.0000         1566.9274
           Tangent Grade:           -2.0500
          Tangent Length:          200.6776

Element: Parabola
                        PC       105+50.0000         1566.9274
                        PI       108+00.0000         1561.8024
                        PT       110+50.0000         1565.0524
                       LOW       108+55.9701         1563.7912
                    Length:          500.0000
  Headlight Sight Distance:          648.4375
          Entrance Grade:           -2.0500
              Exit Grade:            1.3000
      r = ( g2 - g1 ) / L:           0.6700
      K = l / ( g2 - g1 ):         149.2537
```

Middle Ordinate:		2.0937	

Element: Linear

	PT	110+50.0000	1565.0524
	PC	115+95.0000	1572.1374
Tangent Grade:		1.3000	
Tangent Length:		545.0000	

Element: Parabola

	PC	115+95.0000	1572.1374
	PI	117+95.0000	1574.7374
	PT	119+95.0000	1565.6374
	HIGH	116+83.8889	1572.7152
Length:		400.0000	
Stopping Sight Distance:		384.1564	
Entrance Grade:		1.3000	
Exit Grade:		-4.5500	
r = (g2 - g1) / L:		-1.4625	
K = l / (g2 - g1):		68.3761	
Middle Ordinate:		-2.9250	

Element: Linear

	PT	119+95.0000	1565.6374
	POE	120+17.4668	1564.6152
Tangent Grade:		-4.5500	
Tangent Length:		22.4668	

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: South FR_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	200+00.0000	1575.4336
	PI	200+09.2900	1575.4480
Tangent Grade:		0.1546	
Tangent Length:		9.2900	
Element: Linear			
	PI	200+09.2900	1575.4480
	PI	200+19.1600	1575.4555
Tangent Grade:		0.0760	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+19.1600	1575.4555
	PI	200+29.0300	1575.4513
Tangent Grade:		-0.0426	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+29.0300	1575.4513
	PI	200+38.9100	1575.4354
Tangent Grade:		-0.1609	
Tangent Length:		9.8800	
Element: Linear			
	PI	200+38.9100	1575.4354
	PI	200+48.7800	1575.4077
Tangent Grade:		-0.2806	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+48.7800	1575.4077
	PI	200+58.6600	1575.3687
Tangent Grade:		-0.3947	
Tangent Length:		9.8800	
Element: Linear			
	PI	200+58.6600	1575.3687
	PI	200+68.5300	1575.3189
Tangent Grade:		-0.5046	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+68.5300	1575.3189
	PI	200+78.4100	1575.2585
Tangent Grade:		-0.6113	
Tangent Length:		9.8800	
Element: Linear			
	PI	200+78.4100	1575.2585
	PI	200+88.2800	1575.1874
Tangent Grade:		-0.7204	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+88.2800	1575.1874
	PI	200+98.1500	1575.1057
Tangent Grade:		-0.8278	
Tangent Length:		9.8700	
Element: Linear			
	PI	200+98.1500	1575.1057
	PI	201+08.0200	1575.0132
Tangent Grade:		-0.9372	
Tangent Length:		9.8700	
Element: Linear			
	PI	201+08.0200	1575.0132
	PI	201+17.8900	1574.9101

```
            Tangent Grade:           -1.0446
           Tangent Length:            9.8700

Element: Linear
                        PI       201+17.8900         1574.9101
                        PI       201+27.7500         1574.7963
            Tangent Grade:           -1.1542
           Tangent Length:            9.8600

Element: Linear
                        PI       201+27.7500         1574.7963
                        PI       201+37.6200         1574.6719
            Tangent Grade:           -1.2604
           Tangent Length:            9.8700

Element: Linear
                        PI       201+37.6200         1574.6719
                        PI       201+47.4800         1574.5368
            Tangent Grade:           -1.3702
           Tangent Length:            9.8600

Element: Linear
                        PI       201+47.4800         1574.5368
                        PI       201+57.3500         1574.3910
            Tangent Grade:           -1.4772
           Tangent Length:            9.8700

Element: Linear
                        PI       201+57.3500         1574.3910
                        PI       201+67.2100         1574.2345
            Tangent Grade:           -1.5872
           Tangent Length:            9.8600

Element: Linear
                        PI       201+67.2100         1574.2345
                        PI       201+77.0700         1574.0674
            Tangent Grade:           -1.6947
           Tangent Length:            9.8600

Element: Linear
                        PI       201+77.0700         1574.0674
                        PI       201+86.9200         1573.8896
            Tangent Grade:           -1.8051
           Tangent Length:            9.8500

Element: Linear
                        PI       201+86.9200         1573.8896
                        PI       201+96.7800         1573.7011
            Tangent Grade:           -1.9118
           Tangent Length:            9.8600

Element: Linear
                        PI       201+96.7800         1573.7011
                        PI       202+06.6400         1573.5020
            Tangent Grade:           -2.0193
           Tangent Length:            9.8600

Element: Linear
                        PI       202+06.6400         1573.5020
                        PI       202+16.4930         1573.2922
            Tangent Grade:           -2.1293
           Tangent Length:            9.8530

Element: Linear
                        PI       202+16.4930         1573.2922
                        PI       202+26.3400         1573.0730
            Tangent Grade:           -2.2261
           Tangent Length:            9.8470

Element: Linear
                        PI       202+26.3400         1573.0730
                        PI       202+36.1900         1572.8519
            Tangent Grade:           -2.2447
           Tangent Length:            9.8500

Element: Linear
                        PI       202+36.1900         1572.8519
                        PI       202+46.0400         1572.6301
            Tangent Grade:           -2.2518
```

```
          Tangent Length:            9.8500

Element: Linear
                        PI       202+46.0400         1572.6301
                        PI       202+55.8800         1572.3976
           Tangent Grade:           -2.3628
          Tangent Length:            9.8400

Element: Linear
                        PI       202+55.8800         1572.3976
                        PI       202+65.7300         1572.1545
           Tangent Grade:           -2.4680
          Tangent Length:            9.8500

Element: Linear
                        PI       202+65.7300         1572.1545
                        PI       202+75.5700         1571.9308
           Tangent Grade:           -2.2734
          Tangent Length:            9.8400

Element: Linear
                        PI       202+75.5700         1571.9308
                        PI       202+85.5200         1571.6971
           Tangent Grade:           -2.3487
          Tangent Length:            9.9500

Element: Linear
                        PI       202+85.5200         1571.6971
                        PI       202+95.4700         1571.4744
           Tangent Grade:           -2.2382
          Tangent Length:            9.9500

Element: Linear
                        PI       202+95.4700         1571.4744
                        PI       203+05.4100         1571.2528
           Tangent Grade:           -2.2294
          Tangent Length:            9.9400

Element: Linear
                        PI       203+05.4100         1571.2528
                        PI       203+15.3400         1571.0323
           Tangent Grade:           -2.2205
          Tangent Length:            9.9300

Element: Linear
                        PI       203+15.3400         1571.0323
                        PI       203+25.2500         1570.8128
           Tangent Grade:           -2.2149
          Tangent Length:            9.9100

Element: Linear
                        PI       203+25.2500         1570.8128
                        PI       203+35.1600         1570.6043
           Tangent Grade:           -2.1039
          Tangent Length:            9.9100

Element: Linear
                        PI       203+35.1600         1570.6043
                        PI       203+45.0600         1570.3970
           Tangent Grade:           -2.0939
          Tangent Length:            9.9000

Element: Linear
                        PI       203+45.0600         1570.3970
                        PI       203+48.2572         1570.3335
           Tangent Grade:           -1.9858
          Tangent Length:            3.1972

Element: Linear
                        PI       203+48.2572         1570.3335
                        PC       204+25.0000         1568.5684
           Tangent Grade:           -2.3000
          Tangent Length:           76.7428

Element: Parabola
                        PC       204+25.0000         1568.5684
                        PI       205+50.0000         1565.6934
                        PT       206+75.0000         1566.0684
                       LOW       206+46.1538         1566.0252
```

Length:		250.0000	
Headlight Sight Distance:		617.6471	
Entrance Grade:		-2.3000	
Exit Grade:		0.3000	
r = (g2 - g1) / L:		1.0400	
K = l / (g2 - g1):		96.1538	
Middle Ordinate:		0.8125	

Element: Linear

PT	206+75.0000	1566.0684
PC	211+40.0000	1567.4634
Tangent Grade:	0.3000	
Tangent Length:	465.0000	

Element: Parabola

PC	211+40.0000	1567.4634
PI	212+75.0000	1567.8684
PRC	214+10.0000	1561.1184
HIGH	211+55.2830	1567.4863
Length:	270.0000	
Stopping Sight Distance:	338.6133	
Entrance Grade:	0.3000	
Exit Grade:	-5.0000	
r = (g2 - g1) / L:	-1.9630	
K = l / (g2 - g1):	50.9434	
Middle Ordinate:	-1.7888	

Element: Parabola

PRC	214+10.0000	1561.1184
PI	215+00.0000	1556.6184
PT	215+90.0000	1553.2884
Length:	180.0000	
Headlight Sight Distance:	580.0911	
Entrance Grade:	-5.0000	
Exit Grade:	-3.7000	
r = (g2 - g1) / L:	0.7222	
K = l / (g2 - g1):	138.4615	
Middle Ordinate:	0.2925	

Element: Linear

PT	215+90.0000	1553.2884
POE	215+90.5478	1553.2682
Tangent Grade:	-3.7000	
Tangent Length:	0.5478	

Project Name: Add 2_Gary Blvd
Description:
Horizontal Alignment Name: Gary Blvd_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	101+00.7450	1581.7366
	PI	101+14.4468	1581.4626
Tangent Grade:		-2.0000	
Tangent Length:		13.7019	
Element: Linear			
	PI	101+14.4468	1581.4626
	PC	107+05.0000	1578.5098
Tangent Grade:		-0.5000	
Tangent Length:		590.5532	
Element: Parabola			
	PC	107+05.0000	1578.5098
	PI	111+05.0000	1576.5098
	PT	115+05.0000	1583.7098
	LOW	108+78.9130	1578.0750
Length:		800.0000	
Headlight Sight Distance:		2036.3636	
Entrance Grade:		-0.5000	
Exit Grade:		1.8000	
r = (g2 - g1) / L:		0.2875	
K = l / (g2 - g1):		347.8261	
Middle Ordinate:		2.3000	
Element: Linear			
	PT	115+05.0000	1583.7098
	PC	117+00.0000	1587.2198
Tangent Grade:		1.8000	
Tangent Length:		195.0000	
Element: Parabola			
	PC	117+00.0000	1587.2198
	PI	118+00.0000	1589.0198
	PT	119+00.0000	1590.0198
Length:		200.0000	
Stopping Sight Distance:		1448.9378	
Entrance Grade:		1.8000	
Exit Grade:		1.0000	
r = (g2 - g1) / L:		-0.4000	
K = l / (g2 - g1):		250.0000	
Middle Ordinate:		-0.2000	
Element: Linear			
	PT	119+00.0000	1590.0198
	PC	131+19.0175	1602.2100
Tangent Grade:		1.0000	
Tangent Length:		1219.0175	
Element: Parabola			
	PC	131+19.0175	1602.2100
	PI	132+19.0175	1603.2100
	PT	133+19.0175	1603.6100
Length:		200.0000	
Stopping Sight Distance:		1898.5838	
Entrance Grade:		1.0000	
Exit Grade:		0.4000	
r = (g2 - g1) / L:		-0.3000	
K = l / (g2 - g1):		333.3333	
Middle Ordinate:		-0.1500	
Element: Linear			
	PT	133+19.0175	1603.6100
	POE	133+69.0175	1603.8100
Tangent Grade:		0.4000	
Tangent Length:		50.0000	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: 28th St_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	11+39.7700	1635.3889
	PC	14+15.0000	1648.7375
Tangent Grade:		4.8500	
Tangent Length:		275.2300	
Element: Parabola			
	PC	14+15.0000	1648.7375
	PI	16+65.0000	1660.8625
	PT	19+15.0000	1649.6125
	HIGH	16+74.3583	1655.0270
Length:		500.0000	
Stopping Sight Distance:		339.7310	
Entrance Grade:		4.8500	
Exit Grade:		-4.5000	
r = (g2 - g1) / L:		-1.8700	
K = l / (g2 - g1):		53.4759	
Middle Ordinate:		-5.8437	
Element: Linear			
	PT	19+15.0000	1649.6125
	POE	21+09.4300	1640.8632
Tangent Grade:		-4.5000	
Tangent Length:		194.4300	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Lexington Ave_2B_2C_2D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	10+00.0000	1601.1576
	PC	11+00.0000	1598.2561
Tangent Grade:		-2.9016	
Tangent Length:		100.0000	
Element: Parabola			
	PC	11+00.0000	1598.2561
	PI	11+50.0000	1596.8053
	PT	12+00.0000	1597.8053
	LOW	11+59.1969	1597.3972
Length:		100.0000	
Headlight Sight Distance:		141.2240	
Entrance Grade:		-2.9016	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		4.9016	
K = l / (g2 - g1):		20.4016	
Middle Ordinate:		0.6127	
Element: Linear			
	PT	12+00.0000	1597.8053
	PI	12+40.6625	1598.6185
Tangent Grade:		2.0000	
Tangent Length:		40.6625	
Element: Linear			
	PI	12+40.6625	1598.6185
	PC	12+77.5000	1597.8818
Tangent Grade:		-2.0000	
Tangent Length:		36.8375	
Element: Parabola			
	PC	12+77.5000	1597.8818
	PI	13+15.0000	1597.1318
	PT	13+52.5000	1595.3318
Length:		75.0000	
Stopping Sight Distance:		422.9108	
Entrance Grade:		-2.0000	
Exit Grade:		-4.8000	
r = (g2 - g1) / L:		-3.7333	
K = l / (g2 - g1):		26.7857	
Middle Ordinate:		-0.2625	
Element: Linear			
	PT	13+52.5000	1595.3318
	PC	13+62.0000	1594.8758
Tangent Grade:		-4.8000	
Tangent Length:		9.5000	
Element: Parabola			
	PC	13+62.0000	1594.8758
	PI	14+52.0000	1590.5558
	PT	15+42.0000	1592.3558
	LOW	14+89.0588	1591.8264
Length:		180.0000	
Headlight Sight Distance:		159.1690	
Entrance Grade:		-4.8000	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		3.7778	
K = l / (g2 - g1):		26.4706	
Middle Ordinate:		1.5300	
Element: Linear			
	PT	15+42.0000	1592.3558
	POE	15+50.0000	1592.5158
Tangent Grade:		2.0000	
Tangent Length:		8.0000	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Red Wheat_2B_2C
Description:
Style: Default
Vertical Alignment Name: VA_2B_2C
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	0+44.9700	1607.9750
	PC	2+50.0000	1603.8744
Tangent Grade:		-2.0000	
Tangent Length:		205.0300	
Element: Parabola			
	PC	2+50.0000	1603.8744
	PI	3+00.0000	1602.8744
	PT	3+50.0000	1600.5244
Length:		100.0000	
Stopping Sight Distance:		449.6853	
Entrance Grade:		-2.0000	
Exit Grade:		-4.7000	
r = (g2 - g1) / L:		-2.7000	
K = l / (g2 - g1):		37.0370	
Middle Ordinate:		-0.3375	
Element: Linear			
	PT	3+50.0000	1600.5244
	PC	5+00.0000	1593.4744
Tangent Grade:		-4.7000	
Tangent Length:		150.0000	
Element: Parabola			
	PC	5+00.0000	1593.4744
	PI	6+50.0000	1586.4244
	PT	8+00.0000	1587.9244
	LOW	7+47.3684	1587.6612
Length:		300.0000	
Headlight Sight Distance:		263.9657	
Entrance Grade:		-4.7000	
Exit Grade:		1.0000	
r = (g2 - g1) / L:		1.9000	
K = l / (g2 - g1):		52.6316	
Middle Ordinate:		2.1375	
Element: Linear			
	PT	8+00.0000	1587.9244
	POE	8+23.5468	1588.1598
Tangent Grade:		1.0000	
Tangent Length:		23.5468	

APPENDIX D

ALTERNATIVE 2D GEOMETRICS

Project Name: Add 2_I-40 Mainline
Description:
Horizontal Alignment Name: I-40 Survey
Description: v3_I-40
Style: Default

	STATION	EASTING	NORTHING
Element: Circular			
PC (5002)	3401+63.0000	1668517.2610	179652.5796
PI ( )	3428+22.7579	1670437.5540	181492.9020
CC (5001)		1675124.5508	172758.1723
PT (5004)	3453+51.0241	1673032.7119	182075.5400
Radius:	9549.3000		
Delta:	31^07'41.2793" Right		
Degree of Curvature(Arc):	0^35'59.9992"		
Length:	5188.0241		
Tangent:	2659.7578		
Chord:	5124.4545		
Middle Ordinate:	350.1630		
External:	363.4918		
Tangent Direction:	N 46^13'05.6199" E		
Radial Direction:	S 43^46'54.3801" E		
Chord Direction:	N 61^46'56.2589" E		
Radial Direction:	S 12^39'13.1008" E		
Tangent Direction:	N 77^20'46.8992" E		
Element: Linear			
PT (5004)	3453+51.0241	1673032.7119	182075.5400
PI (5005)	3503+41.1825	1677901.6700	183168.6680
Tangent Direction:	N 77^20'46.9011" E		
Tangent Length:	4990.1585		
Element: Linear			
PI (5005)	3503+41.1825	1677901.6700	183168.6680
PC (6)	3513+70.7030	1678906.1856	183394.1914
Tangent Direction:	N 77^20'46.9000" E		
Tangent Length:	1029.5205		
Element: Circular			
PC (6)	3513+70.7030	1678906.1856	183394.1914
PI ( )	3531+15.0638	1680608.1796	183776.3055
CC ( )		1681259.5126	172912.1162
PT ( )	3548+29.2410	1682343.6356	183600.2744
Radius:	10743.0000		
Delta:	18^26'43.6737" Right		
Degree of Curvature(Arc):	0^31'59.9926"		
Length:	3458.5380		
Tangent:	1744.3608		
Chord:	3443.6220		
Middle Ordinate:	138.8774		
External:	140.6962		
Tangent Direction:	N 77^20'46.9000" E		
Radial Direction:	S 12^39'13.1000" E		
Chord Direction:	N 86^34'08.7369" E		
Radial Direction:	S 5^47'30.5737" W		
Tangent Direction:	S 84^12'29.4263" E		

```
            Project Name: Add 2_Ramps
             Description:
Horizontal Alignment Name: Ramp A_2D
             Description:
                   Style: Default
                                        STATION       EASTING      NORTHING

Element: Linear
            POB (     196)       1000+00.0000  1672631.9493   182022.0111
             PC (     140)       1003+01.7971  1672921.4163   182107.3944
        Tangent Direction: N 73^33'56.3733" E
           Tangent Length:           301.7971

Non-collinear

Element: Circular
             PC (     140)       1003+01.7971  1672921.4163   182107.3944
             PI (         )       1003+52.6053  1672970.8698   182119.0489
             CC (       4)                     1675124.9790   172757.0232
             PT (     195)       1004+03.4126  1673020.4438   182130.1797
                   Radius:          9606.5151
                    Delta:      0^36'21.8216" Right
  Degree of Curvature(Arc):      0^35'47.1346"
                   Length:           101.6155
                  Tangent:            50.8082
                    Chord:           101.6150
            Middle Ordinate:             0.1344
                  External:             0.1344
        Tangent Direction: N 76^44'21.4906" E
         Radial Direction: S 13^15'38.5094" E
          Chord Direction: N 77^02'32.4015" E
         Radial Direction: S 12^39'16.6877" E
        Tangent Direction: N 77^20'43.3123" E

Non-collinear

Element: Linear
             PT (         )       1004+03.4126  1673020.4440   182130.1797
             PC (     142)       1012+77.3892  1673873.1936   182321.6302
        Tangent Direction: N 77^20'46.9027" E
           Tangent Length:           873.9766

Element: Circular
             PC (     142)       1012+77.3892  1673873.1936   182321.6302
             PI (         )       1013+74.8125  1673968.2507   182342.9714
             CC (     208)                     1673687.2524   183149.8404
             PT (     209)       1014+71.3870  1674056.0008   182385.2942
                   Radius:           848.8264
                    Delta:     13^05'41.4632" Left
  Degree of Curvature(Arc):      6^44'59.9998"
                   Length:           193.9978
                  Tangent:            97.4233
                    Chord:           193.5758
            Middle Ordinate:             5.5362
                  External:             5.5725
        Tangent Direction: N 77^20'46.9027" E
         Radial Direction: S 12^39'13.0973" E
          Chord Direction: N 70^47'56.1711" E
         Radial Direction: S 25^44'54.5606" E
        Tangent Direction: N 64^15'05.4394" E

Element: Linear
             PT (     209)       1014+71.3870  1674056.0008   182385.2942
             PC (     210)       1017+76.9727  1674331.2449   182518.0473
        Tangent Direction: N 64^15'05.4394" E
           Tangent Length:           305.5857

Element: Circular
             PC (     210)       1017+76.9727  1674331.2449   182518.0473
             PI (         )       1018+82.0192  1674425.8612   182563.6817
             CC (     211)                     1674829.0553   181485.9100
             PT (     220)       1019+86.4801  1674527.1976   182591.3531
                   Radius:          1145.9156
                    Delta:     10^28'31.3263" Right
  Degree of Curvature(Arc):      4^59'59.9998"
                   Length:           209.5074
                  Tangent:           105.0465
                    Chord:           209.2157
            Middle Ordinate:             4.7847
```

```
                External:              4.8047
         Tangent Direction: N 64^15'05.4394" E
          Radial Direction: S 25^44'54.5606" E
           Chord Direction: N 69^29'21.1026" E
          Radial Direction: S 15^16'23.2343" E
         Tangent Direction: N 74^43'36.7657" E

Element: Linear
              PT (     220)       1019+86.4801  1674527.1976   182591.3531
             POE (      40)       1025+13.6294  1675035.7285   182730.2150
         Tangent Direction: N 74^43'36.7657" E
            Tangent Length:           527.1493
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B_2D
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(127)	2000+00.0000	1672775.1795	181968.5524
PI	(128)	2002+98.7976	1673068.3727	182026.1522
Tangent Direction:		N 78^53'07.4332" E		
Tangent Length:		298.7976		
Element: Linear				
PI	(128)	2002+98.7976	1673068.3727	182026.1522
PC	(46)	2010+73.7975	1673824.5495	182195.9212
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		774.9999		
Element: Circular				
PC	(46)	2010+73.7975	1673824.5495	182195.9212
PI	( )	2012+22.2946	1673969.4400	182228.4505
CC	(218)		1674010.4907	181367.7110
PT	(67)	2013+67.8163	1674116.7685	182209.8578
Radius:		848.8264		
Delta:		19^50'46.5683" Right		
Degree of Curvature(Arc):		6^44'59.9989"		
Length:		294.0188		
Tangent:		148.4971		
Chord:		292.5512		
Middle Ordinate:		12.6986		
External:		12.8914		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		N 87^16'10.1849" E		
Radial Direction:		S 7^11'33.4690" W		
Tangent Direction:		S 82^48'26.5310" E		
Element: Linear				
PT	(67)	2013+67.8163	1674116.7685	182209.8578
PC	(68)	2017+37.5571	1674483.5998	182163.5642
Tangent Direction:		S 82^48'26.5310" E		
Tangent Length:		369.7408		
Element: Circular				
PC	(68)	2017+37.5571	1674483.5998	182163.5642
PI	( )	2019+38.0282	1674682.4933	182138.4641
CC	(69)		1674627.0748	183300.4624
PT	(70)	2021+34.4825	1674878.0954	182182.3786
Radius:		1145.9156		
Delta:		19^50'46.5681" Left		
Degree of Curvature(Arc):		4^59'59.9998"		
Length:		396.9254		
Tangent:		200.4711		
Chord:		394.9440		
Middle Ordinate:		17.1431		
External:		17.4035		
Tangent Direction:		S 82^48'26.5310" E		
Radial Direction:		S 7^11'33.4690" W		
Chord Direction:		N 87^16'10.1850" E		
Radial Direction:		S 12^39'13.0991" E		
Tangent Direction:		N 77^20'46.9009" E		
Element: Linear				
PT	(70)	2021+34.4825	1674878.0954	182182.3786
POE	(73)	2024+09.4917	1675146.4252	182242.6213
Tangent Direction:		N 77^20'46.9009" E		
Tangent Length:		275.0092		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp C_2D
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(101)	3000+00.0000	1675143.7965	182254.3298
PC	(102)	3000+50.6928	1675193.2581	182265.4344
Tangent Direction:		N 77^20'46.9009" E		
Tangent Length:		50.6928		
Element: Circular				
PC	(102)	3000+50.6928	1675193.2581	182265.4344
PI	( )	3001+38.0978	1675278.5402	182284.5811
CC	(107)		1675105.6354	182655.7192
PRC	(108)	3002+22.7977	1675348.0632	182337.5546
Radius:		400.0000		
Delta:		24^39'07.9223" Left		
Degree of Curvature(Arc):		14^19'26.2016"		
Length:		172.1048		
Tangent:		87.4050		
Chord:		170.7804		
Middle Ordinate:		9.2206		
External:		9.4382		
Tangent Direction:		N 77^20'46.9009" E		
Radial Direction:		S 12^39'13.0991" E		
Chord Direction:		N 65^01'12.9398" E		
Radial Direction:		S 37^18'21.0213" E		
Tangent Direction:		N 52^41'38.9787" E		
Element: Circular				
PRC	(108)	3002+22.7977	1675348.0632	182337.5546
PI	( )	3004+56.6956	1675534.1084	182479.3130
CC	(103)		1676216.1938	181198.2112
PT	(109)	3006+86.5011	1675755.5834	182554.5268
Radius:		1432.3945		
Delta:		18^32'53.2999" Right		
Degree of Curvature(Arc):		3^59'59.9999"		
Length:		463.7035		
Tangent:		233.8980		
Chord:		461.6813		
Middle Ordinate:		18.7232		
External:		18.9712		
Tangent Direction:		N 52^41'38.9787" E		
Radial Direction:		S 37^18'21.0213" E		
Chord Direction:		N 61^58'05.6286" E		
Radial Direction:		S 18^45'27.7214" E		
Tangent Direction:		N 71^14'32.2786" E		
Element: Linear				
PT	(109)	3006+86.5011	1675755.5834	182554.5268
PC	(104)	3011+70.3884	1676213.7699	182710.1289
Tangent Direction:		N 71^14'32.2786" E		
Tangent Length:		483.8873		
Element: Circular				
PC	(104)	3011+70.3884	1676213.7699	182710.1289
PI	( )	3013+74.0498	1676406.6142	182775.6196
CC	(110)		1677442.0644	179093.2872
PT	(96)	3015+77.3259	1676605.3291	182820.2330
Radius:		3819.7187		
Delta:		6^06'14.6221" Right		
Degree of Curvature(Arc):		1^29'59.9999"		
Length:		406.9375		
Tangent:		203.6614		
Chord:		406.7450		
Middle Ordinate:		5.4179		
External:		5.4256		
Tangent Direction:		N 71^14'32.2786" E		
Radial Direction:		S 18^45'27.7214" E		
Chord Direction:		N 74^17'39.5897" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT	(96)	3015+77.3259	1676605.3291	182820.2330
PI	(105)	3021+77.3259	1677190.7564	182951.6671

```
         Tangent Direction: N 77^20'46.9007" E
            Tangent Length:           600.0000

Element: Linear
              PI (     105)       3021+77.3259  1677190.7564   182951.6671
             POE (     106)       3024+77.5658  1677480.8413   183029.0926
         Tangent Direction: N 75^03'20.7046" E
            Tangent Length:           300.2399
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp D_2D
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(40)	4000+00.0000	1675035.7285	182730.2150
PC	(111)	4001+56.1781	1675189.3942	182758.1156
Tangent Direction:		N 79^42'32.7273" E		
Tangent Length:		156.1781		
Element: Circular				
PC	(111)	4001+56.1781	1675189.3942	182758.1156
PI	( )	4002+37.5549	1675269.4619	182772.6533
CC	(116)		1675317.3401	182053.4396
PRC	(117)	4003+18.2366	1675350.7501	182768.8571
Radius:		716.1972		
Delta:		12^57'52.8607" Right		
Degree of Curvature(Arc):		8^00'00.0018"		
Length:		162.0585		
Tangent:		81.3768		
Chord:		161.7130		
Middle Ordinate:		4.5789		
External:		4.6083		
Tangent Direction:		N 79^42'32.7273" E		
Radial Direction:		S 10^17'27.2727" E		
Chord Direction:		N 86^11'29.1576" E		
Radial Direction:		S 2^40'25.5880" W		
Tangent Direction:		S 87^19'34.4120" E		
Element: Circular				
PRC	(117)	4003+18.2366	1675350.7501	182768.8571
PI	( )	4005+10.2924	1675542.5969	182759.8978
CC	(112)		1675439.8436	184676.6372
PT	(118)	4007+01.0613	1675732.3862	182789.3160
Radius:		1909.8593		
Delta:		11^29'05.0647" Left		
Degree of Curvature(Arc):		3^00'00.0001"		
Length:		382.8247		
Tangent:		192.0558		
Chord:		382.1841		
Middle Ordinate:		9.5840		
External:		9.6323		
Tangent Direction:		S 87^19'34.4120" E		
Radial Direction:		S 2^40'25.5880" W		
Chord Direction:		N 86^55'53.0556" E		
Radial Direction:		S 8^48'39.4768" E		
Tangent Direction:		N 81^11'20.5232" E		
Element: Linear				
PT	(118)	4007+01.0613	1675732.3862	182789.3160
PC	(113)	4013+04.9463	1676329.1448	182881.8161
Tangent Direction:		N 81^11'20.5232" E		
Tangent Length:		603.8850		
Element: Circular				
PC	(113)	4013+04.9463	1676329.1448	182881.8161
PI	( )	4014+33.0834	1676455.7698	182901.4435
CC	(119)		1675744.0595	186656.4586
PT	(120)	4015+61.1245	1676580.7948	182929.5128
Radius:		3819.7187		
Delta:		3^50'33.6225" Left		
Degree of Curvature(Arc):		1^29'59.9999"		
Length:		256.1782		
Tangent:		128.1371		
Chord:		256.1302		
Middle Ordinate:		2.1474		
External:		2.1487		
Tangent Direction:		N 81^11'20.5232" E		
Radial Direction:		S 8^48'39.4768" E		
Chord Direction:		N 79^16'03.7120" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT	(120)	4015+61.1245	1676580.7948	182929.5128
PI	(114)	4022+50.0000	1677252.9390	183080.4156

```
        Tangent Direction: N 77^20'46.9007" E
           Tangent Length:           688.8755

Element: Linear
             PI (     114)       4022+50.0000  1677252.9390   183080.4156
            POE (     115)       4025+50.2399  1677548.2813   183134.4241
        Tangent Direction: N 79^38'13.0969" E
           Tangent Length:           300.2399
```

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: North FR_2D
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC (	29)	100+00.0000	1675730.0892	182804.1391
PI (	)	100+63.5651	1675792.9041	182813.8757
CC (	30)		1675439.8436	184676.6372
PT (	35)	101+27.0825	1675854.9254	182827.8000
Radius:		1894.8593		
Delta:		3^50'33.5579" Left		
Degree of Curvature(Arc):		3^01'25.4946"		
Length:		127.0825		
Tangent:		63.5651		
Chord:		127.0587		
Middle Ordinate:		1.0653		
External:		1.0659		
Tangent Direction:		N 81^11'20.4587" E		
Radial Direction:		S 8^48'39.5413" E		
Chord Direction:		N 79^16'03.6797" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT (	35)	101+27.0825	1675854.9254	182827.8000
PC (	31)	108+13.5461	1676524.7162	182978.1745
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		686.4636		
Element: Circular				
PC (	31)	108+13.5461	1676524.7162	182978.1745
PI (	)	110+32.1968	1676738.0563	183026.0714
CC (	36)		1676345.4158	183776.8057
PT (	37)	112+40.8694	1676899.0916	183173.9761
Radius:		818.5111		
Delta:		29^54'45.4879" Left		
Degree of Curvature(Arc):		7^00'00.0011"		
Length:		427.3233		
Tangent:		218.6507		
Chord:		422.4869		
Middle Ordinate:		27.7288		
External:		28.7011		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		N 62^23'24.1568" E		
Radial Direction:		S 42^33'58.5871" E		
Tangent Direction:		N 47^26'01.4129" E		
Element: Linear				
PT (	37)	112+40.8694	1676899.0916	183173.9761
PC (	32)	113+59.6313	1676986.5591	183254.3116
Tangent Direction:		N 47^26'01.4129" E		
Tangent Length:		118.7618		
Element: Circular				
PC (	32)	113+59.6313	1676986.5591	183254.3116
PI (	)	115+56.7565	1677131.7409	183387.6555
CC (	38)		1677540.2349	182651.4820
PT (	33)	117+46.5141	1677321.7110	183440.2835
Radius:		818.5111		
Delta:		27^04'54.4884" Right		
Degree of Curvature(Arc):		7^00'00.0011"		
Length:		386.8829		
Tangent:		197.1252		
Chord:		383.2915		
Middle Ordinate:		22.7521		
External:		23.4027		
Tangent Direction:		N 47^26'01.4129" E		
Radial Direction:		S 42^33'58.5871" E		
Chord Direction:		N 60^58'28.6571" E		
Radial Direction:		S 15^29'04.0987" E		
Tangent Direction:		N 74^30'55.9013" E		

Non-collinear

Element: Linear

PT (33)	117+46.5141	1677321.7111	183440.2835
POE (34)	118+06.5405	1677380.0077	183454.5895

Tangent Direction: N 76^12'43.2091" E
Tangent Length: 60.0263

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: South FR_2D
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC (	39)	200+00.0000	1675842.5064	182568.2048
PI (	)	201+52.7460	1675987.1396	182617.3229
CC (	40)		1676763.7272	179855.5736
PT (	44)	203+05.2031	1676136.1757	182650.7829
Radius:		2864.7890		
Delta:		6^06'14.6221" Right		
Degree of Curvature(Arc):		1^59'59.9999"		
Length:		305.2031		
Tangent:		152.7460		
Chord:		305.0588		
Middle Ordinate:		4.0634		
External:		4.0692		
Tangent Direction:		N 71^14'32.2786" E		
Radial Direction:		S 18^45'27.7214" E		
Chord Direction:		N 74^17'39.5897" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT (	44)	203+05.2031	1676136.1757	182650.7829
PC (	41)	204+24.8683	1676252.9345	182676.9964
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		119.6652		
Element: Circular				
PC (	41)	204+24.8683	1676252.9345	182676.9964
PI (	)	207+01.9958	1676523.3312	182737.7031
CC (	45)		1676462.1183	181745.2599
PT (	46)	209+64.3053	1676784.2180	182644.2274
Radius:		954.9297		
Delta:		32^21'58.3923" Right		
Degree of Curvature(Arc):		5^59'59.9991"		
Length:		539.4370		
Tangent:		277.1275		
Chord:		532.2931		
Middle Ordinate:		37.8382		
External:		39.3994		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		S 86^28'13.9031" E		
Radial Direction:		S 19^42'45.2931" W		
Tangent Direction:		S 70^17'14.7069" E		
Element: Linear				
PT (	46)	209+64.3053	1676784.2180	182644.2274
PI (	42)	209+94.6868	1676812.8191	182633.9797
Tangent Direction:		S 70^17'14.7069" E		
Tangent Length:		30.3815		
Element: Linear				
PI (	42)	209+94.6868	1676812.8191	182633.9797
POE (	43)	210+94.7371	1676908.0287	182603.2358
Tangent Direction:		S 72^06'15.7156" E		
Tangent Length:		100.0503		

Project Name: Add 2_Gary Blvd
Description:
Horizontal Alignment Name: Gary Blvd_2D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB (	27)	100+00.0000	1675207.1390	181355.9973
PC (	28)	104+68.6515	1675210.0956	181824.6395
Tangent Direction:	N 0^21'41.2877" E			
Tangent Length:	468.6515			
Element: Circular				
PC (	28)	104+68.6515	1675210.0956	181824.6395
PI (	)	105+99.3651	1675210.9202	181955.3505
CC (	31)		1674064.2024	181831.8688
PT (	32)	107+28.9537	1675182.2865	182082.8895
Radius:	1145.9160			
Delta:	13^00'54.3866" Left			
Degree of Curvature(Arc):	4^59'59.9936"			
Length:	260.3022			
Tangent:	130.7137			
Chord:	259.7430			
Middle Ordinate:	7.3832			
External:	7.4311			
Tangent Direction:	N 0^21'41.2877" E			
Radial Direction:	S 89^38'18.7123" E			
Chord Direction:	N 6^08'45.9056" W			
Radial Direction:	N 77^20'46.9011" E			
Tangent Direction:	N 12^39'13.0989" W			
Element: Linear				
PT (	32)	107+28.9537	1675182.2865	182082.8895
PC (	29)	113+40.2902	1675048.3691	182679.3779
Tangent Direction:	N 12^39'13.0989" W			
Tangent Length:	611.3365			
Element: Circular				
PC (	29)	113+40.2902	1675048.3691	182679.3779
PI (	)	115+00.4845	1675013.2775	182835.6814
CC (	33)		1673930.2850	182428.3572
PT (	34)	116+58.6158	1674936.6677	182976.3695
Radius:	1145.9160			
Delta:	15^54'58.5847" Left			
Degree of Curvature(Arc):	4^59'59.9936"			
Length:	318.3256			
Tangent:	160.1943			
Chord:	317.3030			
Middle Ordinate:	11.0358			
External:	11.1431			
Tangent Direction:	N 12^39'13.0989" W			
Radial Direction:	N 77^20'46.9011" E			
Chord Direction:	N 20^36'42.3913" W			
Radial Direction:	N 61^25'48.3164" E			
Tangent Direction:	N 28^34'11.6836" W			
Element: Linear				
PT (	34)	116+58.6158	1674936.6677	182976.3695
PC (	30)	120+50.9953	1674749.0197	183320.9706
Tangent Direction:	N 28^34'11.6836" W			
Tangent Length:	392.3795			
Element: Circular				
PC (	30)	120+50.9953	1674749.0197	183320.9706
PI (	)	123+89.8632	1674586.9627	183618.5760
CC (	35)		1675755.4024	183868.9829
PT (	36)	127+09.9512	1674612.8298	183956.4551
Radius:	1145.9160			
Delta:	32^56'52.0186" Right			
Degree of Curvature(Arc):	4^59'59.9936"			
Length:	658.9559			
Tangent:	338.8679			
Chord:	649.9141			
Middle Ordinate:	47.0409			
External:	49.0547			
Tangent Direction:	N 28^34'11.6836" W			
Radial Direction:	N 61^25'48.3164" E			
Chord Direction:	N 12^05'45.6743" W			

