DRAFT LINE AND GRADE REPORT

I-12 to Bush Draft Environmental Impact Statement

USACE Permit No. MVN-2006-0037

Prepared for

United States Army Corps of Engineers, New Orleans District

and

Louisiana Department of Transportation and Development

August 2011

US Army Corps of Engineers
New Orleans District

DOTD
LOUISIANA'S ON THE MOVE
BUILDS THE WAY

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Acronyms

ALT	Alternative
AASHTO	American Association of State Highway and Transportation Officials
BFE	Base Flood Elevation
CEMVN	U.S. Army Corps of Engineers New Orleans District
CEQ	Council on Environmental Quality
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
DFIRM	Digital Flood Insurance Rate Map
DOQQ	Digital Orthophoto Quarter Quads
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
I-12	Interstate 12
LA No.	Louisiana Highway No. (Ex; LA 21)
LADOTD	Louisiana Department of Transportation and Development
LDWF	Louisiana Department of Wildlife and Fisheries
LiDAR	Light Detection and Ranging Data
LULC	Land Use and Land Cover Data
NEPA	National Environmental Policy Act
ND 2025	St. Tammany Parish's New Direction 2025 Comprehensive Plan
NRCS	Natural Resources Conservation Services
RA	Rural Arterial
ROW	Right of Way
RCB	Reinforced Concrete Box
RCP	Reinforced Concrete Pipe
SA	Suburban Arterial
SCS	Soil Conservation Service
SSURGO	Soil Survey Geographic Database
TIMED	Transportation Infrastructure Model for Economic Development
UA	Urban Arterial
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
USFWS	U.S. Department of Interior – Fish and Wildlife Service

EXECUTIVE SUMMARY

This ***Line and Grade Study*** (Report) has been prepared to assist the U.S. Army Corps of Engineers (USACE), New Orleans District (CEMVN) in the decision making process for the evaluation of impacts and benefits associated with the construction of the proposed roadway project. The CEMVN has prepared a Draft Environmental Impact Statement (DEIS) to evaluate the potential environmental and socioeconomic consequences of granting permits to the Louisiana Department of Transportation and Development (LADOTD) for the construction of the proposed "Louisiana Highway (LA) 3241" from the LA 40/41 intersection in Bush, LA to Interstate 12 (I-12). This Report is an appendix to the DEIS and presents the development and results of the line and grade study, including preliminary project plans (Project Plates), typical cross sections, right of way impacts, and opinions of probable costs.

The project area is located in St. Tammany Parish, Louisiana and is roughly bound by I-12 to the south, LA 41 to the east, and LA 21 / U.S. Highway (US) 190 to the west. Alternatives were developed through stakeholder and public input and were evaluated through a screening process. Four alternatives were determined practicable and feasible alternatives to further evaluate for potential impacts and benefits (Figure 1-1). This Report describes the background, proposed project, existing conditions, alternatives development process, design criteria, and the design alternatives. The four alternatives, in addition to the No Build Alternative, are briefly described below.

The **No Build Alternative** is defined as the alternative in which the proposed action would not be constructed. The CEMVN would not issue any permits for the proposed highway project and project-related impacts due to construction of the new highway would be avoided. The No Build Alternative serves as the benchmark to which other alternatives can be evaluated.

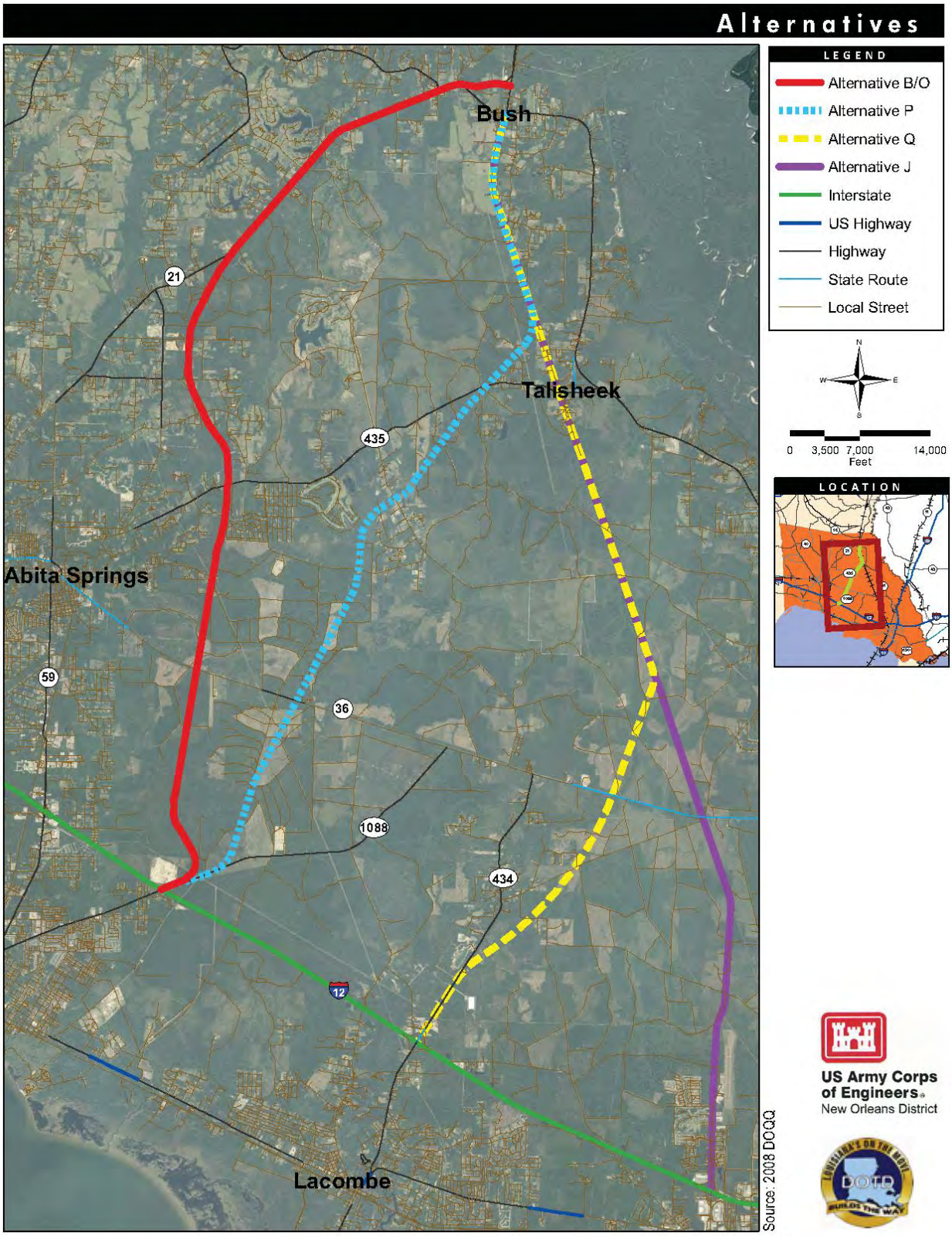
Alternative B/O is defined as the western alternative that would widen LA 21 to a 4-lane highway from Bush to just north of Waldheim, then continue south as a new 4-lane roadway where it would connect to I-12 at the LA 1088 interchange.

Alternative P is defined as the central alternative that would begin at the intersection of LA 41 and LA 40 in Bush and proceed southward to LA 1088. The proposed route will utilize an abandoned railroad corridor from Bush to Talisheek, before turning southwest on a new alignment to I-12 at the LA 1088 interchange.

Alternative Q is defined as the eastern alternative that would construct a 4-lane highway from the intersection of LA 41 and LA 40 in Bush following the abandoned railroad corridor to approximately 1.7 miles north of LA 36, where it would head southeast to connect with I-12 at the LA 434 interchange (Exit 74).

Alternative J is defined as the second eastern alternative that would construct a 4-lane highway from the intersection of LA 41 and LA 40 in Bush and follow the abandoned railroad corridor to a point due north of the Slidell Municipal Airport. From this point, the proposed route would connect to Airport Road, which ties into I-12 at an existing interchange (Exit 80).

Figure 1-1: Project Alternatives Considered for this Report



In summary, the primary focus of this Report is to determine the geometric requirements to construct the proposed project utilizing current highway design guidelines, to evaluate the project for right of way impacts, and determine probable costs for the proposed actions to help determine if they are feasible alternatives. The alternatives developed in this Report have been used in the other supporting technical documents to assess environmental impacts including, but not limited to: wetlands, floodplains, traffic, noise and air, threatened and endangered species, archeological sites, and socio-economic impacts.

Table 1-1 below is a summary of the comparative analysis of each alternative related to the roadway construction, right of way acquisition, and wetland mitigation costs.

Table 1-1: Comparative Opinion of Probable Costs of Alternatives

	Alternative B/O	**Alternative P**	**Alternative Q**	**Alternative J**
CONSTRUCTION*	$196,541,436	$186,832,634	$161,683,782	$184,345,401
ENGINEERING (10%)	$19,654,144	$18,683,263	$16,168,378	$18,434,540
RIGHT OF WAY	$20,612,670	$11,520,034	$10,248,157	$26,939,848
WETLAND IMPACTS	3,802 Acres	3,350 Acres	2,454 Acres	3,221 Acres
MITIGATION**	$57,026,250	$50,250,536	$36,802,500	$48,317,143
PROJECT TOTALS	**$293,834,500**	**$267,286,467**	**$224,902,817**	**$278,036,932**

*Construction Costs include 20% contingency.
**Mitigation costs are preliminary and could increase or decrease based on final engineering design of the roadway and environmental conditions.