```
          Radial Direction: S 85^37'19.6650" E
         Tangent Direction: N  4^22'40.3350" E

Element: Linear
              PT (      36)        127+09.9512  1674612.8298   183956.4551
             POE (      56)        133+97.9449  1674665.3471   184642.4415
         Tangent Direction: N  4^22'40.3350" E
            Tangent Length:           687.9937
```

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Lexington Ave_2B_2C_2D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	( )	10+00.0000	1674375.0800	183999.1000
PC	( )	11+04.0505	1674479.1293	183998.5947
Tangent Direction:		S 89^43'18.3134" E		
Tangent Length:		104.0505		
Element: Circular				
PC	( )	11+04.0505	1674479.1293	183998.5947
PI	( )	11+31.8023	1674506.8808	183998.4599
CC	( )		1674476.5998	183477.7301
PT	( )	11+59.5017	1674534.4608	183995.3771
Radius:		520.8707		
Delta:		6^05'58.6485" Right		
Degree of Curvature(Arc):		11^00'00.0017"		
Length:		55.4511		
Tangent:		27.7518		
Chord:		55.4249		
Middle Ordinate:		0.7377		
External:		0.7388		
Tangent Direction:		S 89^43'18.3134" E		
Radial Direction:		S 0^16'41.6866" W		
Chord Direction:		S 86^40'18.9892" E		
Radial Direction:		S 6^22'40.3350" W		
Tangent Direction:		S 83^37'19.6650" E		
Element: Linear				
PT	( )	11+59.5017	1674534.4608	183995.3771
PC	( )	13+81.1245	1674754.7119	183970.7581
Tangent Direction:		S 83^37'19.6650" E		
Tangent Length:		221.6228		
Element: Circular				
PC	( )	13+81.1245	1674754.7119	183970.7581
PI	( )	14+08.0913	1674781.5119	183967.7625
CC	( )		1674812.5729	184488.4051
PT	(18)	14+35.0101	1674808.4779	183967.5505
Radius:		520.8707		
Delta:		5^55'38.7071" Left		
Degree of Curvature(Arc):		11^00'00.0017"		
Length:		53.8856		
Tangent:		26.9669		
Chord:		53.8616		
Middle Ordinate:		0.6967		
External:		0.6976		
Tangent Direction:		S 83^37'19.6650" E		
Radial Direction:		S 6^22'40.3350" W		
Chord Direction:		S 86^35'09.0185" E		
Radial Direction:		S 0^27'01.6279" W		
Tangent Direction:		S 89^32'58.3721" E		
Element: Linear				
PT	( )	14+35.0101	1674808.4779	183967.5505
POE	( )	15+66.6551	1674940.1189	183966.5155
Tangent Direction:		S 89^32'58.3721" E		
Tangent Length:		131.6451		

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Red Wheat_2D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	80	0+00.0000	1674035.4664	182579.4555
PC		0+89.7392	1674124.0790	182593.6305
Tangent Direction:		N 80^54'42.0746" E		
Tangent Length:		89.7392		
Element: Circular				
PC		0+89.7392	1674124.0790	182593.6305
PI		1+81.2180	1674214.4093	182608.0801
CC	81		1674076.6920	182889.8643
PCC		2+67.3229	1674281.3080	182670.4735
Radius:		300.0000		
Delta:		33^54'57.5469" Left		
Degree of Curvature(Arc):		19^05'54.9354"		
Length:		177.5837		
Tangent:		91.4787		
Chord:		175.0023		
Middle Ordinate:		13.0443		
External:		13.6373		
Tangent Direction:		N 80^54'42.0746" E		
Radial Direction:		S 9^05'17.9254" E		
Chord Direction:		N 63^57'13.3011" E		
Radial Direction:		S 43^00'15.4724" E		
Tangent Direction:		N 46^59'44.5276" E		
Element: Circular				
PCC		2+67.3229	1674281.3080	182670.4735
PI		5+05.1106	1674455.2027	182832.6574
CC	76		1673723.0398	183269.0528
PT	82	7+30.1583	1674515.1305	183062.7696
Radius:		818.5111		
Delta:		32^23'54.5297" Left		
Degree of Curvature(Arc):		7^00'00.0011"		
Length:		462.8354		
Tangent:		237.7877		
Chord:		456.6938		
Middle Ordinate:		32.4970		
External:		33.8406		
Tangent Direction:		N 46^59'44.5276" E		
Radial Direction:		S 43^00'15.4724" E		
Chord Direction:		N 30^47'47.2628" E		
Radial Direction:		S 75^24'10.0021" E		
Tangent Direction:		N 14^35'49.9979" E		
Element: Linear				
PT	82	7+30.1583	1674515.1305	183062.7696
PC	83	7+85.4266	1674529.0594	183116.2539
Tangent Direction:		N 14^35'49.9979" E		
Tangent Length:		55.2682		
Element: Circular				
PC	83	7+85.4266	1674529.0594	183116.2539
PI		9+18.3153	1674562.5503	183244.8532
CC	84		1674819.3758	183040.6471
PT	85	10+35.6183	1674680.2957	183306.4605
Radius:		300.0000		
Delta:		47^46'59.1651" Right		
Degree of Curvature(Arc):		19^05'54.9354"		
Length:		250.1917		
Tangent:		132.8888		
Chord:		243.0041		
Middle Ordinate:		25.7059		
External:		28.1150		
Tangent Direction:		N 14^35'49.9979" E		
Radial Direction:		S 75^24'10.0021" E		
Chord Direction:		N 38^29'19.5805" E		
Radial Direction:		S 27^37'10.8370" E		
Tangent Direction:		N 62^22'49.1630" E		
Element: Linear				
PT	85	10+35.6183	1674680.2957	183306.4605
POE	86	11+03.0801	1674740.0699	183337.7358

Tangent Direction: N 62^22'49.1630" E
Tangent Length: 67.4618

Project Name: Add 2_I-40 Mainline
Description:
Horizontal Alignment Name: I-40 Survey
Description: v3_I-40
Style: Default
Vertical Alignment Name: VA_Ultimate
Description: Final design includes Neptune
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	3440+00.0000	1618.1005
	PC	3441+75.0000	1620.9005
Tangent Grade:		1.6000	
Tangent Length:		175.0000	
Element: Parabola			
	PC	3441+75.0000	1620.9005
	PI	3443+00.0000	1622.9005
	PT	3444+25.0000	1624.5880
Length:		250.0000	
Stopping Sight Distance:		4441.6010	
Entrance Grade:		1.6000	
Exit Grade:		1.3500	
r = (g2 - g1) / L:		-0.1000	
K = l / (g2 - g1):		1000.0000	
Middle Ordinate:		-0.0781	
Element: Linear			
	PT	3444+25.0000	1624.5880
	PC	3446+25.0000	1627.2880
Tangent Grade:		1.3500	
Tangent Length:		200.0000	
Element: Parabola			
	PC	3446+25.0000	1627.2880
	PI	3447+50.0000	1628.9755
	PT	3448+75.0000	1630.9005
Length:		250.0000	
Headlight Sight Distance:		4716.8453	
Entrance Grade:		1.3500	
Exit Grade:		1.5400	
r = (g2 - g1) / L:		0.0760	
K = l / (g2 - g1):		1315.7895	
Middle Ordinate:		0.0594	
Element: Linear			
	PT	3448+75.0000	1630.9005
	PC	3449+70.0000	1632.3635
Tangent Grade:		1.5400	
Tangent Length:		95.0000	
Element: Parabola			
	PC	3449+70.0000	1632.3635
	PI	3450+75.0000	1633.9805
	PT	3451+80.0000	1636.0805
Length:		210.0000	
Headlight Sight Distance:		1704.9350	
Entrance Grade:		1.5400	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		0.2190	
K = l / (g2 - g1):		456.5225	
Middle Ordinate:		0.1207	
Element: Linear			
	PT	3451+80.0000	1636.0805
	PC	3451+83.5487	1636.1514
Tangent Grade:		2.0000	
Tangent Length:		3.5487	
Element: Parabola			
	PC	3451+83.5487	1636.1514
	PI	3458+33.5487	1649.1514
	PT	3464+83.5487	1628.3514
	HIGH	3456+83.5486	1641.1514
Length:		1300.0000	
Stopping Sight Distance:		734.5578	
Entrance Grade:		2.0000	
Exit Grade:		-3.2000	

```
      r = ( g2 - g1 ) / L:          -0.4000
      K = l / ( g2 - g1 ):         250.0000
          Middle Ordinate:          -8.4500

Element: Linear
                          PT     3464+83.5487        1628.3514
                          PC     3479+93.0000        1580.0490
              Tangent Grade:          -3.2000
             Tangent Length:       1509.4513

Element: Parabola
                          PC     3479+93.0000        1580.0490
                          PI     3487+63.0000        1555.4090
                          PT     3495+33.0000        1577.3540
                         LOW     3488+07.5454        1567.0163
                    Length:        1540.0000
  Headlight Sight Distance:         993.4034
            Entrance Grade:          -3.2000
                Exit Grade:           2.8500
      r = ( g2 - g1 ) / L:           0.3929
      K = l / ( g2 - g1 ):         254.5455
          Middle Ordinate:          11.6462

Element: Linear
                          PT     3495+33.0000        1577.3540
                          PC     3495+45.0000        1577.6960
              Tangent Grade:           2.8500
             Tangent Length:          12.0000

Element: Parabola
                          PC     3495+45.0000        1577.6960
                          PI     3503+70.0000        1601.2085
                          PT     3511+95.0000        1569.8585
                        HIGH     3502+52.1429        1587.7728
                    Length:        1650.0000
   Stopping Sight Distance:         731.7911
            Entrance Grade:           2.8500
                Exit Grade:          -3.8000
      r = ( g2 - g1 ) / L:          -0.4030
      K = l / ( g2 - g1 ):         248.1203
          Middle Ordinate:         -13.7156

Element: Linear
                          PT     3511+95.0000        1569.8585
                          PC     3516+50.0000        1552.5685
              Tangent Grade:          -3.8000
             Tangent Length:         455.0000

Element: Parabola
                          PC     3516+50.0000        1552.5685
                          PI     3518+25.0000        1545.9185
                          PT     3520+00.0000        1541.1935
                    Length:         350.0000
  Headlight Sight Distance:        1218.1193
            Entrance Grade:          -3.8000
                Exit Grade:          -2.7000
      r = ( g2 - g1 ) / L:           0.3143
      K = l / ( g2 - g1 ):         318.1818
          Middle Ordinate:           0.4813
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp A_2D
Description:
Style: Default
Vertical Alignment Name: VA_2D
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	1011+52.3900	1636.9600
	PI	1011+72.3900	1636.6200
Tangent Grade:		-1.7000	
Tangent Length:		20.0000	
Element: Linear			
	PI	1011+72.3900	1636.6200
	PI	1011+92.3900	1636.2600
Tangent Grade:		-1.8000	
Tangent Length:		20.0000	
Element: Linear			
	PI	1011+92.3900	1636.2600
	PI	1012+12.3900	1635.8900
Tangent Grade:		-1.8500	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+12.3900	1635.8900
	PI	1012+32.3900	1635.4252
Tangent Grade:		-2.3240	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+32.3900	1635.4252
	PI	1012+52.3900	1634.9152
Tangent Grade:		-2.5500	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+52.3900	1634.9152
	PI	1012+72.3900	1634.3952
Tangent Grade:		-2.6000	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+72.3900	1634.3952
	PI	1012+92.1800	1633.8595
Tangent Grade:		-2.7069	
Tangent Length:		19.7900	
Element: Linear			
	PI	1012+92.1800	1633.8595
	PI	1013+11.8900	1633.2723
Tangent Grade:		-2.9792	
Tangent Length:		19.7100	
Element: Linear			
	PI	1013+11.8900	1633.2723
	PI	1013+31.6100	1632.7608
Tangent Grade:		-2.5938	
Tangent Length:		19.7200	
Element: Linear			
	PI	1013+31.6100	1632.7608
	PI	1013+51.3400	1632.2380
Tangent Grade:		-2.6498	
Tangent Length:		19.7300	
Element: Linear			
	PI	1013+51.3400	1632.2380
	PI	1013+71.1000	1631.6858
Tangent Grade:		-2.7945	
Tangent Length:		19.7600	
Element: Linear			
	PI	1013+71.1000	1631.6858
	PI	1013+90.8900	1631.1041

```
            Tangent Grade:           -2.9394
           Tangent Length:           19.7900

Element: Linear
                        PI      1013+90.8900         1631.1041
                        PI      1014+10.7300         1630.5029
            Tangent Grade:           -3.0302
           Tangent Length:           19.8400

Element: Linear
                        PI      1014+10.7300         1630.5029
                        PI      1014+20.8364         1630.1825
            Tangent Grade:           -3.1698
           Tangent Length:           10.1064

Element: Linear
                        PI      1014+20.8364         1630.1825
                        PC      1014+35.0000         1629.7081
            Tangent Grade:           -3.3500
           Tangent Length:           14.1636

Element: Parabola
                        PC      1014+35.0000         1629.7081
                        PI      1015+50.0000         1625.8556
                        PT      1016+65.0000         1618.9556
                    Length:          230.0000
  Stopping Sight Distance:          522.2265
           Entrance Grade:           -3.3500
               Exit Grade:           -6.0000
      r = ( g2 - g1 ) / L:           -1.1522
      K = l / ( g2 - g1 ):           86.7925
          Middle Ordinate:           -0.7619

Element: Linear
                        PT      1016+65.0000         1618.9556
                        PC      1021+70.0000         1588.6556
            Tangent Grade:           -6.0000
           Tangent Length:          505.0000

Element: Parabola
                        PC      1021+70.0000         1588.6556
                        PI      1023+00.0000         1580.8556
                        PT      1024+30.0000         1578.2556
                    Length:          260.0000
 Headlight Sight Distance:          320.0004
           Entrance Grade:           -6.0000
               Exit Grade:           -2.0000
      r = ( g2 - g1 ) / L:            1.5385
      K = l / ( g2 - g1 ):           65.0001
          Middle Ordinate:            1.3000

Element: Linear
                        PT      1024+30.0000         1578.2556
                        PI      1024+80.6267         1577.2430
            Tangent Grade:           -2.0000
           Tangent Length:           50.6267

Element: Linear
                        PI      1024+80.6267         1577.2430
                       POE      1025+13.6294         1576.5830
            Tangent Grade:           -2.0000
           Tangent Length:           33.0026
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B_2D
Description:
Style: Default
Vertical Alignment Name: VA
Description: I-40 Bridges
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	2009+63.8000	1637.8900
	PI	2009+83.8000	1637.5900
Tangent Grade:		-1.5000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2009+83.8000	1637.5900
	PI	2010+03.8000	1637.2900
Tangent Grade:		-1.5000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+03.8000	1637.2900
	PI	2010+23.8000	1636.9100
Tangent Grade:		-1.9000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+23.8000	1636.9100
	PI	2010+43.8000	1636.4700
Tangent Grade:		-2.2000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+43.8000	1636.4700
	PI	2010+63.8000	1636.0100
Tangent Grade:		-2.3000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+63.8000	1636.0100
	PI	2010+83.6600	1635.5378
Tangent Grade:		-2.3776	
Tangent Length:		19.8600	
Element: Linear			
	PI	2010+83.6600	1635.5378
	PI	2011+03.3700	1635.0245
Tangent Grade:		-2.6043	
Tangent Length:		19.7100	
Element: Linear			
	PI	2011+03.3700	1635.0245
	PI	2011+23.0800	1634.5500
Tangent Grade:		-2.4074	
Tangent Length:		19.7100	
Element: Linear			
	PI	2011+23.0800	1634.5500
	PI	2011+42.8100	1634.0895
Tangent Grade:		-2.3340	
Tangent Length:		19.7300	
Element: Linear			
	PI	2011+42.8100	1634.0895
	PI	2011+62.5600	1633.6095
Tangent Grade:		-2.4304	
Tangent Length:		19.7500	
Element: Linear			
	PI	2011+62.5600	1633.6095
	PI	2011+82.3400	1633.0901
Tangent Grade:		-2.6259	
Tangent Length:		19.7800	
Element: Linear			
	PI	2011+82.3400	1633.0901
	PI	2012+02.1700	1632.5512

```
            Tangent Grade:           -2.7176
           Tangent Length:           19.8300

Element: Linear
                       PI      2012+02.1700         1632.5512
                       PI      2012+21.6785         1632.0031
            Tangent Grade:           -2.8094
           Tangent Length:           19.5085

Element: Linear
                       PI      2012+21.6785         1632.0031
                       PC      2012+25.0000         1631.9018
            Tangent Grade:           -3.0500
           Tangent Length:            3.3215

Element: Parabola
                       PC      2012+25.0000         1631.9018
                       PI      2013+75.0000         1627.3268
                       PT      2015+25.0000         1618.3268
                   Length:          300.0000
  Stopping Sight Distance:          515.8136
           Entrance Grade:           -3.0500
               Exit Grade:           -6.0000
      r = ( g2 - g1 ) / L:           -0.9833
      K = l / ( g2 - g1 ):          101.6949
          Middle Ordinate:           -1.1063

Element: Linear
                       PT      2015+25.0000         1618.3268
                       PC      2020+65.0000         1585.9268
            Tangent Grade:           -6.0000
           Tangent Length:          540.0000

Element: Parabola
                       PC      2020+65.0000         1585.9268
                       PI      2021+95.0000         1578.1268
                       PT      2023+25.0000         1575.5268
                   Length:          260.0000
 Headlight Sight Distance:          320.0000
           Entrance Grade:           -6.0000
               Exit Grade:           -2.0000
      r = ( g2 - g1 ) / L:            1.5385
      K = l / ( g2 - g1 ):           65.0000
          Middle Ordinate:            1.3000

Element: Linear
                       PT      2023+25.0000         1575.5268
                       PI      2023+76.4917         1574.4970
            Tangent Grade:           -2.0000
           Tangent Length:           51.4917

Element: Linear
                       PI      2023+76.4917         1574.4970
                      POE      2024+09.4917         1573.8370
            Tangent Grade:           -2.0000
           Tangent Length:           33.0000
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp C_2D
Description:
Style: Default
Vertical Alignment Name: VA
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	3000+00.0000	1573.7110
	PI	3000+33.0000	1573.0510
Tangent Grade:		-2.0000	
Tangent Length:		33.0000	
Element: Linear			
	PI	3000+33.0000	1573.0510
	PC	3000+75.0000	1572.2110
Tangent Grade:		-2.0000	
Tangent Length:		42.0000	
Element: Parabola			
	PC	3000+75.0000	1572.2110
	PI	3001+50.0000	1570.7110
	PT	3002+25.0000	1570.4110
Length:		150.0000	
Headlight Sight Distance:		417.8666	
Entrance Grade:		-2.0000	
Exit Grade:		-0.4000	
r = (g2 - g1) / L:		1.0667	
K = l / (g2 - g1):		93.7500	
Middle Ordinate:		0.3000	
Element: Linear			
	PT	3002+25.0000	1570.4110
	PI	3011+89.9844	1566.5511
Tangent Grade:		-0.4000	
Tangent Length:		964.9844	
Element: Linear			
	PI	3011+89.9844	1566.5511
	PI	3012+08.2000	1566.4386
Tangent Grade:		-0.6174	
Tangent Length:		18.2156	
Element: Linear			
	PI	3012+08.2000	1566.4386
	PI	3012+28.2000	1566.3455
Tangent Grade:		-0.4655	
Tangent Length:		20.0000	
Element: Linear			
	PI	3012+28.2000	1566.3455
	PI	3012+48.1900	1566.2665
Tangent Grade:		-0.3952	
Tangent Length:		19.9900	
Element: Linear			
	PI	3012+48.1900	1566.2665
	PI	3012+68.1700	1566.2011
Tangent Grade:		-0.3273	
Tangent Length:		19.9800	
Element: Linear			
	PI	3012+68.1700	1566.2011
	PI	3012+88.1400	1566.1493
Tangent Grade:		-0.2594	
Tangent Length:		19.9700	
Element: Linear			
	PI	3012+88.1400	1566.1493
	PI	3013+08.1100	1566.1111
Tangent Grade:		-0.1913	
Tangent Length:		19.9700	
Element: Linear			
	PI	3013+08.1100	1566.1111
	PI	3013+28.0700	1566.0865

```
            Tangent Grade:           -0.1232
           Tangent Length:           19.9600

Element: Linear
                       PI      3013+28.0700         1566.0865
                       PI      3013+48.0200         1566.0756
            Tangent Grade:           -0.0546
           Tangent Length:           19.9500

Element: Linear
                       PI      3013+48.0200         1566.0756
                       PI      3013+67.9700         1566.0783
            Tangent Grade:            0.0135
           Tangent Length:           19.9500

Element: Linear
                       PI      3013+67.9700         1566.0783
                       PI      3013+87.9200         1566.0946
            Tangent Grade:            0.0817
           Tangent Length:           19.9500

Element: Linear
                       PI      3013+87.9200         1566.0946
                       PI      3014+07.8600         1566.1245
            Tangent Grade:            0.1499
           Tangent Length:           19.9400

Element: Linear
                       PI      3014+07.8600         1566.1245
                       PI      3014+27.8100         1566.1680
            Tangent Grade:            0.2180
           Tangent Length:           19.9500

Element: Linear
                       PI      3014+27.8100         1566.1680
                       PI      3014+47.7400         1566.2252
            Tangent Grade:            0.2870
           Tangent Length:           19.9300

Element: Linear
                       PI      3014+47.7400         1566.2252
                       PI      3014+67.6800         1566.2960
            Tangent Grade:            0.3551
           Tangent Length:           19.9400

Element: Linear
                       PI      3014+67.6800         1566.2960
                       PI      3014+87.6200         1566.3804
            Tangent Grade:            0.4233
           Tangent Length:           19.9400

Element: Linear
                       PI      3014+87.6200         1566.3804
                       PI      3015+07.5500         1566.4768
            Tangent Grade:            0.4837
           Tangent Length:           19.9300

Element: Linear
                       PI      3015+07.5500         1566.4768
                       PI      3015+27.4900         1566.5894
            Tangent Grade:            0.5647
           Tangent Length:           19.9400

Element: Linear
                       PI      3015+27.4900         1566.5894
                       PI      3015+47.4200         1566.7164
            Tangent Grade:            0.6372
           Tangent Length:           19.9300

Element: Linear
                       PI      3015+47.4200         1566.7164
                       PI      3015+67.3600         1566.8890
            Tangent Grade:            0.8656
           Tangent Length:           19.9400

Element: Linear
                       PI      3015+67.3600         1566.8890
                       PI      3015+87.3300         1567.1024
            Tangent Grade:            1.0686
```

Tangent Length: 19.9700

Element: Linear

PI	3015+87.3300	1567.1024
PI	3016+07.3300	1567.2693

Tangent Grade: 0.8345
Tangent Length: 20.0000

Element: Linear

PI	3016+07.3300	1567.2693
PI	3016+27.3300	1567.4520

Tangent Grade: 0.9135
Tangent Length: 20.0000

Element: Linear

PI	3016+27.3300	1567.4520
PI	3016+47.3300	1567.6503

Tangent Grade: 0.9915
Tangent Length: 20.0000

Element: Linear

PI	3016+47.3300	1567.6503
PI	3016+67.3300	1567.8644

Tangent Grade: 1.0705
Tangent Length: 20.0000

Element: Linear

PI	3016+67.3300	1567.8644
POE	3016+87.3300	1568.0942

Tangent Grade: 1.1490
Tangent Length: 20.0000

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp D_2D
Description:
Style: Default
Vertical Alignment Name: VA
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	4000+00.0000	1576.5830
	PI	4000+33.1214	1575.8364
Tangent Grade:		-2.2540	
Tangent Length:		33.1214	
Element: Linear			
	PI	4000+33.1214	1575.8364
	PC	4001+50.0000	1573.4988
Tangent Grade:		-2.0000	
Tangent Length:		116.8786	
Element: Parabola			
	PC	4001+50.0000	1573.4988
	PI	4002+50.0000	1571.4988
	PRC	4003+50.0000	1572.2988
	LOW	4002+92.8571	1572.0703
Length:		200.0000	
Headlight Sight Distance:		457.1429	
Entrance Grade:		-2.0000	
Exit Grade:		0.8000	
r = (g2 - g1) / L:		1.4000	
K = l / (g2 - g1):		71.4286	
Middle Ordinate:		0.7000	
Element: Parabola			
	PRC	4003+50.0000	1572.2988
	PI	4004+95.0000	1573.4588
	PT	4006+40.0000	1572.0088
	HIGH	4004+78.8889	1572.8144
Length:		290.0000	
Stopping Sight Distance:		744.5279	
Entrance Grade:		0.8000	
Exit Grade:		-1.0000	
r = (g2 - g1) / L:		-0.6207	
K = l / (g2 - g1):		161.1111	
Middle Ordinate:		-0.6525	
Element: Linear			
	PT	4006+40.0000	1572.0088
	PI	4011+65.4297	1566.7545
Tangent Grade:		-1.0000	
Tangent Length:		525.4297	
Element: Linear			
	PI	4011+65.4297	1566.7545
	PI	4011+81.6600	1566.6507
Tangent Grade:		-0.6397	
Tangent Length:		16.2303	
Element: Linear			
	PI	4011+81.6600	1566.6507
	PI	4012+01.7100	1566.5393
Tangent Grade:		-0.5556	
Tangent Length:		20.0500	
Element: Linear			
	PI	4012+01.7100	1566.5393
	PI	4012+21.7500	1566.4422
Tangent Grade:		-0.4845	
Tangent Length:		20.0400	
Element: Linear			
	PI	4012+21.7500	1566.4422
	PI	4012+41.7900	1566.3598
Tangent Grade:		-0.4112	
Tangent Length:		20.0400	
Element: Linear			

```
                        PI      4012+41.7900         1566.3598
                        PI      4012+61.8300         1566.2943
             Tangent Grade:           -0.3268
            Tangent Length:           20.0400

Element: Linear
                        PI      4012+61.8300         1566.2943
                        PI      4012+81.8600         1566.2445
             Tangent Grade:           -0.2486
            Tangent Length:           20.0300

Element: Linear
                        PI      4012+81.8600         1566.2445
                        PI      4013+01.8800         1566.1392
             Tangent Grade:           -0.5260
            Tangent Length:           20.0200

Element: Linear
                        PI      4013+01.8800         1566.1392
                        PI      4013+21.8400         1566.0795
             Tangent Grade:           -0.2991
            Tangent Length:           19.9600

Element: Linear
                        PI      4013+21.8400         1566.0795
                        PI      4013+41.7900         1566.0764
             Tangent Grade:           -0.0155
            Tangent Length:           19.9500

Element: Linear
                        PI      4013+41.7900         1566.0764
                        PI      4013+61.7300         1566.0867
             Tangent Grade:            0.0517
            Tangent Length:           19.9400

Element: Linear
                        PI      4013+61.7300         1566.0867
                        PI      4013+81.6800         1566.1104
             Tangent Grade:            0.1188
            Tangent Length:           19.9500

Element: Linear
                        PI      4013+81.6800         1566.1104
                        PI      4014+01.6200         1566.1474
             Tangent Grade:            0.1856
            Tangent Length:           19.9400

Element: Linear
                        PI      4014+01.6200         1566.1474
                        PI      4014+21.5600         1566.1977
             Tangent Grade:            0.2523
            Tangent Length:           19.9400

Element: Linear
                        PI      4014+21.5600         1566.1977
                        PI      4014+41.5000         1566.2615
             Tangent Grade:            0.3200
            Tangent Length:           19.9400

Element: Linear
                        PI      4014+41.5000         1566.2615
                        PI      4014+61.4400         1566.3385
             Tangent Grade:            0.3862
            Tangent Length:           19.9400

Element: Linear
                        PI      4014+61.4400         1566.3385
                        PI      4014+81.3800         1566.4290
             Tangent Grade:            0.4539
            Tangent Length:           19.9400

Element: Linear
                        PI      4014+81.3800         1566.4290
                        PI      4015+01.7868         1566.5353
             Tangent Grade:            0.5209
            Tangent Length:           20.4068

Element: Linear
                        PI      4015+01.7868         1566.5353
```

	PI	4015+21.2500	1566.6520
Tangent Grade:		0.5996	
Tangent Length:		19.4632	

Element: Linear

	PI	4015+21.2500	1566.6520
	PI	4015+41.1900	1566.7840
Tangent Grade:		0.6620	
Tangent Length:		19.9400	

Element: Linear

	PI	4015+41.1900	1566.7840
	PI	4015+61.1200	1567.0128
Tangent Grade:		1.1480	
Tangent Length:		19.9300	

Element: Linear

	PI	4015+61.1200	1567.0128
	PI	4015+81.1200	1567.1839
Tangent Grade:		0.8555	
Tangent Length:		20.0000	

Element: Linear

	PI	4015+81.1200	1567.1839
	PI	4016+01.1200	1567.3587
Tangent Grade:		0.8740	
Tangent Length:		20.0000	

Element: Linear

	PI	4016+01.1200	1567.3587
	PI	4016+21.1200	1567.5492
Tangent Grade:		0.9525	
Tangent Length:		20.0000	

Element: Linear

	PI	4016+21.1200	1567.5492
	PI	4016+41.1200	1567.7554
Tangent Grade:		1.0310	
Tangent Length:		20.0000	

Element: Linear

	PI	4016+41.1200	1567.7554
	POE	4016+61.1200	1567.9773
Tangent Grade:		1.1095	
Tangent Length:		20.0000	

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: North FR_2D
Description:
Style: Default
Vertical Alignment Name: VA_2D
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	100+00.0000	1571.0994
	PI	100+08.9400	1571.0096
Tangent Grade:		-1.0045	
Tangent Length:		8.9400	
Element: Linear			
	PI	100+08.9400	1571.0096
	PI	100+18.7900	1570.9081
Tangent Grade:		-1.0305	
Tangent Length:		9.8500	
Element: Linear			
	PI	100+18.7900	1570.9081
	PI	100+28.7100	1570.8056
Tangent Grade:		-1.0333	
Tangent Length:		9.9200	
Element: Linear			
	PI	100+28.7100	1570.8056
	PI	100+38.6300	1570.7021
Tangent Grade:		-1.0433	
Tangent Length:		9.9200	
Element: Linear			
	PI	100+38.6300	1570.7021
	PI	100+48.5600	1570.5975
Tangent Grade:		-1.0534	
Tangent Length:		9.9300	
Element: Linear			
	PI	100+48.5600	1570.5975
	PI	100+58.4800	1570.4918
Tangent Grade:		-1.0655	
Tangent Length:		9.9200	
Element: Linear			
	PI	100+58.4800	1570.4918
	PI	100+68.4100	1570.3851
Tangent Grade:		-1.0745	
Tangent Length:		9.9300	
Element: Linear			
	PI	100+68.4100	1570.3851
	PI	100+78.3400	1570.2774
Tangent Grade:		-1.0846	
Tangent Length:		9.9300	
Element: Linear			
	PI	100+78.3400	1570.2774
	PI	100+88.2700	1570.1686
Tangent Grade:		-1.0957	
Tangent Length:		9.9300	
Element: Linear			
	PI	100+88.2700	1570.1686
	PI	100+98.2000	1570.0587
Tangent Grade:		-1.1067	
Tangent Length:		9.9300	
Element: Linear			
	PI	100+98.2000	1570.0587
	PI	101+08.1400	1569.9478
Tangent Grade:		-1.1157	
Tangent Length:		9.9400	
Element: Linear			
	PI	101+08.1400	1569.9478
	PI	101+18.0800	1569.8359

```
            Tangent Grade:           -1.1258
           Tangent Length:            9.9400

Element: Linear
                       PI       101+18.0800         1569.8359
                       PI       101+28.0300         1569.7229
            Tangent Grade:           -1.1357
           Tangent Length:            9.9500

Element: Linear
                       PI       101+28.0300         1569.7229
                       PI       101+38.0500         1569.6094
            Tangent Grade:           -1.1327
           Tangent Length:           10.0200

Element: Linear
                       PI       101+38.0500         1569.6094
                       PI       101+48.0800         1569.4960
            Tangent Grade:           -1.1306
           Tangent Length:           10.0300

Element: Linear
                       PI       101+48.0800         1569.4960
                       PI       101+58.1000         1569.3826
            Tangent Grade:           -1.1317
           Tangent Length:           10.0200

Element: Linear
                       PI       101+58.1000         1569.3826
                       PI       101+68.1200         1569.2691
            Tangent Grade:           -1.1327
           Tangent Length:           10.0200

Element: Linear
                       PI       101+68.1200         1569.2691
                       PI       101+78.1400         1569.1557
            Tangent Grade:           -1.1317
           Tangent Length:           10.0200

Element: Linear
                       PI       101+78.1400         1569.1557
                       PI       101+88.1700         1569.0423
            Tangent Grade:           -1.1306
           Tangent Length:           10.0300

Element: Linear
                       PI       101+88.1700         1569.0423
                       PI       101+98.1900         1568.9288
            Tangent Grade:           -1.1327
           Tangent Length:           10.0200

Element: Linear
                       PI       101+98.1900         1568.9288
                       PI       102+08.2100         1568.8154
            Tangent Grade:           -1.1317
           Tangent Length:           10.0200

Element: Linear
                       PI       102+08.2100         1568.8154
                       PI       102+18.2300         1568.7020
            Tangent Grade:           -1.1317
           Tangent Length:           10.0200

Element: Linear
                       PI       102+18.2300         1568.7020
                       PI       102+28.2600         1568.5885
            Tangent Grade:           -1.1316
           Tangent Length:           10.0300

Element: Linear
                       PI       102+28.2600         1568.5885
                       PI       102+38.2800         1568.4751
            Tangent Grade:           -1.1317
           Tangent Length:           10.0200

Element: Linear
                       PI       102+38.2800         1568.4751
                       PI       102+48.3000         1568.3617
            Tangent Grade:           -1.1317
```

```
          Tangent Length:           10.0200

Element: Linear
                        PI       102+48.3000         1568.3617
                        PI       102+58.3200         1568.2482
           Tangent Grade:           -1.1327
          Tangent Length:           10.0200

Element: Linear
                        PI       102+58.3200         1568.2482
                        PI       102+61.3434         1568.2140
           Tangent Grade:           -1.1306
          Tangent Length:            3.0234

Element: Linear
                        PI       102+61.3434         1568.2140
                        PC       105+00.0000         1565.4695
           Tangent Grade:           -1.1500
          Tangent Length:          238.6566

Element: Parabola
                        PC       105+00.0000         1565.4695
                        PI       106+50.0000         1563.7445
                        PT       108+00.0000         1565.6945
                       LOW       106+40.8163         1564.6598
                    Length:          300.0000
  Headlight Sight Distance:          810.7143
          Entrance Grade:           -1.1500
              Exit Grade:            1.3000
      r = ( g2 - g1 ) / L:           0.8167
      K = l / ( g2 - g1 ):         122.4490
          Middle Ordinate:           0.9188

Element: Linear
                        PT       108+00.0000         1565.6945
                        PC       113+45.0000         1572.7795
           Tangent Grade:            1.3000
          Tangent Length:          545.0000

Element: Parabola
                        PC       113+45.0000         1572.7795
                        PI       115+45.0000         1575.3795
                        PT       117+45.0000         1566.0795
                      HIGH       114+32.3950         1573.3475
                    Length:          400.0000
   Stopping Sight Distance:          380.9145
          Entrance Grade:            1.3000
              Exit Grade:           -4.6500
      r = ( g2 - g1 ) / L:          -1.4875
      K = l / ( g2 - g1 ):           67.2269
          Middle Ordinate:          -2.9750

Element: Linear
                        PT       117+45.0000         1566.0795
                       POE       117+46.5100         1566.0093
           Tangent Grade:           -4.6500
          Tangent Length:            1.5100
```

Project Name: Add 2_Frontage Rd
Description:
Horizontal Alignment Name: South FR_2D
Description:
Style: Default
Vertical Alignment Name: VA_2D
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	200+00.0000	1567.9172
	PI	200+06.7600	1567.8898
Tangent Grade:		-0.4053	
Tangent Length:		6.7600	
Element: Linear			
	PI	200+06.7600	1567.8898
	PI	200+16.7100	1567.8490
Tangent Grade:		-0.4101	
Tangent Length:		9.9500	
Element: Linear			
	PI	200+16.7100	1567.8490
	PI	200+26.6600	1567.8075
Tangent Grade:		-0.4171	
Tangent Length:		9.9500	
Element: Linear			
	PI	200+26.6600	1567.8075
	PI	200+36.6000	1567.7653
Tangent Grade:		-0.4245	
Tangent Length:		9.9400	
Element: Linear			
	PI	200+36.6000	1567.7653
	PI	200+46.5500	1567.7224
Tangent Grade:		-0.4312	
Tangent Length:		9.9500	
Element: Linear			
	PI	200+46.5500	1567.7224
	PI	200+56.5000	1567.6788
Tangent Grade:		-0.4382	
Tangent Length:		9.9500	
Element: Linear			
	PI	200+56.5000	1567.6788
	PI	200+66.4500	1567.6345
Tangent Grade:		-0.4452	
Tangent Length:		9.9500	
Element: Linear			
	PI	200+66.4500	1567.6345
	PI	200+76.4000	1567.5895
Tangent Grade:		-0.4523	
Tangent Length:		9.9500	
Element: Linear			
	PI	200+76.4000	1567.5895
	PI	200+86.3600	1567.5438
Tangent Grade:		-0.4588	
Tangent Length:		9.9600	
Element: Linear			
	PI	200+86.3600	1567.5438
	PI	200+96.3100	1567.4975
Tangent Grade:		-0.4653	
Tangent Length:		9.9500	
Element: Linear			
	PI	200+96.3100	1567.4975
	PI	201+06.2600	1567.4504
Tangent Grade:		-0.4734	
Tangent Length:		9.9500	
Element: Linear			
	PI	201+06.2600	1567.4504
	PI	201+16.2200	1567.4026

```
            Tangent Grade:            -0.4799
           Tangent Length:             9.9600

Element: Linear
                       PI       201+16.2200         1567.4026
                       PI       201+26.1700         1567.3541
            Tangent Grade:            -0.4874
           Tangent Length:             9.9500

Element: Linear
                       PI       201+26.1700         1567.3541
                       PI       201+36.1300         1567.3050
            Tangent Grade:            -0.4930
           Tangent Length:             9.9600

Element: Linear
                       PI       201+36.1300         1567.3050
                       PI       201+46.0900         1567.2551
            Tangent Grade:            -0.5010
           Tangent Length:             9.9600

Element: Linear
                       PI       201+46.0900         1567.2551
                       PI       201+56.0500         1567.2046
            Tangent Grade:            -0.5070
           Tangent Length:             9.9600

Element: Linear
                       PI       201+56.0500         1567.2046
                       PI       201+66.0200         1567.1533
            Tangent Grade:            -0.5145
           Tangent Length:             9.9700

Element: Linear
                       PI       201+66.0200         1567.1533
                       PI       201+75.9800         1567.1014
            Tangent Grade:            -0.5211
           Tangent Length:             9.9600

Element: Linear
                       PI       201+75.9800         1567.1014
                       PI       201+85.9500         1567.0487
            Tangent Grade:            -0.5286
           Tangent Length:             9.9700

Element: Linear
                       PI       201+85.9500         1567.0487
                       PI       201+95.9200         1566.9954
            Tangent Grade:            -0.5346
           Tangent Length:             9.9700

Element: Linear
                       PI       201+95.9200         1566.9954
                       PI       202+05.8900         1566.9413
            Tangent Grade:            -0.5426
           Tangent Length:             9.9700

Element: Linear
                       PI       202+05.8900         1566.9413
                       PI       202+14.8843         1566.8920
            Tangent Grade:            -0.5481
           Tangent Length:             8.9943

Element: Linear
                       PI       202+14.8843         1566.8920
                       PC       205+25.0000         1565.3414
            Tangent Grade:            -0.5000
           Tangent Length:           310.1157

Element: Parabola
                       PC       205+25.0000         1565.3414
                       PI       206+25.0000         1564.8414
                      PRC       207+25.0000         1566.0914
                      LOW       205+82.1429         1565.1986
                  Length:           200.0000
  Headlight Sight Distance:           492.7700
           Entrance Grade:            -0.5000
               Exit Grade:             1.2500
      r = ( g2 - g1 ) / L:             0.8750
```

K = l / (g2 - g1):		114.2857	
Middle Ordinate:		0.4375	

Element: Parabola

	PRC	207+25.0000	1566.0914
	PI	208+50.0000	1567.6539
	PT	209+75.0000	1564.2164
	HIGH	208+03.1250	1566.5797
Length:		250.0000	
Stopping Sight Distance:		394.7876	
Entrance Grade:		1.2500	
Exit Grade:		-2.7500	
r = (g2 - g1) / L:		-1.6000	
K = l / (g2 - g1):		62.5000	
Middle Ordinate:		-1.2500	

Element: Linear

	PT	209+75.0000	1564.2164
	POE	209+94.6900	1563.6749
Tangent Grade:		-2.7500	
Tangent Length:		19.6900	

```
            Project Name: Add 2_Gary Blvd
             Description:
Horizontal Alignment Name: Gary Blvd_2D_9A_9B
             Description:
                   Style: Default
  Vertical Alignment Name: VA_2D
             Description: Gary Under
                   Style: Default
                                      STATION         ELEVATION

Element: Linear
                        POB       100+07.7281         1581.5560
                         PI       100+18.0525         1581.3496
            Tangent Grade:            -2.0000
           Tangent Length:            10.3244

Element: Linear
                         PI       100+18.0525         1581.3496
                         PC       104+75.0000         1577.9224
            Tangent Grade:            -0.7500
           Tangent Length:           456.9475

Element: Parabola
                         PC       104+75.0000         1577.9224
                         PI       105+75.0000         1577.1724
                         PT       106+75.0000         1576.1224
                   Length:           200.0000
   Stopping Sight Distance:          3697.1675
            Entrance Grade:            -0.7500
                Exit Grade:            -1.0500
      r = ( g2 - g1 ) / L:            -0.1500
      K = l / ( g2 - g1 ):           666.6667
          Middle Ordinate:            -0.0750

Element: Linear
                         PT       106+75.0000         1576.1224
                         PC       110+50.0000         1572.1849
            Tangent Grade:            -1.0500
           Tangent Length:           375.0000

Element: Parabola
                         PC       110+50.0000         1572.1849
                         PI       112+00.0000         1570.6099
                         PT       113+50.0000         1575.2599
                        LOW       111+25.9036         1571.7865
                   Length:           300.0000
  Headlight Sight Distance:           342.7083
            Entrance Grade:            -1.0500
                Exit Grade:             3.1000
      r = ( g2 - g1 ) / L:             1.3833
      K = l / ( g2 - g1 ):            72.2892
          Middle Ordinate:             1.5563

Element: Linear
                         PT       113+50.0000         1575.2599
                         PC       116+75.0000         1585.3349
            Tangent Grade:             3.1000
           Tangent Length:           325.0000

Element: Parabola
                         PC       116+75.0000         1585.3349
                         PI       118+00.0000         1589.2099
                         PT       119+25.0000         1590.4599
                   Length:           250.0000
   Stopping Sight Distance:           638.8811
            Entrance Grade:             3.1000
                Exit Grade:             1.0000
      r = ( g2 - g1 ) / L:            -0.8400
      K = l / ( g2 - g1 ):           119.0476
          Middle Ordinate:            -0.6563

Element: Linear
                         PT       119+25.0000         1590.4599
                         PC       131+00.0000         1602.2099
            Tangent Grade:             1.0000
           Tangent Length:          1175.0000

Element: Parabola
                         PC       131+00.0000         1602.2099
```

	PI	132+00.0000	1603.2099
	PT	133+00.0000	1603.6099
Length:		200.0000	
Stopping Sight Distance:		1898.5838	
Entrance Grade:		1.0000	
Exit Grade:		0.4000	
r = (g2 - g1) / L:		-0.3000	
K = l / (g2 - g1):		333.3333	
Middle Ordinate:		-0.1500	

Element: Linear

	PT	133+00.0000	1603.6099
	POE	133+50.0000	1603.8099
Tangent Grade:		0.4000	
Tangent Length:		50.0000	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Lexington Ave_2B_2C_2D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	10+00.0000	1601.1576
	PC	11+00.0000	1598.2561
Tangent Grade:		-2.9016	
Tangent Length:		100.0000	
Element: Parabola			
	PC	11+00.0000	1598.2561
	PI	11+50.0000	1596.8053
	PT	12+00.0000	1597.8053
	LOW	11+59.1969	1597.3972
Length:		100.0000	
Headlight Sight Distance:		141.2240	
Entrance Grade:		-2.9016	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		4.9016	
K = l / (g2 - g1):		20.4016	
Middle Ordinate:		0.6127	
Element: Linear			
	PT	12+00.0000	1597.8053
	PI	12+40.6625	1598.6185
Tangent Grade:		2.0000	
Tangent Length:		40.6625	
Element: Linear			
	PI	12+40.6625	1598.6185
	PC	12+77.5000	1597.8818
Tangent Grade:		-2.0000	
Tangent Length:		36.8375	
Element: Parabola			
	PC	12+77.5000	1597.8818
	PI	13+15.0000	1597.1318
	PT	13+52.5000	1595.3318
Length:		75.0000	
Stopping Sight Distance:		422.9108	
Entrance Grade:		-2.0000	
Exit Grade:		-4.8000	
r = (g2 - g1) / L:		-3.7333	
K = l / (g2 - g1):		26.7857	
Middle Ordinate:		-0.2625	
Element: Linear			
	PT	13+52.5000	1595.3318
	PC	13+62.0000	1594.8758
Tangent Grade:		-4.8000	
Tangent Length:		9.5000	
Element: Parabola			
	PC	13+62.0000	1594.8758
	PI	14+52.0000	1590.5558
	PT	15+42.0000	1592.3558
	LOW	14+89.0588	1591.8264
Length:		180.0000	
Headlight Sight Distance:		159.1690	
Entrance Grade:		-4.8000	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		3.7778	
K = l / (g2 - g1):		26.4706	
Middle Ordinate:		1.5300	
Element: Linear			
	PT	15+42.0000	1592.3558
	POE	15+50.0000	1592.5158
Tangent Grade:		2.0000	
Tangent Length:		8.0000	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Red Wheat_2D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_2D
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	0+44.9700	1606.3212
	PC	2+50.0000	1604.1683
Tangent Grade:		-1.0500	
Tangent Length:		205.0300	
Element: Parabola			
	PC	2+50.0000	1604.1683
	PI	3+00.0000	1603.6433
	PT	3+50.0000	1601.9183
Length:		100.0000	
Stopping Sight Distance:		499.6459	
Entrance Grade:		-1.0500	
Exit Grade:		-3.4500	
r = (g2 - g1) / L:		-2.4000	
K = l / (g2 - g1):		41.6667	
Middle Ordinate:		-0.3000	
Element: Linear			
	PT	3+50.0000	1601.9183
	PC	5+60.0000	1594.6733
Tangent Grade:		-3.4500	
Tangent Length:		210.0000	
Element: Parabola			
	PC	5+60.0000	1594.6733
	PI	8+10.0000	1586.0483
	PT	10+60.0000	1591.0483
	LOW	8+76.5138	1589.2135
Length:		500.0000	
Headlight Sight Distance:		410.4978	
Entrance Grade:		-3.4500	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		1.0900	
K = l / (g2 - g1):		91.7431	
Middle Ordinate:		3.4062	
Element: Linear			
	PT	10+60.0000	1591.0483
	POE	10+70.0801	1591.2499
Tangent Grade:		2.0000	
Tangent Length:		10.0801	

APPENDIX E

ALTERNATIVE 9A GEOMETRICS

Project Name: Add 2_I-40 Mainline
Description:
Horizontal Alignment Name: I-40 Survey
Description: v3_I-40
Style: Default

	STATION	EASTING	NORTHING
Element: Circular			
PC (5002)	3401+63.0000	1668517.2610	179652.5796
PI ( )	3428+22.7579	1670437.5540	181492.9020
CC (5001)		1675124.5508	172758.1723
PT (5004)	3453+51.0241	1673032.7119	182075.5400
Radius:	9549.3000		
Delta:	31^07'41.2793" Right		
Degree of Curvature(Arc):	0^35'59.9992"		
Length:	5188.0241		
Tangent:	2659.7578		
Chord:	5124.4545		
Middle Ordinate:	350.1630		
External:	363.4918		
Tangent Direction:	N 46^13'05.6199" E		
Radial Direction:	S 43^46'54.3801" E		
Chord Direction:	N 61^46'56.2589" E		
Radial Direction:	S 12^39'13.1008" E		
Tangent Direction:	N 77^20'46.8992" E		
Element: Linear			
PT (5004)	3453+51.0241	1673032.7119	182075.5400
PI (5005)	3503+41.1825	1677901.6700	183168.6680
Tangent Direction:	N 77^20'46.9011" E		
Tangent Length:	4990.1585		
Element: Linear			
PI (5005)	3503+41.1825	1677901.6700	183168.6680
PC (6)	3513+70.7030	1678906.1856	183394.1914
Tangent Direction:	N 77^20'46.9000" E		
Tangent Length:	1029.5205		
Element: Circular			
PC (6)	3513+70.7030	1678906.1856	183394.1914
PI ( )	3531+15.0638	1680608.1796	183776.3055
CC ( )		1681259.5126	172912.1162
PT ( )	3548+29.2410	1682343.6356	183600.2744
Radius:	10743.0000		
Delta:	18^26'43.6737" Right		
Degree of Curvature(Arc):	0^31'59.9926"		
Length:	3458.5380		
Tangent:	1744.3608		
Chord:	3443.6220		
Middle Ordinate:	138.8774		
External:	140.6962		
Tangent Direction:	N 77^20'46.9000" E		
Radial Direction:	S 12^39'13.1000" E		
Chord Direction:	N 86^34'08.7369" E		
Radial Direction:	S 5^47'30.5737" W		
Tangent Direction:	S 84^12'29.4263" E		

```
            Project Name: Add 2_Ramps
             Description:
Horizontal Alignment Name: Ramp A_9A_9B
             Description:
                   Style: Default
                                        STATION       EASTING      NORTHING

Element: Linear
               POB (     139)       1000+00.0000  1672631.9563   182021.9871
                PC (     140)       1003+01.7970  1672921.4163   182107.3944
          Tangent Direction: N 73^33'39.2870" E
             Tangent Length:           301.7970

Non-collinear

Element: Circular
                PC (     140)       1003+01.7970  1672921.4163   182107.3944
                PI (         )       1003+52.6053  1672970.8698   182119.0489
                CC (       4)                     1675124.9790   172757.0232
                PT (     195)       1004+03.4126  1673020.4438   182130.1797
                      Radius:          9606.5151
                       Delta:      0^36'21.8216" Right
    Degree of Curvature(Arc):      0^35'47.1346"
                      Length:           101.6155
                     Tangent:            50.8082
                       Chord:           101.6150
            Middle Ordinate:             0.1344
                    External:             0.1344
          Tangent Direction: N 76^44'21.4906" E
           Radial Direction: S 13^15'38.5094" E
            Chord Direction: N 77^02'32.4015" E
           Radial Direction: S 12^39'16.6877" E
          Tangent Direction: N 77^20'43.3123" E

Non-coincident

Element: Linear
                PT (     212)       1004+03.4126  1673021.4547   182130.4066
                PC (     213)       1012+76.3532  1673873.1935   182321.6302
          Tangent Direction: N 77^20'46.9007" E
             Tangent Length:           872.9406

Element: Circular
                PC (     213)       1012+76.3532  1673873.1935   182321.6302
                PI (         )       1016+21.5923  1674210.0475   182397.2571
                CC (     214)                     1673687.2523   183149.8404
                PT (     215)       1019+32.1404  1674398.4859   182686.5338
                      Radius:           848.8264
                       Delta:     44^15'56.2835" Left
    Degree of Curvature(Arc):      6^44'59.9989"
                      Length:           655.7872
                     Tangent:           345.2391
                       Chord:           639.5990
            Middle Ordinate:            62.5475
                    External:            67.5231
          Tangent Direction: N 77^20'46.9007" E
           Radial Direction: S 12^39'13.0993" E
            Chord Direction: N 55^12'48.7590" E
           Radial Direction: S 56^55'09.3828" E
          Tangent Direction: N 33^04'50.6172" E

Element: Linear
                PT (     215)       1019+32.1404  1674398.4859   182686.5338
                PC (     216)       1022+18.6920  1674554.8916   182926.6361
          Tangent Direction: N 33^04'50.6172" E
             Tangent Length:           286.5516

Non-coincident

Element: Circular
                PC (     161)       1022+18.6920  1674554.9188   182926.6780
                PI (         )       1023+07.0910  1674603.1688   183000.7477
                CC (     163)                     1674848.1847   182735.6409
                PT (     147)       1023+91.8683  1674680.8039   183043.0229
                      Radius:           350.0000
                       Delta:     28^20'57.6992" Right
    Degree of Curvature(Arc):     16^22'12.8018"
                      Length:           173.1764
                     Tangent:            88.3991
```

Chord:	171.4153
Middle Ordinate:	10.6562
External:	10.9909
Tangent Direction:	N 33^04'50.6172" E
Radial Direction:	S 56^55'09.3828" E
Chord Direction:	N 47^15'19.4668" E
Radial Direction:	S 28^34'11.6836" E
Tangent Direction:	N 61^25'48.3164" E

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp A-D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(149)	100+00.0000	1674689.8903	183026.3364
POE	(150)	101+92.8326	1674859.2425	183118.5549

Tangent Direction: N 61^25'48.3164" E
Tangent Length: 192.8326

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(127)	2000+00.0000	1672775.1795	181968.5524
PI	(128)	2002+98.7976	1673068.3727	182026.1522
Tangent Direction:		N 78^53'07.4332" E		
Tangent Length:		298.7976		
Element: Linear				
PI	(128)	2002+98.7976	1673068.3727	182026.1522
PC	(217)	2010+73.7974	1673824.5494	182195.9212
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		774.9998		
Element: Circular				
PC	(217)	2010+73.7974	1673824.5494	182195.9212
PI	( )	2014+37.0022	1674178.9327	182275.4836
CC	(218)		1674010.4906	181367.7110
PT	(219)	2017+60.1862	1674481.1811	182074.0796
Radius:		848.8264		
Delta:		46^19'52.4803" Right		
Degree of Curvature(Arc):		6^44'59.9989"		
Length:		686.3888		
Tangent:		363.2048		
Chord:		667.8402		
Middle Ordinate:		68.4396		
External:		74.4417		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		S 79^29'16.8591" E		
Radial Direction:		S 33^40'39.3810" W		
Tangent Direction:		S 56^19'20.6190" E		
Element: Linear				
PT	(219)	2017+60.1862	1674481.1811	182074.0796
POE	(130)	2020+17.5171	1674695.3244	181931.3847
Tangent Direction:		S 56^19'20.6190" E		
Tangent Length:		257.3308		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B-C_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC	(153)	200+00.0000	1674705.8602	181947.1960
PI	( )	200+94.4007	1674784.4177	181894.8490
CC	(125)		1674855.0259	182171.0499
PT	(157)	201+81.5776	1674878.4595	181903.0726
Radius:		269.0000		
Delta:		38^40'30.7114" Left		
Degree of Curvature(Arc):		21^17'58.3666"		
Length:		181.5776		
Tangent:		94.4007		
Chord:		178.1499		
Middle Ordinate:		15.1759		
External:		16.0833		
Tangent Direction:		S 56^19'20.6190" E		
Radial Direction:		S 33^40'39.3810" W		
Chord Direction:		S 75^39'35.9747" E		
Radial Direction:		S 4^59'51.3305" E		
Tangent Direction:		N 85^00'08.6695" E		
Element: Linear				
PT	(157)	201+81.5776	1674878.4595	181903.0726
POE	(158)	205+10.1291	1675205.7620	181931.6940
Tangent Direction:		N 85^00'08.6695" E		
Tangent Length:		328.5515		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp C_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC (	164)	3000+00.0000	1674716.3961	181963.0072
PI (	)	3001+09.9942	1674624.8621	182024.0011
CC (	125)		1674855.0259	182171.0499
PCC (	126)	3002+07.2438	1674607.9859	182132.6930
Radius:		250.0000		
Delta:		47^29'48.4042" Right		
Degree of Curvature(Arc):		22^55'05.9225"		
Length:		207.2438		
Tangent:		109.9942		
Chord:		201.3605		
Middle Ordinate:		21.1693		
External:		23.1277		
Tangent Direction:		N 56^19'20.6190" W		
Radial Direction:		N 33^40'39.3810" E		
Chord Direction:		N 32^34'26.4169" W		
Radial Direction:		N 81^10'27.7851" E		
Tangent Direction:		N 8^49'32.2149" W		
Element: Circular				
PCC (	126)	3002+07.2438	1674607.9859	182132.6930
PI (	)	3004+41.0750	1674572.1098	182363.7557
CC (	125)		1674855.0259	182171.0499
PT (	123)	3005+83.2400	1674800.2617	182414.9780
Radius:		250.0000		
Delta:		86^10'19.1156" Right		
Degree of Curvature(Arc):		22^55'05.9225"		
Length:		375.9962		
Tangent:		233.8312		
Chord:		341.5476		
Middle Ordinate:		67.4177		
External:		92.3113		
Tangent Direction:		N 8^49'32.2149" W		
Radial Direction:		N 81^10'27.7851" E		
Chord Direction:		N 34^15'37.3429" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT (	123)	3005+83.2400	1674800.2617	182414.9780
POE (	167)	3014+33.2400	1675629.6170	182601.1762
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		850.0000		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC (	134)	4000+00.0000	1674698.9767	183009.6500
PI (	)	4002+17.4821	1674507.9765	182905.6434
CC (	137)		1674818.5344	182790.0914
PCC (	138)	4003+57.9752	1674584.5376	182702.0829
Radius:		250.0000		
Delta:		82^02'30.7078" Left		
Degree of Curvature(Arc):		22^55'05.9225"		
Length:		357.9752		
Tangent:		217.4821		
Chord:		328.1674		
Middle Ordinate:		61.3825		
External:		81.3585		
Tangent Direction:		S 61^25'48.3164" W		
Radial Direction:		N 28^34'11.6836" W		
Chord Direction:		S 20^24'32.9625" W		
Radial Direction:		S 69^23'17.6086" W		
Tangent Direction:		S 20^36'42.3914" E		
Element: Circular				
PCC (	138)	4003+57.9752	1674584.5376	182702.0829
PI (	)	4005+75.4572	1674661.0987	182498.5225
CC (	137)		1674818.5344	182790.0914
PT (	135)	4007+15.9503	1674873.2986	182546.1634
Radius:		250.0000		
Delta:		82^02'30.7078" Left		
Degree of Curvature(Arc):		22^55'05.9225"		
Length:		357.9752		
Tangent:		217.4821		
Chord:		328.1674		
Middle Ordinate:		61.3825		
External:		81.3585		
Tangent Direction:		S 20^36'42.3914" E		
Radial Direction:		S 69^23'17.6086" W		
Chord Direction:		S 61^37'57.7453" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT (	135)	4007+15.9503	1674873.2986	182546.1634
POE (	154)	4014+65.9503	1675605.0826	182710.4560
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		750.0000		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp E_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(154)	5000+00.0000	1675605.0826	182710.4560
PC	(182)	5008+03.7818	1676389.3423	182886.5298
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		803.7818		
Element: Circular				
PC	(182)	5008+03.7818	1676389.3423	182886.5298
PI	( )	5010+47.1240	1676626.7742	182939.8356
CC	(185)		1676180.1585	183818.2663
PT	(122)	5012+80.3239	1676809.7393	183100.2700
Radius:		954.9297		
Delta:		28^35'33.0821" Left		
Degree of Curvature(Arc):		5^59'59.9991"		
Length:		476.5421		
Tangent:		243.3422		
Chord:		471.6126		
Middle Ordinate:		29.5724		
External:		30.5175		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		N 63^03'00.3597" E		
Radial Direction:		S 41^14'46.1814" E		
Tangent Direction:		N 48^45'13.8186" E		
Element: Linear				
PT	(122)	5012+80.3239	1676809.7393	183100.2700
PC	(124)	5015+55.8469	1677016.9006	183281.9210
Tangent Direction:		N 48^45'13.8186" E		
Tangent Length:		275.5230		
Element: Circular				
PC	(124)	5015+55.8469	1677016.9006	183281.9210
PI	( )	5017+19.4134	1677139.8836	183389.7597
CC	(132)		1677489.0862	182743.4238
PT	(133)	5018+77.4639	1677297.4885	183433.5171
Radius:		716.1973		
Delta:		25^43'45.7047" Right		
Degree of Curvature(Arc):		7^59'59.9977"		
Length:		321.6171		
Tangent:		163.5665		
Chord:		318.9215		
Middle Ordinate:		17.9775		
External:		18.4404		
Tangent Direction:		N 48^45'13.8186" E		
Radial Direction:		S 41^14'46.1814" E		
Chord Direction:		N 61^37'06.6710" E		
Radial Direction:		S 15^31'00.4766" E		
Tangent Direction:		N 74^28'59.5234" E		
Element: Linear				
PT	(133)	5018+77.4639	1677297.4885	183433.5171
PI	(131)	5020+31.6789	1677446.0827	183474.7729
Tangent Direction:		N 74^28'59.5234" E		
Tangent Length:		154.2150		
Element: Linear				
PI	(131)	5020+31.6789	1677446.0827	183474.7729
POE	(193)	5020+81.6642	1677494.7143	183486.3268
Tangent Direction:		N 76^38'07.5757" E		
Tangent Length:		49.9853		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp F_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(167)	6000+00.0000	1675629.6170	182601.1762
PC	(168)	6007+07.8879	1676320.3118	182756.2439
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		707.8879		
Element: Circular				
PC	(168)	6007+07.8879	1676320.3118	182756.2439
PI	( )	6009+79.4433	1676585.2717	182815.7299
CC	(171)		1676477.1996	182057.4415
PT	(199)	6012+27.0097	1676823.0636	182684.5911
Radius:		716.1973		
Delta:		41^31'47.0703" Right		
Degree of Curvature(Arc):		7^59'59.9977"		
Length:		519.1218		
Tangent:		271.5555		
Chord:		507.8322		
Middle Ordinate:		46.5219		
External:		49.7537		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		S 81^53'19.5641" E		
Radial Direction:		S 28^52'33.9711" W		
Tangent Direction:		S 61^07'26.0289" E		
Element: Linear				
PT	(199)	6012+27.0097	1676823.0636	182684.5911
PC	(200)	6014+07.8659	1676981.4333	182597.2525
Tangent Direction:		S 61^07'26.0289" E		
Tangent Length:		180.8562		
Element: Circular				
PC	(200)	6014+07.8659	1676981.4333	182597.2525
PI	( )	6015+46.7321	1677103.0337	182530.1917
CC	(203)		1677832.7908	184141.0054
PT	(204)	6016+85.0260	1677233.6340	182482.9965
Radius:		1762.9471		
Delta:		9^00'27.7353" Left		
Degree of Curvature(Arc):		3^14'59.9997"		
Length:		277.1601		
Tangent:		138.8662		
Chord:		276.8748		
Middle Ordinate:		5.4439		
External:		5.4607		
Tangent Direction:		S 61^07'26.0289" E		
Radial Direction:		S 28^52'33.9711" W		
Chord Direction:		S 65^37'39.8966" E		
Radial Direction:		S 19^52'06.2358" W		
Tangent Direction:		S 70^07'53.7642" E		
Element: Linear				
PT	(204)	6016+85.0260	1677233.6340	182482.9965
PI	(201)	6017+60.1010	1677304.2402	182457.4814
Tangent Direction:		S 70^07'53.7642" E		
Tangent Length:		75.0750		
Element: Linear				
PI	(201)	6017+60.1010	1677304.2402	182457.4814
POE	(202)	6018+10.1947	1677352.3045	182443.3678
Tangent Direction:		S 73^38'08.1889" E		
Tangent Length:		50.0936		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp G_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(198)	7000+00.0000	1677363.8449	182475.3028
PI	(136)	7000+50.0616	1677317.6647	182494.6302
Tangent Direction:		N 67^17'22.6773" W		
Tangent Length:		50.0616		
Element: Linear				
PI	(136)	7000+50.0616	1677317.6647	182494.6302
PC	(141)	7001+01.2023	1677269.5681	182512.0109
Tangent Direction:		N 70^07'53.7642" W		
Tangent Length:		51.1408		
Element: Circular				
PC	(141)	7001+01.2023	1677269.5681	182512.0109
PI	( )	7002+17.2304	1677160.4465	182551.4444
CC	(152)		1677659.0200	183589.7167
PT	(194)	7003+32.4704	1677061.4442	182611.9511
Radius:		1145.9156		
Delta:		11^33'48.2407" Right		
Degree of Curvature(Arc):		4^59'59.9998"		
Length:		231.2680		
Tangent:		116.0281		
Chord:		230.8757		
Middle Ordinate:		5.8293		
External:		5.8592		
Tangent Direction:		N 70^07'53.7642" W		
Radial Direction:		N 19^52'06.2358" E		
Chord Direction:		N 64^20'59.6439" W		
Radial Direction:		N 31^25'54.4764" E		
Tangent Direction:		N 58^34'05.5236" W		
Element: Linear				
PT	(194)	7003+32.4704	1677061.4442	182611.9511
PC	(143)	7004+12.5339	1676993.1290	182653.7029
Tangent Direction:		N 58^34'05.5236" W		
Tangent Length:		80.0636		
Element: Circular				
PC	(143)	7004+12.5339	1676993.1290	182653.7029
PI	( )	7007+68.1827	1676689.6675	182839.1678
CC	(151)		1677068.2226	182776.5725
PT	(156)	7007+54.1245	1677036.6784	182917.0751
Radius:		144.0000		
Delta:		135^54'52.4243" Right		
Degree of Curvature(Arc):		39^47'19.4488"		
Length:		341.5906		
Tangent:		355.6488		
Chord:		266.9484		
Middle Ordinate:		89.9571		
External:		239.6953		
Tangent Direction:		N 58^34'05.5236" W		
Radial Direction:		N 31^25'54.4764" E		
Chord Direction:		N 9^23'20.6886" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT	(156)	7007+54.1245	1677036.6784	182917.0751
PI	(144)	7016+53.2370	1677913.9534	183114.0318
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		899.1126		
Element: Linear				
PI	(144)	7016+53.2370	1677913.9534	183114.0318
PI	(146)	7021+74.1245	1678422.1896	183228.1357
Tangent Direction:		N 77^20'46.9000" E		
Tangent Length:		520.8874		
Element: Linear				
PI	(146)	7021+74.1245	1678422.1896	183228.1357
POE	(148)	7024+74.3644	1678712.2746	183305.5613
Tangent Direction:		N 75^03'20.7039" E		

Tangent Length: 300.2399

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp H_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(189)	8000+00.0000	1677504.0996	183452.5229
PI	(190)	8000+49.9916	1677456.5160	183437.1943
Tangent Direction:		S 72^08'39.3450" W		
Tangent Length:		49.9916		
Element: Linear				
PI	(190)	8000+49.9916	1677456.5160	183437.1943
PC	(88)	8002+04.2067	1677307.9218	183395.9386
Tangent Direction:		S 74^28'59.5234" W		
Tangent Length:		154.2150		
Element: Circular				
PC	(88)	8002+04.2067	1677307.9218	183395.9386
PI	( )	8003+48.5542	1677168.8354	183357.3226
CC	(93)		1677347.5149	183253.3329
PCC	(121)	8004+32.9866	1677203.9645	183217.3149
Radius:		148.0000		
Delta:		88^34'06.3101" Left		
Degree of Curvature(Arc):		38^42'48.1123"		
Length:		228.7800		
Tangent:		144.3475		
Chord:		206.6725		
Middle Ordinate:		42.0490		
External:		58.7371		
Tangent Direction:		S 74^28'59.5234" W		
Radial Direction:		N 15^31'00.4766" W		
Chord Direction:		S 30^11'56.3683" W		
Radial Direction:		S 75^54'53.2133" W		
Tangent Direction:		S 14^05'06.7867" E		
Element: Circular				
PCC	(121)	8004+32.9866	1677203.9645	183217.3149
PI	( )	8005+77.3342	1677239.0936	183077.3072
CC	(93)		1677347.5149	183253.3329
PT	(89)	8006+61.7666	1677379.9353	183108.9275
Radius:		148.0000		
Delta:		88^34'06.3128" Left		
Degree of Curvature(Arc):		38^42'48.1123"		
Length:		228.7800		
Tangent:		144.3475		
Chord:		206.6725		
Middle Ordinate:		42.0490		
External:		58.7371		
Tangent Direction:		S 14^05'06.7867" E		
Radial Direction:		S 75^54'53.2133" W		
Chord Direction:		S 58^22'09.9431" E		
Radial Direction:		S 12^39'13.0995" E		
Tangent Direction:		N 77^20'46.9005" E		
Element: Linear				
PT	(89)	8006+61.7666	1677379.9353	183108.9275
PI	(197)	8014+61.7666	1678160.5049	183284.1729
Tangent Direction:		N 77^20'46.9005" E		
Tangent Length:		800.0000		
Element: Linear				
PI	(197)	8014+61.7666	1678160.5049	183284.1729
POE	(207)	8017+62.0065	1678455.8472	183338.1814
Tangent Direction:		N 79^38'13.0962" E		
Tangent Length:		300.2399		