Based on a comparative analysis of the alternatives, the following information is concluded:

- Alternative Q is the least expensive alternative at approximately $225 Million
- Alternative B/O is the most expensive at approximately $294 Million
- Alternative J has the most right of way impacts
- Alternative Q impacts the least acreage of wetlands
- Alternative B/O impacts the most acreage of wetlands

SECTION 1.0 BACKGROUND

The I-12 to Bush project has been studied as a planning effort by LADOTD and regional municipalities since the 1980s to provide a 4-lane highway from I-12 to Bogalusa, LA in Washington Parish. The Project is also identified in the regional transportation planning documents produced by the St. Tammany Parish Government (*St. Tammany Parish Road Plan*, supporting the *St. Tammany Parish Comprehensive Plan: New Directions 2025*[1]) and by the Regional Planning Commission's (the Metropolitan Planning Organization covering St. Tammany Parish) *Metropolitan Transportation Plan*.[2] Local elected officials have seen this project as a priority for the region to provide regional connectivity and promote economic development.

In 1989 the Louisiana State Legislature created the Transportation Infrastructure Model for Economic Development (TIMED) Program, which was designed to enhance economic development in Louisiana through an investment in transportation projects (See Figure 1-2 for TIMED Project Corridors). Louisiana Revised Statute (R.S.) 47:820.2.B(1)(e) identified "LA 3241 – I-12 to Bush" as one of the projects to be funded by the TIMED Program. The proposed highway would provide a 4-lane highway from Bush, LA to I-12 to provide economic development in the Bogalusa and Washington Parish region, and provide for regional transportation needs.

Figure 1-2: TIMED Program Project Status (as of February 2005)

SOURCE: FHWA Website - Office of Corporate Research, Technology, and Innovation Management, Publication Number: FHWA-HRT-05-001, http://www.fhwa.dot.gov/publications/publicroads/05nov/08.cfm

[1] *St. Tammany Parish Road Plan*, http://www.stpgov.org/pdf/1190146163.pdf, a 10 Year Infrastructure Plan supporting the St Tammany Parish Comprehensive Plan: New Direction 2025.
[2] *Metropolitan Transportation Plan*, East St. Tammany/Slidell/Mandeville/Covington Urbanized Areas – Fiscal Years 2011- 2040. Regional Planning Commission, August 10, 2010.

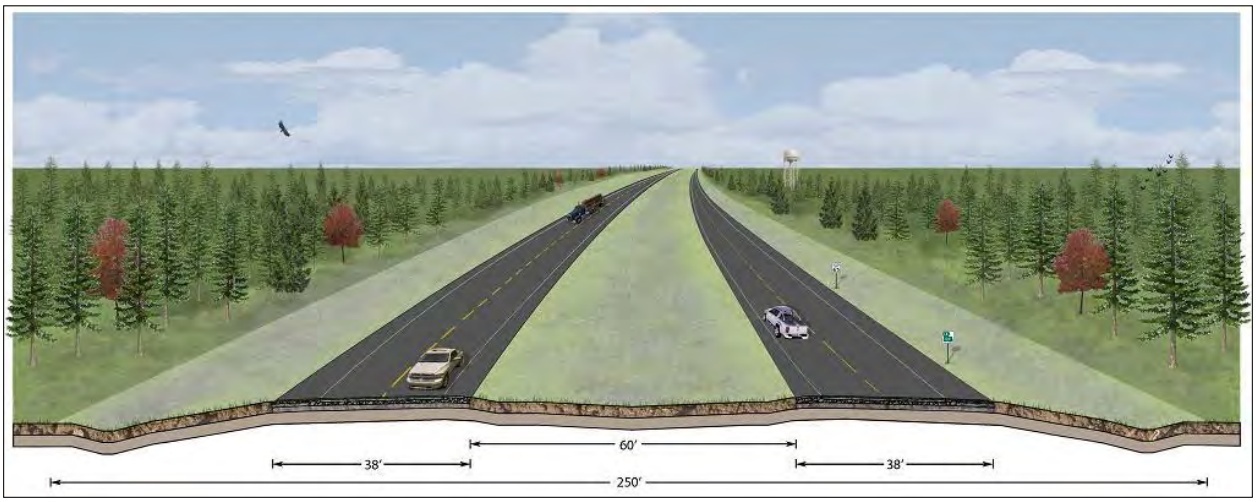
An environmental document must be prepared for the proposed project to evaluate the significance of impacts to the environment, as required by the National Environmental Policy Act (NEPA). In 2008, the USACE CEMVN received an application for a Department of Army permit from LADOTD in the form of an Environmental Assessment (EA), requesting authorization to construct a modern, high-speed, 4-lane arterial highway from I-12 in St. Tammany Parish to the northern terminus of the current 4-lane arterial portion of LA 21 in Bush, LA. The CEMVN concluded that the proposed project may have significant impacts to the environment and an Environmental Impact Statement (EIS) would be required to further evaluate those potential impacts, including more detailed analysis of water surface quality and hydrologic impacts to the project area. The analysis also considered impacts to threatened and endangered species, cultural resources, environmental conditions (noise and air), transportation systems, secondary and cumulative impacts, and socio-economic impacts (including environmental justice).

C.H. Fenstermaker & Associates, Inc. (Fenstermaker), sub-consultant to TetraTech, Inc., was enlisted to prepare this Report as a supplement to the EIS in order to review the previously developed alternatives, determine which alternatives were practicable and feasible to be further evaluated, and perform a detailed analysis of those alternatives in order to evaluate their potential impacts. This Report incorporates information from previous studies and reports that were completed during the preparation of the previous EA, and provides additional information and analysis to evaluate the alternatives and to assist the CEMVN in the permit application.

SECTION 2.0 PROPOSED PROJECT

The proposed project has been defined as a high speed, 4-lane arterial highway that will connect I-12 to the southern terminus of the current 4-lane arterial portion of LA 21 in Bush, LA. The project area is roughly bound by I-12 to the south, LA 21 and US 190 to East, and LA 41 to the West. Four build alternatives, along with the No Build Alternative, have been selected through an alternatives development and screening process, described in Section 5.0 of this Report. The four alternatives range from 17.4 to 21.1 miles in length and would be designed primarily as a rural arterial (RA-3) highway with a design speed of 70 miles per hour (mph). The majority of the corridor is proposed to be bounded by a 250 foot Control of Access right of way to limit the number of locations where vehicles enter the highway. Each of the project alternatives will have varying roadway classifications dependent upon existing and future planned land use, speed limit control, and existing roadway classifications at connections to existing state routes. The figure below illustrates a rendering of the typical highway section through the woodlands of St. Tammany Parish.

Figure 2-1: Rendering of Proposed Highway LA 3241 from I-12 to Bush, LA. (Fenstermaker)



As stated by the Federal Highway Administration (FHWA), rural minor arterial roadway corridors should combine with the principal arterials to form a rural network having the following characteristics:

1. *"Link cities and larger towns (and other traffic generators, such as major resort areas, that are capable of attracting travel over similarly long distances) and form an integrated network providing interstate and intercounty service.*
2. *Be spaced at such intervals, consistent with population density, so that all developed areas of the State are within a reasonable distance of an arterial highway.*
3. *Provide (because of the two characteristics defined immediately above) service to corridors with trip lengths and travel density greater than those predominantly served by rural collector or local systems. Minor arterials therefore constitute routes whose design should be expected to provide for relatively high overall travel speeds, with minimum interference to through movement." (FHWA 1989, http://www.fhwa.dot.gov/planning/fcsec2_1.htm)*

The proposed project shall comply with current LADOTD design guidelines, AASHTO design guidelines, and all applicable requirements for roadway, bridge, and drainage design. The proposed highway will generally consist of two 12-foot roadway travel lanes in each direction, eight to ten foot outside shoulders, and four foot inside shoulders. The median width and right of way required to construct the roadway will vary depending on the roadway segment, design parameters, and roadway classification, but will typically consist of a 60 foot median and a 250 foot right of way corridor for the majority of the roadway which is classified as a Rural Arterial (RA-3). The inside and outside slope of roadway embankments will generally be 6:1 throughout the horizontal clear zone. Roadside ditches will be required along various segments of the alignments to reduce ponding and convey surface water to the nearest culvert or bridge crossing. The ditches will typically have a four foot bottom width, with depths approximately four feet below the road shoulder. Drainage structures would be proposed to have no net impact on the area when considering peak run-off flows during 10-, 50-, and 100-year storm events at each of the locations. Additional design information can be found in the Design Criteria section of this Report, with typical roadway sections located in Appendix A - Project Plans for each alternative.

SECTION 3.0 EXISTING CONDITIONS

The project area is located in St. Tammany Parish, Louisiana and encompasses an area of approximately 244 square miles. The incorporated areas of Abita Springs, Pearl River, and portions of the cities of Slidell and Covington are located within the project area, as well as portions of the unincorporated areas of Bush, Hickory, Talisheek, and Waldheim. The project area is roughly triangular-shaped and is bound by I-12 to the south, LA 41 to the east, and LA 21 and US 190 to the west.

The existing land is predominantly rural forest land with areas of development along and adjacent to the major state routes. The higher population densities are located in the south western and eastern regions in the areas of Covington/Abita Springs (to the west) and near the City of Slidell (to the east). The surface waters generally flow from the northeast in a southwesterly direction. The southern area of the project is very flat, with rolling hills in the northern regions. Numerous floodplains and wetland areas extend throughout the project area. There are three wetland mitigation banks located within the project area.

3.1 Existing Roadways

The project area is generally bound by state roads. I-12 forms the southern boundary of the project, while LA 41 forms the eastern limit and LA 21 and US 190 form the western limits. There are four main roadways that cross through the project area: LA 36, LA 1088, LA 434 and LA 435. Airport Road extends from I-12 to the Slidell Municipal Airport and although it is not a state route, it is a major collector road in the area.