Project Name: Add 2_Gary Blvd
Description:
Horizontal Alignment Name: Gary Blvd_2D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB (	27)	100+00.0000	1675207.1390	181355.9973
PC (	28)	104+68.6515	1675210.0956	181824.6395
Tangent Direction:	N 0^21'41.2877" E			
Tangent Length:	468.6515			
Element: Circular				
PC (	28)	104+68.6515	1675210.0956	181824.6395
PI (	)	105+99.3651	1675210.9202	181955.3505
CC (	31)		1674064.2024	181831.8688
PT (	32)	107+28.9537	1675182.2865	182082.8895
Radius:	1145.9160			
Delta:	13^00'54.3866" Left			
Degree of Curvature(Arc):	4^59'59.9936"			
Length:	260.3022			
Tangent:	130.7137			
Chord:	259.7430			
Middle Ordinate:	7.3832			
External:	7.4311			
Tangent Direction:	N 0^21'41.2877" E			
Radial Direction:	S 89^38'18.7123" E			
Chord Direction:	N 6^08'45.9056" W			
Radial Direction:	N 77^20'46.9011" E			
Tangent Direction:	N 12^39'13.0989" W			
Element: Linear				
PT (	32)	107+28.9537	1675182.2865	182082.8895
PC (	29)	113+40.2902	1675048.3691	182679.3779
Tangent Direction:	N 12^39'13.0989" W			
Tangent Length:	611.3365			
Element: Circular				
PC (	29)	113+40.2902	1675048.3691	182679.3779
PI (	)	115+00.4845	1675013.2775	182835.6814
CC (	33)		1673930.2850	182428.3572
PT (	34)	116+58.6158	1674936.6677	182976.3695
Radius:	1145.9160			
Delta:	15^54'58.5847" Left			
Degree of Curvature(Arc):	4^59'59.9936"			
Length:	318.3256			
Tangent:	160.1943			
Chord:	317.3030			
Middle Ordinate:	11.0358			
External:	11.1431			
Tangent Direction:	N 12^39'13.0989" W			
Radial Direction:	N 77^20'46.9011" E			
Chord Direction:	N 20^36'42.3913" W			
Radial Direction:	N 61^25'48.3164" E			
Tangent Direction:	N 28^34'11.6836" W			
Element: Linear				
PT (	34)	116+58.6158	1674936.6677	182976.3695
PC (	30)	120+50.9953	1674749.0197	183320.9706
Tangent Direction:	N 28^34'11.6836" W			
Tangent Length:	392.3795			
Element: Circular				
PC (	30)	120+50.9953	1674749.0197	183320.9706
PI (	)	123+89.8632	1674586.9627	183618.5760
CC (	35)		1675755.4024	183868.9829
PT (	36)	127+09.9512	1674612.8298	183956.4551
Radius:	1145.9160			
Delta:	32^56'52.0186" Right			
Degree of Curvature(Arc):	4^59'59.9936"			
Length:	658.9559			
Tangent:	338.8679			
Chord:	649.9141			
Middle Ordinate:	47.0409			
External:	49.0547			
Tangent Direction:	N 28^34'11.6836" W			
Radial Direction:	N 61^25'48.3164" E			
Chord Direction:	N 12^05'45.6743" W			

```
          Radial Direction: S 85^37'19.6650" E
         Tangent Direction: N  4^22'40.3350" E

Element: Linear
              PT (      36)        127+09.9512  1674612.8298   183956.4551
             POE (      56)        133+97.9449  1674665.3471   184642.4415
         Tangent Direction: N  4^22'40.3350" E
            Tangent Length:           687.9937
```

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Lexington Ave_2B_2C_2D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	( )	10+00.0000	1674375.0800	183999.1000
PC	( )	11+04.0505	1674479.1293	183998.5947
Tangent Direction:		S 89^43'18.3134" E		
Tangent Length:		104.0505		
Element: Circular				
PC	( )	11+04.0505	1674479.1293	183998.5947
PI	( )	11+31.8023	1674506.8808	183998.4599
CC	( )		1674476.5998	183477.7301
PT	( )	11+59.5017	1674534.4608	183995.3771
Radius:		520.8707		
Delta:		6^05'58.6485" Right		
Degree of Curvature(Arc):		11^00'00.0017"		
Length:		55.4511		
Tangent:		27.7518		
Chord:		55.4249		
Middle Ordinate:		0.7377		
External:		0.7388		
Tangent Direction:		S 89^43'18.3134" E		
Radial Direction:		S 0^16'41.6866" W		
Chord Direction:		S 86^40'18.9892" E		
Radial Direction:		S 6^22'40.3350" W		
Tangent Direction:		S 83^37'19.6650" E		
Element: Linear				
PT	( )	11+59.5017	1674534.4608	183995.3771
PC	( )	13+81.1245	1674754.7119	183970.7581
Tangent Direction:		S 83^37'19.6650" E		
Tangent Length:		221.6228		
Element: Circular				
PC	( )	13+81.1245	1674754.7119	183970.7581
PI	( )	14+08.0913	1674781.5119	183967.7625
CC	( )		1674812.5729	184488.4051
PT	(18)	14+35.0101	1674808.4779	183967.5505
Radius:		520.8707		
Delta:		5^55'38.7071" Left		
Degree of Curvature(Arc):		11^00'00.0017"		
Length:		53.8856		
Tangent:		26.9669		
Chord:		53.8616		
Middle Ordinate:		0.6967		
External:		0.6976		
Tangent Direction:		S 83^37'19.6650" E		
Radial Direction:		S 6^22'40.3350" W		
Chord Direction:		S 86^35'09.0185" E		
Radial Direction:		S 0^27'01.6279" W		
Tangent Direction:		S 89^32'58.3721" E		
Element: Linear				
PT	( )	14+35.0101	1674808.4779	183967.5505
POE	( )	15+66.6551	1674940.1189	183966.5155
Tangent Direction:		S 89^32'58.3721" E		
Tangent Length:		131.6451		

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Red Wheat_2D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	80	0+00.0000	1674035.4664	182579.4555
PC		0+89.7392	1674124.0790	182593.6305
Tangent Direction:		N 80^54'42.0746" E		
Tangent Length:		89.7392		
Element: Circular				
PC		0+89.7392	1674124.0790	182593.6305
PI		1+81.2180	1674214.4093	182608.0801
CC	81		1674076.6920	182889.8643
PCC		2+67.3229	1674281.3080	182670.4735
Radius:		300.0000		
Delta:		33^54'57.5469" Left		
Degree of Curvature(Arc):		19^05'54.9354"		
Length:		177.5837		
Tangent:		91.4787		
Chord:		175.0023		
Middle Ordinate:		13.0443		
External:		13.6373		
Tangent Direction:		N 80^54'42.0746" E		
Radial Direction:		S 9^05'17.9254" E		
Chord Direction:		N 63^57'13.3011" E		
Radial Direction:		S 43^00'15.4724" E		
Tangent Direction:		N 46^59'44.5276" E		
Element: Circular				
PCC		2+67.3229	1674281.3080	182670.4735
PI		5+05.1106	1674455.2027	182832.6574
CC	76		1673723.0398	183269.0528
PT	82	7+30.1583	1674515.1305	183062.7696
Radius:		818.5111		
Delta:		32^23'54.5297" Left		
Degree of Curvature(Arc):		7^00'00.0011"		
Length:		462.8354		
Tangent:		237.7877		
Chord:		456.6938		
Middle Ordinate:		32.4970		
External:		33.8406		
Tangent Direction:		N 46^59'44.5276" E		
Radial Direction:		S 43^00'15.4724" E		
Chord Direction:		N 30^47'47.2628" E		
Radial Direction:		S 75^24'10.0021" E		
Tangent Direction:		N 14^35'49.9979" E		
Element: Linear				
PT	82	7+30.1583	1674515.1305	183062.7696
PC	83	7+85.4266	1674529.0594	183116.2539
Tangent Direction:		N 14^35'49.9979" E		
Tangent Length:		55.2682		
Element: Circular				
PC	83	7+85.4266	1674529.0594	183116.2539
PI		9+18.3153	1674562.5503	183244.8532
CC	84		1674819.3758	183040.6471
PT	85	10+35.6183	1674680.2957	183306.4605
Radius:		300.0000		
Delta:		47^46'59.1651" Right		
Degree of Curvature(Arc):		19^05'54.9354"		
Length:		250.1917		
Tangent:		132.8888		
Chord:		243.0041		
Middle Ordinate:		25.7059		
External:		28.1150		
Tangent Direction:		N 14^35'49.9979" E		
Radial Direction:		S 75^24'10.0021" E		
Chord Direction:		N 38^29'19.5805" E		
Radial Direction:		S 27^37'10.8370" E		
Tangent Direction:		N 62^22'49.1630" E		
Element: Linear				
PT	85	10+35.6183	1674680.2957	183306.4605
POE	86	11+03.0801	1674740.0699	183337.7358

Tangent Direction: N 62^22'49.1630" E
Tangent Length: 67.4618

Project Name: Add 2_I-40 Mainline
Description:
Horizontal Alignment Name: I-40 Survey
Description: v3_I-40
Style: Default
Vertical Alignment Name: VA_Ultimate
Description: Final design includes Neptune
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	3440+00.0000	1618.1005
	PC	3441+75.0000	1620.9005
Tangent Grade:		1.6000	
Tangent Length:		175.0000	
Element: Parabola			
	PC	3441+75.0000	1620.9005
	PI	3443+00.0000	1622.9005
	PT	3444+25.0000	1624.5880
Length:		250.0000	
Stopping Sight Distance:		4441.6010	
Entrance Grade:		1.6000	
Exit Grade:		1.3500	
r = (g2 - g1) / L:		-0.1000	
K = l / (g2 - g1):		1000.0000	
Middle Ordinate:		-0.0781	
Element: Linear			
	PT	3444+25.0000	1624.5880
	PC	3446+25.0000	1627.2880
Tangent Grade:		1.3500	
Tangent Length:		200.0000	
Element: Parabola			
	PC	3446+25.0000	1627.2880
	PI	3447+50.0000	1628.9755
	PT	3448+75.0000	1630.9005
Length:		250.0000	
Headlight Sight Distance:		4716.8453	
Entrance Grade:		1.3500	
Exit Grade:		1.5400	
r = (g2 - g1) / L:		0.0760	
K = l / (g2 - g1):		1315.7895	
Middle Ordinate:		0.0594	
Element: Linear			
	PT	3448+75.0000	1630.9005
	PC	3449+70.0000	1632.3635
Tangent Grade:		1.5400	
Tangent Length:		95.0000	
Element: Parabola			
	PC	3449+70.0000	1632.3635
	PI	3450+75.0000	1633.9805
	PT	3451+80.0000	1636.0805
Length:		210.0000	
Headlight Sight Distance:		1704.9350	
Entrance Grade:		1.5400	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		0.2190	
K = l / (g2 - g1):		456.5225	
Middle Ordinate:		0.1207	
Element: Linear			
	PT	3451+80.0000	1636.0805
	PC	3451+83.5487	1636.1514
Tangent Grade:		2.0000	
Tangent Length:		3.5487	
Element: Parabola			
	PC	3451+83.5487	1636.1514
	PI	3458+33.5487	1649.1514
	PT	3464+83.5487	1628.3514
	HIGH	3456+83.5486	1641.1514
Length:		1300.0000	
Stopping Sight Distance:		734.5578	
Entrance Grade:		2.0000	
Exit Grade:		-3.2000	

```
      r = ( g2 - g1 ) / L:          -0.4000
      K = l / ( g2 - g1 ):         250.0000
          Middle Ordinate:          -8.4500

Element: Linear
                          PT     3464+83.5487        1628.3514
                          PC     3479+93.0000        1580.0490
              Tangent Grade:          -3.2000
             Tangent Length:       1509.4513

Element: Parabola
                          PC     3479+93.0000        1580.0490
                          PI     3487+63.0000        1555.4090
                          PT     3495+33.0000        1577.3540
                         LOW     3488+07.5454        1567.0163
                    Length:        1540.0000
  Headlight Sight Distance:         993.4034
            Entrance Grade:          -3.2000
                Exit Grade:           2.8500
      r = ( g2 - g1 ) / L:           0.3929
      K = l / ( g2 - g1 ):         254.5455
          Middle Ordinate:          11.6462

Element: Linear
                          PT     3495+33.0000        1577.3540
                          PC     3495+45.0000        1577.6960
              Tangent Grade:           2.8500
             Tangent Length:          12.0000

Element: Parabola
                          PC     3495+45.0000        1577.6960
                          PI     3503+70.0000        1601.2085
                          PT     3511+95.0000        1569.8585
                        HIGH     3502+52.1429        1587.7728
                    Length:        1650.0000
   Stopping Sight Distance:         731.7911
            Entrance Grade:           2.8500
                Exit Grade:          -3.8000
      r = ( g2 - g1 ) / L:          -0.4030
      K = l / ( g2 - g1 ):         248.1203
          Middle Ordinate:         -13.7156

Element: Linear
                          PT     3511+95.0000        1569.8585
                          PC     3516+50.0000        1552.5685
              Tangent Grade:          -3.8000
             Tangent Length:         455.0000

Element: Parabola
                          PC     3516+50.0000        1552.5685
                          PI     3518+25.0000        1545.9185
                          PT     3520+00.0000        1541.1935
                    Length:         350.0000
  Headlight Sight Distance:        1218.1193
            Entrance Grade:          -3.8000
                Exit Grade:          -2.7000
      r = ( g2 - g1 ) / L:           0.3143
      K = l / ( g2 - g1 ):         318.1818
          Middle Ordinate:           0.4813
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp A_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	1011+52.3900	1636.9600
	PI	1011+72.3900	1636.6200
Tangent Grade:		-1.7000	
Tangent Length:		20.0000	
Element: Linear			
	PI	1011+72.3900	1636.6200
	PI	1011+92.3900	1636.2600
Tangent Grade:		-1.8000	
Tangent Length:		20.0000	
Element: Linear			
	PI	1011+92.3900	1636.2600
	PI	1012+12.3900	1635.8900
Tangent Grade:		-1.8500	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+12.3900	1635.8900
	PI	1012+32.3900	1635.4250
Tangent Grade:		-2.3250	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+32.3900	1635.4250
	PI	1012+52.3900	1634.9150
Tangent Grade:		-2.5500	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+52.3900	1634.9150
	PI	1012+72.3900	1634.3950
Tangent Grade:		-2.6000	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+72.3900	1634.3950
	PI	1012+92.1800	1633.8594
Tangent Grade:		-2.7064	
Tangent Length:		19.7900	
Element: Linear			
	PI	1012+92.1800	1633.8594
	PI	1013+11.8900	1633.2721
Tangent Grade:		-2.9797	
Tangent Length:		19.7100	
Element: Linear			
	PI	1013+11.8900	1633.2721
	PI	1013+31.6100	1632.7607
Tangent Grade:		-2.5933	
Tangent Length:		19.7200	
Element: Linear			
	PI	1013+31.6100	1632.7607
	PI	1013+51.3400	1632.2378
Tangent Grade:		-2.6503	
Tangent Length:		19.7300	
Element: Linear			
	PI	1013+51.3400	1632.2378
	PI	1013+71.0900	1631.6856
Tangent Grade:		-2.7959	
Tangent Length:		19.7500	
Element: Linear			
	PI	1013+71.0900	1631.6856
	PI	1013+90.8900	1631.1039

```
            Tangent Grade:           -2.9379
           Tangent Length:           19.8000

Element: Linear
                       PI      1013+90.8900         1631.1039
                       PI      1014+10.7300         1630.5026
            Tangent Grade:           -3.0307
           Tangent Length:           19.8400

Element: Linear
                       PI      1014+10.7300         1630.5026
                       PI      1014+30.6300         1629.8717
            Tangent Grade:           -3.1704
           Tangent Length:           19.9000

Element: Linear
                       PI      1014+30.6300         1629.8717
                       PI      1014+50.6000         1629.2112
            Tangent Grade:           -3.3075
           Tangent Length:           19.9700

Element: Linear
                       PI      1014+50.6000         1629.2112
                       PI      1014+70.6700         1628.5341
            Tangent Grade:           -3.3737
           Tangent Length:           20.0700

Element: Linear
                       PI      1014+70.6700         1628.5341
                       PI      1014+88.2893         1627.9319
            Tangent Grade:           -3.4180
           Tangent Length:           17.6193

Element: Linear
                       PI      1014+88.2893         1627.9319
                       PI      1014+93.7812         1627.7442
            Tangent Grade:           -3.4180
           Tangent Length:            5.4919

Element: Linear
                       PI      1014+93.7812         1627.7442
                       PC      1020+00.0000         1612.5576
            Tangent Grade:           -3.0000
           Tangent Length:          506.2188

Element: Parabola
                       PC      1020+00.0000         1612.5576
                       PI      1021+00.0000         1609.5576
                       PT      1022+00.0000         1607.5576
                  Length:          200.0000
  Headlight Sight Distance:          800.0000
           Entrance Grade:           -3.0000
               Exit Grade:           -2.0000
      r = ( g2 - g1 ) / L:            0.5000
      K = l / ( g2 - g1 ):          200.0000
          Middle Ordinate:            0.2500

Element: Linear
                       PT      1022+00.0000         1607.5576
                      POE      1023+91.8066         1603.7215
            Tangent Grade:           -2.0000
           Tangent Length:          191.8066
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp A-D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A
Description:
Style: Default

		STATION	ELEVATION
Element: Parabola			
	PC	100+00.0000	1602.9235
	PI	100+75.0000	1601.4235
	PT	101+50.0000	1602.9235
	LOW	100+75.0000	1602.1735
Length:		150.0000	
Headlight Sight Distance:		222.2222	
Entrance Grade:		-2.0000	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		2.6667	
K = l / (g2 - g1):		37.5000	
Middle Ordinate:		0.7500	
Element: Linear			
	PT	101+50.0000	1602.9235
	PI	101+59.8326	1603.1201
Tangent Grade:		2.0000	
Tangent Length:		9.8326	
Element: Linear			
	PI	101+59.8326	1603.1201
	POE	101+92.8326	1603.7801
Tangent Grade:		2.0000	
Tangent Length:		33.0000	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	2009+63.8000	1637.8900
	PI	2009+83.8000	1637.5900
Tangent Grade:		-1.5000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2009+83.8000	1637.5900
	PI	2010+03.8000	1637.2900
Tangent Grade:		-1.5000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+03.8000	1637.2900
	PI	2010+23.8000	1636.9100
Tangent Grade:		-1.9000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+23.8000	1636.9100
	PI	2010+43.8000	1636.4700
Tangent Grade:		-2.2000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+43.8000	1636.4700
	PI	2010+63.8000	1636.0100
Tangent Grade:		-2.3000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+63.8000	1636.0100
	PI	2010+83.6600	1635.5378
Tangent Grade:		-2.3776	
Tangent Length:		19.8600	
Element: Linear			
	PI	2010+83.6600	1635.5378
	PI	2011+03.3700	1635.0245
Tangent Grade:		-2.6043	
Tangent Length:		19.7100	
Element: Linear			
	PI	2011+03.3700	1635.0245
	PI	2011+23.0800	1634.5500
Tangent Grade:		-2.4074	
Tangent Length:		19.7100	
Element: Linear			
	PI	2011+23.0800	1634.5500
	PI	2011+42.8100	1634.0895
Tangent Grade:		-2.3340	
Tangent Length:		19.7300	
Element: Linear			
	PI	2011+42.8100	1634.0895
	PI	2011+62.5600	1633.6095
Tangent Grade:		-2.4304	
Tangent Length:		19.7500	
Element: Linear			
	PI	2011+62.5600	1633.6095
	PI	2011+82.3400	1633.0901
Tangent Grade:		-2.6259	
Tangent Length:		19.7800	
Element: Linear			
	PI	2011+82.3400	1633.0901
	PI	2012+02.1700	1632.5512

```
            Tangent Grade:           -2.7176
           Tangent Length:           19.8300

Element: Linear
                       PI      2012+02.1700         1632.5512
                       PI      2012+22.0500         1631.9927
            Tangent Grade:           -2.8094
           Tangent Length:           19.8800

Element: Linear
                       PI      2012+22.0500         1631.9927
                       PI      2012+42.0000         1631.4044
            Tangent Grade:           -2.9489
           Tangent Length:           19.9500

Element: Linear
                       PI      2012+42.0000         1631.4044
                       PI      2012+46.7028         1631.2595
            Tangent Grade:           -3.0813
           Tangent Length:            4.7028

Element: Linear
                       PI      2012+46.7028         1631.2595
                       PC      2018+00.0000         1613.0007
            Tangent Grade:           -3.3000
           Tangent Length:          553.2972

Element: Parabola
                       PC      2018+00.0000         1613.0007
                       PI      2019+00.0000         1609.7007
                       PT      2020+00.0000         1605.7007
                   Length:          200.0000
  Stopping Sight Distance:         1641.6432
           Entrance Grade:           -3.3000
               Exit Grade:           -4.0000
      r = ( g2 - g1 ) / L:           -0.3500
      K = l / ( g2 - g1 ):          285.7143
          Middle Ordinate:           -0.1750

Element: Linear
                       PT      2020+00.0000         1605.7007
                      POE      2020+17.5171         1605.0000
            Tangent Grade:           -4.0000
           Tangent Length:           17.5171
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B-C_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	200+00.0000	1604.1741
	PC	202+00.0000	1596.1741
Tangent Grade:		-4.0000	
Tangent Length:		200.0000	
Element: Parabola			
	PC	202+00.0000	1596.1741
	PI	203+25.0000	1591.1741
	PT	204+50.0000	1593.6741
	LOW	203+66.6667	1592.8407
Length:		250.0000	
Headlight Sight Distance:		221.1850	
Entrance Grade:		-4.0000	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		2.4000	
K = l / (g2 - g1):		41.6667	
Middle Ordinate:		1.8750	
Element: Linear			
	PT	204+50.0000	1593.6741
	PI	204+77.1276	1594.2166
Tangent Grade:		2.0000	
Tangent Length:		27.1276	
Element: Linear			
	PI	204+77.1276	1594.2166
	POE	205+10.1291	1594.8766
Tangent Grade:		1.9998	
Tangent Length:		33.0014	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp C_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	3000+00.0000	1603.0341
	PC	3000+75.0000	1606.0341
Tangent Grade:		4.0000	
Tangent Length:		75.0000	
Element: Parabola			
	PC	3000+75.0000	1606.0341
	PI	3002+75.0000	1614.0341
	PT	3004+75.0000	1608.8341
	HIGH	3003+17.4242	1610.8826
Length:		400.0000	
Stopping Sight Distance:		361.6712	
Entrance Grade:		4.0000	
Exit Grade:		-2.6000	
r = (g2 - g1) / L:		-1.6500	
K = l / (g2 - g1):		60.6061	
Middle Ordinate:		-3.3000	
Element: Linear			
	PT	3004+75.0000	1608.8341
	PI	3004+95.5426	1608.3000
Tangent Grade:		-2.6000	
Tangent Length:		20.5426	
Element: Linear			
	PI	3004+95.5426	1608.3000
	PI	3004+96.6100	1608.2750
Tangent Grade:		-2.3395	
Tangent Length:		1.0674	
Element: Linear			
	PI	3004+96.6100	1608.2750
	PI	3005+16.2500	1607.7864
Tangent Grade:		-2.4878	
Tangent Length:		19.6400	
Element: Linear			
	PI	3005+16.2500	1607.7864
	PI	3005+35.5500	1607.2671
Tangent Grade:		-2.6907	
Tangent Length:		19.3000	
Element: Linear			
	PI	3005+35.5500	1607.2671
	PI	3005+54.6600	1606.7156
Tangent Grade:		-2.8859	
Tangent Length:		19.1100	
Element: Linear			
	PI	3005+54.6600	1606.7156
	PI	3005+73.7000	1606.2577
Tangent Grade:		-2.4049	
Tangent Length:		19.0400	
Element: Linear			
	PI	3005+73.7000	1606.2577
	PI	3005+93.2400	1605.7558
Tangent Grade:		-2.5686	
Tangent Length:		19.5400	
Element: Linear			
	PI	3005+93.2400	1605.7558
	PI	3006+13.2400	1605.2474
Tangent Grade:		-2.5420	
Tangent Length:		20.0000	
Element: Linear			
	PI	3006+13.2400	1605.2474

	PI	3006+33.2400	1604.7100
Tangent Grade:		-2.6870	
Tangent Length:		20.0000	

Element: Linear

	PI	3006+33.2400	1604.7100
	PI	3006+53.2400	1604.0700
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	

Element: Linear

	PI	3006+53.2400	1604.0700
	PI	3006+73.2400	1603.4300
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	

Element: Linear

	PI	3006+73.2400	1603.4300
	PI	3006+93.2400	1602.7900
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	

Element: Linear

	PI	3006+93.2400	1602.7900
	PI	3007+13.2400	1602.1500
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	

Element: Linear

	PI	3007+13.2400	1602.1500
	POE	3007+33.2400	1601.5100
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	4000+00.0000	1602.0685
	PC	4002+00.0000	1606.0685
Tangent Grade:		2.0000	
Tangent Length:		200.0000	
Element: Parabola			
	PC	4002+00.0000	1606.0685
	PI	4004+00.0000	1610.0685
	PT	4006+00.0000	1605.6685
	HIGH	4003+90.4762	1607.9732
Length:		400.0000	
Stopping Sight Distance:		456.9405	
Entrance Grade:		2.0000	
Exit Grade:		-2.2000	
r = (g2 - g1) / L:		-1.0500	
K = l / (g2 - g1):		95.2381	
Middle Ordinate:		-2.1000	
Element: Linear			
	PT	4006+00.0000	1605.6685
	PI	4006+50.2002	1604.5641
Tangent Grade:		-2.2000	
Tangent Length:		50.2002	
Element: Linear			
	PI	4006+50.2002	1604.5641
	PI	4006+68.2100	1604.0770
Tangent Grade:		-2.7044	
Tangent Length:		18.0098	
Element: Linear			
	PI	4006+68.2100	1604.0770
	PI	4006+87.3500	1603.5215
Tangent Grade:		-2.9023	
Tangent Length:		19.1400	
Element: Linear			
	PI	4006+87.3500	1603.5215
	PI	4007+06.4100	1603.0577
Tangent Grade:		-2.4334	
Tangent Length:		19.0600	
Element: Linear			
	PI	4007+06.4100	1603.0577
	PI	4007+25.9500	1602.5558
Tangent Grade:		-2.5686	
Tangent Length:		19.5400	
Element: Linear			
	PI	4007+25.9500	1602.5558
	PI	4007+45.9500	1602.0474
Tangent Grade:		-2.5420	
Tangent Length:		20.0000	
Element: Linear			
	PI	4007+45.9500	1602.0474
	PI	4007+65.9500	1601.5100
Tangent Grade:		-2.6870	
Tangent Length:		20.0000	
Element: Linear			
	PI	4007+65.9500	1601.5100
	PI	4007+85.9500	1600.8700
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	
Element: Linear			
	PI	4007+85.9500	1600.8700

PI	4008+05.9500	1600.2300
Tangent Grade:	-3.2000	
Tangent Length:	20.0000	

Element: Linear

PI	4008+05.9500	1600.2300
POE	4008+25.9500	1599.5900
Tangent Grade:	-3.2000	
Tangent Length:	20.0000	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp E_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	5006+40.0000	1566.8500
	PI	5006+60.0000	1566.7300
Tangent Grade:		-0.6000	
Tangent Length:		20.0000	
Element: Linear			
	PI	5006+60.0000	1566.7300
	PI	5006+80.0000	1566.6200
Tangent Grade:		-0.5500	
Tangent Length:		20.0000	
Element: Linear			
	PI	5006+80.0000	1566.6200
	PI	5007+00.0000	1566.5200
Tangent Grade:		-0.5000	
Tangent Length:		20.0000	
Element: Linear			
	PI	5007+00.0000	1566.5200
	PI	5007+20.0000	1566.4500
Tangent Grade:		-0.3500	
Tangent Length:		20.0000	
Element: Linear			
	PI	5007+20.0000	1566.4500
	PI	5007+40.0000	1566.4000
Tangent Grade:		-0.2500	
Tangent Length:		20.0000	
Element: Linear			
	PI	5007+40.0000	1566.4000
	PI	5007+60.0000	1566.2789
Tangent Grade:		-0.6055	
Tangent Length:		20.0000	
Element: Linear			
	PI	5007+60.0000	1566.2789
	PI	5007+80.0000	1566.1489
Tangent Grade:		-0.6500	
Tangent Length:		20.0000	
Element: Linear			
	PI	5007+80.0000	1566.1489
	PI	5008+00.0000	1566.0189
Tangent Grade:		-0.6500	
Tangent Length:		20.0000	
Element: Linear			
	PI	5008+00.0000	1566.0189
	PI	5008+19.8000	1565.9129
Tangent Grade:		-0.5354	
Tangent Length:		19.8000	
Element: Linear			
	PI	5008+19.8000	1565.9129
	PI	5008+39.5400	1565.8041
Tangent Grade:		-0.5512	
Tangent Length:		19.7400	
Element: Linear			
	PI	5008+39.5400	1565.8041
	PI	5008+59.2800	1565.8006
Tangent Grade:		-0.0177	
Tangent Length:		19.7400	
Element: Linear			
	PI	5008+59.2800	1565.8006
	PI	5008+79.0300	1565.8099

```
            Tangent Grade:            0.0471
           Tangent Length:           19.7500

Element: Linear
                        PI      5008+79.0300         1565.8099
                        PI      5008+98.8100         1565.8309
            Tangent Grade:            0.1062
           Tangent Length:           19.7800

Element: Linear
                        PI      5008+98.8100         1565.8309
                        PI      5009+18.6100         1565.8535
            Tangent Grade:            0.1141
           Tangent Length:           19.8000

Element: Linear
                        PI      5009+18.6100         1565.8535
                        PI      5009+38.4400         1565.8876
            Tangent Grade:            0.1720
           Tangent Length:           19.8300

Element: Linear
                        PI      5009+38.4400         1565.8876
                        PI      5009+58.3200         1565.9232
            Tangent Grade:            0.1791
           Tangent Length:           19.8800

Element: Linear
                        PI      5009+58.3200         1565.9232
                        PI      5009+78.3600         1565.9602
            Tangent Grade:            0.1846
           Tangent Length:           20.0400

Element: Linear
                        PI      5009+78.3600         1565.9602
                        PI      5009+98.3100         1566.0289
            Tangent Grade:            0.3444
           Tangent Length:           19.9500

Element: Linear
                        PI      5009+98.3100         1566.0289
                        PI      5010+05.2013         1566.0504
            Tangent Grade:            0.3127
           Tangent Length:            6.8913

Element: Linear
                        PI      5010+05.2013         1566.0504
                        PC      5010+15.0000         1566.0994
            Tangent Grade:            0.5000
           Tangent Length:            9.7987

Element: Parabola
                        PC      5010+15.0000         1566.0994
                        PI      5011+15.0000         1566.5994
                        PT      5012+15.0000         1568.1494
                  Length:          200.0000
  Headlight Sight Distance:          766.1169
           Entrance Grade:            0.5000
               Exit Grade:            1.5500
      r = ( g2 - g1 ) / L:            0.5250
      K = l / ( g2 - g1 ):          190.4762
          Middle Ordinate:            0.2625

Element: Linear
                        PT      5012+15.0000         1568.1494
                        PC      5015+25.0000         1572.9544
            Tangent Grade:            1.5500
           Tangent Length:          310.0000

Element: Parabola
                        PC      5015+25.0000         1572.9544
                        PI      5017+25.0000         1576.0544
                        PT      5019+25.0000         1565.2544
                      HIGH      5016+14.2086         1573.6458
                  Length:          400.0000
   Stopping Sight Distance:          352.4468
           Entrance Grade:            1.5500
               Exit Grade:           -5.4000
      r = ( g2 - g1 ) / L:           -1.7375
```

K = l / (g2 - g1):	57.5540	
Middle Ordinate:	-3.4750	

Element: Linear

PT	5019+25.0000	1565.2544
POE	5020+30.8200	1559.5402
Tangent Grade:	-5.4000	
Tangent Length:	105.8200	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp F_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	6006+00.0000	1567.1400
	PI	6006+20.0000	1566.9900
Tangent Grade:		-0.7500	
Tangent Length:		20.0000	
Element: Linear			
	PI	6006+20.0000	1566.9900
	PI	6006+40.0000	1566.8500
Tangent Grade:		-0.7000	
Tangent Length:		20.0000	
Element: Linear			
	PI	6006+40.0000	1566.8500
	PI	6006+60.0000	1566.6889
Tangent Grade:		-0.8055	
Tangent Length:		20.0000	
Element: Linear			
	PI	6006+60.0000	1566.6889
	PI	6006+80.0000	1566.4708
Tangent Grade:		-1.0905	
Tangent Length:		20.0000	
Element: Linear			
	PI	6006+80.0000	1566.4708
	PI	6007+00.0000	1566.2626
Tangent Grade:		-1.0410	
Tangent Length:		20.0000	
Element: Linear			
	PI	6007+00.0000	1566.2626
	PI	6007+19.8000	1566.0805
Tangent Grade:		-0.9197	
Tangent Length:		19.8000	
Element: Linear			
	PI	6007+19.8000	1566.0805
	PI	6007+39.4600	1565.8938
Tangent Grade:		-0.9496	
Tangent Length:		19.6600	
Element: Linear			
	PI	6007+39.4600	1565.8938
	PI	6007+59.1200	1565.8072
Tangent Grade:		-0.4405	
Tangent Length:		19.6600	
Element: Linear			
	PI	6007+59.1200	1565.8072
	PI	6007+78.8100	1565.7293
Tangent Grade:		-0.3956	
Tangent Length:		19.6900	
Element: Linear			
	PI	6007+78.8100	1565.7293
	PI	6007+98.5300	1565.6402
Tangent Grade:		-0.4518	
Tangent Length:		19.7200	
Element: Linear			
	PI	6007+98.5300	1565.6402
	PI	6008+18.3000	1565.5698
Tangent Grade:		-0.3561	
Tangent Length:		19.7700	
Element: Linear			
	PI	6008+18.3000	1565.5698
	PI	6008+39.2263	1565.5047

```
            Tangent Grade:           -0.3113
           Tangent Length:           20.9263

Element: Linear
                       PI      6008+39.2263         1565.5047
                       PC      6012+10.0000         1563.4654
            Tangent Grade:           -0.5500
           Tangent Length:          370.7737

Element: Parabola
                       PC      6012+10.0000         1563.4654
                       PI      6013+60.0000         1562.6404
                      PRC      6015+10.0000         1555.8904
                  Length:          300.0000
  Stopping Sight Distance:          423.2026
          Entrance Grade:           -0.5500
              Exit Grade:           -4.5000
     r = ( g2 - g1 ) / L:           -1.3167
     K = l / ( g2 - g1 ):           75.9494
         Middle Ordinate:           -1.4813

Element: Parabola
                      PRC      6015+10.0000         1555.8904
                       PI      6016+10.0000         1551.3904
                       PT      6017+10.0000         1548.8904
                  Length:          200.0000
 Headlight Sight Distance:         1600.0000
          Entrance Grade:           -4.5000
              Exit Grade:           -2.5000
     r = ( g2 - g1 ) / L:            1.0000
     K = l / ( g2 - g1 ):          100.0000
         Middle Ordinate:            0.5000