LA 435 traverses the northern portion of the project area in a northeasterly direction from Abita Springs to Talisheek. LA 36 also traverses the project area in an east-west direction from Abita Springs to Pearl River. LA 59, LA 1088, LA 1083 and LA 434 are also located in the project area and generally traverse in a north-south direction. These roadways are typically 2- lane rural roadways with 11 foot travel lanes and three to four foot unpaved shoulders.

Numerous rural parish roads create the network of roads to service area residents, including Peg Keller Road, Bob Levy Road, Horse Shoe Island Road, Watts Thomas Road, Rheusaw Parker Road, Mossy Hill Road, Railroad Avenue, and Money Hill Road. Unpaved roads extend through much of the rural and forested areas.

Roadway Functional System and Classification

LADOTD designates the roadway classifications for all state roads. The three main roadway functional classifications are Arterial, Collector, and Local Road. Roadways are classified as Urban if located within the designated statewide urbanized areas and Rural if located outside. Roadways are also classified as Minor, Major, or Principal depending on the functional use of the roadway and traffic volumes for the segment of roadway.

The following are the roadway classifications for Rural and Urban areas:

Road Classification	Road Type
Arterial	Principal or Minor
Collector	Major or Minor
Local Road	

The major roads within the project area have the following roadway classifications and can be found in Figure 3-1:

LA 21 - LA 21 traverses the western side of the project area and extends from the City of Covington to Bush and then proceeds north to the City of Bogalusa in Washington Parish. The segment between Covington and Bush is classified as a ***Minor Arterial***. At the intersection of LA 21 and LA 41 where the roadway heads north to Bogalusa, the functional classification of the roadway is a ***Principal Arterial***.

LA 41 - LA 41 traverses the eastern side of the project area and extends from the Town of Pearl River to Bush, where it intersects with LA 21. The roadway classification for LA 41 is a ***Minor Arterial***.

LA 36 - LA 36 traverses the project area in an east-west direction connecting LA 21 in Covington to LA 41 just north of Pearl River. LA 36 is classified as a ***Minor Arterial*** from the Covington to the Town of Abita Springs. From the intersection with LA 435 in Abita Springs to the intersection of LA 41 near Pearl River, LA 36 is classified as a ***Major Collector.***

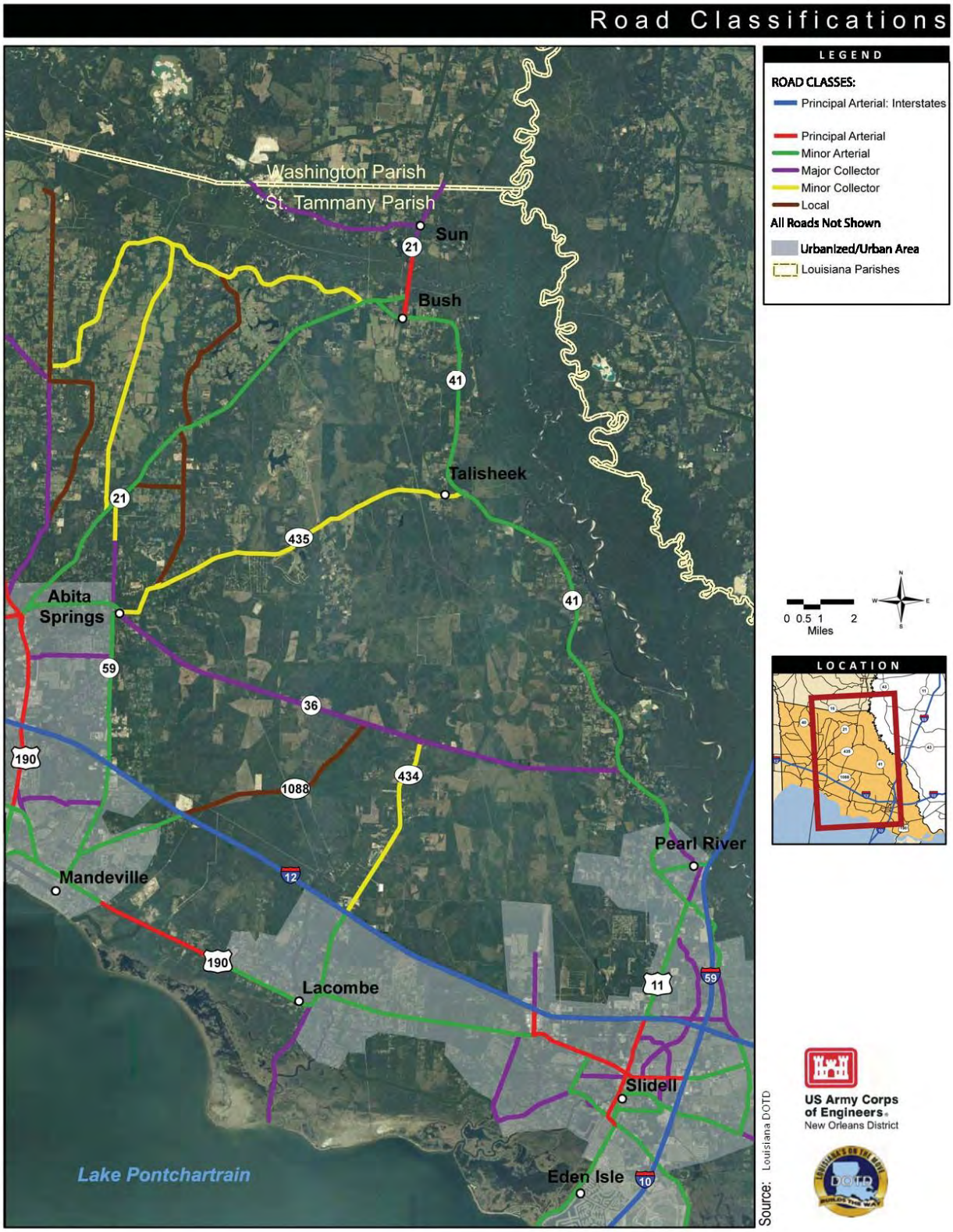
LA 435 - LA 435 traverses the project area in a northeasterly direction connecting LA 36 in the Town of Abita Springs with LA 41 in Talisheek. The entire length of LA 435 is classified as a ***Minor Collector***.

LA 1088 - LA 1088 extends from the City of Mandeville in a northeast direction until it terminates at LA 36. LA 1088 is classified as a ***Minor Arterial*** for the segment from Mandeville to I-12. From I-12 to the intersection with LA 36, LA 1088 is classified as a ***Local Roadway***.

LA 434 - LA 434 extends in a north-south direction connecting Lacombe to I-12 and I-12 to LA 36. The segment of LA 434 from I-12 to LA 36 is classified as a ***Minor Collector***. South of I-12, LA 434 is classified as a ***Minor Arterial*** between I-12 and US 190 and a ***Major Collector*** south of US 190.

Airport Road – Airport Road is a north-south roadway located in the urbanized area of the City of Slidell that extends from I-12 to the Slidell Municipal Airport and is classified as a ***Major Collector*** for the length of the roadway. South of I-12, Airport Road becomes Northshore Boulevard, which continues to the intersection with US 190 and is classified as a ***Principal Arterial***.

Figure 3-1: LADOTD Roadway Classifications



3.2 Existing Traffic

Existing traffic data was collected and analyzed to determine the base traffic conditions. The results are presented in the Traffic Study, prepared by Urban Systems, Inc. Capacity analysis was performed to determine operational conditions in the peak periods for the existing roadways. There are three existing segments of roadway functioning at Level of Service (LOS)-E or greater (Urban Systems 2010), which indicates a roadway at or above capacity. The following table illustrates the LOS and Average Daily Traffic (ADT) volumes for the various roadway segments in the project area for the existing conditions.

Table 3-1: Roadway Segments - AM and PM pead LOS and Average Daily Traffic Volumes

Roadway segment	AM peak LOS	PM peak LOS	ADT
LA 40 between LA 1083 and LA 21	D	D	641 (NB) / 651 (SB)
LA 41 between LA 40 and LA 435	C	C	1642 (NB) / 1947 (SB)
LA 21 between LA 40 and LA 1083	D	D	3991 (EB) / 3949 (WB)
LA 21 between LA 1084 and LA 1083	D	D	4710 (EB) / 4797 (WB)
LA 21 between LA 59 and LA 1084	D	D	5440 (EB) / 5419 (WB)
LA 21 between LA 36 and LA 1082	D	D	4922 (EB) / 4806 (WB)
LA 59 between LA 21 and LA 36	D	D	N/A
LA 59 between LA 36 and I-12	**E**	**E**	N/A
LA 435 between LA 1083 and Peg Keller	D	D	2181 (EB) / 2169 (WB)
LA 435 between White Oaks and LA 41	C	C	487 (EB) / 473 (WB)
LA 1083 between LA 1084 and LA 435	C	C	418 (NB) / 440 (SB)
LA 1083 between LA 21 and LA 1084	C	C	331 (NB) / 329 (SB)
LA 1084 between LA 21 and LA 1083	C	D	516 (EB) / 260 (WB)
LA 36 between LA 21 and LA 59	**E**	**E**	N/A
LA 36 between LA 435 and LA 1088	C	C	966 (EB) / 1073 (WB)
LA 36 between LA 434 and LA 41	C	C	1532 (EB) / 1525 (WB)
LA 36 between LA 1088 and LA 434	C	C	1123 (EB) / 1547 (WB)
LA 1088 between LA 36 and I-12	C	C	456 (NB) / 431 (SB)
LA 434 between LA 36 and I-12	D	D	1688 (NB) / 1779 (SB)
Airport Road north of I-12	**E**	**E**	9511 (NB) / 10251 (SB)

Source: Urban Systems 2010

The *Highway Capacity Manual* (Transportation Research Board, 2000) and *A Policy on Geometric Design of Highways and Streets* (AASHTO) list the following levels of service:

A= Free flow
B=Reasonably free flow
C=Stable flow
D=Approaching unstable flow
E=Unstable flow
F=Forced or breakdown flow

3.3 LADOTD Highway Control Sections

LADOTD categorizes each section of state highways in Control Sections (CS), for which various highway data is collected and maintained. Fenstermaker has researched the CS data for highways LA 41 and LA 21, which are eastern and western boundaries for the project area. The CS for all segments within the project area is shown in Figure 3-2.

LA 41 (Control Section 058-01)

LA 41 consists of varying Control Sections with each section having various subsections (See Figure 3-2). LA 41 (CS 058-01) commences at the intersection of LA 41 and its junction with US 11, near the Town of Pearl River, and ends in Talisheek, LA near the junction with LA 435. This section of roadway entered the state highway system in 1936. This CS is broken down into eight subsections having a total length of 23.22 miles and a roadway classification of minor arterial with the individual subsections being classified as either rural or urban (near Pearl River). The ADT, as documented by LADOTD, ranges from 4,100 to 9,600 vehicles per day with a LOS ranging from "A" to "D". Section No. 1 of this CS (log mile 0.00 to log mile 1.14) consists of a Portland Cement Concrete pavement (w/ a stabilized base) having two 12-foot travel lanes, 10 foot outside shoulders, no inside shoulders, and an average operating speed of 45 mph (45 mph posted). There is only one signalized intersection along this subsection of roadway (as per LADOTD records). The remaining subsections of this roadway (log mile 1.14 to 15.71) consist mainly of a bituminous pavement (asphalt) with an average highway speed of 70 mph. The existing roadway typical section consists of two 12-foot travel lanes (one in each direction) with 8-10 foot wide outside shoulders and 0-4 foot wide inside shoulders. There are a total of two signalized intersections along this section of roadway. This section of roadway contains a total of two structures which vary from bridge to culvert crossings with no railroad crossings. The apparent right of way of this section of roadway is 100 feet. The entire right of way corridor along this section of roadway consists of standard right of way with no Control of Access areas.

LA 41 (Control Section 058-02)

The second Control Section of LA 41 is CS 058-02 which commences in Talisheek, LA near the junction at LA 435 and ends in Bush at the intersection of LA 41 and LA 40. This section of road entered the state highway system in 1932. This CS is broken down into two subsections having a total length of 7.51 miles. This entire CS has a roadway classification of a rural minor arterial. The ADT in this section, as documented by LADOTD, is 5,200 vehicles per day. This section of roadway consists of a bituminous pavement (asphalt) with an average operating speed of 54 mph. The existing roadway typical section consists of two 12-foot travel lanes (one in each direction) with 10 foot wide outside shoulders and no inside shoulders (no median). This section of roadway contains a total of five structures which vary from bridge to culvert crossings with no railroad crossings. The apparent right of way of this section of roadway is 110 feet. The entire right of way corridor along this section of roadway consists of standard right of way with no Control of Access areas.

LA 21 (Control Section 030-01)

LA 21 consists of varying Control Sections with each section having various subsections. Only CS 030-01 of LA 21 is located within the immediate study limits of this project. LA 21 (CS 030-01)

has a total of three subsections with the first subsections commencing in the City of Covington, LA at US 190 (log mile 0.00). The last subsection of this roadway ends at log mile 14.47, and is located at the intersection of LA 21 and Columbia Road located northwest of Bush. This section of road entered the state highway system in 1931. This entire CS has a roadway classification of minor arterial. The ADT, as documented by LADOTD, ranges from 8,300 to 13,500 vehicles per day with a LOS ranging from "C" to "F". All subsections of LA 21 within this CS consist of two 12-foot travel lanes made of bituminous pavement (w/ a stabilized base), 8 foot shoulders on the outside and no inside shoulders, and an operating speed of 49 mph. There is only one signalized intersection along this section of roadway. This section of roadway contains a total of two structures which vary from bridge to culvert crossings with no railroad crossings. The apparent right of way of this section of roadway is 80 feet. The entire right of way corridor along this section of roadway consists of standard right of way with no areas of Control of Access.

LA 21 (Control Section 030-02)

Control Section 030-02 consists of six subsections of roadway. The first subsection of CS 030-02 begins at the intersection of LA 21 and Columbia Road located northwest of Bush (log mile 0.00). The last subsection ends at the St. Tammany and Washington Parish boundary line along LA 41 (log mile 4.39). This section of road entered the state highway system in 1932. The ADT, as documented by LADOTD, ranges from 8,200 to 9,300 vehicles per day with a level of service ranging from "A" to "D". Subsections 1, 2, and 6 of CS 030-02 are considered a rural minor arterial that consists of two 12-foot travel lanes (two lanes in each direction) made of bituminous pavement (w/ a stabilized base), 8 foot shoulders on the outside with no shoulders on the inside. Subsections 3, 4, and 5 of CS 030-02 are considered a rural principal arterial that consists of having four 12-foot travel lanes made of Portland Cement Concrete (w/ a stabilized base), 32 foot median width, 10 foot outside shoulders and 6 foot inside shoulders. The apparent right of way for subsections 1, 2, and 6 is 80 feet. The apparent right of way for subsections 3, 4, and 5 is 300 feet. There is only one "stop condition" intersection along this Control Section of roadway. This section of roadway contains a total of seven structures which vary from bridge to culvert crossings with no railroad crossings. The entire right of way corridor along this section of roadway consists of standard right of way with no Control of Access areas.

Figure 3-2: LADOTD Highway Control Sections

3.3 Railroad Corridor

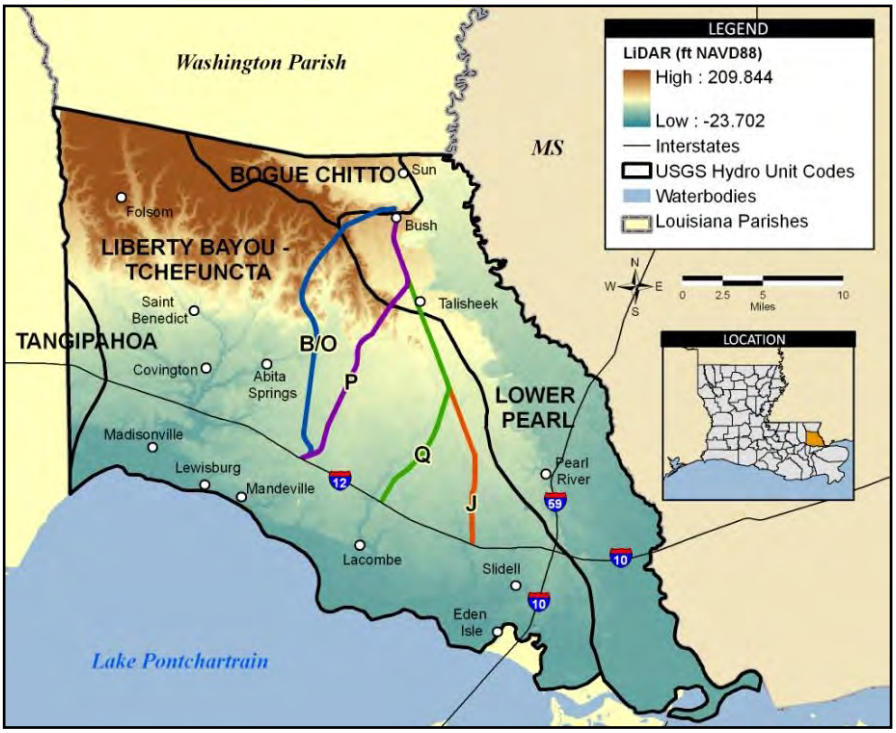
There is an abandoned Gulf Mobile and Ohio Railroad (GMO) corridor that extends through the project area from Bush in a southeast direction to the City of Slidell. The former right of way for the rail corridor has been abandoned and is no longer owned by GMO. Much of the abandoned rail bed is located on property currently owned by Weyerhaeuser, a timber producer in the area. Old railroad tracks have been removed from the rail corridor, but the bedding and embankment that was placed for the construction of the tracks remains in place. The old rail bed is typically three to five feet above the existing terrain and approximately 15-20 feet wide. The rail bed generally creates some of the higher ground elevations in the area, particularly in the flat regions to the south. In areas near Bush and Talisheek along Rheusaw Parker Road, Boyd Davis Road, and Railroad Drive, houses have been built directly on the old rail bed to take advantage of the higher ground elevations.

3.4 Drainage

3.4.1 Topography

The project area is generally very flat and at low elevations in the southern and eastern areas and increases in elevation to the northwest (See Figure 3-3). The elevations along I-12 range from 17 to 32 feet for the four alternatives and the elevation at the northern connection point with LA 21/41 in Bush is approximately 90 feet.

Figure 3-3: Hydrologic Codes and LiDAR for St. Tammany Parish



Source: USGS 2005 and LSU CADGIS Research Laboratory 2010

3.4.2 Floodplains

Table 3-2 shows the Preliminary 2008 FEMA Floodplain designations. Much of the project area consists of flood zones AE, which are areas that have had a detailed analysis performed to determine the base flood elevations. Also present in the project are flood zone A, which are designated flood zones that have not had a detailed analysis.