Element: Linear
                       PT      6017+10.0000         1548.8904
                      POE      6017+60.1000         1547.6379
            Tangent Grade:           -2.5000
           Tangent Length:           50.1000
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp G_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	7000+50.0600	1547.5725
	PC	7001+00.0000	1548.8210
Tangent Grade:		2.5000	
Tangent Length:		49.9400	
Element: Parabola			
	PC	7001+00.0000	1548.8210
	PI	7002+00.0000	1551.3210
	PT	7003+00.0000	1555.8210
Length:		200.0000	
Headlight Sight Distance:		1600.0000	
Entrance Grade:		2.5000	
Exit Grade:		4.5000	
r = (g2 - g1) / L:		1.0000	
K = l / (g2 - g1):		100.0000	
Middle Ordinate:		0.5000	
Element: Linear			
	PT	7003+00.0000	1555.8210
	PC	7004+50.0000	1562.5710
Tangent Grade:		4.5000	
Tangent Length:		150.0000	
Element: Parabola			
	PC	7004+50.0000	1562.5710
	PI	7005+50.0000	1567.0710
	PT	7006+50.0000	1570.3710
Length:		200.0000	
Stopping Sight Distance:		999.2919	
Entrance Grade:		4.5000	
Exit Grade:		3.3000	
r = (g2 - g1) / L:		-0.6000	
K = l / (g2 - g1):		166.6667	
Middle Ordinate:		-0.3000	
Element: Linear			
	PT	7006+50.0000	1570.3710
	PI	7006+81.6423	1571.4152
Tangent Grade:		3.3000	
Tangent Length:		31.6423	
Element: Linear			
	PI	7006+81.6423	1571.4152
	PI	7006+86.3700	1571.5658
Tangent Grade:		3.1853	
Tangent Length:		4.7277	
Element: Linear			
	PI	7006+86.3700	1571.5658
	PI	7006+96.2600	1571.8916
Tangent Grade:		3.2942	
Tangent Length:		9.8900	
Element: Linear			
	PI	7006+96.2600	1571.8916
	PI	7007+05.8300	1572.2140
Tangent Grade:		3.3689	
Tangent Length:		9.5700	
Element: Linear			
	PI	7007+05.8300	1572.2140
	PI	7007+15.2500	1572.5253
Tangent Grade:		3.3047	
Tangent Length:		9.4200	
Element: Linear			
	PI	7007+15.2500	1572.5253
	PI	7007+24.5500	1572.8427

```
            Tangent Grade:            3.4129
           Tangent Length:            9.3000

Element: Linear
                       PI      7007+24.5500         1572.8427
                       PI      7007+33.7900         1573.1892
            Tangent Grade:            3.7500
           Tangent Length:            9.2400

Element: Linear
                       PI      7007+33.7900         1573.1892
                       PI      7007+42.9900         1573.5222
            Tangent Grade:            3.6196
           Tangent Length:            9.2000

Element: Linear
                       PI      7007+42.9900         1573.5222
                       PI      7007+52.2000         1573.8430
            Tangent Grade:            3.4832
           Tangent Length:            9.2100

Element: Linear
                       PI      7007+52.2000         1573.8430
                       PI      7007+62.0400         1574.1491
            Tangent Grade:            3.1108
           Tangent Length:            9.8400

Element: Linear
                       PI      7007+62.0400         1574.1491
                       PI      7007+72.0400         1574.4594
            Tangent Grade:            3.1030
           Tangent Length:           10.0000

Element: Linear
                       PI      7007+72.0400         1574.4594
                       PI      7007+82.0400         1574.7737
            Tangent Grade:            3.1430
           Tangent Length:           10.0000

Element: Linear
                       PI      7007+82.0400         1574.7737
                       PI      7007+92.0400         1575.0918
            Tangent Grade:            3.1810
           Tangent Length:           10.0000

Element: Linear
                       PI      7007+92.0400         1575.0918
                       PI      7008+02.0400         1575.4139
            Tangent Grade:            3.2210
           Tangent Length:           10.0000

Element: Linear
                       PI      7008+02.0400         1575.4139
                      POE      7008+12.0400         1575.7159
            Tangent Grade:            3.0200
           Tangent Length:           10.0000
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp H_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	8000+49.9900	1559.7555
	PC	8000+50.0000	1559.7560
Tangent Grade:		4.9000	
Tangent Length:		0.0100	
Element: Parabola			
	PC	8000+50.0000	1559.7560
	PI	8003+00.0000	1572.0060
	PT	8005+50.0000	1579.6310
Length:		500.0000	
Stopping Sight Distance:		833.3245	
Entrance Grade:		4.9000	
Exit Grade:		3.0500	
r = (g2 - g1) / L:		-0.3700	
K = l / (g2 - g1):		270.2703	
Middle Ordinate:		-1.1563	
Element: Linear			
	PT	8005+50.0000	1579.6310
	PI	8005+77.3370	1580.4647
Tangent Grade:		3.0500	
Tangent Length:		27.3370	
Element: Linear			
	PI	8005+77.3370	1580.4647
	PI	8005+86.8500	1580.7600
Tangent Grade:		3.1038	
Tangent Length:		9.5130	
Element: Linear			
	PI	8005+86.8500	1580.7600
	PI	8005+96.8700	1581.0817
Tangent Grade:		3.2106	
Tangent Length:		10.0200	
Element: Linear			
	PI	8005+96.8700	1581.0817
	PI	8006+06.6400	1581.3829
Tangent Grade:		3.0829	
Tangent Length:		9.7700	
Element: Linear			
	PI	8006+06.6400	1581.3829
	PI	8006+16.2000	1581.6651
Tangent Grade:		2.9519	
Tangent Length:		9.5600	
Element: Linear			
	PI	8006+16.2000	1581.6651
	PI	8006+25.6200	1581.9290
Tangent Grade:		2.8015	
Tangent Length:		9.4200	
Element: Linear			
	PI	8006+25.6200	1581.9290
	PI	8006+34.9400	1582.1753
Tangent Grade:		2.6427	
Tangent Length:		9.3200	
Element: Linear			
	PI	8006+34.9400	1582.1753
	PI	8006+44.2000	1582.4648
Tangent Grade:		3.1263	
Tangent Length:		9.2600	
Element: Linear			
	PI	8006+44.2000	1582.4648
	PI	8006+53.4200	1582.7438

```
            Tangent Grade:            3.0260
           Tangent Length:            9.2200

Element: Linear
                       PI      8006+53.4200         1582.7438
                       PI      8006+62.7300         1582.9978
            Tangent Grade:            2.7282
           Tangent Length:            9.3100

Element: Linear
                       PI      8006+62.7300         1582.9978
                       PI      8006+72.7300         1583.2398
            Tangent Grade:            2.4200
           Tangent Length:           10.0000

Element: Linear
                       PI      8006+72.7300         1583.2398
                       PI      8006+82.7300         1583.4779
            Tangent Grade:            2.3810
           Tangent Length:           10.0000

Element: Linear
                       PI      8006+82.7300         1583.4779
                       PI      8006+92.7300         1583.7119
            Tangent Grade:            2.3400
           Tangent Length:           10.0000

Element: Linear
                       PI      8006+92.7300         1583.7119
                       PI      8007+02.7300         1583.9419
            Tangent Grade:            2.3000
           Tangent Length:           10.0000

Element: Linear
                       PI      8007+02.7300         1583.9419
                       PI      8007+12.7300         1584.1115
            Tangent Grade:            1.6960
           Tangent Length:           10.0000

Element: Linear
                       PI      8007+12.7300         1584.1115
                       PI      8007+22.7300         1584.2635
            Tangent Grade:            1.5200
           Tangent Length:           10.0000

Element: Linear
                       PI      8007+22.7300         1584.2635
                       PI      8007+32.7300         1584.4115
            Tangent Grade:            1.4800
           Tangent Length:           10.0000

Element: Linear
                       PI      8007+32.7300         1584.4115
                      POE      8007+42.7300         1584.5554
            Tangent Grade:            1.4390
           Tangent Length:           10.0000
```

Project Name: Add 2_Gary Blvd
Description:
Horizontal Alignment Name: Gary Blvd_2D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	100+08.2433	1581.5538
	PI	100+21.9741	1581.2792
Tangent Grade:		-2.0000	
Tangent Length:		13.7308	
Element: Linear			
	PI	100+21.9741	1581.2792
	PC	100+75.0000	1580.8550
Tangent Grade:		-0.8000	
Tangent Length:		53.0259	
Element: Parabola			
	PC	100+75.0000	1580.8550
	PI	102+65.0000	1579.3350
	PT	104+55.0000	1588.8350
	LOW	101+27.4138	1580.6453
Length:		380.0000	
Headlight Sight Distance:		313.0303	
Entrance Grade:		-0.8000	
Exit Grade:		5.0000	
r = (g2 - g1) / L:		1.5263	
K = l / (g2 - g1):		65.5172	
Middle Ordinate:		2.7550	
Element: Linear			
	PT	104+55.0000	1588.8350
	PC	109+70.0000	1614.5850
Tangent Grade:		5.0000	
Tangent Length:		515.0000	
Element: Parabola			
	PC	109+70.0000	1614.5850
	PI	111+70.0000	1624.5850
	PT	113+70.0000	1618.0850
	HIGH	112+12.4242	1620.6456
Length:		400.0000	
Stopping Sight Distance:		323.4886	
Entrance Grade:		5.0000	
Exit Grade:		-3.2500	
r = (g2 - g1) / L:		-2.0625	
K = l / (g2 - g1):		48.4848	
Middle Ordinate:		-4.1250	
Element: Linear			
	PT	113+70.0000	1618.0850
	PC	117+20.0000	1606.7100
Tangent Grade:		-3.2500	
Tangent Length:		350.0000	
Element: Parabola			
	PC	117+20.0000	1606.7100
	PI	118+70.0000	1601.8350
	PT	120+20.0000	1599.9600
Length:		300.0000	
Headlight Sight Distance:		2000.0000	
Entrance Grade:		-3.2500	
Exit Grade:		-1.2500	
r = (g2 - g1) / L:		0.6667	
K = l / (g2 - g1):		150.0000	
Middle Ordinate:		0.7500	
Element: Linear			
	PT	120+20.0000	1599.9600
	PC	122+00.0000	1597.7100
Tangent Grade:		-1.2500	
Tangent Length:		180.0000	
Element: Parabola			

	PC	122+00.0000	1597.7100
	PI	124+00.0000	1595.2100
	PT	126+00.0000	1597.2100
	LOW	124+22.2222	1596.3211
Length:		400.0000	
Headlight Sight Distance:		1300.0000	
Entrance Grade:		-1.2500	
Exit Grade:		1.0000	
r = (g2 - g1) / L:		0.5625	
K = l / (g2 - g1):		177.7778	
Middle Ordinate:		1.1250	

Element: Linear

	PT	126+00.0000	1597.2100
	PC	131+00.0000	1602.2100
Tangent Grade:		1.0000	
Tangent Length:		500.0000	

Element: Parabola

	PC	131+00.0000	1602.2100
	PI	132+00.0000	1603.2100
	PT	133+00.0000	1603.6100
Length:		200.0000	
Stopping Sight Distance:		1898.5838	
Entrance Grade:		1.0000	
Exit Grade:		0.4000	
r = (g2 - g1) / L:		-0.3000	
K = l / (g2 - g1):		333.3333	
Middle Ordinate:		-0.1500	

Element: Linear

	PT	133+00.0000	1603.6100
	POE	133+50.0000	1603.8100
Tangent Grade:		0.4000	
Tangent Length:		50.0000	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Lexington Ave_2B_2C_2D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	10+00.0000	1601.1576
	PC	11+00.0000	1598.2561
Tangent Grade:		-2.9016	
Tangent Length:		100.0000	
Element: Parabola			
	PC	11+00.0000	1598.2561
	PI	11+50.0000	1596.8053
	PT	12+00.0000	1597.8053
	LOW	11+59.1969	1597.3972
Length:		100.0000	
Headlight Sight Distance:		141.2240	
Entrance Grade:		-2.9016	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		4.9016	
K = l / (g2 - g1):		20.4016	
Middle Ordinate:		0.6127	
Element: Linear			
	PT	12+00.0000	1597.8053
	PI	12+40.6625	1598.6185
Tangent Grade:		2.0000	
Tangent Length:		40.6625	
Element: Linear			
	PI	12+40.6625	1598.6185
	PC	12+77.5000	1597.8818
Tangent Grade:		-2.0000	
Tangent Length:		36.8375	
Element: Parabola			
	PC	12+77.5000	1597.8818
	PI	13+15.0000	1597.1318
	PT	13+52.5000	1595.3318
Length:		75.0000	
Stopping Sight Distance:		422.9108	
Entrance Grade:		-2.0000	
Exit Grade:		-4.8000	
r = (g2 - g1) / L:		-3.7333	
K = l / (g2 - g1):		26.7857	
Middle Ordinate:		-0.2625	
Element: Linear			
	PT	13+52.5000	1595.3318
	PC	13+62.0000	1594.8758
Tangent Grade:		-4.8000	
Tangent Length:		9.5000	
Element: Parabola			
	PC	13+62.0000	1594.8758
	PI	14+52.0000	1590.5558
	PT	15+42.0000	1592.3558
	LOW	14+89.0588	1591.8264
Length:		180.0000	
Headlight Sight Distance:		159.1690	
Entrance Grade:		-4.8000	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		3.7778	
K = l / (g2 - g1):		26.4706	
Middle Ordinate:		1.5300	
Element: Linear			
	PT	15+42.0000	1592.3558
	POE	15+50.0000	1592.5158
Tangent Grade:		2.0000	
Tangent Length:		8.0000	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Red Wheat_2D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	0+44.9738	1607.0137
	PC	2+50.0000	1604.9634
Tangent Grade:		-1.0000	
Tangent Length:		205.0262	
Element: Parabola			
	PC	2+50.0000	1604.9634
	PI	3+00.0000	1604.4634
	PT	3+50.0000	1601.3884
Length:		100.0000	
Stopping Sight Distance:		259.5437	
Entrance Grade:		-1.0000	
Exit Grade:		-6.1500	
r = (g2 - g1) / L:		-5.1500	
K = l / (g2 - g1):		19.4175	
Middle Ordinate:		-0.6438	
Element: Linear			
	PT	3+50.0000	1601.3884
	PC	3+60.0000	1600.7734
Tangent Grade:		-6.1500	
Tangent Length:		10.0000	
Element: Parabola			
	PC	3+60.0000	1600.7734
	PI	5+60.0000	1588.4734
	PT	7+60.0000	1592.4734
	LOW	6+61.8405	1591.4918
Length:		400.0000	
Headlight Sight Distance:		250.2335	
Entrance Grade:		-6.1500	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		2.0375	
K = l / (g2 - g1):		49.0798	
Middle Ordinate:		4.0750	
Element: Linear			
	PT	7+60.0000	1592.4734
	POE	10+70.0801	1598.6750
Tangent Grade:		2.0000	
Tangent Length:		310.0801	

APPENDIX F

ALTERNATIVE 9B GEOMETRICS

Project Name: Add 2_I-40 Mainline
Description:
Horizontal Alignment Name: I-40 Survey
Description: v3_I-40
Style: Default

	STATION	EASTING	NORTHING
Element: Circular			
PC (5002)	3401+63.0000	1668517.2610	179652.5796
PI ( )	3428+22.7579	1670437.5540	181492.9020
CC (5001)		1675124.5508	172758.1723
PT (5004)	3453+51.0241	1673032.7119	182075.5400
Radius:	9549.3000		
Delta:	31^07'41.2793" Right		
Degree of Curvature(Arc):	0^35'59.9992"		
Length:	5188.0241		
Tangent:	2659.7578		
Chord:	5124.4545		
Middle Ordinate:	350.1630		
External:	363.4918		
Tangent Direction:	N 46^13'05.6199" E		
Radial Direction:	S 43^46'54.3801" E		
Chord Direction:	N 61^46'56.2589" E		
Radial Direction:	S 12^39'13.1008" E		
Tangent Direction:	N 77^20'46.8992" E		
Element: Linear			
PT (5004)	3453+51.0241	1673032.7119	182075.5400
PI (5005)	3503+41.1825	1677901.6700	183168.6680
Tangent Direction:	N 77^20'46.9011" E		
Tangent Length:	4990.1585		
Element: Linear			
PI (5005)	3503+41.1825	1677901.6700	183168.6680
PC (6)	3513+70.7030	1678906.1856	183394.1914
Tangent Direction:	N 77^20'46.9000" E		
Tangent Length:	1029.5205		
Element: Circular			
PC (6)	3513+70.7030	1678906.1856	183394.1914
PI ( )	3531+15.0638	1680608.1796	183776.3055
CC ( )		1681259.5126	172912.1162
PT ( )	3548+29.2410	1682343.6356	183600.2744
Radius:	10743.0000		
Delta:	18^26'43.6737" Right		
Degree of Curvature(Arc):	0^31'59.9926"		
Length:	3458.5380		
Tangent:	1744.3608		
Chord:	3443.6220		
Middle Ordinate:	138.8774		
External:	140.6962		
Tangent Direction:	N 77^20'46.9000" E		
Radial Direction:	S 12^39'13.1000" E		
Chord Direction:	N 86^34'08.7369" E		
Radial Direction:	S 5^47'30.5737" W		
Tangent Direction:	S 84^12'29.4263" E		

```
            Project Name: Add 2_Ramps
             Description:
Horizontal Alignment Name: Ramp A_9A_9B
             Description:
                   Style: Default
                                        STATION       EASTING      NORTHING

Element: Linear
               POB (     139)       1000+00.0000  1672631.9563   182021.9871
                PC (     140)       1003+01.7970  1672921.4163   182107.3944
          Tangent Direction: N 73^33'39.2870" E
             Tangent Length:           301.7970

Non-collinear

Element: Circular
                PC (     140)       1003+01.7970  1672921.4163   182107.3944
                PI (         )       1003+52.6053  1672970.8698   182119.0489
                CC (       4)                     1675124.9790   172757.0232
                PT (     195)       1004+03.4126  1673020.4438   182130.1797
                      Radius:          9606.5151
                       Delta:      0^36'21.8216" Right
    Degree of Curvature(Arc):      0^35'47.1346"
                      Length:           101.6155
                     Tangent:            50.8082
                       Chord:           101.6150
            Middle Ordinate:             0.1344
                    External:             0.1344
          Tangent Direction: N 76^44'21.4906" E
           Radial Direction: S 13^15'38.5094" E
            Chord Direction: N 77^02'32.4015" E
           Radial Direction: S 12^39'16.6877" E
          Tangent Direction: N 77^20'43.3123" E

Non-coincident

Element: Linear
                PT (     212)       1004+03.4126  1673021.4547   182130.4066
                PC (     213)       1012+76.3532  1673873.1935   182321.6302
          Tangent Direction: N 77^20'46.9007" E
             Tangent Length:           872.9406

Element: Circular
                PC (     213)       1012+76.3532  1673873.1935   182321.6302
                PI (         )       1016+21.5923  1674210.0475   182397.2571
                CC (     214)                     1673687.2523   183149.8404
                PT (     215)       1019+32.1404  1674398.4859   182686.5338
                      Radius:           848.8264
                       Delta:     44^15'56.2835" Left
    Degree of Curvature(Arc):      6^44'59.9989"
                      Length:           655.7872
                     Tangent:           345.2391
                       Chord:           639.5990
            Middle Ordinate:            62.5475
                    External:            67.5231
          Tangent Direction: N 77^20'46.9007" E
           Radial Direction: S 12^39'13.0993" E
            Chord Direction: N 55^12'48.7590" E
           Radial Direction: S 56^55'09.3828" E
          Tangent Direction: N 33^04'50.6172" E

Element: Linear
                PT (     215)       1019+32.1404  1674398.4859   182686.5338
                PC (     216)       1022+18.6920  1674554.8916   182926.6361
          Tangent Direction: N 33^04'50.6172" E
             Tangent Length:           286.5516

Non-coincident

Element: Circular
                PC (     161)       1022+18.6920  1674554.9188   182926.6780
                PI (         )       1023+07.0910  1674603.1688   183000.7477
                CC (     163)                     1674848.1847   182735.6409
                PT (     147)       1023+91.8683  1674680.8039   183043.0229
                      Radius:           350.0000
                       Delta:     28^20'57.6992" Right
    Degree of Curvature(Arc):     16^22'12.8018"
                      Length:           173.1764
                     Tangent:            88.3991
```

Chord:	171.4153
Middle Ordinate:	10.6562
External:	10.9909
Tangent Direction:	N 33^04'50.6172" E
Radial Direction:	S 56^55'09.3828" E
Chord Direction:	N 47^15'19.4668" E
Radial Direction:	S 28^34'11.6836" E
Tangent Direction:	N 61^25'48.3164" E

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp A-D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(149)	100+00.0000	1674689.8903	183026.3364
POE	(150)	101+92.8326	1674859.2425	183118.5549

Tangent Direction: N 61^25'48.3164" E
Tangent Length: 192.8326

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(127)	2000+00.0000	1672775.1795	181968.5524
PI	(128)	2002+98.7976	1673068.3727	182026.1522
Tangent Direction:		N 78^53'07.4332" E		
Tangent Length:		298.7976		
Element: Linear				
PI	(128)	2002+98.7976	1673068.3727	182026.1522
PC	(217)	2010+73.7974	1673824.5494	182195.9212
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		774.9998		
Element: Circular				
PC	(217)	2010+73.7974	1673824.5494	182195.9212
PI	( )	2014+37.0022	1674178.9327	182275.4836
CC	(218)		1674010.4906	181367.7110
PT	(219)	2017+60.1862	1674481.1811	182074.0796
Radius:		848.8264		
Delta:		46^19'52.4803" Right		
Degree of Curvature(Arc):		6^44'59.9989"		
Length:		686.3888		
Tangent:		363.2048		
Chord:		667.8402		
Middle Ordinate:		68.4396		
External:		74.4417		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		S 79^29'16.8591" E		
Radial Direction:		S 33^40'39.3810" W		
Tangent Direction:		S 56^19'20.6190" E		
Element: Linear				
PT	(219)	2017+60.1862	1674481.1811	182074.0796
POE	(130)	2020+17.5171	1674695.3244	181931.3847
Tangent Direction:		S 56^19'20.6190" E		
Tangent Length:		257.3308		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B-C_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC	(153)	200+00.0000	1674705.8602	181947.1960
PI	( )	200+94.4007	1674784.4177	181894.8490
CC	(125)		1674855.0259	182171.0499
PT	(157)	201+81.5776	1674878.4595	181903.0726
Radius:		269.0000		
Delta:		38^40'30.7114" Left		
Degree of Curvature(Arc):		21^17'58.3666"		
Length:		181.5776		
Tangent:		94.4007		
Chord:		178.1499		
Middle Ordinate:		15.1759		
External:		16.0833		
Tangent Direction:		S 56^19'20.6190" E		
Radial Direction:		S 33^40'39.3810" W		
Chord Direction:		S 75^39'35.9747" E		
Radial Direction:		S 4^59'51.3305" E		
Tangent Direction:		N 85^00'08.6695" E		
Element: Linear				
PT	(157)	201+81.5776	1674878.4595	181903.0726
POE	(158)	205+10.1291	1675205.7620	181931.6940
Tangent Direction:		N 85^00'08.6695" E		
Tangent Length:		328.5515		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp C_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC (	164)	3000+00.0000	1674716.3961	181963.0072
PI (	)	3001+09.9942	1674624.8621	182024.0011
CC (	125)		1674855.0259	182171.0499
PCC (	126)	3002+07.2438	1674607.9859	182132.6930
Radius:		250.0000		
Delta:		47^29'48.4042" Right		
Degree of Curvature(Arc):		22^55'05.9225"		
Length:		207.2438		
Tangent:		109.9942		
Chord:		201.3605		
Middle Ordinate:		21.1693		
External:		23.1277		
Tangent Direction:		N 56^19'20.6190" W		
Radial Direction:		N 33^40'39.3810" E		
Chord Direction:		N 32^34'26.4169" W		
Radial Direction:		N 81^10'27.7851" E		
Tangent Direction:		N 8^49'32.2149" W		
Element: Circular				
PCC (	126)	3002+07.2438	1674607.9859	182132.6930
PI (	)	3004+41.0750	1674572.1098	182363.7557
CC (	125)		1674855.0259	182171.0499
PT (	123)	3005+83.2400	1674800.2617	182414.9780
Radius:		250.0000		
Delta:		86^10'19.1156" Right		
Degree of Curvature(Arc):		22^55'05.9225"		
Length:		375.9962		
Tangent:		233.8312		
Chord:		341.5476		
Middle Ordinate:		67.4177		
External:		92.3113		
Tangent Direction:		N 8^49'32.2149" W		
Radial Direction:		N 81^10'27.7851" E		
Chord Direction:		N 34^15'37.3429" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT (	123)	3005+83.2400	1674800.2617	182414.9780
POE (	167)	3014+33.2400	1675629.6170	182601.1762
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		850.0000		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Circular				
PC (	134)	4000+00.0000	1674698.9767	183009.6500
PI (	)	4002+17.4821	1674507.9765	182905.6434
CC (	137)		1674818.5344	182790.0914
PCC (	138)	4003+57.9752	1674584.5376	182702.0829
Radius:		250.0000		
Delta:		82^02'30.7078" Left		
Degree of Curvature(Arc):		22^55'05.9225"		
Length:		357.9752		
Tangent:		217.4821		
Chord:		328.1674		
Middle Ordinate:		61.3825		
External:		81.3585		
Tangent Direction:		S 61^25'48.3164" W		
Radial Direction:		N 28^34'11.6836" W		
Chord Direction:		S 20^24'32.9625" W		
Radial Direction:		S 69^23'17.6086" W		
Tangent Direction:		S 20^36'42.3914" E		
Element: Circular				
PCC (	138)	4003+57.9752	1674584.5376	182702.0829
PI (	)	4005+75.4572	1674661.0987	182498.5225
CC (	137)		1674818.5344	182790.0914
PT (	135)	4007+15.9503	1674873.2986	182546.1634
Radius:		250.0000		
Delta:		82^02'30.7078" Left		
Degree of Curvature(Arc):		22^55'05.9225"		
Length:		357.9752		
Tangent:		217.4821		
Chord:		328.1674		
Middle Ordinate:		61.3825		
External:		81.3585		
Tangent Direction:		S 20^36'42.3914" E		
Radial Direction:		S 69^23'17.6086" W		
Chord Direction:		S 61^37'57.7453" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT (	135)	4007+15.9503	1674873.2986	182546.1634
POE (	154)	4014+65.9503	1675605.0826	182710.4560
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		750.0000		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp E_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(154)	5000+00.0000	1675605.0826	182710.4560
PC	(182)	5008+03.7818	1676389.3423	182886.5298
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		803.7818		
Element: Circular				
PC	(182)	5008+03.7818	1676389.3423	182886.5298
PI	( )	5010+47.1240	1676626.7742	182939.8356
CC	(185)		1676180.1585	183818.2663
PT	(122)	5012+80.3239	1676809.7393	183100.2700
Radius:		954.9297		
Delta:		28^35'33.0821" Left		
Degree of Curvature(Arc):		5^59'59.9991"		
Length:		476.5421		
Tangent:		243.3422		
Chord:		471.6126		
Middle Ordinate:		29.5724		
External:		30.5175		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		N 63^03'00.3597" E		
Radial Direction:		S 41^14'46.1814" E		
Tangent Direction:		N 48^45'13.8186" E		
Element: Linear				
PT	(122)	5012+80.3239	1676809.7393	183100.2700
PC	(124)	5015+55.8469	1677016.9006	183281.9210
Tangent Direction:		N 48^45'13.8186" E		
Tangent Length:		275.5230		
Element: Circular				
PC	(124)	5015+55.8469	1677016.9006	183281.9210
PI	( )	5017+19.4134	1677139.8836	183389.7597
CC	(132)		1677489.0862	182743.4238
PT	(133)	5018+77.4639	1677297.4885	183433.5171
Radius:		716.1973		
Delta:		25^43'45.7047" Right		
Degree of Curvature(Arc):		7^59'59.9977"		
Length:		321.6171		
Tangent:		163.5665		
Chord:		318.9215		
Middle Ordinate:		17.9775		
External:		18.4404		
Tangent Direction:		N 48^45'13.8186" E		
Radial Direction:		S 41^14'46.1814" E		
Chord Direction:		N 61^37'06.6710" E		
Radial Direction:		S 15^31'00.4766" E		
Tangent Direction:		N 74^28'59.5234" E		
Element: Linear				
PT	(133)	5018+77.4639	1677297.4885	183433.5171
PI	(131)	5020+31.6789	1677446.0827	183474.7729
Tangent Direction:		N 74^28'59.5234" E		
Tangent Length:		154.2150		
Element: Linear				
PI	(131)	5020+31.6789	1677446.0827	183474.7729
POE	(193)	5020+81.6642	1677494.7143	183486.3268
Tangent Direction:		N 76^38'07.5757" E		
Tangent Length:		49.9853		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp F_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(167)	6000+00.0000	1675629.6170	182601.1762
PC	(168)	6007+07.8879	1676320.3118	182756.2439
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		707.8879		
Element: Circular				
PC	(168)	6007+07.8879	1676320.3118	182756.2439
PI	( )	6009+79.4433	1676585.2717	182815.7299
CC	(171)		1676477.1996	182057.4415
PT	(199)	6012+27.0097	1676823.0636	182684.5911
Radius:		716.1973		
Delta:		41^31'47.0703" Right		
Degree of Curvature(Arc):		7^59'59.9977"		
Length:		519.1218		
Tangent:		271.5555		
Chord:		507.8322		
Middle Ordinate:		46.5219		
External:		49.7537		
Tangent Direction:		N 77^20'46.9007" E		
Radial Direction:		S 12^39'13.0993" E		
Chord Direction:		S 81^53'19.5641" E		
Radial Direction:		S 28^52'33.9711" W		
Tangent Direction:		S 61^07'26.0289" E		
Element: Linear				
PT	(199)	6012+27.0097	1676823.0636	182684.5911
PC	(200)	6014+07.8659	1676981.4333	182597.2525
Tangent Direction:		S 61^07'26.0289" E		
Tangent Length:		180.8562		
Element: Circular				
PC	(200)	6014+07.8659	1676981.4333	182597.2525
PI	( )	6015+46.7321	1677103.0337	182530.1917
CC	(203)		1677832.7908	184141.0054
PT	(204)	6016+85.0260	1677233.6340	182482.9965
Radius:		1762.9471		
Delta:		9^00'27.7353" Left		
Degree of Curvature(Arc):		3^14'59.9997"		
Length:		277.1601		
Tangent:		138.8662		
Chord:		276.8748		
Middle Ordinate:		5.4439		
External:		5.4607		
Tangent Direction:		S 61^07'26.0289" E		
Radial Direction:		S 28^52'33.9711" W		
Chord Direction:		S 65^37'39.8966" E		
Radial Direction:		S 19^52'06.2358" W		
Tangent Direction:		S 70^07'53.7642" E		
Element: Linear				
PT	(204)	6016+85.0260	1677233.6340	182482.9965
PI	(201)	6017+60.1010	1677304.2402	182457.4814
Tangent Direction:		S 70^07'53.7642" E		
Tangent Length:		75.0750		
Element: Linear				
PI	(201)	6017+60.1010	1677304.2402	182457.4814
POE	(202)	6018+10.1947	1677352.3045	182443.3678
Tangent Direction:		S 73^38'08.1889" E		
Tangent Length:		50.0936		

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp G_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(198)	7000+00.0000	1677363.8449	182475.3028
PI	(136)	7000+50.0616	1677317.6647	182494.6302
Tangent Direction:		N 67^17'22.6773" W		
Tangent Length:		50.0616		
Element: Linear				
PI	(136)	7000+50.0616	1677317.6647	182494.6302
PC	(141)	7001+01.2023	1677269.5681	182512.0109
Tangent Direction:		N 70^07'53.7642" W		
Tangent Length:		51.1408		
Element: Circular				
PC	(141)	7001+01.2023	1677269.5681	182512.0109
PI	( )	7002+17.2304	1677160.4465	182551.4444
CC	(152)		1677659.0200	183589.7167
PT	(194)	7003+32.4704	1677061.4442	182611.9511
Radius:		1145.9156		
Delta:		11^33'48.2407" Right		
Degree of Curvature(Arc):		4^59'59.9998"		
Length:		231.2680		
Tangent:		116.0281		
Chord:		230.8757		
Middle Ordinate:		5.8293		
External:		5.8592		
Tangent Direction:		N 70^07'53.7642" W		
Radial Direction:		N 19^52'06.2358" E		
Chord Direction:		N 64^20'59.6439" W		
Radial Direction:		N 31^25'54.4764" E		
Tangent Direction:		N 58^34'05.5236" W		
Element: Linear				
PT	(194)	7003+32.4704	1677061.4442	182611.9511
PC	(143)	7004+12.5339	1676993.1290	182653.7029
Tangent Direction:		N 58^34'05.5236" W		
Tangent Length:		80.0636		
Element: Circular				
PC	(143)	7004+12.5339	1676993.1290	182653.7029
PI	( )	7007+68.1827	1676689.6675	182839.1678
CC	(151)		1677068.2226	182776.5725
PT	(156)	7007+54.1245	1677036.6784	182917.0751
Radius:		144.0000		
Delta:		135^54'52.4243" Right		
Degree of Curvature(Arc):		39^47'19.4488"		
Length:		341.5906		
Tangent:		355.6488		
Chord:		266.9484		
Middle Ordinate:		89.9571		
External:		239.6953		
Tangent Direction:		N 58^34'05.5236" W		
Radial Direction:		N 31^25'54.4764" E		
Chord Direction:		N 9^23'20.6886" E		
Radial Direction:		S 12^39'13.0993" E		
Tangent Direction:		N 77^20'46.9007" E		
Element: Linear				
PT	(156)	7007+54.1245	1677036.6784	182917.0751
PI	(144)	7016+53.2370	1677913.9534	183114.0318
Tangent Direction:		N 77^20'46.9007" E		
Tangent Length:		899.1126		
Element: Linear				
PI	(144)	7016+53.2370	1677913.9534	183114.0318
PI	(146)	7021+74.1245	1678422.1896	183228.1357
Tangent Direction:		N 77^20'46.9000" E		
Tangent Length:		520.8874		
Element: Linear				
PI	(146)	7021+74.1245	1678422.1896	183228.1357
POE	(148)	7024+74.3644	1678712.2746	183305.5613
Tangent Direction:		N 75^03'20.7039" E		

Tangent Length: 300.2399

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp H_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	(189)	8000+00.0000	1677504.0996	183452.5229
PI	(190)	8000+49.9916	1677456.5160	183437.1943
Tangent Direction:		S 72^08'39.3450" W		
Tangent Length:		49.9916		
Element: Linear				
PI	(190)	8000+49.9916	1677456.5160	183437.1943
PC	(88)	8002+04.2067	1677307.9218	183395.9386
Tangent Direction:		S 74^28'59.5234" W		
Tangent Length:		154.2150		
Element: Circular				
PC	(88)	8002+04.2067	1677307.9218	183395.9386
PI	( )	8003+48.5542	1677168.8354	183357.3226
CC	(93)		1677347.5149	183253.3329
PCC	(121)	8004+32.9866	1677203.9645	183217.3149
Radius:		148.0000		
Delta:		88^34'06.3101" Left		
Degree of Curvature(Arc):		38^42'48.1123"		
Length:		228.7800		
Tangent:		144.3475		
Chord:		206.6725		
Middle Ordinate:		42.0490		
External:		58.7371		
Tangent Direction:		S 74^28'59.5234" W		
Radial Direction:		N 15^31'00.4766" W		
Chord Direction:		S 30^11'56.3683" W		
Radial Direction:		S 75^54'53.2133" W		
Tangent Direction:		S 14^05'06.7867" E		
Element: Circular				
PCC	(121)	8004+32.9866	1677203.9645	183217.3149
PI	( )	8005+77.3342	1677239.0936	183077.3072
CC	(93)		1677347.5149	183253.3329
PT	(89)	8006+61.7666	1677379.9353	183108.9275
Radius:		148.0000		
Delta:		88^34'06.3128" Left		
Degree of Curvature(Arc):		38^42'48.1123"		
Length:		228.7800		
Tangent:		144.3475		
Chord:		206.6725		
Middle Ordinate:		42.0490		
External:		58.7371		
Tangent Direction:		S 14^05'06.7867" E		
Radial Direction:		S 75^54'53.2133" W		
Chord Direction:		S 58^22'09.9431" E		
Radial Direction:		S 12^39'13.0995" E		
Tangent Direction:		N 77^20'46.9005" E		
Element: Linear				
PT	(89)	8006+61.7666	1677379.9353	183108.9275
PI	(197)	8014+61.7666	1678160.5049	183284.1729
Tangent Direction:		N 77^20'46.9005" E		
Tangent Length:		800.0000		
Element: Linear				
PI	(197)	8014+61.7666	1678160.5049	183284.1729
POE	(207)	8017+62.0065	1678455.8472	183338.1814
Tangent Direction:		N 79^38'13.0962" E		
Tangent Length:		300.2399		

Project Name: Add 2_Gary Blvd
Description:
Horizontal Alignment Name: Gary Blvd_2D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB (	27)	100+00.0000	1675207.1390	181355.9973
PC (	28)	104+68.6515	1675210.0956	181824.6395
Tangent Direction:	N 0^21'41.2877" E			
Tangent Length:	468.6515			
Element: Circular				
PC (	28)	104+68.6515	1675210.0956	181824.6395
PI (	)	105+99.3651	1675210.9202	181955.3505
CC (	31)		1674064.2024	181831.8688
PT (	32)	107+28.9537	1675182.2865	182082.8895
Radius:	1145.9160			
Delta:	13^00'54.3866" Left			
Degree of Curvature(Arc):	4^59'59.9936"			
Length:	260.3022			
Tangent:	130.7137			
Chord:	259.7430			
Middle Ordinate:	7.3832			
External:	7.4311			
Tangent Direction:	N 0^21'41.2877" E			
Radial Direction:	S 89^38'18.7123" E			
Chord Direction:	N 6^08'45.9056" W			
Radial Direction:	N 77^20'46.9011" E			
Tangent Direction:	N 12^39'13.0989" W			
Element: Linear				
PT (	32)	107+28.9537	1675182.2865	182082.8895
PC (	29)	113+40.2902	1675048.3691	182679.3779
Tangent Direction:	N 12^39'13.0989" W			
Tangent Length:	611.3365			
Element: Circular				
PC (	29)	113+40.2902	1675048.3691	182679.3779
PI (	)	115+00.4845	1675013.2775	182835.6814
CC (	33)		1673930.2850	182428.3572
PT (	34)	116+58.6158	1674936.6677	182976.3695
Radius:	1145.9160			
Delta:	15^54'58.5847" Left			
Degree of Curvature(Arc):	4^59'59.9936"			
Length:	318.3256			
Tangent:	160.1943			
Chord:	317.3030			
Middle Ordinate:	11.0358			
External:	11.1431			
Tangent Direction:	N 12^39'13.0989" W			
Radial Direction:	N 77^20'46.9011" E			
Chord Direction:	N 20^36'42.3913" W			
Radial Direction:	N 61^25'48.3164" E			
Tangent Direction:	N 28^34'11.6836" W			
Element: Linear				
PT (	34)	116+58.6158	1674936.6677	182976.3695
PC (	30)	120+50.9953	1674749.0197	183320.9706
Tangent Direction:	N 28^34'11.6836" W			
Tangent Length:	392.3795			
Element: Circular				
PC (	30)	120+50.9953	1674749.0197	183320.9706
PI (	)	123+89.8632	1674586.9627	183618.5760
CC (	35)		1675755.4024	183868.9829
PT (	36)	127+09.9512	1674612.8298	183956.4551
Radius:	1145.9160			
Delta:	32^56'52.0186" Right			
Degree of Curvature(Arc):	4^59'59.9936"			
Length:	658.9559			
Tangent:	338.8679			
Chord:	649.9141			
Middle Ordinate:	47.0409			
External:	49.0547			
Tangent Direction:	N 28^34'11.6836" W			
Radial Direction:	N 61^25'48.3164" E			
Chord Direction:	N 12^05'45.6743" W			

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          Radial Direction: S 85^37'19.6650" E
         Tangent Direction: N  4^22'40.3350" E

Element: Linear
              PT (      36)        127+09.9512  1674612.8298   183956.4551
             POE (      56)        133+97.9449  1674665.3471   184642.4415
         Tangent Direction: N  4^22'40.3350" E
            Tangent Length:           687.9937
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Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Lexington Ave_2B_2C_2D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	( )	10+00.0000	1674375.0800	183999.1000
PC	( )	11+04.0505	1674479.1293	183998.5947
Tangent Direction:		S 89^43'18.3134" E		
Tangent Length:		104.0505		
Element: Circular				
PC	( )	11+04.0505	1674479.1293	183998.5947
PI	( )	11+31.8023	1674506.8808	183998.4599
CC	( )		1674476.5998	183477.7301
PT	( )	11+59.5017	1674534.4608	183995.3771
Radius:		520.8707		
Delta:		6^05'58.6485" Right		
Degree of Curvature(Arc):		11^00'00.0017"		
Length:		55.4511		
Tangent:		27.7518		
Chord:		55.4249		
Middle Ordinate:		0.7377		
External:		0.7388		
Tangent Direction:		S 89^43'18.3134" E		
Radial Direction:		S 0^16'41.6866" W		
Chord Direction:		S 86^40'18.9892" E		
Radial Direction:		S 6^22'40.3350" W		
Tangent Direction:		S 83^37'19.6650" E		
Element: Linear				
PT	( )	11+59.5017	1674534.4608	183995.3771
PC	( )	13+81.1245	1674754.7119	183970.7581
Tangent Direction:		S 83^37'19.6650" E		
Tangent Length:		221.6228		
Element: Circular				
PC	( )	13+81.1245	1674754.7119	183970.7581
PI	( )	14+08.0913	1674781.5119	183967.7625
CC	( )		1674812.5729	184488.4051
PT	(18)	14+35.0101	1674808.4779	183967.5505
Radius:		520.8707		
Delta:		5^55'38.7071" Left		
Degree of Curvature(Arc):		11^00'00.0017"		
Length:		53.8856		
Tangent:		26.9669		
Chord:		53.8616		
Middle Ordinate:		0.6967		
External:		0.6976		
Tangent Direction:		S 83^37'19.6650" E		
Radial Direction:		S 6^22'40.3350" W		
Chord Direction:		S 86^35'09.0185" E		
Radial Direction:		S 0^27'01.6279" W		
Tangent Direction:		S 89^32'58.3721" E		
Element: Linear				
PT	( )	14+35.0101	1674808.4779	183967.5505
POE	( )	15+66.6551	1674940.1189	183966.5155
Tangent Direction:		S 89^32'58.3721" E		
Tangent Length:		131.6451		

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Red Wheat_2D_9A_9B
Description:
Style: Default

		STATION	EASTING	NORTHING
Element: Linear				
POB	80	0+00.0000	1674035.4664	182579.4555
PC		0+89.7392	1674124.0790	182593.6305
Tangent Direction:		N 80^54'42.0746" E		
Tangent Length:		89.7392		
Element: Circular				
PC		0+89.7392	1674124.0790	182593.6305
PI		1+81.2180	1674214.4093	182608.0801
CC	81		1674076.6920	182889.8643
PCC		2+67.3229	1674281.3080	182670.4735
Radius:		300.0000		
Delta:		33^54'57.5469" Left		
Degree of Curvature(Arc):		19^05'54.9354"		
Length:		177.5837		
Tangent:		91.4787		
Chord:		175.0023		
Middle Ordinate:		13.0443		
External:		13.6373		
Tangent Direction:		N 80^54'42.0746" E		
Radial Direction:		S 9^05'17.9254" E		
Chord Direction:		N 63^57'13.3011" E		
Radial Direction:		S 43^00'15.4724" E		
Tangent Direction:		N 46^59'44.5276" E		
Element: Circular				
PCC		2+67.3229	1674281.3080	182670.4735
PI		5+05.1106	1674455.2027	182832.6574
CC	76		1673723.0398	183269.0528
PT	82	7+30.1583	1674515.1305	183062.7696
Radius:		818.5111		
Delta:		32^23'54.5297" Left		
Degree of Curvature(Arc):		7^00'00.0011"		
Length:		462.8354		
Tangent:		237.7877		
Chord:		456.6938		
Middle Ordinate:		32.4970		
External:		33.8406		
Tangent Direction:		N 46^59'44.5276" E		
Radial Direction:		S 43^00'15.4724" E		
Chord Direction:		N 30^47'47.2628" E		
Radial Direction:		S 75^24'10.0021" E		
Tangent Direction:		N 14^35'49.9979" E		
Element: Linear				
PT	82	7+30.1583	1674515.1305	183062.7696
PC	83	7+85.4266	1674529.0594	183116.2539
Tangent Direction:		N 14^35'49.9979" E		
Tangent Length:		55.2682		
Element: Circular				
PC	83	7+85.4266	1674529.0594	183116.2539
PI		9+18.3153	1674562.5503	183244.8532
CC	84		1674819.3758	183040.6471
PT	85	10+35.6183	1674680.2957	183306.4605
Radius:		300.0000		
Delta:		47^46'59.1651" Right		
Degree of Curvature(Arc):		19^05'54.9354"		
Length:		250.1917		
Tangent:		132.8888		
Chord:		243.0041		
Middle Ordinate:		25.7059		
External:		28.1150		
Tangent Direction:		N 14^35'49.9979" E		
Radial Direction:		S 75^24'10.0021" E		
Chord Direction:		N 38^29'19.5805" E		
Radial Direction:		S 27^37'10.8370" E		
Tangent Direction:		N 62^22'49.1630" E		
Element: Linear				
PT	85	10+35.6183	1674680.2957	183306.4605
POE	86	11+03.0801	1674740.0699	183337.7358

Tangent Direction: N 62^22'49.1630" E
Tangent Length: 67.4618

Project Name: Add 2_I-40 Mainline
Description:
Horizontal Alignment Name: I-40 Survey
Description: v3_I-40
Style: Default
Vertical Alignment Name: VA_Ultimate
Description: Final design includes Neptune
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	3440+00.0000	1618.1005
	PC	3441+75.0000	1620.9005
Tangent Grade:		1.6000	
Tangent Length:		175.0000	
Element: Parabola			
	PC	3441+75.0000	1620.9005
	PI	3443+00.0000	1622.9005
	PT	3444+25.0000	1624.5880
Length:		250.0000	
Stopping Sight Distance:		4441.6010	
Entrance Grade:		1.6000	
Exit Grade:		1.3500	
r = (g2 - g1) / L:		-0.1000	
K = l / (g2 - g1):		1000.0000	
Middle Ordinate:		-0.0781	
Element: Linear			
	PT	3444+25.0000	1624.5880
	PC	3446+25.0000	1627.2880
Tangent Grade:		1.3500	
Tangent Length:		200.0000	
Element: Parabola			
	PC	3446+25.0000	1627.2880
	PI	3447+50.0000	1628.9755
	PT	3448+75.0000	1630.9005
Length:		250.0000	
Headlight Sight Distance:		4716.8453	
Entrance Grade:		1.3500	
Exit Grade:		1.5400	
r = (g2 - g1) / L:		0.0760	
K = l / (g2 - g1):		1315.7895	
Middle Ordinate:		0.0594	
Element: Linear			
	PT	3448+75.0000	1630.9005
	PC	3449+70.0000	1632.3635
Tangent Grade:		1.5400	
Tangent Length:		95.0000	
Element: Parabola			
	PC	3449+70.0000	1632.3635
	PI	3450+75.0000	1633.9805
	PT	3451+80.0000	1636.0805
Length:		210.0000	
Headlight Sight Distance:		1704.9350	
Entrance Grade:		1.5400	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		0.2190	
K = l / (g2 - g1):		456.5225	
Middle Ordinate:		0.1207	
Element: Linear			
	PT	3451+80.0000	1636.0805
	PC	3451+83.5487	1636.1514
Tangent Grade:		2.0000	
Tangent Length:		3.5487	
Element: Parabola			
	PC	3451+83.5487	1636.1514
	PI	3458+33.5487	1649.1514
	PT	3464+83.5487	1628.3514
	HIGH	3456+83.5486	1641.1514
Length:		1300.0000	
Stopping Sight Distance:		734.5578	
Entrance Grade:		2.0000	
Exit Grade:		-3.2000	

```
      r = ( g2 - g1 ) / L:          -0.4000
      K = l / ( g2 - g1 ):         250.0000
          Middle Ordinate:          -8.4500

Element: Linear
                          PT     3464+83.5487        1628.3514
                          PC     3479+93.0000        1580.0490
              Tangent Grade:          -3.2000
             Tangent Length:       1509.4513

Element: Parabola
                          PC     3479+93.0000        1580.0490
                          PI     3487+63.0000        1555.4090
                          PT     3495+33.0000        1577.3540
                         LOW     3488+07.5454        1567.0163
                    Length:        1540.0000
  Headlight Sight Distance:         993.4034
            Entrance Grade:          -3.2000
                Exit Grade:           2.8500
      r = ( g2 - g1 ) / L:           0.3929
      K = l / ( g2 - g1 ):         254.5455
          Middle Ordinate:          11.6462

Element: Linear
                          PT     3495+33.0000        1577.3540
                          PC     3495+45.0000        1577.6960
              Tangent Grade:           2.8500
             Tangent Length:          12.0000

Element: Parabola
                          PC     3495+45.0000        1577.6960
                          PI     3503+70.0000        1601.2085
                          PT     3511+95.0000        1569.8585
                        HIGH     3502+52.1429        1587.7728
                    Length:        1650.0000
   Stopping Sight Distance:         731.7911
            Entrance Grade:           2.8500
                Exit Grade:          -3.8000
      r = ( g2 - g1 ) / L:          -0.4030
      K = l / ( g2 - g1 ):         248.1203
          Middle Ordinate:         -13.7156

Element: Linear
                          PT     3511+95.0000        1569.8585
                          PC     3516+50.0000        1552.5685
              Tangent Grade:          -3.8000
             Tangent Length:         455.0000

Element: Parabola
                          PC     3516+50.0000        1552.5685
                          PI     3518+25.0000        1545.9185
                          PT     3520+00.0000        1541.1935
                    Length:         350.0000
  Headlight Sight Distance:        1218.1193
            Entrance Grade:          -3.8000
                Exit Grade:          -2.7000
      r = ( g2 - g1 ) / L:           0.3143
      K = l / ( g2 - g1 ):         318.1818
          Middle Ordinate:           0.4813
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp A_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	1011+52.3900	1636.9600
	PI	1011+72.3900	1636.6200
Tangent Grade:		-1.7000	
Tangent Length:		20.0000	
Element: Linear			
	PI	1011+72.3900	1636.6200
	PI	1011+92.3900	1636.2600
Tangent Grade:		-1.8000	
Tangent Length:		20.0000	
Element: Linear			
	PI	1011+92.3900	1636.2600
	PI	1012+12.3900	1635.8900
Tangent Grade:		-1.8500	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+12.3900	1635.8900
	PI	1012+32.3900	1635.4250
Tangent Grade:		-2.3250	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+32.3900	1635.4250
	PI	1012+52.3900	1634.9150
Tangent Grade:		-2.5500	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+52.3900	1634.9150
	PI	1012+72.3900	1634.3950
Tangent Grade:		-2.6000	
Tangent Length:		20.0000	
Element: Linear			
	PI	1012+72.3900	1634.3950
	PI	1012+92.1800	1633.8594
Tangent Grade:		-2.7064	
Tangent Length:		19.7900	
Element: Linear			
	PI	1012+92.1800	1633.8594
	PI	1013+11.8900	1633.2721
Tangent Grade:		-2.9797	
Tangent Length:		19.7100	
Element: Linear			
	PI	1013+11.8900	1633.2721
	PI	1013+31.6100	1632.7607
Tangent Grade:		-2.5933	
Tangent Length:		19.7200	
Element: Linear			
	PI	1013+31.6100	1632.7607
	PI	1013+51.3400	1632.2378
Tangent Grade:		-2.6503	
Tangent Length:		19.7300	
Element: Linear			
	PI	1013+51.3400	1632.2378
	PI	1013+71.0900	1631.6856
Tangent Grade:		-2.7959	
Tangent Length:		19.7500	
Element: Linear			
	PI	1013+71.0900	1631.6856
	PI	1013+90.8900	1631.1039

```
            Tangent Grade:           -2.9379
           Tangent Length:           19.8000

Element: Linear
                       PI      1013+90.8900         1631.1039
                       PI      1014+10.7300         1630.5026
            Tangent Grade:           -3.0307
           Tangent Length:           19.8400

Element: Linear
                       PI      1014+10.7300         1630.5026
                       PI      1014+30.6300         1629.8717
            Tangent Grade:           -3.1704
           Tangent Length:           19.9000

Element: Linear
                       PI      1014+30.6300         1629.8717
                       PI      1014+50.6000         1629.2112
            Tangent Grade:           -3.3075
           Tangent Length:           19.9700

Element: Linear
                       PI      1014+50.6000         1629.2112
                       PI      1014+54.0159         1629.0960
            Tangent Grade:           -3.3737
           Tangent Length:            3.4159

Element: Linear
                       PI      1014+54.0159         1629.0960
                       PC      1015+25.0000         1626.9309
            Tangent Grade:           -3.0500
           Tangent Length:           70.9841

Element: Parabola
                       PC      1015+25.0000         1626.9309
                       PI      1016+75.0000         1622.3559
                       PT      1018+25.0000         1614.8559
                   Length:          300.0000
  Stopping Sight Distance:          703.4104
           Entrance Grade:           -3.0500
               Exit Grade:           -5.0000
      r = ( g2 - g1 ) / L:           -0.6500
      K = l / ( g2 - g1 ):          153.8462
          Middle Ordinate:           -0.7313

Element: Linear
                       PT      1018+25.0000         1614.8559
                       PC      1022+35.0000         1594.3559
            Tangent Grade:           -5.0000
           Tangent Length:          410.0000

Element: Parabola
                       PC      1022+35.0000         1594.3559
                       PI      1023+10.0000         1590.6059
                       PT      1023+85.0000         1589.1059
                   Length:          150.0000
 Headlight Sight Distance:          340.0000
           Entrance Grade:           -5.0000
               Exit Grade:           -2.0000
      r = ( g2 - g1 ) / L:            2.0000
      K = l / ( g2 - g1 ):           50.0000
          Middle Ordinate:            0.5625

Element: Linear
                       PT      1023+85.0000         1589.1059
                      POE      1023+91.8066         1588.9698
            Tangent Grade:           -2.0000
           Tangent Length:            6.8066
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp A-D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	100+00.0000	1588.0769
	PI	101+59.8326	1584.8802
Tangent Grade:		-2.0000	
Tangent Length:		159.8326	
Element: Linear			
	PI	101+59.8326	1584.8802
	POE	101+92.8326	1584.2202
Tangent Grade:		-2.0000	
Tangent Length:		33.0000	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	2009+63.8000	1637.8900
	PI	2009+83.8000	1637.5900
Tangent Grade:		-1.5000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2009+83.8000	1637.5900
	PI	2010+03.8000	1637.2900
Tangent Grade:		-1.5000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+03.8000	1637.2900
	PI	2010+23.8000	1636.9100
Tangent Grade:		-1.9000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+23.8000	1636.9100
	PI	2010+43.8000	1636.4700
Tangent Grade:		-2.2000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+43.8000	1636.4700
	PI	2010+63.8000	1636.0100
Tangent Grade:		-2.3000	
Tangent Length:		20.0000	
Element: Linear			
	PI	2010+63.8000	1636.0100
	PI	2010+83.6600	1635.5378
Tangent Grade:		-2.3776	
Tangent Length:		19.8600	
Element: Linear			
	PI	2010+83.6600	1635.5378
	PI	2011+03.3700	1635.0245
Tangent Grade:		-2.6043	
Tangent Length:		19.7100	
Element: Linear			
	PI	2011+03.3700	1635.0245
	PI	2011+23.0800	1634.5500
Tangent Grade:		-2.4074	
Tangent Length:		19.7100	
Element: Linear			
	PI	2011+23.0800	1634.5500
	PI	2011+42.8100	1634.0895
Tangent Grade:		-2.3340	
Tangent Length:		19.7300	
Element: Linear			
	PI	2011+42.8100	1634.0895
	PI	2011+62.5600	1633.6095
Tangent Grade:		-2.4304	
Tangent Length:		19.7500	
Element: Linear			
	PI	2011+62.5600	1633.6095
	PI	2011+82.3400	1633.0901
Tangent Grade:		-2.6259	
Tangent Length:		19.7800	
Element: Linear			
	PI	2011+82.3400	1633.0901
	PI	2012+02.1700	1632.5512

```
            Tangent Grade:           -2.7176
           Tangent Length:           19.8300

Element: Linear
                        PI      2012+02.1700         1632.5512
                        PI      2012+22.0500         1631.9927
            Tangent Grade:           -2.8094
           Tangent Length:           19.8800

Element: Linear
                        PI      2012+22.0500         1631.9927
                        PI      2012+27.7501         1631.8246
            Tangent Grade:           -2.9489
           Tangent Length:            5.7001

Element: Linear
                        PI      2012+27.7501         1631.8246
                        PC      2012+50.0000         1631.2461
            Tangent Grade:           -2.6000
           Tangent Length:           22.2499

Element: Parabola
                        PC      2012+50.0000         1631.2461
                        PI      2014+00.0000         1627.3461
                        PT      2015+50.0000         1618.3461
                    Length:          300.0000
  Stopping Sight Distance:          467.3971
           Entrance Grade:           -2.6000
               Exit Grade:           -6.0000
      r = ( g2 - g1 ) / L:           -1.1333
      K = l / ( g2 - g1 ):           88.2353
          Middle Ordinate:           -1.2750

Element: Linear
                        PT      2015+50.0000         1618.3461
                        PC      2017+75.0000         1604.8461
            Tangent Grade:           -6.0000
           Tangent Length:          225.0000

Element: Parabola
                        PC      2017+75.0000         1604.8461
                        PI      2018+50.0000         1600.3461
                        PT      2019+25.0000         1596.5961
                    Length:          150.0000
 Headlight Sight Distance:          621.5352
           Entrance Grade:           -6.0000
               Exit Grade:           -5.0000
      r = ( g2 - g1 ) / L:            0.6667
      K = l / ( g2 - g1 ):          150.0000
          Middle Ordinate:            0.1875

Element: Linear
                        PT      2019+25.0000         1596.5961
                       POE      2020+17.5171         1591.9703
            Tangent Grade:           -5.0000
           Tangent Length:           92.5171
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp B-C_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	200+00.0000	1591.1153
	PC	202+00.0000	1581.1153
Tangent Grade:		-5.0000	
Tangent Length:		200.0000	
Element: Parabola			
	PC	202+00.0000	1581.1153
	PI	203+00.0000	1576.1153
	PT	204+00.0000	1574.1153
Length:		200.0000	
Headlight Sight Distance:		400.0000	
Entrance Grade:		-5.0000	
Exit Grade:		-2.0000	
r = (g2 - g1) / L:		1.5000	
K = l / (g2 - g1):		66.6667	
Middle Ordinate:		0.7500	
Element: Linear			
	PT	204+00.0000	1574.1153
	PI	204+77.1276	1572.5727
Tangent Grade:		-2.0000	
Tangent Length:		77.1276	
Element: Linear			
	PI	204+77.1276	1572.5727
	POE	205+10.1291	1571.9127
Tangent Grade:		-2.0000	
Tangent Length:		33.0014	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp C_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Parabola			
	PC	3000+00.0000	1589.9753
	PI	3001+00.0000	1594.9753
	PT	3002+00.0000	1600.4753
Length:		200.0000	
Headlight Sight Distance:		1506.2258	
Entrance Grade:		5.0000	
Exit Grade:		5.5000	
r = (g2 - g1) / L:		0.2500	
K = l / (g2 - g1):		400.0000	
Middle Ordinate:		0.1250	
Element: Linear			
	PT	3002+00.0000	1600.4753
	PC	3002+65.0000	1604.0503
Tangent Grade:		5.5000	
Tangent Length:		65.0000	
Element: Parabola			
	PC	3002+65.0000	1604.0503
	PI	3003+90.0000	1610.9253
	PT	3005+15.0000	1607.8003
	HIGH	3004+36.8750	1608.7768
Length:		250.0000	
Stopping Sight Distance:		259.8938	
Entrance Grade:		5.5000	
Exit Grade:		-2.5000	
r = (g2 - g1) / L:		-3.2000	
K = l / (g2 - g1):		31.2500	
Middle Ordinate:		-2.5000	
Element: Linear			
	PT	3005+15.0000	1607.8003
	PI	3005+25.3703	1607.5410
Tangent Grade:		-2.5000	
Tangent Length:		10.3703	
Element: Linear			
	PI	3005+25.3703	1607.5410
	PI	3005+35.5500	1607.2671
Tangent Grade:		-2.6907	
Tangent Length:		10.1797	
Element: Linear			
	PI	3005+35.5500	1607.2671
	PI	3005+54.6600	1606.7156
Tangent Grade:		-2.8859	
Tangent Length:		19.1100	
Element: Linear			
	PI	3005+54.6600	1606.7156
	PI	3005+73.7000	1606.2577
Tangent Grade:		-2.4049	
Tangent Length:		19.0400	
Element: Linear			
	PI	3005+73.7000	1606.2577
	PI	3005+93.2400	1605.7558
Tangent Grade:		-2.5686	
Tangent Length:		19.5400	
Element: Linear			
	PI	3005+93.2400	1605.7558
	PI	3006+13.2400	1605.2474
Tangent Grade:		-2.5420	
Tangent Length:		20.0000	
Element: Linear			
	PI	3006+13.2400	1605.2474

	PI	3006+33.2400	1604.7100
Tangent Grade:		-2.6870	
Tangent Length:		20.0000	

Element: Linear

	PI	3006+33.2400	1604.7100
	PI	3006+53.2400	1604.0700
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	

Element: Linear

	PI	3006+53.2400	1604.0700
	PI	3006+73.2400	1603.4300
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	

Element: Linear

	PI	3006+73.2400	1603.4300
	PI	3006+93.2400	1602.7900
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	

Element: Linear

	PI	3006+93.2400	1602.7900
	PI	3007+13.2400	1602.1500
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	

Element: Linear

	PI	3007+13.2400	1602.1500
	POE	3007+33.2400	1601.5100
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Parabola			
	PC	4000+00.0000	1587.1269
	PI	4000+75.0000	1588.6269
	PT	4001+50.0000	1592.3769
Length:		150.0000	
Headlight Sight Distance:		340.0000	
Entrance Grade:		2.0000	
Exit Grade:		5.0000	
r = (g2 - g1) / L:		2.0000	
K = l / (g2 - g1):		50.0000	
Middle Ordinate:		0.5625	
Element: Linear			
	PT	4001+50.0000	1592.3769
	PC	4003+30.0000	1601.3769
Tangent Grade:		5.0000	
Tangent Length:		180.0000	
Element: Parabola			
	PC	4003+30.0000	1601.3769
	PI	4004+80.0000	1608.8769
	PT	4006+30.0000	1605.0519
	HIGH	4005+28.6755	1606.3438
Length:		300.0000	
Stopping Sight Distance:		292.8486	
Entrance Grade:		5.0000	
Exit Grade:		-2.5500	
r = (g2 - g1) / L:		-2.5167	
K = l / (g2 - g1):		39.7351	
Middle Ordinate:		-2.8312	
Element: Linear			
	PT	4006+30.0000	1605.0519
	PI	4006+68.0553	1604.0815
Tangent Grade:		-2.5500	
Tangent Length:		38.0553	
Element: Linear			
	PI	4006+68.0553	1604.0815
	PI	4006+87.3500	1603.5215
Tangent Grade:		-2.9023	
Tangent Length:		19.2947	
Element: Linear			
	PI	4006+87.3500	1603.5215
	PI	4007+06.4100	1603.0577
Tangent Grade:		-2.4334	
Tangent Length:		19.0600	
Element: Linear			
	PI	4007+06.4100	1603.0577
	PI	4007+25.9500	1602.5558
Tangent Grade:		-2.5686	
Tangent Length:		19.5400	
Element: Linear			
	PI	4007+25.9500	1602.5558
	PI	4007+45.9500	1602.0474
Tangent Grade:		-2.5420	
Tangent Length:		20.0000	
Element: Linear			
	PI	4007+45.9500	1602.0474
	PI	4007+65.9500	1601.5100
Tangent Grade:		-2.6870	
Tangent Length:		20.0000	
Element: Linear			
	PI	4007+65.9500	1601.5100

	PI	4007+85.9500	1600.8700
Tangent Grade:		-3.2000	
Tangent Length:		20.0000	

Element: Linear

	PI	4007+85.9500	1600.8700
	PI	4008+08.1551	1600.1594
Tangent Grade:		-3.2000	
Tangent Length:		22.2051	

Element: Linear

	PI	4008+08.1551	1600.1594
	POE	4008+25.9500	1599.5900
Tangent Grade:		-3.2000	
Tangent Length:		17.7949	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp E_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	5006+40.0000	1566.8500
	PI	5006+60.0000	1566.7300
Tangent Grade:		-0.6000	
Tangent Length:		20.0000	
Element: Linear			
	PI	5006+60.0000	1566.7300
	PI	5006+80.0000	1566.6200
Tangent Grade:		-0.5500	
Tangent Length:		20.0000	
Element: Linear			
	PI	5006+80.0000	1566.6200
	PI	5007+00.0000	1566.5200
Tangent Grade:		-0.5000	
Tangent Length:		20.0000	
Element: Linear			
	PI	5007+00.0000	1566.5200
	PI	5007+20.0000	1566.4500
Tangent Grade:		-0.3500	
Tangent Length:		20.0000	
Element: Linear			
	PI	5007+20.0000	1566.4500
	PI	5007+40.0000	1566.4000
Tangent Grade:		-0.2500	
Tangent Length:		20.0000	
Element: Linear			
	PI	5007+40.0000	1566.4000
	PI	5007+60.0000	1566.2789
Tangent Grade:		-0.6055	
Tangent Length:		20.0000	
Element: Linear			
	PI	5007+60.0000	1566.2789
	PI	5007+80.0000	1566.1489
Tangent Grade:		-0.6500	
Tangent Length:		20.0000	
Element: Linear			
	PI	5007+80.0000	1566.1489
	PI	5008+00.0000	1566.0189
Tangent Grade:		-0.6500	
Tangent Length:		20.0000	
Element: Linear			
	PI	5008+00.0000	1566.0189
	PI	5008+19.8000	1565.9129
Tangent Grade:		-0.5354	
Tangent Length:		19.8000	
Element: Linear			
	PI	5008+19.8000	1565.9129
	PI	5008+39.5400	1565.8041
Tangent Grade:		-0.5512	
Tangent Length:		19.7400	
Element: Linear			
	PI	5008+39.5400	1565.8041
	PI	5008+59.2800	1565.8006
Tangent Grade:		-0.0177	
Tangent Length:		19.7400	
Element: Linear			
	PI	5008+59.2800	1565.8006
	PI	5008+79.0300	1565.8099

```
            Tangent Grade:            0.0471
           Tangent Length:           19.7500

Element: Linear
                        PI      5008+79.0300         1565.8099
                        PI      5008+98.8100         1565.8309
            Tangent Grade:            0.1062
           Tangent Length:           19.7800

Element: Linear
                        PI      5008+98.8100         1565.8309
                        PI      5009+18.6100         1565.8535
            Tangent Grade:            0.1141
           Tangent Length:           19.8000

Element: Linear
                        PI      5009+18.6100         1565.8535
                        PI      5009+38.4400         1565.8876
            Tangent Grade:            0.1720
           Tangent Length:           19.8300

Element: Linear
                        PI      5009+38.4400         1565.8876
                        PI      5009+58.3200         1565.9232
            Tangent Grade:            0.1791
           Tangent Length:           19.8800

Element: Linear
                        PI      5009+58.3200         1565.9232
                        PI      5009+78.3600         1565.9602
            Tangent Grade:            0.1846
           Tangent Length:           20.0400

Element: Linear
                        PI      5009+78.3600         1565.9602
                        PI      5009+98.3100         1566.0289
            Tangent Grade:            0.3444
           Tangent Length:           19.9500

Element: Linear
                        PI      5009+98.3100         1566.0289
                        PI      5010+05.2013         1566.0504
            Tangent Grade:            0.3127
           Tangent Length:            6.8913

Element: Linear
                        PI      5010+05.2013         1566.0504
                        PC      5010+15.0000         1566.0994
            Tangent Grade:            0.5000
           Tangent Length:            9.7987

Element: Parabola
                        PC      5010+15.0000         1566.0994
                        PI      5011+15.0000         1566.5994
                        PT      5012+15.0000         1568.1494
                  Length:          200.0000
  Headlight Sight Distance:          766.1169
           Entrance Grade:            0.5000
               Exit Grade:            1.5500
      r = ( g2 - g1 ) / L:            0.5250
      K = l / ( g2 - g1 ):          190.4762
          Middle Ordinate:            0.2625

Element: Linear
                        PT      5012+15.0000         1568.1494
                        PC      5015+25.0000         1572.9544
            Tangent Grade:            1.5500
           Tangent Length:          310.0000

Element: Parabola
                        PC      5015+25.0000         1572.9544
                        PI      5017+25.0000         1576.0544
                        PT      5019+25.0000         1565.2544
                      HIGH      5016+14.2086         1573.6458
                  Length:          400.0000
   Stopping Sight Distance:          352.4468
           Entrance Grade:            1.5500
               Exit Grade:           -5.4000
      r = ( g2 - g1 ) / L:           -1.7375
```

K = l / (g2 - g1):	57.5540	
Middle Ordinate:	-3.4750	

Element: Linear

PT	5019+25.0000	1565.2544
POE	5020+30.8200	1559.5402
Tangent Grade:	-5.4000	
Tangent Length:	105.8200	

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp F_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	6006+00.0000	1567.1400
	PI	6006+20.0000	1566.9900
Tangent Grade:		-0.7500	
Tangent Length:		20.0000	
Element: Linear			
	PI	6006+20.0000	1566.9900
	PI	6006+40.0000	1566.8500
Tangent Grade:		-0.7000	
Tangent Length:		20.0000	
Element: Linear			
	PI	6006+40.0000	1566.8500
	PI	6006+60.0000	1566.6889
Tangent Grade:		-0.8055	
Tangent Length:		20.0000	
Element: Linear			
	PI	6006+60.0000	1566.6889
	PI	6006+80.0000	1566.4708
Tangent Grade:		-1.0905	
Tangent Length:		20.0000	
Element: Linear			
	PI	6006+80.0000	1566.4708
	PI	6007+00.0000	1566.2626
Tangent Grade:		-1.0410	
Tangent Length:		20.0000	
Element: Linear			
	PI	6007+00.0000	1566.2626
	PI	6007+19.8000	1566.0805
Tangent Grade:		-0.9197	
Tangent Length:		19.8000	
Element: Linear			
	PI	6007+19.8000	1566.0805
	PI	6007+39.4600	1565.8938
Tangent Grade:		-0.9496	
Tangent Length:		19.6600	
Element: Linear			
	PI	6007+39.4600	1565.8938
	PI	6007+59.1200	1565.8072
Tangent Grade:		-0.4405	
Tangent Length:		19.6600	
Element: Linear			
	PI	6007+59.1200	1565.8072
	PI	6007+78.8100	1565.7293
Tangent Grade:		-0.3956	
Tangent Length:		19.6900	
Element: Linear			
	PI	6007+78.8100	1565.7293
	PI	6007+98.5300	1565.6402
Tangent Grade:		-0.4518	
Tangent Length:		19.7200	
Element: Linear			
	PI	6007+98.5300	1565.6402
	PI	6008+18.3000	1565.5698
Tangent Grade:		-0.3561	
Tangent Length:		19.7700	
Element: Linear			
	PI	6008+18.3000	1565.5698
	PI	6008+39.2263	1565.5047

```
            Tangent Grade:           -0.3113
           Tangent Length:           20.9263

Element: Linear
                       PI      6008+39.2263         1565.5047
                       PC      6012+10.0000         1563.4654
            Tangent Grade:           -0.5500
           Tangent Length:          370.7737

Element: Parabola
                       PC      6012+10.0000         1563.4654
                       PI      6013+60.0000         1562.6404
                      PRC      6015+10.0000         1555.8904
                  Length:          300.0000
  Stopping Sight Distance:          423.2026
          Entrance Grade:           -0.5500
              Exit Grade:           -4.5000
     r = ( g2 - g1 ) / L:           -1.3167
     K = l / ( g2 - g1 ):           75.9494
         Middle Ordinate:           -1.4813

Element: Parabola
                      PRC      6015+10.0000         1555.8904
                       PI      6016+10.0000         1551.3904
                       PT      6017+10.0000         1548.8904
                  Length:          200.0000
 Headlight Sight Distance:         1600.0000
          Entrance Grade:           -4.5000
              Exit Grade:           -2.5000
     r = ( g2 - g1 ) / L:            1.0000
     K = l / ( g2 - g1 ):          100.0000
         Middle Ordinate:            0.5000

Element: Linear
                       PT      6017+10.0000         1548.8904
                      POE      6017+60.1000         1547.6379
            Tangent Grade:           -2.5000
           Tangent Length:           50.1000
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp G_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	7000+50.0600	1547.5725
	PC	7001+00.0000	1548.8210
Tangent Grade:		2.5000	
Tangent Length:		49.9400	
Element: Parabola			
	PC	7001+00.0000	1548.8210
	PI	7002+00.0000	1551.3210
	PT	7003+00.0000	1555.8210
Length:		200.0000	
Headlight Sight Distance:		1600.0000	
Entrance Grade:		2.5000	
Exit Grade:		4.5000	
r = (g2 - g1) / L:		1.0000	
K = l / (g2 - g1):		100.0000	
Middle Ordinate:		0.5000	
Element: Linear			
	PT	7003+00.0000	1555.8210
	PC	7004+50.0000	1562.5710
Tangent Grade:		4.5000	
Tangent Length:		150.0000	
Element: Parabola			
	PC	7004+50.0000	1562.5710
	PI	7005+50.0000	1567.0710
	PT	7006+50.0000	1570.3710
Length:		200.0000	
Stopping Sight Distance:		999.2919	
Entrance Grade:		4.5000	
Exit Grade:		3.3000	
r = (g2 - g1) / L:		-0.6000	
K = l / (g2 - g1):		166.6667	
Middle Ordinate:		-0.3000	
Element: Linear			
	PT	7006+50.0000	1570.3710
	PI	7006+81.6423	1571.4152
Tangent Grade:		3.3000	
Tangent Length:		31.6423	
Element: Linear			
	PI	7006+81.6423	1571.4152
	PI	7006+86.3700	1571.5658
Tangent Grade:		3.1853	
Tangent Length:		4.7277	
Element: Linear			
	PI	7006+86.3700	1571.5658
	PI	7006+96.2600	1571.8916
Tangent Grade:		3.2942	
Tangent Length:		9.8900	
Element: Linear			
	PI	7006+96.2600	1571.8916
	PI	7007+05.8300	1572.2140
Tangent Grade:		3.3689	
Tangent Length:		9.5700	
Element: Linear			
	PI	7007+05.8300	1572.2140
	PI	7007+15.2500	1572.5253
Tangent Grade:		3.3047	
Tangent Length:		9.4200	
Element: Linear			
	PI	7007+15.2500	1572.5253
	PI	7007+24.5500	1572.8427