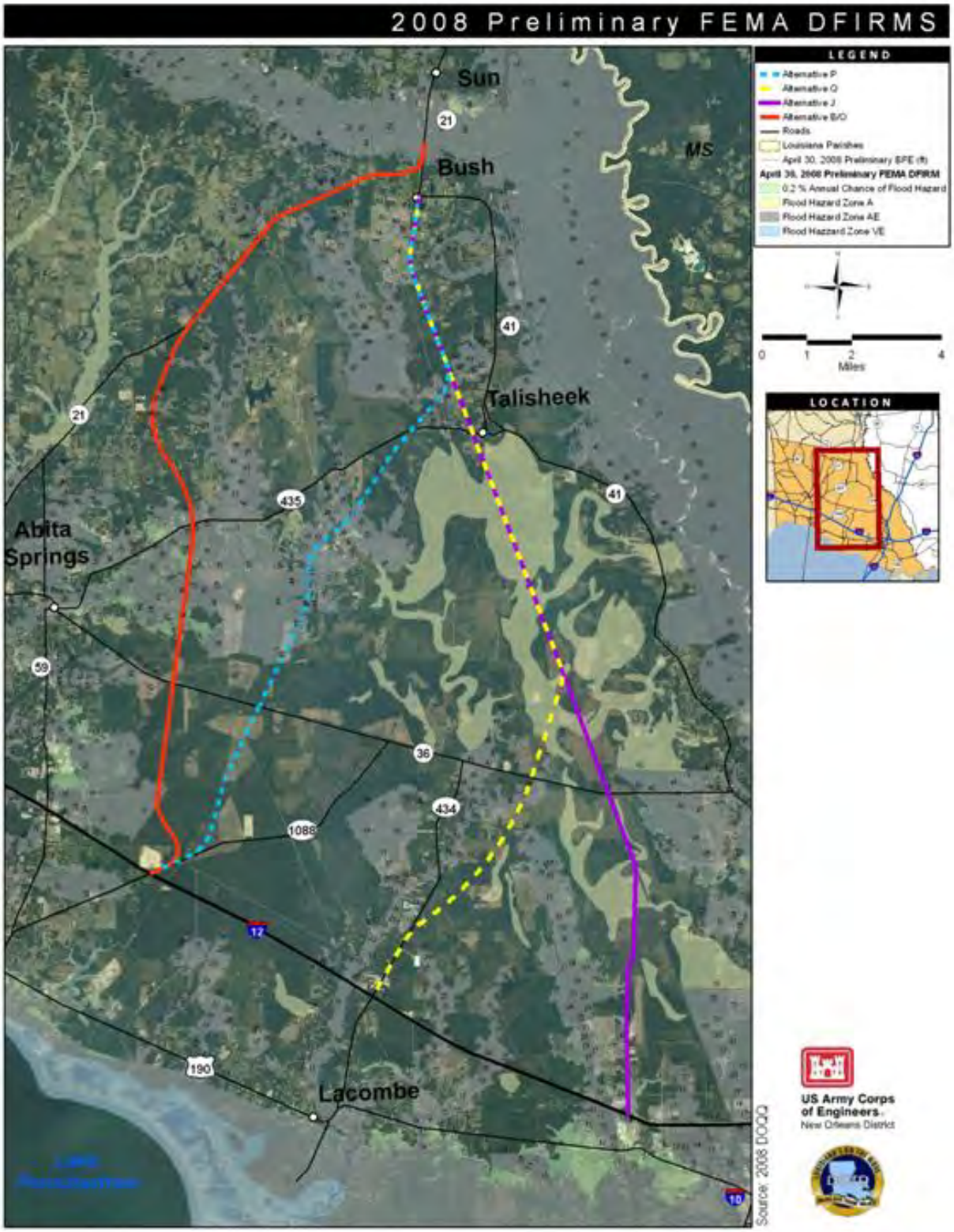
The flood hazard zones shown in Figure 3-4 illustrate the extent of the flood zones within the project area. The shaded gray areas indicate Zones AE, which are predominantly located throughout the project area. The shaded light green areas indicate the 0.2% annual chance of flooding, which is equivalent to the 50 year storm event.

Table 3-2: FEMA Flood Zone Designations

ZONE	DESCRIPTION
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
VE	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

Source: FEMA Map Service Center, msc.**fema**.gov

Figure 3-4: FEMA Flood Insurance Rate Map (FIRM) based on April 30, 2008 Revised Preliminary DFIRM Map, not yet approved by FEMA



3.5 Land Use

The land use in the project area is predominantly forest and shrub/scrub. Figure 3-5 depicts the 2002 land uses in the project area, which is roughly bound by I- 12 to the south, LA Highway (LA) 41 to the east, and LA 21 and US 190 to the west. Developed areas with higher population densities are located at Bush, Talisheek, and the intersections of I-12 with LA 434 near Mandeville and Abita Springs, and Airline Drive near Slidell. These developed areas are surrounded by a mix of shrub/scrub, forest and water/wetland. This section describes the existing land use along the proposed alignments. St. Tammany Parish has prepared a map of projected designated land uses in conjunction with their Comprehensive Plan, New Directions for 2025.

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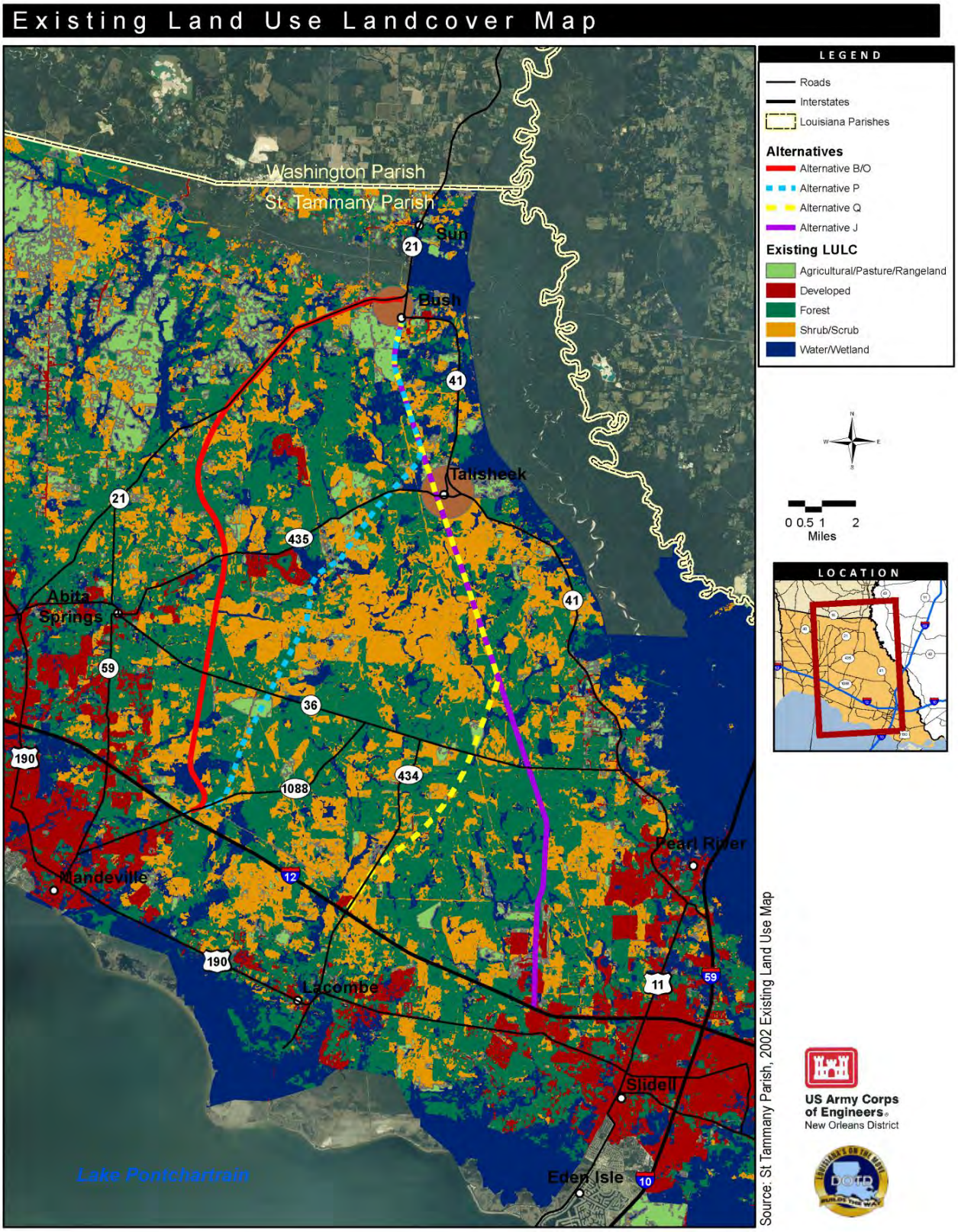
Figure 3-5: St. Tammany Parish Existing Land Use Map (2002)