```
            Tangent Grade:            3.4129
           Tangent Length:            9.3000

Element: Linear
                       PI      7007+24.5500         1572.8427
                       PI      7007+33.7900         1573.1892
            Tangent Grade:            3.7500
           Tangent Length:            9.2400

Element: Linear
                       PI      7007+33.7900         1573.1892
                       PI      7007+42.9900         1573.5222
            Tangent Grade:            3.6196
           Tangent Length:            9.2000

Element: Linear
                       PI      7007+42.9900         1573.5222
                       PI      7007+52.2000         1573.8430
            Tangent Grade:            3.4832
           Tangent Length:            9.2100

Element: Linear
                       PI      7007+52.2000         1573.8430
                       PI      7007+62.0400         1574.1491
            Tangent Grade:            3.1108
           Tangent Length:            9.8400

Element: Linear
                       PI      7007+62.0400         1574.1491
                       PI      7007+72.0400         1574.4594
            Tangent Grade:            3.1030
           Tangent Length:           10.0000

Element: Linear
                       PI      7007+72.0400         1574.4594
                       PI      7007+82.0400         1574.7737
            Tangent Grade:            3.1430
           Tangent Length:           10.0000

Element: Linear
                       PI      7007+82.0400         1574.7737
                       PI      7007+92.0400         1575.0918
            Tangent Grade:            3.1810
           Tangent Length:           10.0000

Element: Linear
                       PI      7007+92.0400         1575.0918
                       PI      7008+02.0400         1575.4139
            Tangent Grade:            3.2210
           Tangent Length:           10.0000

Element: Linear
                       PI      7008+02.0400         1575.4139
                      POE      7008+12.0400         1575.7159
            Tangent Grade:            3.0200
           Tangent Length:           10.0000
```

Project Name: Add 2_Ramps
Description:
Horizontal Alignment Name: Ramp H_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9A_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	8000+49.9900	1559.7555
	PC	8000+50.0000	1559.7560
Tangent Grade:		4.9000	
Tangent Length:		0.0100	
Element: Parabola			
	PC	8000+50.0000	1559.7560
	PI	8003+00.0000	1572.0060
	PT	8005+50.0000	1579.6310
Length:		500.0000	
Stopping Sight Distance:		833.3245	
Entrance Grade:		4.9000	
Exit Grade:		3.0500	
r = (g2 - g1) / L:		-0.3700	
K = l / (g2 - g1):		270.2703	
Middle Ordinate:		-1.1563	
Element: Linear			
	PT	8005+50.0000	1579.6310
	PI	8005+77.3370	1580.4647
Tangent Grade:		3.0500	
Tangent Length:		27.3370	
Element: Linear			
	PI	8005+77.3370	1580.4647
	PI	8005+86.8500	1580.7600
Tangent Grade:		3.1038	
Tangent Length:		9.5130	
Element: Linear			
	PI	8005+86.8500	1580.7600
	PI	8005+96.8700	1581.0817
Tangent Grade:		3.2106	
Tangent Length:		10.0200	
Element: Linear			
	PI	8005+96.8700	1581.0817
	PI	8006+06.6400	1581.3829
Tangent Grade:		3.0829	
Tangent Length:		9.7700	
Element: Linear			
	PI	8006+06.6400	1581.3829
	PI	8006+16.2000	1581.6651
Tangent Grade:		2.9519	
Tangent Length:		9.5600	
Element: Linear			
	PI	8006+16.2000	1581.6651
	PI	8006+25.6200	1581.9290
Tangent Grade:		2.8015	
Tangent Length:		9.4200	
Element: Linear			
	PI	8006+25.6200	1581.9290
	PI	8006+34.9400	1582.1753
Tangent Grade:		2.6427	
Tangent Length:		9.3200	
Element: Linear			
	PI	8006+34.9400	1582.1753
	PI	8006+44.2000	1582.4648
Tangent Grade:		3.1263	
Tangent Length:		9.2600	
Element: Linear			
	PI	8006+44.2000	1582.4648
	PI	8006+53.4200	1582.7438

```
            Tangent Grade:            3.0260
           Tangent Length:            9.2200

Element: Linear
                       PI      8006+53.4200         1582.7438
                       PI      8006+62.7300         1582.9978
            Tangent Grade:            2.7282
           Tangent Length:            9.3100

Element: Linear
                       PI      8006+62.7300         1582.9978
                       PI      8006+72.7300         1583.2398
            Tangent Grade:            2.4200
           Tangent Length:           10.0000

Element: Linear
                       PI      8006+72.7300         1583.2398
                       PI      8006+82.7300         1583.4779
            Tangent Grade:            2.3810
           Tangent Length:           10.0000

Element: Linear
                       PI      8006+82.7300         1583.4779
                       PI      8006+92.7300         1583.7119
            Tangent Grade:            2.3400
           Tangent Length:           10.0000

Element: Linear
                       PI      8006+92.7300         1583.7119
                       PI      8007+02.7300         1583.9419
            Tangent Grade:            2.3000
           Tangent Length:           10.0000

Element: Linear
                       PI      8007+02.7300         1583.9419
                       PI      8007+12.7300         1584.1115
            Tangent Grade:            1.6960
           Tangent Length:           10.0000

Element: Linear
                       PI      8007+12.7300         1584.1115
                       PI      8007+22.7300         1584.2635
            Tangent Grade:            1.5200
           Tangent Length:           10.0000

Element: Linear
                       PI      8007+22.7300         1584.2635
                       PI      8007+32.7300         1584.4115
            Tangent Grade:            1.4800
           Tangent Length:           10.0000

Element: Linear
                       PI      8007+32.7300         1584.4115
                      POE      8007+42.7300         1584.5554
            Tangent Grade:            1.4390
           Tangent Length:           10.0000
```

```
            Project Name: Add 2_Gary Blvd
             Description:
Horizontal Alignment Name: Gary Blvd_2D_9A_9B
             Description:
                   Style: Default
  Vertical Alignment Name: VA_9B
             Description: Gary Under
                   Style: Default
                                        STATION          ELEVATION

Element: Linear
                        POB       100+07.7281          1581.5510
                         PI       100+18.0525          1581.3446
            Tangent Grade:             -2.0000
          Tangent Length:              10.3244

Element: Linear
                         PI       100+18.0525          1581.3446
                         PC       100+65.0000          1580.9924
            Tangent Grade:             -0.7500
          Tangent Length:              46.9475

Element: Parabola
                         PC       100+65.0000          1580.9924
                         PI       101+40.0000          1580.4299
                         PT       102+15.0000          1578.7799
                    Length:            150.0000
   Stopping Sight Distance:            819.2416
             Entrance Grade:             -0.7500
                Exit Grade:             -2.2000
      r = ( g2 - g1 ) / L:             -0.9667
      K = l / ( g2 - g1 ):            103.4483
          Middle Ordinate:             -0.2719

Element: Linear
                         PT       102+15.0000          1578.7799
                         PC       103+50.0000          1575.8099
            Tangent Grade:             -2.2000
          Tangent Length:             135.0000

Element: Parabola
                         PC       103+50.0000          1575.8099
                         PI       108+50.0000          1564.8099
                         PT       113+50.0000          1574.8099
                        LOW       108+73.8095          1570.0480
                    Length:           1000.0000
  Headlight Sight Distance:            935.1734
             Entrance Grade:             -2.2000
                Exit Grade:              2.0000
      r = ( g2 - g1 ) / L:              0.4200
      K = l / ( g2 - g1 ):            238.0952
          Middle Ordinate:              5.2500

Element: Linear
                         PT       113+50.0000          1574.8099
                         PC       121+40.0000          1590.6099
            Tangent Grade:              2.0000
          Tangent Length:             790.0000

Element: Parabola
                         PC       121+40.0000          1590.6099
                         PI       123+40.0000          1594.6099
                         PT       125+40.0000          1596.6099
                    Length:            400.0000
   Stopping Sight Distance:           1279.1503
             Entrance Grade:              2.0000
                Exit Grade:              1.0000
      r = ( g2 - g1 ) / L:             -0.2500
      K = l / ( g2 - g1 ):            400.0000
          Middle Ordinate:             -0.5000

Element: Linear
                         PT       125+40.0000          1596.6099
                         PC       131+00.0000          1602.2099
            Tangent Grade:              1.0000
          Tangent Length:             560.0000