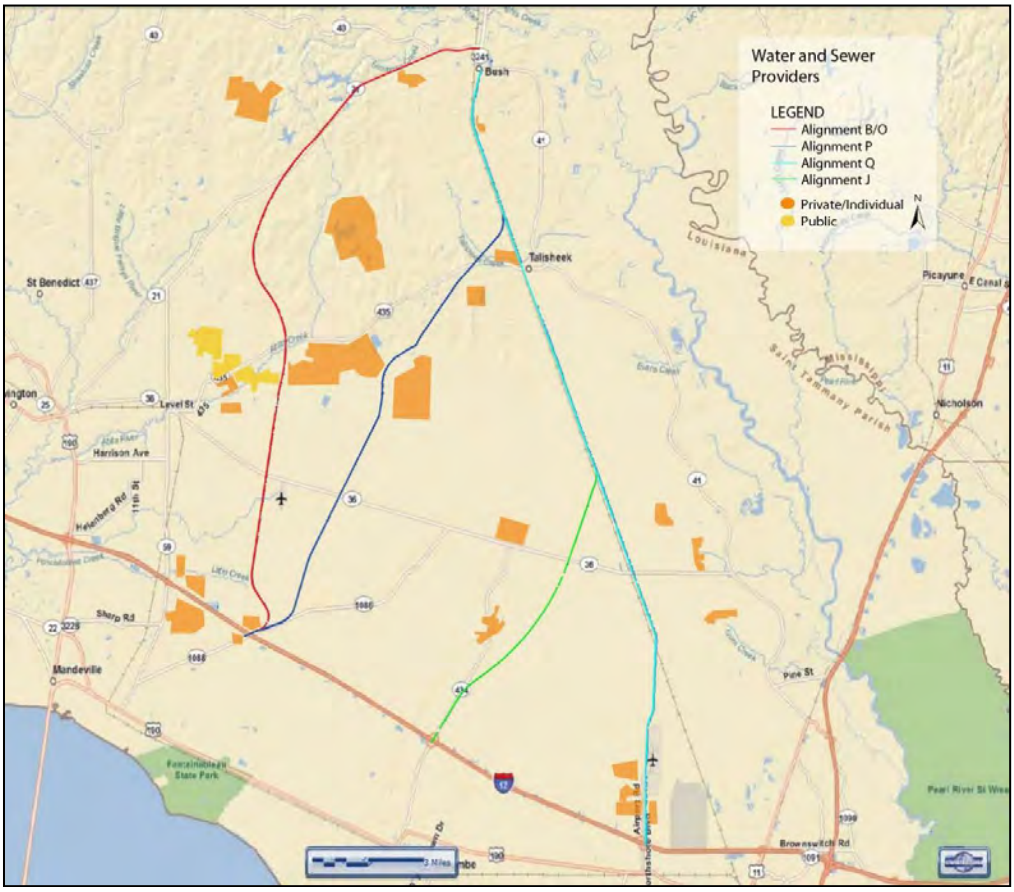
3.6 Utilities

There are various utilities located within the project area that service the residents and businesses of St. Tammany Parish, as well as transmission lines that traverse the Parish to service other regions of the State. Service lines for water, sewer, gas, electric, telephone, cable, and oil & gas transmission lines are all present in the area. The primary public utility is Tammany Utilities, which provides water and sewer services to various subdivisions within the Parish. Due to the rural character of the project area, there is not a network of collection and distribution systems to provide water, sewer, and gas services to the rural sections of the Parish.

3.6.1 Water and Wastewater

Tammany Utilities provides public water and wastewater (sewer) services to many of the subdivisions and businesses in St. Tammany Parish. Tammany Utilities predominantly services the more densely populated areas of the Parish, located in the western and southern regions of the project area. Many of the subdivisions that are located in the rural areas of the Parish are on private wells for water and individual septic or private wastewater treatment systems. Figure 3-6 shows areas that are serviced by private and public providers.

Figure 3-6: Private and Public Water and Wastewater Services in St Tammany Parish



Source: Fenstermaker & Associates

St. Tammany Parish currently services approximately 11,000 potable water customers and 9,000 wastewater treatment customers in the urbanized areas of the Parish. Based on research cross referenced with a list of the companies that service subdivisions in the area, the following private service providers are also located in the project area:

- Coast Waterworks, Inc.
- H20 Systems
- Louisiana Water Service, Inc.
- Williams Waterworks, Inc.

3.6.2 Electrical

The existing electrical facilities within the project are primarily overhead service and transmission lines. CLECO Power, LLC and Washington-St. Tammany Electric Cooperative, LLC (WSTE) are the primary electrical service providers in the area, with WSTE owning the majority of the lines. Ownership was determined by field research and correspondence with both companies. CLECO and WSTE have facilities along the same roadways in portions of St. Tammany Parish. Most of the electrical power poles are joint pole facilities, including telephone and cable lines. Service lines for telephone and cable are typically located on the joint power poles with the electrical service lines.

- CLECO Power, LLC — Coverage is primarily in the southern part of the Parish.

- Washington — St. Tammany Electric Cooperative, LLC (WSTE) — Primary provider of electrical service in the area. Their coverage services much of the rural areas of the Parish and they have facilities that extend along many of the rural roadways in the Parish.

Figure 3-7: LA 435 Looking Westbound near Talisheek

Source: Fenstermaker & Associates

Field visits established location of overhead lines running parallel to LA 36, LA 435, LA 41, LA 21, LA 1083, and LA 1088 as well as overhead and buried fiber optic lines at the I-12 and LA 434 Interchange.

3.6.3 Telephone, Cable and Internet

Service lines for the telephone, cable, and internet services are typically located on joint power poles with the electrical service lines. Individual service lines with service poles will often extend from the main joint service lines to provide the service connections to residents and subdivisions. Several companies in St. Tammany Parish provide hard-wired telephone, cable and internet services. The following is a list of the providers located within the Parish:

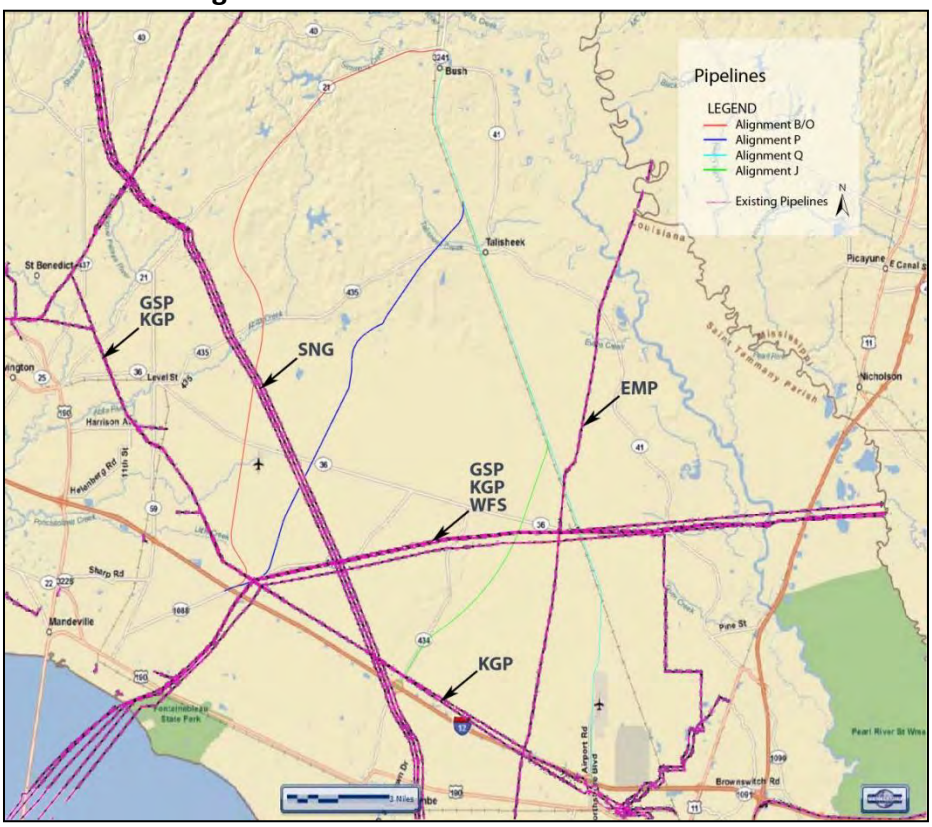
- AT&T
- Cable Television Programming
- Charter Business
- Executone Systems Co. of Louisiana, Inc.
- Freedom Communications
- Intelcom
- NuVox

3.6.4 Oil and Gas

Oil and gas transmission lines traverse the project area. Pipeline diameters range from 6-inch to 30-inch diameter. The following companies own and operate facilities in the area (see Figure 3-8):

- Southern Natural Gas Co. (SNG)
- Koch Gateway Pipeline Co. (KGP)
- Exxon-Mobile Pipeline Co. (EMP)
- Gulf South Pipeline Co. LP (GSP)
- WFS-NLG Pipeline Company, LLC (WFS)

Figure 3-8: Oil and Gas Transmission Lines



Source: Fenstermaker & Associates

3.6.5 Drainage Systems

There are few drainage structures within the project area. The southern area of the project is generally flat and consists of wetlands and flood plains. The existing roadways have drainage culverts to drain the flows that generally run in a southwesterly direction. LA 36, as an example, has cross drain culverts located at 500 and 1,000 foot intervals throughout the roadway.

Airport Road is the only roadway in the project area that has a closed drainage system. This drainage system extends along the Airport Road, draining to the south and connecting to a major drainage channel near the westbound I-12 ramps. The proposed alignment along Airport Road will require replacement of the drainage system to accommodate the new roadway cross section.

SECTION 4.0 PROJECT DESIGN CRITERIA

The design of the various alternatives within this Report complies with the Design Guidelines of LADOTD for the applicable roadway classification. The geometric design of the roadway also complies with current LADOTD Roadway Design Procedures and Details and AASHTO design guidelines. The following is a list of design guidelines, standards, and reference materials that were adopted as the guideline for the analysis of the project for the Report:

1. LADOTD Roadway Design Procedures and Details – These guidelines were used as the basis for the roadway design.

2. LADOTD Minimum Design Guidelines – This reference was used as the basis for the design criteria for each roadway classification. This project utilized the following roadway classifications:

    - Rural Arterial (RA-3 and RA-2)
    - Suburban Arterial (SA-1)
    - Urban Arterial (UA-2)

3. AASHTO – Policy on Geometric Design of Highways and Streets - These design guidelines were also used in the design of the roadway geometrics.

4. AASHTO Roadside Design Guidelines – These design guidelines were used for the roadside and median design guidelines.

5. LADOTD Bridge Design Manual – This manual was used as the basis for the design of all bridges.

6. LADOTD Hydraulics Manual – This manual was used as the basis for the analysis and design of all surface water crossings, including bridges and culverts. All drainage features shall meet state drainage guidelines. All surface water crossings of the 4-Lane highway shall be designed for a 50 year, 24 hour storm event. Drainage crossings for minor collector roads may be designed for a 10 year, 24 hour storm event.

7. LADOTD Engineering Directives and Standards (EDSMs) - EDSMs were referenced to provide direction on additional State requirements and guidelines, such as right of way requirements and median crossovers.

4.1 Roadway Design Guidelines

The LADOTD technical requirements and design criteria in Tables 4-1 to 4-4 were adopted as guidelines for the design of the roadway alternatives.

Table 4-1: Recommended Design Guidelines for Rural Arterial (RA-3)

Item No.	Item	Rural Arterial-3
1	Design Speed (mph)	70
2	Number of Lanes (minimum)	4
3	Width of Travel Lanes (ft)	12
4	Width of Shoulders (minimum) (ft)	(Divided facilities)
	a) Inside	4
	b) Outside	8 – 10 [1]
5	Shoulder Type	Paved [2]
6	Parking Lane Width (ft)	N/A
7	Width of Median on Divided Facilities (ft)	
	a) Depressed	60
8	Fore slope (vertical: horizontal)	1:6
9	Back Slope (vertical: horizontal)	1:4
10	Pavement cross-slope (%)	2.5
11	Minimum Stopping sight distance (ft)	730
12	Maximum Superelevation (%)	10
13	Minimum Radius (ft) [3]	
	a) With full superelevation	1,700
14	Maximum Grade (%)[4]	3
15	Minimum Vertical Clearance (ft)[5]	16
16	Minimum Horizontal Clear Zone (ft) (From edge of travel lane)	34
17	Bridge Design Live Load	AASHTO
18	Width of bridges (min) (face to face of bridge rail at gutter line) (ft)	Roadway Width

Source: LADOTD, English Design Guidelines, 2009

1- Consider using 10 foot outside shoulders where trucks are greater than 10 percent or if large agricultural vehicles use the roadway. 10 foot shoulders recommended due to large number of trucks and vehicles anticipated to utilize corridor.
2- For ADT 5,000 or greater, the full shoulder width shall be paved. For ADT less than 5,000, aggregate shoulders with two foot minimum paved is allowed. Full shoulder width is shown as paved and included in the cost estimates.
3- It may be necessary to increase the radius of the curve and/or increase the shoulder width (maximum of 12 ft.) to provide adequate stopping sight distance for structures.
4- 4% Grades are allowable in Rolling terrain.
5- An additional 6 inches should be added for additional future surfacing.

Table 4-2: Recommended Design Guidelines for Rural Arterial (RA-2)

Item No.	Item	Rural Arterial-2
1	Design Speed (mph)	60
2	Number of Lanes (minimum)	2
3	Width of Travel Lanes (ft)	12
4	Width of Shoulders (minimum) (ft)	(Divided facilities)
	1) Inside	4
	2) Outside	8[1]
5	Shoulder Type	Paved [2]
6	Parking Lane Width (ft)	N/A
7	Width of Median on Divided Facilities (ft)	
	a) Depressed	42-60
	b) Raised	N/A
	c) Two way left turn lane	N/A
8	Fore slope (vertical: horizontal)	1:6
9	Back Slope (vertical: horizontal)	1:4
10	Pavement cross-slope (%)	2.5
11	Minimum Stopping Sight Distance (ft)	570
12	Maximum Superelevation (%)	10
13	Minimum Radius (ft) [3]	
	a) With full superelevation	1100
14	Maximum Grade (%)	3[4]
15	Minimum Vertical Clearance (ft)[5]	16
16	Minimum Clear Zone (ft) (from edge of through travel lane)	32
17	Bridge Design Live Load	AASHTO
18	Width of bridges (min) (face to face of bridge rail at gutter line) (ft)	Roadway Width

Source: LADOTD, English Design Guidelines, 2009

1- Six foot shoulders are allowed if design volume is between 400 to 2,000 vehicles per day. Four foot shoulders are allowed if design volume is below 400 vehicles per day.
2- For ADT 5,000 or greater, the full shoulder width shall be paved. For ADT less than 5,000, aggregate shoulders with two foot minimum paved is allowed. Full shoulder width is shown as paved and included in the cost estimates.
3- It may be necessary to increase the radius of the curve and/or increase the shoulder width (maximum of 12 ft.) to provide adequate stopping sight distance for structures.
4- 4% Grades are allowable in rolling terrain.
5- An additional 6 inches should be added for additional future surfacing.

Table 4-3: Recommended Design Guidelines for Suburban Arterial (SA-1)

Item No.	Item	Suburban Arterial-1
1	Design Speed (mph)	50
2	Level of Service	C
3	Number of Lanes (minimum)	2 (min) – 4 (typ)
4	Width of Travel Lanes (ft)	12
5	Width of Shoulders (minimum) (ft)	
	a) Inside on multilane facilities	4
	b) Outside	8
6	Shoulder Type	Paved
7	Parking Lane Width (ft)	N/A
8	Width of Median on Multilane Facilities (ft)	
	a) Depressed	30 - 42
	b) Raised	30
	c) Two way left turn lane	N/A
9	Width of Sidewalk (min.) (where used) (ft)	N/A
10	Fore slope (vertical: horizontal)	1:4 – 1:6
11	Back Slope (vertical: horizontal)	1:3
12	Pavement cross-slope (%)	2.5
13	Stopping sight distance (ft)	425
14	Maximum Superelevation (%)	4
15	Minimum Radius (ft) [1]	
	a) With normal crown (-2.5% cross slope)	16,700
	b) With 2.5% superelevation	3,500
	c) With full superelevation	1,000
16	Maximum Grade (%)	4[2]
17	Minimum Vertical Clearance (ft)[3]	16
18	Minimum Clear Zone (ft)	
	a) From edge of through travel lane	20-28 [4]
19	Bridge Design Live Load	AASHTO
20	Width of bridges (face to face of bridge rail at gutter line)	
	a) Curbed facilities (without sidewalks)	Roadway width
	b) Shoulder facilities	Roadway width
21	Guardrail required at Bridge Ends	Yes

Source: LADOTD, English Design Guidelines, 2009

1- It may be necessary to increase the radius of the curve and/or increase the shoulder width (maximum of 12 ft.) to provide adequate stopping sight distance for structures.

2- 5% Grades are allowable in rolling terrain.

3- An additional 6 inches should be added for additional future surfacing.

4 - Use larger value when 1:4 fore slopes are used.

Table 4-4: Recommended Design Guidelines for Urban Arterial (UA-2)

Item No.	Item	Urban Arterial-2
1	Design Speed (mph)	45
2	Level of Service	C
3	Number of Lanes (minimum)	2 (min) – 4 (typ)
4	Width of Travel Lanes (ft)	11 - 12
5	Width of Shoulders (minimum) (ft)	
	A) Inside	N/A
	B) Outside	8
6	Shoulder Type	Paved
7	Parking Lane Width (ft) (Where Used)	10 - 12
8	Width of Median on Multilane Facilities (ft)	
	a) Depressed	N/A
	b) Raised	6[1] – 30
	c) Two way left turn lane	11 - 14 typ.[2]
9	Width of Sidewalk (minimum) (where used) (ft)	
	a) When offset from curb	4
	b) When adjacent to curb	6
10	Fore slope (vertical: horizontal)	1:3(min) – 1:4 (desirable)
11	Back Slope (vertical: horizontal)	1:3
12	Pavement cross-slope (%)	2.5
13	Minimum Stopping Sight Distance (ft)	360
14	Maximum Superelevation (%)	4
15	Minimum Radius (ft)	
	b) With normal crown	1,000
	c) With 2.5% superelevation	750
	d) With full superelevation	700
16	Maximum Grade (%)	6
17	Minimum Vertical Clearance (ft)[3]	16
18	Minimum Clear Zone (ft) (from edge of through travel lane)	24[4]
19	Bridge Design Live Load	AASHTO
20	Width of bridges (min) (face to face of bridge rail at gutter line) (ft)	Roadway Width (shoulder facilities)
21	Guardrail Required at Bride Ends	Yes

Source: LADOTD, English Design Guidelines, 2009

1- With Chief Engineer's approval, curb offsets may be eliminated and the minimum width can be reduced to 4 feet. On principal arterials, particularly at intersections, the upper limit should be considered.
2- Cannot be used on a multilane roadway (four or more through lanes) without the Chief Engineer's approval.
3- An additional 6 inches should be added for additional future surfacing.
4- Applies to facilities with shoulders. Refer to Roadside Design Guide when 1:3 fore slopes are used or for slopes flatter than 1:4.

4.2 Roadway Design Criteria

In addition to the Roadway Design Guidelines presented in the tables in Section 4.1, additional roadway design criteria were utilized for the geometric roadway design of the four alternatives. The following are design criteria utilized for the project:

1. ***Floodplains*** **-** Roadway profile grade line (PGL) was set to a minimum of three feet above the 100 year flood elevation, as designated by the preliminary 2007 FEMA Flood Insurance Rate maps.

2. ***Design High Water Elevation at Culvert and Bridge Crossings*** **-** Profiles shall provide adequate clearance at all bridge structures (see bridge design guidelines)

3. ***Existing Buried Oil and Gas transmission Lines*** **-** Profiles grade shall be three feet above existing ground in areas where buried oil and gas transmission lines exist.

4.2.1 Access Management

The primary roadway classification for the proposed highway will be the Rural Arterial (RA-3). This segment is also proposed to be predominantly Control of Access right of way. Access management within the corridor will allow the designed traffic conditions to be maintained and provide improved safety within the corridor. The following figure shows the impacts that access points will have on a roadway, including up to 10 mph decrease in travel speeds with 40 or more connections within 1.0 miles.