Element: Parabola
                         PC       131+00.0000          1602.2099
```

	PI	132+00.0000	1603.2099
	PT	133+00.0000	1603.6099
Length:		200.0000	
Stopping Sight Distance:		1898.5838	
Entrance Grade:		1.0000	
Exit Grade:		0.4000	
r = (g2 - g1) / L:		-0.3000	
K = l / (g2 - g1):		333.3333	
Middle Ordinate:		-0.1500	

Element: Linear

	PT	133+00.0000	1603.6099
	POE	133+50.0000	1603.8099
Tangent Grade:		0.4000	
Tangent Length:		50.0000	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Lexington Ave_2B_2C_2D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	10+00.0000	1601.1576
	PC	11+00.0000	1598.2561
Tangent Grade:		-2.9016	
Tangent Length:		100.0000	
Element: Parabola			
	PC	11+00.0000	1598.2561
	PI	11+50.0000	1596.8053
	PT	12+00.0000	1597.8053
	LOW	11+59.1969	1597.3972
Length:		100.0000	
Headlight Sight Distance:		141.2240	
Entrance Grade:		-2.9016	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		4.9016	
K = l / (g2 - g1):		20.4016	
Middle Ordinate:		0.6127	
Element: Linear			
	PT	12+00.0000	1597.8053
	PI	12+40.6625	1598.6185
Tangent Grade:		2.0000	
Tangent Length:		40.6625	
Element: Linear			
	PI	12+40.6625	1598.6185
	PC	12+77.5000	1597.8818
Tangent Grade:		-2.0000	
Tangent Length:		36.8375	
Element: Parabola			
	PC	12+77.5000	1597.8818
	PI	13+15.0000	1597.1318
	PT	13+52.5000	1595.3318
Length:		75.0000	
Stopping Sight Distance:		422.9108	
Entrance Grade:		-2.0000	
Exit Grade:		-4.8000	
r = (g2 - g1) / L:		-3.7333	
K = l / (g2 - g1):		26.7857	
Middle Ordinate:		-0.2625	
Element: Linear			
	PT	13+52.5000	1595.3318
	PC	13+62.0000	1594.8758
Tangent Grade:		-4.8000	
Tangent Length:		9.5000	
Element: Parabola			
	PC	13+62.0000	1594.8758
	PI	14+52.0000	1590.5558
	PT	15+42.0000	1592.3558
	LOW	14+89.0588	1591.8264
Length:		180.0000	
Headlight Sight Distance:		159.1690	
Entrance Grade:		-4.8000	
Exit Grade:		2.0000	
r = (g2 - g1) / L:		3.7778	
K = l / (g2 - g1):		26.4706	
Middle Ordinate:		1.5300	
Element: Linear			
	PT	15+42.0000	1592.3558
	POE	15+50.0000	1592.5158
Tangent Grade:		2.0000	
Tangent Length:		8.0000	

Project Name: Add 2_Local St
Description:
Horizontal Alignment Name: Red Wheat_2D_9A_9B
Description:
Style: Default
Vertical Alignment Name: VA_9B
Description:
Style: Default

		STATION	ELEVATION
Element: Linear			
	POB	0+44.9700	1607.8001
	PC	2+50.0000	1603.6995
Tangent Grade:		-2.0000	
Tangent Length:		205.0300	
Element: Parabola			
	PC	2+50.0000	1603.6995
	PI	3+00.0000	1602.6995
	PT	3+50.0000	1601.1495
Length:		100.0000	
Stopping Sight Distance:		1031.0457	
Entrance Grade:		-2.0000	
Exit Grade:		-3.1000	
r = (g2 - g1) / L:		-1.1000	
K = l / (g2 - g1):		90.9091	
Middle Ordinate:		-0.1375	
Element: Linear			
	PT	3+50.0000	1601.1495
	PC	5+50.0000	1594.9495
Tangent Grade:		-3.1000	
Tangent Length:		200.0000	
Element: Parabola			
	PC	5+50.0000	1594.9495
	PI	8+00.0000	1587.1995
	PT	10+50.0000	1588.4495
	LOW	9+80.5556	1588.2759
Length:		500.0000	
Headlight Sight Distance:		594.5946	
Entrance Grade:		-3.1000	
Exit Grade:		0.5000	
r = (g2 - g1) / L:		0.7200	
K = l / (g2 - g1):		138.8889	
Middle Ordinate:		2.2500	
Element: Linear			
	PT	10+50.0000	1588.4495
	POE	10+70.0801	1588.5499
Tangent Grade:		0.5000	
Tangent Length:		20.0801	

APPENDIX G

RIGHT OF WAY AND UTILITY COST ESTIMATES

June 4, 2020

To: Roger Schultz, Project Management Division

From: Christa P. Sawyer, Project Management Branch, Right-of-Way & Utilities Division

Subject: Custer County, I-40: Interchange and intersection modification at Exit 65, I-40B w. Jct. in Clinton. Federal Aid Project No. J3-1842(004), State Job No. 31842 (04) Const, (05)R/W, (06)Util.

This estimate has been prepared based on the following Right-of-Way costs.

31842 (05) **Right-of-Way – ALTERNATIVE 2B**

Mapping Service Provider Fees					
11	owners	11	Parcels		24,300.00
R/W Costs	(Land, Improvements, Damages)				1,093,900.00
Appraisal Service Provider Fee					
(Master Addenda, 11 Appraisals, 0 Seconds, 0 Waivers)					38,500.00
Appraisal Review Service Provider Fee					8,800.00
Project Manager Fee					17,600.00
Administrative Settlements					
30%	@	FMV of R/W Costs			
60%	@	100.00%	Increase		
10%	@	130.00%	Increase		798,547.00
Acquisition Service Provider Fee					
11	owners	@		$2,950.00	32,450.00
Relocation Costs (Res., Comm., Reest. Exp.) 0 RHP's, 0 Comm. Total Takes, 0 Comm. Partial Takes (Per. Prop.)					0.00
Relocation Service Provider Fee					0.00
Demolition Service Provider Fee					4,000.00
NESHAP, Abatement and Erosion Control					48,000.00
Mileage					2,417.00
Staking Costs					
11	Parcels	@		$750.00	8,250.00
Subtotal					**2,076,764.00**
Administrative & Contingency Costs (10% of Subtotal)					207,676.40
Total Right-of-Way Costs (Rounded)					**2,285,000.00**

EC: Chad Parsons, Assistant Chief, Right-of-Way & Utilities
Records Center

OKLAHOMA DEPARTMENT OF TRANSPORTATION

Right-of-Way & Utilities Division

June 4, 2020

To: Roger Schultz, Project Management Division

From: Christa P. Sawyer, Project Management Branch, Right-of-Way & Utilities Division

Subject: Custer County, I-40: Interchange and intersection modification at Exit 65, I-40B w. Jct. in Clinton. Federal Aid Project No. J3-1842(004), State Job No. 31842 (04) Const, (05)R/W, (06)Util.

This estimate has been prepared based on the following Right-of-Way costs.

31842 (05) **Right-of-Way – ALTERNATIVE 2C**

Mapping Service Provider Fees					
11	owners	11	Parcels		24,300.00
R/W Costs (Land, Improvements, Damages)					1,093,900.00
Appraisal Service Provider Fee (Master Addenda, 11 Appraisals, 0 Seconds, 0 Waivers)					38,500.00
Appraisal Review Service Provider Fee					9,900.00
Project Manager Fee					17,600.00
Administrative Settlements					
30%	@	FMV of R/W Costs			
60%	@	100.00%	Increase		
10%	@	130.00%	Increase		798,547.00
Acquisition Service Provider Fee					
11	owners	@	$2,950.00		32,450.00
Relocation Costs (Res., Comm., Reest. Exp.) 0 RHP's, 0 Comm. Total Takes, 0 Comm. Partial Takes (Per. Prop.)					0.00
Relocation Service Provider Fee					0.00
Demolition Service Provider Fee					4,000.00
NESHAP, Abatement and Erosion Control					43,000.00
Mileage					2,417.00
Staking Costs					
11	Parcels	@	$750.00		8,250.00
Subtotal					**2,072,864.00**
Administrative & Contingency Costs (10% of Subtotal)					207,286.40
Total Right-of-Way Costs (Rounded)					**2,281,000.00**

EC: Chad Parsons, Assistant Chief, Right-of-Way & Utilities
Records Center

OKLAHOMA DEPARTMENT OF TRANSPORTATION

Right-of-Way & Utilities Division

June 4, 2020

To: Roger Schultz, Project Management Division

From: Christa P. Sawyer, Project Management Branch, Right-of-Way & Utilities Division

Subject: Custer County, I-40: Interchange and intersection modification at Exit 65, I-40B w. Jct. in Clinton. Federal Aid Project No. J3-1842(004), State Job No. 31842 (04) Const, (05)R/W, (06)Util.

This estimate has been prepared based on the following Right-of-Way costs.

31842 (05) **Right-of-Way – ALTERNATIVE 2D**

Mapping Service Provider Fees					
14	owners	14	Parcels		31,440.00
R/W Costs	(Land, Improvements, Damages)				1,173,600.00
Appraisal Service Provider Fee					
(Master Addenda, 14 Appraisals, 0 Seconds, 0 Waivers)					49,000.00
Appraisal Review Service Provider Fee					12,600.00
Project Manager Fee					22,400.00
Administrative Settlements					
30%	@	FMV of R/W Costs			
60%	@	100.00%	Increase		
10%	@	130.00%	Increase		856,728.00
Acquisition Service Provider Fee					
14	owners	@		$2,950.00	41,300.00
Relocation Costs (Res., Comm., Reest. Exp.) 0 RHP's, 0 Comm. Total Takes, 0 Comm. Partial Takes (Per. Prop.)					0.00
Relocation Service Provider Fee					0.00
Demolition Service Provider Fee					4,000.00
NESHAP, Abatement and Erosion Control					48,000.00
Mileage					2,417.00
Staking Costs					
14	Parcels	@		$750.00	10,500.00
Subtotal					**2,251,985.00**
Administrative & Contingency Costs (10% of Subtotal)					225,198.50
Total Right-of-Way Costs (Rounded)					**2,478,000.00**

EC: Chad Parsons, Assistant Chief, Right-of-Way & Utilities
Records Center

OKLAHOMA DEPARTMENT OF TRANSPORTATION

Right-of-Way & Utilities Division

June 4, 2020

To: Roger Schultz, Project Management Division

From: Christa P. Sawyer, Project Management Branch, Right-of-Way & Utilities Division

Subject: Custer County, I-40: Interchange and intersection modification at Exit 65, I-40B w. Jct. in Clinton. Federal Aid Project No. J3-1842(004), State Job No. 31842 (04) Const, (05)R/W, (06)Util.

This estimate has been prepared based on the following Right-of-Way costs.

31842 (05) **Right-of-Way – ALTERNATIVE 9A**

Mapping Service Provider Fees					
11	owners	11	Parcels		24,300.00
R/W Costs	(Land, Improvements, Damages)				1,067,900.00
Appraisal Service Provider Fee					
(Master Addenda, 11 Appraisals, 0 Seconds, 0 Waivers)					38,500.00
Appraisal Review Service Provider Fee					9,900.00
Project Manager Fee					17,600.00
Administrative Settlements					
30%	@	FMV of R/W Costs			
60%	@	100.00%	Increase		
10%	@	130.00%	Increase		779,567.00
Acquisition Service Provider Fee					
11	owners	@		$2,950.00	32,450.00
Relocation Costs (Res., Comm., Reest. Exp.) 0 RHP's, 0 Comm. Total Takes, 0 Comm. Partial Takes (Per. Prop.)					0.00
Relocation Service Provider Fee					0.00
Demolition Service Provider Fee					3,500.00
NESHAP, Abatement and Erosion Control					32,000.00
Mileage					2,417.00
Staking Costs					
11	Parcels	@		$750.00	8,250.00
Subtotal					**2,016,384.00**
Administrative & Contingency Costs (10% of Subtotal)					201,638.40
Total Right-of-Way Costs (Rounded)					**2,219,000.00**

EC: Chad Parsons, Assistant Chief, Right-of-Way & Utilities
Records Center

June 4, 2020

To: Roger Schultz, Project Management Division

From: Christa P. Sawyer, Project Management Branch, Right-of-Way & Utilities Division

Subject: Custer County, I-40: Interchange and intersection modification at Exit 65, I-40B w. Jct. in Clinton. Federal Aid Project No. J3-1842(004), State Job No. 31842 (04) Const, (05)R/W, (06)Util.

This estimate has been prepared based on the following Right-of-Way costs.

31842 (05) **Right-of-Way – ALTERNATIVE 9B**

Mapping Service Provider Fees					
9	owners	9	Parcels		21,420.00
R/W Costs (Land, Improvements, Damages)					991,200.00
Appraisal Service Provider Fee (Master Addenda, 9 Appraisals, 0 Seconds, 0 Waivers)					59,500.00
Appraisal Review Service Provider Fee					8,100.00
Project Manager Fee					14,400.00
Administrative Settlements					
30%	@	FMV of R/W Costs			
60%	@	100.00%	Increase		
10%	@	130.00%	Increase		723,576.00
Acquisition Service Provider Fee					
9	owners	@	$2,950.00		26,550.00
Relocation Costs (Res., Comm., Reest. Exp.) 0 RHP's, 0 Comm. Total Takes, 0 Comm. Partial Takes (Per. Prop.)					0.00
Relocation Service Provider Fee					0.00
Demolition Service Provider Fee					3,500.00
NESHAP, Abatement and Erosion Control					32,000.00
Mileage					2,417.00
Staking Costs					
9	Parcels	@	$750.00		6,750.00
Subtotal					**1,889,413.00**
Administrative & Contingency Costs (10% of Subtotal)					188,941.30
Total Right-of-Way Costs (Rounded)					**2,079,000.00**

EC: Chad Parsons, Assistant Chief, Right-of-Way & Utilities
Records Center

June 29, 2020

To: Roger Schultz, Project Management Division

From: Christa P. Sawyer, Project Management Branch, Right-of-Way & Utilities Division

Subject: Custer County, I-40: Interchange and intersection modification at Exit 65, I-40B w. Jct. in Clinton. Federal Aid Project No. J3-1842(004), State Job No. 31842 (04) Const, (05)R/W, (06)Util.

These estimates have been prepared based on an aerial photograph and are for cost estimating and scheduling purposes.

31842 (06) Utilities – Alt. 2B, 2C, 2D

Utility Relocation Cost	705,051.00
Utility Service Provider Fee	27,611.00
Subtotal	**732,662.00**
Administrative & Contingency Costs (15% of Subtotal)	109,899.30
Total Utilities Costs	**842,562.00**

31842 (06) Utilities – Alt. 9A, 9B

Utility Relocation Cost	710,953.00
Utility Service Provider Fee	27,611.00
Subtotal	**738,564.00**
Administrative & Contingency Costs (15% of Subtotal)	110,784.60
Total Utilities Costs	**849,349.00**

EC: Chad Parsons, Assistant Chief, Right-of-Way & Utilities

APPENDIX H

CONSTRUCTION COST ESTIMATES

Project: **I-40 Exit 65 Interchange - Clinton, OK**
Proj No.
J/P No. **31842(04)**

May 28, 2020
Garver Proj. No. 17037360

ENGINEER'S OPINION OF PROBABLE COST

ALTERNATIVE 2B - PLANNING LEVEL ESTIMATE
I-40 Exit 65 Interchange - Clinton, OK

ITEM NO.	CODE NO.	DESCRIPTION		UNIT	QUANTITY	UNIT PRICE	TOTAL
ROADWAY	*0100*						
201(A)	0102	CLEARING AND GRUBBING		LSUM	1.00	$15,000.00	$ 15,000.00
202(A)	0183	UNCLASSIFIED EXCAVATION		CY	446,300.00	$7.00	$ 3,124,100.00
202(D)	0184	UNCLASSIFIED BORROW		CY	29,500.00	$10.00	$ 295,000.00
205(A)	4229	TYPE A-SALVAGED TOPSOIL		LSUM	1.00	$85,000.00	$ 85,000.00
N/A	N/A	TEMPORARY EROSION CONTROL		LSUM	1.00	$70,000.00	$ 70,000.00
230(A)	2806	SOLID SLAB SODDING		SY	179,525.00	$1.50	$ 269,287.50
232(B)	2814	SEEDING METHOD B		AC	75.00	$500.00	$ 37,500.00
233(A)	2817	VEGETATIVE MULCHING		AC	38.00	$400.00	$ 15,200.00
241	2832	MOWING		AC	38.00	$65.00	$ 2,470.00
242	0400	(PL)STABILIZED CONSTRUCTION EXIT		EA	4.00	$2,000.00	$ 8,000.00
303(A)	2100	AGGREGATE BASE TYPE A		CY	34,544.00	$60.00	$ 2,072,640.00
307(K)	4300	STABILIZED SUBGRADE		SY	171,848.00	$7.00	$ 1,202,936.00
317	4270	CEMENT TREATED BASE		SY	75,971.00	$12.00	$ 911,652.00
325	5271	SEPARATOR FABRIC		SY	195,113.00	$1.50	$ 292,669.50
402(E)	0225	TRAFFIC BOUND SURFACE COURSE TYPE E		TON	20,599.00	$35.00	$ 720,965.00
407(B)	0250	TACK COAT		GAL	2,034.00	$3.50	$ 7,119.00
408	5774	PRIME COAT		GAL	61,532.00	$4.00	$ 246,128.00
411(B)	5945	SUPERPAVE, TYPE S3(PG 64-22 OK)		TON	15,397.00	$80.00	$ 1,231,760.00
411(C)	5955	SUPERPAVE, TYPE S4(PG 70-28 OK)		TON	1,497.00	$120.00	$ 179,640.00
411(C)	5960	SUPERPAVE, TYPE S4(PG 64-22 OK)		TON	62.00	$120.00	$ 7,440.00
414(A)	0210	P.C.CONCRETE PAVEMENT(PLACEMENT)		SY	30,295.00	$12.00	$ 363,540.00
414(B)	5725	DOWEL JOINTED P.C. CONCRETE PAVEMENT (PLACEMENT)		SY	95,872.00	$20.00	$ 1,917,440.00
414(G)	5275	P.C. CONCRETE FOR PAVEMENT		CY	36,145.00	$125.00	$ 4,518,125.00
509(A)	0319	CLASS AA CONCRETE		CY	162.00	$500.00	$ 81,000.00
510(A)	6333	RETAINING WALL		SY	755.00	$550.00	$ 415,250.00
511(A)	0332	REINFORCING STEEL		LB	22,092.00	$1.00	$ 22,092.00
609(A)	0300	CONCRETE CURB (6" BARRIER-INTEGRAL)		LF	16,495.00	$10.00	$ 164,950.00
609(B)	1525	2'-8" COMB. CURB & GUTTER (6" BARRIER)		LF	2,531.00	$22.00	$ 55,682.00
611(G)	5102	INLET CI DES. 1 (B)		EA	54.00	$1,000.00	$ 54,000.00
611(G)	5117	INLET CI DES. 2 (2B)		EA	8.00	$5,000.00	$ 40,000.00
613(A)	0491	18" R.C.PIPE CLASS III		LF	4,965.00	$55.00	$ 273,075.00
613(A)	0492	24" R.C.PIPE CLASS III		LF	1,540.00	$65.00	$ 100,100.00
613(A)	0494	36" R.C.PIPE CLASS III		LF	710.00	$90.00	$ 63,900.00
613(A)	0495	42" R.C.PIPE CLASS III		LF	100.00	$150.00	$ 15,000.00
613(A)	0496	48" R.C.PIPE CLASS III		LF	380.00	$175.00	$ 66,500.00
613(J)	5915	EDGE DRAIN CONDUIT-PERFORATED		LF	15,868.00	$10.00	$ 158,680.00
613(K)	5916	EDGE DRAIN OUTLET LATERAL-NONPERFORATED		LF	635.00	$15.00	$ 9,525.00
613(L)	5726	18" PREFAB. CULVERT END SECTION, ROUND		EA	10.00	$350.00	$ 3,500.00
613(L)	5730	24" PREFAB. CULVERT END SECTION, ROUND		EA	20.00	$450.00	$ 9,000.00
613(L)	5734	36" PREFAB. CULVERT END SECTION, ROUND		EA	2.00	$1,000.00	$ 2,000.00
613(L)	5736	42" PREFAB. CULVERT END SECTION, ROUND		EA	2.00	$1,500.00	$ 3,000.00
613(L)	5738	48" PREFAB. CULVERT END SECTION, ROUND		EA	2.00	$2,000.00	$ 4,000.00
619(A)	0920	REMOVAL OF STRUCTURES & OBSTRUCTIONS		LSUM	1.00	$75,000.00	$ 75,000.00
619(B)	4725	REMOVAL OF FENCE		LF	6,390.00	$1.50	$ 9,585.00
619(B)	4726	REMOVAL OF CURB AND GUTTER		LF	4,778.00	$6.00	$ 28,668.00
619(B)	4727	REMOVAL OF CONCRETE PAVEMENT		SY	5,265.00	$10.00	$ 52,650.00
619(B)	4728	REMOVAL OF ASPHALT PAVEMENT		SY	112,805.00	$4.50	$ 507,622.50
619(B)	4780	REMOVAL OF GUARDRAIL		LF	8,383.00	$4.00	$ 33,532.00
624(C)	4459	FENCE-STYLE SWF (5 BARBED WIRE)		LF	6,518.00	$4.50	$ 29,331.00
628(B)	5125	HIGH-TENSION CABLE BARRIER(TL-4)		LF	6,198.00	$15.00	$ 92,970.00
628(C)	5110	END ANCHORS		EA	6.00	$2,500.00	$ 15,000.00
623(A)	0932	BEAM GUARDRAIL W-BEAM SINGLE		LF	50.00	$20.00	$ 1,000.00
623(G)	8571	GUARDRAIL END TREATMENT (GET)		EA	4.00	$2,500.00	$ 10,000.00
623(I)	8700	GUARDRAIL BRIDGE CONN-THRIE BEAM (31")		EA	4.00	$2,300.00	$ 9,200.00
871(A)	8325	(SP)IMPACT ATTENUATOR		EA	16.00	$25,000.00	$ 400,000.00
BRIDGE	*0200*						
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge A (28th Street)	LSUM	1.00	$75,000.00	$ 75,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,171,000.00	$ 1,171,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge B (FRMC WB)	LSUM	1.00	$112,000.00	$ 112,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,427,000.00	$ 1,427,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge C (FRMC EB)	LSUM	1.00	$112,000.00	$ 112,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,439,000.00	$ 1,439,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge D (RAMP WB)	LSUM	1.00	$1,446,000.00	$ 1,446,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge E (RAMP EB)	LSUM	1.00	$999,143.61	$ 999,143.61
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge F (GARY WB)	LSUM	1.00	$1,171,000.00	$ 1,171,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge G (GARY EB)	LSUM	1.00	$1,171,000.00	$ 1,171,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge H (NEPTUNE WB)	LSUM	1.00	$207,000.00	$ 207,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$4,803,000.00	$ 4,803,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge I (NEPTUNE EB)	LSUM	1.00	$207,000.00	$ 207,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$4,803,000.00	$ 4,803,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge J (EB-NB FLYOVER)	LSUM	1.00	$80,000.00	$ 80,000.00
N/A	N/A	CONSTRUCTION OF PARAPET WALLS	Parapet Walls	LSUM	1.00	$2,037,000.00	$ 2,037,000.00
TRAFFIC	*0300*						
N/A	N/A	CONSTRUCTION TRAFFIC CONTROL	5% (Road + Bridge)	LSUM	1.00	$2,083,000.00	$ 2,083,000.00
N/A	N/A	OTHER PERMANENT TRAFFIC	5% (Road + Bridge)	LSUM	1.00	$2,083,000.00	$ 2,083,000.00
STAKING	*0600*						
642(B)	0096	CONSTRUCTION STAKING LEVEL 2	1.5% (Project - Mobilization)	LSUM	1.00	$688,000.00	$ 688,000.00
CONSTRUCTION	*0640*						
220	2800	SWPPP DOCUMENTATION AND MANAGEMENT		LSUM	1.00	$5,000.00	$ 5,000.00
640(A)	1426	FIELD OFFICE		EA	1.00	$10,000.00	$ 10,000.00
641	1552	MOBILIZATION		LSUM	1.00	$2,007,000.00	$ 2,007,000.00

ROADWAY TOTAL	$20,399,424.50
BRIDGE TOTAL	$21,260,143.61
TRAFFIC TOTAL	$4,166,000.00
STAKING	$688,000.00
CONSTRUCTION	$2,022,000.00
20% CONTINGENCY	$ 9,707,113.62
PRELIM. GRAND TOTAL	$58,242,681.73
ALT. 2B || GRAND TOTAL ROUNDED	**$58,243,000.00**

Frontage Rds + I-40/Ramps + Bridges | **ODOT:**	$53,753,000.00
Gary Blvd + Oliver/Lexington + Red Wheat + Drives | **CITY:**	$4,490,000.00

Project: **I-40 Exit 65 Interchange - Clinton, OK**
Proj No.
J/P No. **31842(04)**

May 28, 2020
Garver Proj. No. 17037360

ENGINEER'S OPINION OF PROBABLE COST

ALTERNATIVE 2C - PLANNING LEVEL ESTIMATE
I-40 Exit 65 Interchange - Clinton, OK

ITEM NO.	CODE NO.	DESCRIPTION		UNIT	QUANTITY	UNIT PRICE	TOTAL
ROADWAY	*0100*						
201(A)	0102	CLEARING AND GRUBBING		LSUM	1.00	$15,000.00	$ 15,000.00
202(A)	0183	UNCLASSIFIED EXCAVATION		CY	455,700.00	$7.00	$ 3,189,900.00
202(D)	0184	UNCLASSIFIED BORROW		CY	300.00	$10.00	$ 3,000.00
205(A)	4229	TYPE A-SALVAGED TOPSOIL		LSUM	1.00	$85,000.00	$ 85,000.00
N/A	N/A	TEMPORARY EROSION CONTROL		LSUM	1.00	$70,000.00	$ 70,000.00
230(A)	2806	SOLID SLAB SODDING		SY	192,409.00	$1.50	$ 288,613.50
232(B)	2814	SEEDING METHOD B		AC	80.00	$500.00	$ 40,000.00
233(A)	2817	VEGETATIVE MULCHING		AC	40.00	$400.00	$ 16,000.00
241	2832	MOWING		AC	40.00	$65.00	$ 2,600.00
242	0400	(PL)STABILIZED CONSTRUCTION EXIT		EA	4.00	$2,000.00	$ 8,000.00
303(A)	2100	AGGREGATE BASE TYPE A		CY	34,304.00	$60.00	$ 2,058,240.00
307(K)	4300	STABILIZED SUBGRADE		SY	170,463.00	$7.00	$ 1,193,241.00
317	4270	CEMENT TREATED BASE		SY	75,296.00	$12.00	$ 903,552.00
325	5271	SEPARATOR FABRIC		SY	193,962.00	$1.50	$ 290,943.00
402(E)	0225	TRAFFIC BOUND SURFACE COURSE TYPE E		TON	20,167.00	$35.00	$ 705,845.00
407(B)	0250	TACK COAT		GAL	2,034.00	$3.50	$ 7,119.00
408	5774	PRIME COAT		GAL	61,027.00	$4.00	$ 244,108.00
411(B)	5945	SUPERPAVE, TYPE S3(PG 64-22 OK)		TON	15,359.00	$80.00	$ 1,228,720.00
411(C)	5955	SUPERPAVE, TYPE S4(PG 70-28 OK)		TON	1,497.00	$120.00	$ 179,640.00
411(C)	5960	SUPERPAVE, TYPE S4(PG 64-22 OK)		TON	62.00	$120.00	$ 7,440.00
414(A)	0210	P.C.CONCRETE PAVEMENT(PLACEMENT)		SY	29,563.00	$12.00	$ 354,756.00
414(B)	5725	DOWEL JOINTED P.C. CONCRETE PAVEMENT (PLACEMENT)		SY	95,720.00	$20.00	$ 1,914,400.00
414(G)	5275	P.C. CONCRETE FOR PAVEMENT		CY	35,881.00	$125.00	$ 4,485,125.00
509(A)	0319	CLASS AA CONCRETE		CY	162.00	$500.00	$ 81,000.00
510(A)	6333	RETAINING WALL		SY	755.00	$550.00	$ 415,250.00
511(A)	0332	REINFORCING STEEL		LB	22,092.00	$1.00	$ 22,092.00
609(A)	0300	CONCRETE CURB (6" BARRIER-INTEGRAL)		LF	17,424.00	$10.00	$ 174,240.00
609(B)	1525	2'-8" COMB. CURB & GUTTER (6" BARRIER)		LF	2,531.00	$22.00	$ 55,682.00
611(G)	5102	INLET CI DES. 1 (B)		EA	54.00	$1,000.00	$ 54,000.00
611(G)	5117	INLET CI DES. 2 (2B)		EA	8.00	$5,000.00	$ 40,000.00
613(A)	0491	18" R.C.PIPE CLASS III		LF	4,965.00	$55.00	$ 273,075.00
613(A)	0492	24" R.C.PIPE CLASS III		LF	1,540.00	$65.00	$ 100,100.00
613(A)	0494	36" R.C.PIPE CLASS III		LF	710.00	$90.00	$ 63,900.00
613(A)	0495	42" R.C.PIPE CLASS III		LF	100.00	$150.00	$ 15,000.00
613(A)	0496	48" R.C.PIPE CLASS III		LF	380.00	$175.00	$ 66,500.00
613(J)	5915	EDGE DRAIN CONDUIT-PERFORATED		LF	16,333.00	$10.00	$ 163,330.00
613(K)	5916	EDGE DRAIN OUTLET LATERAL-NONPERFORATED		LF	654.00	$15.00	$ 9,810.00
613(L)	5726	18" PREFAB. CULVERT END SECTION, ROUND		EA	10.00	$350.00	$ 3,500.00
613(L)	5730	24" PREFAB. CULVERT END SECTION, ROUND		EA	20.00	$450.00	$ 9,000.00
613(L)	5734	36" PREFAB. CULVERT END SECTION, ROUND		EA	2.00	$1,000.00	$ 2,000.00
613(L)	5736	42" PREFAB. CULVERT END SECTION, ROUND		EA	2.00	$1,500.00	$ 3,000.00
613(L)	5738	48" PREFAB. CULVERT END SECTION, ROUND		EA	2.00	$2,000.00	$ 4,000.00
619(A)	0920	REMOVAL OF STRUCTURES & OBSTRUCTIONS		LSUM	1.00	$75,000.00	$ 75,000.00
619(B)	4725	REMOVAL OF FENCE		LF	6,390.00	$1.50	$ 9,585.00
619(B)	4726	REMOVAL OF CURB AND GUTTER		LF	4,778.00	$6.00	$ 28,668.00
619(B)	4727	REMOVAL OF CONCRETE PAVEMENT		SY	5,265.00	$10.00	$ 52,650.00
619(B)	4728	REMOVAL OF ASPHALT PAVEMENT		SY	114,209.00	$4.50	$ 513,940.50
619(B)	4780	REMOVAL OF GUARDRAIL		LF	8,383.00	$4.00	$ 33,532.00
624(C)	4459	FENCE-STYLE SWF (5 BARBED WIRE)		LF	6,518.00	$4.50	$ 29,331.00
628(B)	5125	HIGH-TENSION CABLE BARRIER(TL-4)		LF	6,198.00	$15.00	$ 92,970.00
628(C)	5110	END ANCHORS		EA	6.00	$2,500.00	$ 15,000.00
623(A)	0932	BEAM GUARDRAIL W-BEAM SINGLE		LF	50.00	$20.00	$ 1,000.00
623(G)	8571	GUARDRAIL END TREATMENT (GET)		EA	4.00	$2,500.00	$ 10,000.00
623(I)	8700	GUARDRAIL BRIDGE CONN-THRIE BEAM (31")		EA	4.00	$2,300.00	$ 9,200.00
871(A)	8325	(SP)IMPACT ATTENUATOR		EA	16.00	$25,000.00	$ 400,000.00
BRIDGE	*0200*						
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge A (28th Street)	LSUM	1.00	$75,000.00	$ 75,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,171,000.00	$ 1,171,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge B (FRMC WB)	LSUM	1.00	$112,000.00	$ 112,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,427,000.00	$ 1,427,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge C (FRMC EB)	LSUM	1.00	$112,000.00	$ 112,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,439,000.00	$ 1,439,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge D (RAMP WB)	LSUM	1.00	$1,446,000.00	$ 1,446,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge E (RAMP EB)	LSUM	1.00	$999,143.61	$ 999,143.61
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge F (GARY WB)	LSUM	1.00	$1,276,000.00	$ 1,276,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge G (GARY EB)	LSUM	1.00	$1,276,000.00	$ 1,276,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge H (NEPTUNE WB)	LSUM	1.00	$207,000.00	$ 207,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$3,706,000.00	$ 3,706,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge I (NEPTUNE EB)	LSUM	1.00	$207,000.00	$ 207,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$4,803,000.00	$ 4,803,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge J (EB-NB FLYOVER)	LSUM	1.00	$80,000.00	$ 80,000.00
N/A	N/A	CONSTRUCTION OF PARAPET WALLS	Parapet Walls	LSUM	1.00	$2,034,000.00	$ 2,034,000.00
TRAFFIC	*0300*						
N/A	N/A	CONSTRUCTION TRAFFIC CONTROL	5% (Road + Bridge)	LSUM	1.00	$2,024,000.00	$ 2,024,000.00
N/A	N/A	OTHER PERMANENT TRAFFIC	5% (Road + Bridge)	LSUM	1.00	$2,024,000.00	$ 2,024,000.00
STAKING	*0600*						
642(B)	0096	CONSTRUCTION STAKING LEVEL 2	1.5% (Project - Mobilization)	LSUM	1.00	$668,000.00	$ 668,000.00
CONSTRUCTION	*0640*						
220	2800	SWPPP DOCUMENTATION AND MANAGEMENT		LSUM	1.00	$5,000.00	$ 5,000.00
640(A)	1426	FIELD OFFICE		EA	1.00	$10,000.00	$ 10,000.00
641	1552	MOBILIZATION		LSUM	1.00	$1,952,000.00	$ 1,952,000.00

ROADWAY TOTAL	$20,117,598.00
BRIDGE TOTAL	$20,370,143.61
TRAFFIC TOTAL	$4,048,000.00
STAKING	$668,000.00
CONSTRUCTION	$1,967,000.00
20% CONTINGENCY	$ 9,434,148.32
PRELIM. GRAND TOTAL	$56,604,889.93
ALT. 2C || GRAND TOTAL ROUNDED	**$56,605,000.00**

Frontage Rds + I-40/Ramps + Bridges | **ODOT:**	$52,032,000.00
Gary Blvd + Oliver/Lexington + Red Wheat + Drives | **CITY:**	$4,573,000.00

Project: **I-40 Exit 65 Interchange - Clinton, OK**
Proj No.
J/P No. **31842(04)**

May 28, 2020
Garver Proj. No. 17037360

ENGINEER'S OPINION OF PROBABLE COST

ALTERNATIVE 2D - PLANNING LEVEL ESTIMATE
I-40 Exit 65 Interchange - Clinton, OK

ITEM NO.	CODE NO.	DESCRIPTION		UNIT	QUANTITY	UNIT PRICE	TOTAL
ROADWAY		*0100*					
201(A)	0102	CLEARING AND GRUBBING		LSUM	1.00	$15,000.00	$ 15,000.00
202(A)	0183	UNCLASSIFIED EXCAVATION		CY	409,200.00	$7.00	$ 2,864,400.00
205(A)	4229	TYPE A-SALVAGED TOPSOIL		LSUM	1.00	$85,000.00	$ 85,000.00
N/A	N/A	TEMPORARY EROSION CONTROL		LSUM	1.00	$70,000.00	$ 70,000.00
230(A)	2806	SOLID SLAB SODDING		SY	175,347.00	$1.50	$ 263,020.50
232(B)	2814	SEEDING METHOD B		AC	73.00	$500.00	$ 36,500.00
233(A)	2817	VEGETATIVE MULCHING		AC	37.00	$400.00	$ 14,800.00
241	2832	MOWING		AC	37.00	$65.00	$ 2,405.00
242	0400	(PL)STABILIZED CONSTRUCTION EXIT		EA	4.00	$2,000.00	$ 8,000.00
303(A)	2100	AGGREGATE BASE TYPE A		CY	29,888.00	$60.00	$ 1,793,280.00
307(K)	4300	STABILIZED SUBGRADE		SY	148,250.00	$7.00	$ 1,037,750.00
317	4270	CEMENT TREATED BASE		SY	64,517.00	$12.00	$ 774,204.00
325	5271	SEPARATOR FABRIC		SY	169,162.00	$1.50	$ 253,743.00
402(E)	0225	TRAFFIC BOUND SURFACE COURSE TYPE E		TON	16,687.00	$35.00	$ 584,045.00
407(B)	0250	TACK COAT		GAL	1,817.00	$3.50	$ 6,359.50
408	5774	PRIME COAT		GAL	52,951.00	$4.00	$ 211,804.00
411(B)	5945	SUPERPAVE, TYPE S3(PG 64-22 OK)		TON	13,712.00	$80.00	$ 1,096,960.00
411(C)	5955	SUPERPAVE, TYPE S4(PG 70-28 OK)		TON	1,339.00	$120.00	$ 160,680.00
414(A)	0210	P.C.CONCRETE PAVEMENT(PLACEMENT)		SY	24,076.00	$12.00	$ 288,912.00
414(B)	5725	DOWEL JOINTED P.C. CONCRETE PAVEMENT (PLACEMENT)		SY	85,424.00	$20.00	$ 1,708,480.00
414(G)	5275	P.C. CONCRETE FOR PAVEMENT		CY	31,256.00	$125.00	$ 3,907,000.00
509(A)	0319	CLASS AA CONCRETE		CY	162.00	$500.00	$ 81,000.00
510(A)	6333	RETAINING WALL		SY	598.00	$550.00	$ 328,900.00
511(A)	0332	REINFORCING STEEL		LB	22,092.00	$1.00	$ 22,092.00
609(A)	0300	CONCRETE CURB (6" BARRIER-INTEGRAL)		LF	15,905.00	$10.00	$ 159,050.00
609(B)	1525	2'-8" COMB. CURB & GUTTER (6" BARRIER)		LF	3,024.00	$22.00	$ 66,528.00
611(G)	5102	INLET CI DES. 1 (B)		EA	54.00	$1,000.00	$ 54,000.00
611(G)	5117	INLET CI DES. 2 (2B)		EA	8.00	$5,000.00	$ 40,000.00
613(A)	0491	18" R.C.PIPE CLASS III		LF	4,965.00	$55.00	$ 273,075.00
613(A)	0492	24" R.C.PIPE CLASS III		LF	1,540.00	$65.00	$ 100,100.00
613(A)	0494	36" R.C.PIPE CLASS III		LF	710.00	$90.00	$ 63,900.00
613(A)	0495	42" R.C.PIPE CLASS III		LF	100.00	$150.00	$ 15,000.00
613(A)	0496	48" R.C.PIPE CLASS III		LF	380.00	$175.00	$ 66,500.00
613(J)	5915	EDGE DRAIN CONDUIT-PERFORATED		LF	16,266.00	$10.00	$ 162,660.00
613(K)	5916	EDGE DRAIN OUTLET LATERAL-NONPERFORATED		LF	651.00	$15.00	$ 9,765.00
613(L)	5726	18" PREFAB. CULVERT END SECTION, ROUND		EA	10.00	$350.00	$ 3,500.00
613(L)	5730	24" PREFAB. CULVERT END SECTION, ROUND		EA	20.00	$450.00	$ 9,000.00
613(L)	5734	36" PREFAB. CULVERT END SECTION, ROUND		EA	2.00	$1,000.00	$ 2,000.00
613(L)	5736	42" PREFAB. CULVERT END SECTION, ROUND		EA	2.00	$1,500.00	$ 3,000.00
613(L)	5738	48" PREFAB. CULVERT END SECTION, ROUND		EA	2.00	$2,000.00	$ 4,000.00
619(A)	0920	REMOVAL OF STRUCTURES & OBSTRUCTIONS		LSUM	1.00	$75,000.00	$ 75,000.00
619(B)	4725	REMOVAL OF FENCE		LF	6,025.00	$1.50	$ 9,037.50
619(B)	4726	REMOVAL OF CURB AND GUTTER		LF	4,433.00	$6.00	$ 26,598.00
619(B)	4727	REMOVAL OF CONCRETE PAVEMENT		SY	5,265.00	$10.00	$ 52,650.00
619(B)	4728	REMOVAL OF ASPHALT PAVEMENT		SY	104,527.00	$4.50	$ 470,371.50
619(B)	4780	REMOVAL OF GUARDRAIL		LF	6,793.00	$4.00	$ 27,172.00
624(C)	4459	FENCE-STYLE SWF (5 BARBED WIRE)		LF	6,146.00	$4.50	$ 27,657.00
628(B)	5125	HIGH-TENSION CABLE BARRIER(TL-4)		LF	4,920.00	$15.00	$ 73,800.00
628(C)	5110	END ANCHORS		EA	6.00	$2,500.00	$ 15,000.00
871(A)	8325	(SP)IMPACT ATTENUATOR		EA	13.00	$25,000.00	$ 325,000.00
BRIDGE		*0200*					
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge A (FRMC WB)	LSUM	1.00	$112,000.00	$ 112,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,734,000.00	$ 1,734,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge B (FRMC EB)	LSUM	1.00	$112,000.00	$ 112,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,734,000.00	$ 1,734,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge C (GARY WB)	LSUM	1.00	$1,188,000.00	$ 1,188,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge D (GARY EB)	LSUM	1.00	$1,188,000.00	$ 1,188,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge E (NEPTUNE WB)	LSUM	1.00	$207,000.00	$ 207,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$3,706,000.00	$ 3,706,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge F (NEPTUNE EB)	LSUM	1.00	$207,000.00	$ 207,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$3,706,000.00	$ 3,706,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge G (EB-NB FLYOVER)	LSUM	1.00	$80,000.00	$ 80,000.00
N/A	N/A	CONSTRUCTION OF PARAPET WALLS	Parapet Walls	LSUM	1.00	$1,762,000.00	$ 1,762,000.00
TRAFFIC		*0300*					
N/A	N/A	CONSTRUCTION TRAFFIC CONTROL	5% (Road + Bridge)	LSUM	1.00	$1,674,000.00	$ 1,674,000.00
N/A	N/A	OTHER PERMANENT TRAFFIC	5% (Road + Bridge)	LSUM	1.00	$1,674,000.00	$ 1,674,000.00
STAKING		*0600*					
642(B)	0096	CONSTRUCTION STAKING LEVEL 2	1.5% (Project - Mobilization)	LSUM	1.00	$553,000.00	$ 553,000.00
CONSTRUCTION		*0640*					
220	2800	SWPPP DOCUMENTATION AND MANAGEMENT		LSUM	1.00	$5,000.00	$ 5,000.00
640(A)	1426	FIELD OFFICE		EA	1.00	$10,000.00	$ 10,000.00
641	1552	MOBILIZATION		LSUM	1.00	$1,627,000.00	$ 1,627,000.00

ROADWAY TOTAL	$17,748,699.00
BRIDGE TOTAL	$15,736,000.00
TRAFFIC TOTAL	$3,348,000.00
STAKING	$553,000.00
CONSTRUCTION	$1,642,000.00
20% CONTINGENCY	$ 7,805,539.80
PRELIM. GRAND TOTAL	$46,833,238.80
ALT. 2D || GRAND TOTAL ROUNDED	**$46,834,000.00**

Frontage Rds + I-40/Ramps + Bridges | **ODOT:**	$41,612,000.00
Gary Blvd + Oliver/Lexington + Red Wheat + Drives | **CITY:**	$5,222,000.00

GARVER

Project: **I-40 Exit 65 Interchange - Clinton, OK**
Proj No.
J/P No. **31842(04)**

May 28, 2020
Garver Proj. No. 17037360

ENGINEER'S OPINION OF PROBABLE COST

ALTERNATIVE 9A - PLANNING LEVEL ESTIMATE
I-40 Exit 65 Interchange - Clinton, OK

ITEM NO.	CODE NO.	DESCRIPTION		UNIT	QUANTITY	UNIT PRICE	TOTAL
ROADWAY		*0100*					
201(A)	0102	CLEARING AND GRUBBING		LSUM	1.00	$15,000.00	$ 15,000.00
202(A)	0183	UNCLASSIFIED EXCAVATION		CY	86,900.00	$7.00	$ 608,300.00
202(D)	0184	UNCLASSIFIED BORROW		CY	446,300.00	$10.00	$ 4,463,000.00
205(A)	4229	TYPE A-SALVAGED TOPSOIL		LSUM	1.00	$85,000.00	$ 85,000.00
N/A	N/A	TEMPORARY EROSION CONTROL		LSUM	1.00	$70,000.00	$ 70,000.00
230(A)	2806	SOLID SLAB SODDING		SY	172,951.00	$1.50	$ 259,426.50
232(B)	2814	SEEDING METHOD B		AC	72.00	$500.00	$ 36,000.00
233(A)	2817	VEGETATIVE MULCHING		AC	36.00	$400.00	$ 14,400.00
241	2832	MOWING		AC	36.00	$65.00	$ 2,340.00
242	0400	(PL)STABILIZED CONSTRUCTION EXIT		EA	4.00	$2,000.00	$ 8,000.00
303(A)	2100	AGGREGATE BASE TYPE A		CY	30,892.00	$60.00	$ 1,853,520.00
307(K)	4300	STABILIZED SUBGRADE		SY	155,611.00	$7.00	$ 1,089,277.00
317	4270	CEMENT TREATED BASE		SY	70,850.00	$12.00	$ 850,200.00
325	5271	SEPARATOR FABRIC		SY	173,492.00	$1.50	$ 260,238.00
402(E)	0225	TRAFFIC BOUND SURFACE COURSE TYPE E		TON	20,898.00	$35.00	$ 731,430.00
407(B)	0250	TACK COAT		GAL	2,054.00	$3.50	$ 7,189.00
408	5774	PRIME COAT		GAL	55,695.00	$4.00	$ 222,780.00
411(B)	5945	SUPERPAVE, TYPE S3(PG 64-22 OK)		TON	13,392.00	$80.00	$ 1,071,360.00
411(C)	5955	SUPERPAVE, TYPE S4(PG 70-28 OK)		TON	1,516.00	$120.00	$ 181,920.00
411(C)	5960	SUPERPAVE, TYPE S4(PG 64-22 OK)		TON	-	$120.00	$ -
414(A)	0210	P.C.CONCRETE PAVEMENT(PLACEMENT)		SY	30,295.00	$12.00	$ 363,540.00
414(B)	5725	DOWEL JOINTED P.C. CONCRETE PAVEMENT (PLACEMENT)		SY	80,216.00	$20.00	$ 1,604,320.00
414(G)	5275	P.C. CONCRETE FOR PAVEMENT		CY	31,809.00	$125.00	$ 3,976,125.00
509(A)	0319	CLASS AA CONCRETE		CY	162.00	$500.00	$ 81,000.00
510(A)	6333	RETAINING WALL		SY	598.00	$550.00	$ 328,900.00
511(A)	0332	REINFORCING STEEL		LB	22,092.00	$1.00	$ 22,092.00
609(A)	0300	CONCRETE CURB (6" BARRIER-INTEGRAL)		LF	8,229.00	$10.00	$ 82,290.00
609(B)	1525	2'-8" COMB. CURB & GUTTER (6" BARRIER)		LF	3,023.00	$22.00	$ 66,506.00
611(G)	5102	INLET CI DES. 1 (B)		EA	29.00	$1,000.00	$ 29,000.00
611(G)	5117	INLET CI DES. 2 (2B)		EA	2.00	$5,000.00	$ 10,000.00
613(A)	0491	18" R.C.PIPE CLASS III		LF	3,200.00	$55.00	$ 176,000.00
613(A)	0492	24" R.C.PIPE CLASS III		LF	1,322.00	$65.00	$ 85,930.00
613(A)	0494	36" R.C.PIPE CLASS III		LF	500.00	$90.00	$ 45,000.00
613(A)	0496	48" R.C.PIPE CLASS III		LF	60.00	$175.00	$ 10,500.00
613(J)	5915	EDGE DRAIN CONDUIT-PERFORATED		LF	9,986.00	$10.00	$ 99,860.00
613(K)	5916	EDGE DRAIN OUTLET LATERAL-NONPERFORATED		LF	400.00	$15.00	$ 6,000.00
613(L)	5726	18" PREFAB. CULVERT END SECTION, ROUND		EA	11.00	$350.00	$ 3,850.00
613(L)	5730	24" PREFAB. CULVERT END SECTION, ROUND		EA	11.00	$450.00	$ 4,950.00
613(L)	5734	36" PREFAB. CULVERT END SECTION, ROUND		EA	6.00	$1,000.00	$ 6,000.00
613(L)	5738	48" PREFAB. CULVERT END SECTION, ROUND		EA	3.00	$2,000.00	$ 6,000.00
619(A)	0920	REMOVAL OF STRUCTURES & OBSTRUCTIONS		LSUM	1.00	$75,000.00	$ 75,000.00
619(B)	4725	REMOVAL OF FENCE		LF	6,025.00	$1.50	$ 9,037.50
619(B)	4726	REMOVAL OF CURB AND GUTTER		LF	4,433.00	$6.00	$ 26,598.00
619(B)	4727	REMOVAL OF CONCRETE PAVEMENT		SY	5,265.00	$10.00	$ 52,650.00
619(B)	4728	REMOVAL OF ASPHALT PAVEMENT		SY	104,527.00	$4.50	$ 470,371.50
619(B)	4780	REMOVAL OF GUARDRAIL		LF	6,118.00	$4.00	$ 24,472.00
624(C)	4459	FENCE-STYLE SWF (5 BARBED WIRE)		LF	6,146.00	$4.50	$ 27,657.00
628(B)	5125	HIGH-TENSION CABLE BARRIER(TL-4)		LF	4,920.00	$15.00	$ 73,800.00
628(C)	5110	END ANCHORS		EA	6.00	$2,500.00	$ 15,000.00
871(A)	8325	(SP)IMPACT ATTENUATOR		EA	13.00	$25,000.00	$ 325,000.00
BRIDGE		*0200*					
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge A (FRMC WB)	LSUM	1.00	$112,000.00	$ 112,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,734,000.00	$ 1,734,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge B (FRMC EB)	LSUM	1.00	$112,000.00	$ 112,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,734,000.00	$ 1,734,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge C (GARY WB)	LSUM	1.00	$3,939,000.00	$ 3,939,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge D (NEPTUNE WB)	LSUM	1.00	$207,000.00	$ 207,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$4,803,000.00	$ 4,803,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge E (NEPTUNE EB)	LSUM	1.00	$207,000.00	$ 207,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$4,803,000.00	$ 4,803,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge F (EB-NB FLYOVER)	LSUM	1.00	$80,000.00	$ 80,000.00
N/A	N/A	CONSTRUCTION OF PARAPET WALLS	Parapet Walls	LSUM	1.00	$1,251,000.00	$ 1,251,000.00
TRAFFIC		*0300*					
N/A	N/A	CONSTRUCTION TRAFFIC CONTROL	5% (Road + Bridge)	LSUM	1.00	$1,946,000.00	$ 1,946,000.00
N/A	N/A	OTHER PERMANENT TRAFFIC	5% (Road + Bridge)	LSUM	1.00	$1,946,000.00	$ 1,946,000.00
STAKING		*0600*					
642(B)	0096	CONSTRUCTION STAKING LEVEL 2	1.5% (Project - Mobilization)	LSUM	1.00	$642,000.00	$ 642,000.00
CONSTRUCTION		*0640*					
220	2800	SWPPP DOCUMENTATION AND MANAGEMENT		LSUM	1.00	$5,000.00	$ 5,000.00
640(A)	1426	FIELD OFFICE		EA	1.00	$10,000.00	$ 10,000.00
641	1552	MOBILIZATION		LSUM	1.00	$1,879,000.00	$ 1,879,000.00

ROADWAY TOTAL	$19,936,829.50
BRIDGE TOTAL	$18,982,000.00
TRAFFIC TOTAL	$3,892,000.00
STAKING	$642,000.00
CONSTRUCTION	$1,894,000.00
20% CONTINGENCY	$ 9,069,365.90
PRELIM. GRAND TOTAL	$54,416,195.40
ALT. 9A || GRAND TOTAL ROUNDED	**$54,417,000.00**

Frontage Rds + I-40/Ramps + Bridges | **ODOT:**	$48,483,000.00
Gary Blvd + Oliver/Lexington + Red Wheat + Drives | **CITY:**	$5,934,000.00

Project: **I-40 Exit 65 Interchange - Clinton, OK**
Proj No.
J/P No. **31842(04)**

May 28, 2020
Garver Proj. No. 17037360

ENGINEER'S OPINION OF PROBABLE COST

ALTERNATIVE 9B - PLANNING LEVEL ESTIMATE
I-40 Exit 65 Interchange - Clinton, OK

ITEM NO.	CODE NO.	DESCRIPTION		UNIT	QUANTITY	UNIT PRICE	TOTAL
ROADWAY	*0100*						
201(A)	0102	CLEARING AND GRUBBING		LSUM	1.00	$15,000.00	$ 15,000.00
202(A)	0183	UNCLASSIFIED EXCAVATION		CY	284,300.00	$7.00	$ 1,990,100.00
202(D)	0184	UNCLASSIFIED BORROW		CY	-	$10.00	$ -
205(A)	4229	TYPE A-SALVAGED TOPSOIL		LSUM	1.00	$85,000.00	$ 85,000.00
N/A	N/A	TEMPORARY EROSION CONTROL		LSUM	1.00	$70,000.00	$ 70,000.00
230(A)	2806	SOLID SLAB SODDING		SY	169,593.00	$1.50	$ 254,389.50
232(B)	2814	SEEDING METHOD B		AC	71.00	$500.00	$ 35,500.00
233(A)	2817	VEGETATIVE MULCHING		AC	36.00	$400.00	$ 14,400.00
241	2832	MOWING		AC	36.00	$65.00	$ 2,340.00
242	0400	(PL)STABILIZED CONSTRUCTION EXIT		EA	4.00	$2,000.00	$ 8,000.00
303(A)	2100	AGGREGATE BASE TYPE A		CY	30,512.00	$60.00	$ 1,830,720.00
307(K)	4300	STABILIZED SUBGRADE		SY	153,580.00	$7.00	$ 1,075,060.00
317	4270	CEMENT TREATED BASE		SY	68,291.00	$12.00	$ 819,492.00
325	5271	SEPARATOR FABRIC		SY	171,457.00	$1.50	$ 257,185.50
402(E)	0225	TRAFFIC BOUND SURFACE COURSE TYPE E		TON	20,266.00	$35.00	$ 709,310.00
407(B)	0250	TACK COAT		GAL	1,817.00	$3.50	$ 6,359.50
408	5774	PRIME COAT		GAL	54,924.00	$4.00	$ 219,696.00
411(B)	5945	SUPERPAVE, TYPE S3(PG 64-22 OK)		TON	13,303.00	$80.00	$ 1,064,240.00
411(C)	5955	SUPERPAVE, TYPE S4(PG 70-28 OK)		TON	1,339.00	$120.00	$ 160,680.00
411(C)	5960	SUPERPAVE, TYPE S4(PG 64-22 OK)		TON	-	$120.00	$ -
414(A)	0210	P.C.CONCRETE PAVEMENT(PLACEMENT)		SY	29,481.00	$12.00	$ 353,772.00
414(B)	5725	DOWEL JOINTED P.C. CONCRETE PAVEMENT (PLACEMENT)		SY	81,185.00	$20.00	$ 1,623,700.00
414(G)	5275	P.C. CONCRETE FOR PAVEMENT		CY	31,719.00	$125.00	$ 3,964,875.00
509(A)	0319	CLASS AA CONCRETE		CY	162.00	$500.00	$ 81,000.00
510(A)	6333	RETAINING WALL		SY	598.00	$550.00	$ 328,900.00
511(A)	0332	REINFORCING STEEL		LB	22,092.00	$1.00	$ 22,092.00
609(A)	0300	CONCRETE CURB (6" BARRIER-INTEGRAL)		LF	8,892.00	$10.00	$ 88,920.00
609(B)	1525	2'-8" COMB. CURB & GUTTER (6" BARRIER)		LF	3,023.00	$22.00	$ 66,506.00
611(G)	5102	INLET CI DES. 1 (B)		EA	31.00	$1,000.00	$ 31,000.00
611(G)	5117	INLET CI DES. 2 (2B)		EA	4.00	$5,000.00	$ 20,000.00
613(A)	0491	18" R.C.PIPE CLASS III		LF	3,585.00	$55.00	$ 197,175.00
613(A)	0492	24" R.C.PIPE CLASS III		LF	1,322.00	$65.00	$ 85,930.00
613(A)	0494	36" R.C.PIPE CLASS III		LF	500.00	$90.00	$ 45,000.00
613(A)	0495	42" R.C.PIPE CLASS III		LF	-	$150.00	$ -
613(A)	0496	48" R.C.PIPE CLASS III		LF	60.00	$175.00	$ 10,500.00
613(J)	5915	EDGE DRAIN CONDUIT-PERFORATED		LF	10,649.00	$10.00	$ 106,490.00
613(K)	5916	EDGE DRAIN OUTLET LATERAL-NONPERFORATED		LF	426.00	$15.00	$ 6,390.00
613(L)	5726	18" PREFAB. CULVERT END SECTION, ROUND		EA	11.00	$350.00	$ 3,850.00
613(L)	5730	24" PREFAB. CULVERT END SECTION, ROUND		EA	11.00	$450.00	$ 4,950.00
613(L)	5734	36" PREFAB. CULVERT END SECTION, ROUND		EA	6.00	$1,000.00	$ 6,000.00
613(L)	5738	48" PREFAB. CULVERT END SECTION, ROUND		EA	3.00	$2,000.00	$ 6,000.00
619(A)	0920	REMOVAL OF STRUCTURES & OBSTRUCTIONS		LSUM	1.00	$75,000.00	$ 75,000.00
619(B)	4725	REMOVAL OF FENCE		LF	6,025.00	$1.50	$ 9,037.50
619(B)	4726	REMOVAL OF CURB AND GUTTER		LF	4,433.00	$6.00	$ 26,598.00
619(B)	4727	REMOVAL OF CONCRETE PAVEMENT		SY	5,265.00	$10.00	$ 52,650.00
619(B)	4728	REMOVAL OF ASPHALT PAVEMENT		SY	104,527.00	$4.50	$ 470,371.50
619(B)	4780	REMOVAL OF GUARDRAIL		LF	6,118.00	$4.00	$ 24,472.00
624(C)	4459	FENCE-STYLE SWF (5 BARBED WIRE)		LF	6,146.00	$4.50	$ 27,657.00
628(B)	5125	HIGH-TENSION CABLE BARRIER(TL-4)		LF	4,920.00	$15.00	$ 73,800.00
628(C)	5110	END ANCHORS		EA	6.00	$2,500.00	$ 15,000.00
871(A)	8325	(SP)IMPACT ATTENUATOR		EA	13.00	$25,000.00	$ 325,000.00
BRIDGE	*0200*						
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge A (FRMC WB)	LSUM	1.00	$112,000.00	$ 112,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,734,000.00	$ 1,734,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge B (FRMC EB)	LSUM	1.00	$112,000.00	$ 112,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$1,734,000.00	$ 1,734,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge C (GARY WB)	LSUM	1.00	$1,374,000.00	$ 1,374,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE	Bridge D (GARY EB)	LSUM	1.00	$1,374,000.00	$ 1,374,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge E (NEPTUNE WB)	LSUM	1.00	$207,000.00	$ 207,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$4,803,000.00	$ 4,803,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge F (NEPTUNE EB)	LSUM	1.00	$207,000.00	$ 207,000.00
N/A	N/A	CONSTRUCTION OF NEW BRIDGE		LSUM	1.00	$4,803,000.00	$ 4,803,000.00
619(D)	1397	REMOVAL OF EXISTING BRIDGE STRUCTURE	Bridge G (EB-NB FLYOVER)	LSUM	1.00	$80,000.00	$ 80,000.00
N/A	N/A	CONSTRUCTION OF PARAPET WALLS	Parapet Walls	LSUM	1.00	$1,208,000.00	$ 1,208,000.00
TRAFFIC	*0300*						
N/A	N/A	CONSTRUCTION TRAFFIC CONTROL	5% (Road + Bridge)	LSUM	1.00	$1,726,000.00	$ 1,726,000.00
N/A	N/A	OTHER PERMANENT TRAFFIC	5% (Road + Bridge)	LSUM	1.00	$1,726,000.00	$ 1,726,000.00
STAKING	*0600*						
642(B)	0096	CONSTRUCTION STAKING LEVEL 2	1.5% (Project - Mobilization)	LSUM	1.00	$570,000.00	$ 570,000.00
CONSTRUCTION	*0640*						
220	2800	SWPPP DOCUMENTATION AND MANAGEMENT		LSUM	1.00	$5,000.00	$ 5,000.00
640(A)	1426	FIELD OFFICE		EA	1.00	$10,000.00	$ 10,000.00
641	1552	MOBILIZATION		LSUM	1.00	$1,675,000.00	$ 1,675,000.00

ROADWAY TOTAL	$16,770,108.50
BRIDGE TOTAL	$17,748,000.00
TRAFFIC TOTAL	$3,452,000.00
STAKING	$570,000.00
CONSTRUCTION	$1,690,000.00
20% CONTINGENCY	$ 8,046,021.70
PRELIM. GRAND TOTAL	$48,276,130.20
ALT. 9B || GRAND TOTAL ROUNDED	**$48,277,000.00**

Frontage Rds + I-40/Ramps + Bridges | **ODOT:**	$43,264,000.00
Gary Blvd + Oliver/Lexington + Red Wheat + Drives | **CITY:**	$5,013,000.00


GARVER