Figure 4-1: Control of Access - Impact on Traffic Flow

Access point density adjustment factors

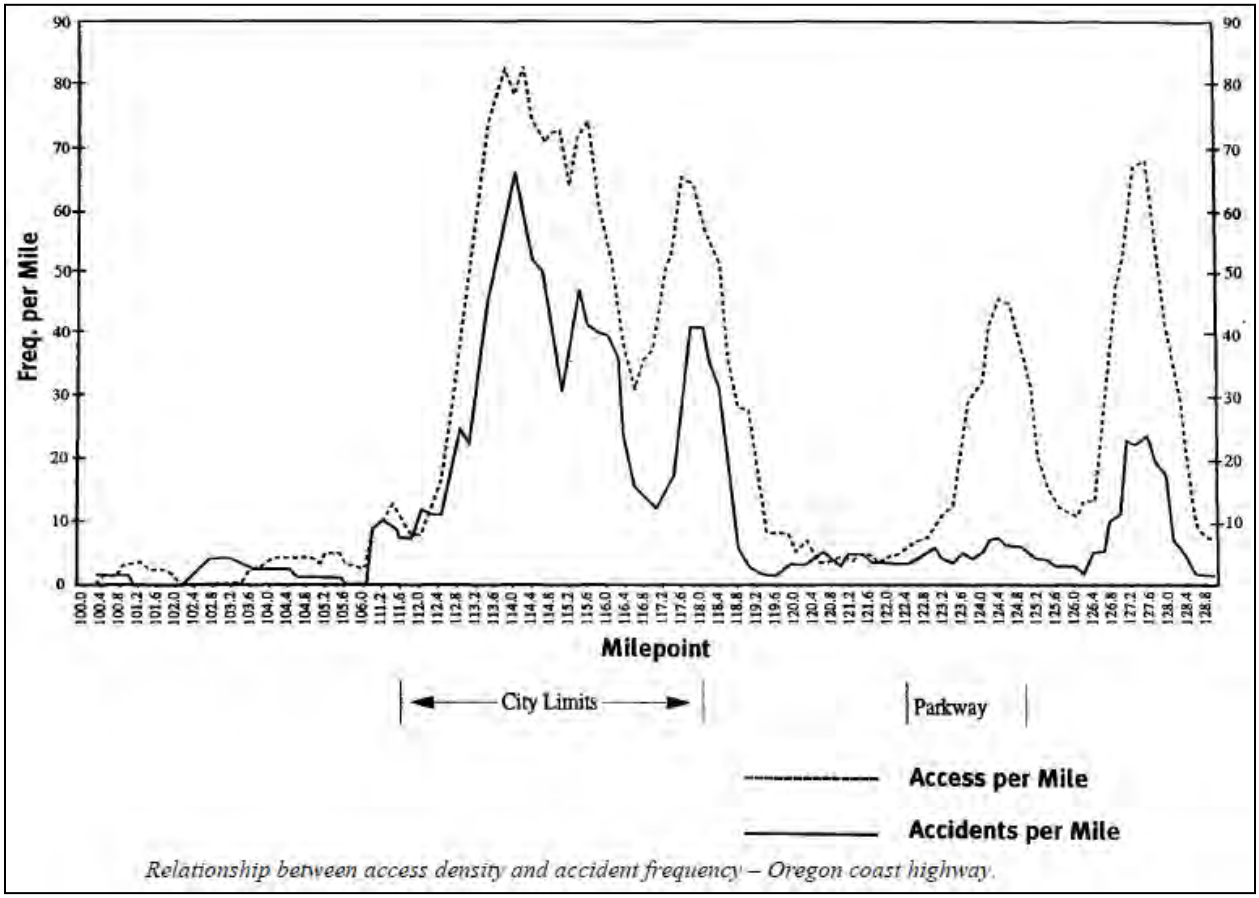
Access Points Per Mile	Reduction in Free-flow Speed (mph)
0	0.0
10	2.5
20	5.0
30	7.5
40 or more	10

Source: Table 7-5 of 1994 HCM.

Source: NCHRP Report 420: Impacts of Access Management Techniques

Control of Access also provides improved safety to a corridor. By reducing the number and locations and vehicles turning and entering into the flow of traffic, the number of accidents can be greatly reduced. Figure 4-2 illustrates the relationship between access points and accidents. The frequency of accidents per mile of roadway is directly related to the number of access points located within the roadway Control Section.

Figure 4-2: Control of Access - Access Points vs. Accident Frequency

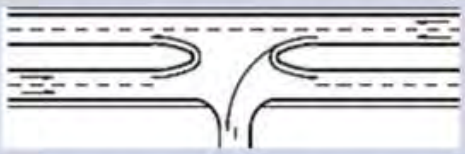
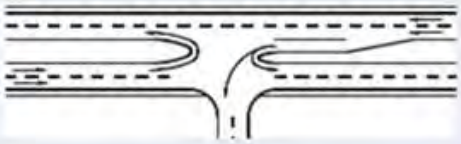
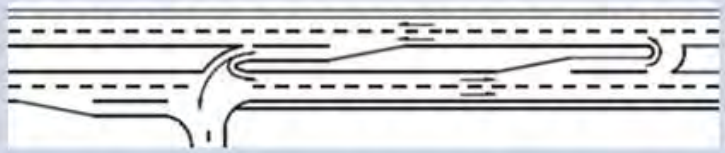


Source: NCHRP Report 420: Impacts of Access Management Techniques

4.2.2 Intersections

The intersection design was performed to increase safety within the corridor. Accidents typically occur at conflict points within intersections or where vehicles are entering and exiting travel lanes, such as driveway connections. Figure 4-3 shows the reduction in crashes at intersections by providing various improvements, such as left turn lanes, right turn lanes, both left and right turn lanes, and right only with U-turns. The intersections for the various alternatives utilized the left turn lane within the medians per EDSM No. IV.2.1.4, which results in a typical 44% reduction in crashes. Right turn lanes may also be warranted at intersections with high right turn volumes. The layout of the intersections will be determined in the design phase.

Figure 4-3: Intersection Safety - Crash Reductions

Improvement	Image	Crash Reduction
Conventional median opening		Base line
Add left-turn lane (HSM Exhibit 14-18)		-44%
Add a right-turn lane (HSM Exhibit 14-23)		-14%
Add both left and right turn lanes.		-51%
Add turn lanes; lefts out must turn right then u-turn (HSM Exhibit 14-35)		-62%

Source: AASHTO Highway Safety Manual, 2010

4.2.3 Median Openings

There will be four types of median openings that may be used for the various alternatives. EDSM No: IV.2.1.4 and EDSM IV.1.1.14 describe the types and procedures for the use of each median opening condition. The four types are described below:

1. **Full Access Median Opening** is defined as a median opening that allows all directions of movement including lefts, thru, rights and possibly u-turns when necessary.

   Use: Full Access Median openings will only be allowed at intersections with state roads, such as LA 36, LA 435, LA 1088, LA 435 and LA 41. Traffic Impact Studies will be required to determine the need for signalized intersections and full access median openings.

2. **Partial Median Opening** is defined as a median opening that allows for lefts from the mainline and right-in and right-out from the side street (driveway). This opening does not allow for left or thru traffic from the side street (driveway). This opening shall be designed with a left turn lane and the storage lengths shall be verified by the District Traffic Operations Engineer (DTOE).

   Use: Partial median openings will be used in the non-Control of Access areas to allow for left turn movements from the highway and right turn in and out of local side roads. These openings shall be a minimum of 0.25 miles from another median opening.

3. **Directional U-turn Opening** is defined as one median opening that serves one or both directions where only U-turns are allowed. These U-turns are to be separated to allow for adequate sight distances and shall be designed with a turn lane.

   Use: Directional U-turn median openings will be provided approximately 0.5 miles in each direction of these intersections to allow drivers that may have made a wrong turn to reverse direction.

4. **Emergency Median Crossovers** are required where interchange spacing exceeds 5.0 miles to provide places to turn around for emergency and law enforcement vehicles. These openings are restricted to the public and are not typically paved.

   Use: For the Control of Access areas of the project, median crossovers will be provided in areas where the distance between intersections is in excess of 4.0 miles to limit the distance emergency and law enforcement vehicles need to travel to change direction.

Through project meetings and discussions with LADOTD and CEVMN, the number of median openings on the project should be minimized for operational and safety purposes. The proposed roadway is a high speed highway and the number of median openings can reduce the travel speeds and increase the potential for accidents along the corridor. Proposed median openings are shown on the project plates, but the exact locations should be determined in the design phase. For the urban arterial section that extends along Airport Road for Alternative J, the median will require widening to 24 feet to provide adequate width for U-turn movements at the Partial Median Openings. Per LADOTD EDSM IV.2.1.4, all median openings shall be designed with left turn lanes and storage lengths approved by the District Traffic Operations Engineer.

4.3 Bridge Design Criteria

There are two types of bridges recommended for the project alternatives: Water Crossings and Roadway Crossings.

4.3.1 Waterway Crossings

Bridges are recommended at locations where the peak runoff exceeds 1,000 cfs. These bridge spans were sized using LADOTD HYDR1140 Open Channel Flow program. This is used only to provide a preliminary estimation of the bridge size. At the time of final design, a comprehensive hydraulic analysis of each bridge should be conducted. The following assumptions were made when the bridges were being sized:

- The Bridge would be a Type III Girder bridge (see below)
- The channel section is rectangular.
- Channel slope is based on the slope of the channel downstream of the proposed structure.
- An assumed Manning's Roughness Coefficient of n = 0.05 has been used which represents an excavated channel in clay with growth of weeds and grass, and variation of section and size (LADOTD 1987).
- Structure width was approximated using LiDAR data, and finalized through analysis iterations and coordination with the line and grade team.

It should be noted that a detailed FEMA no-rise analysis may need to be completed at the bridge locations as part of the final design. Although slab span bridges may be acceptable, the Type III girder bridge was used as a conservative design measure due to the possibility of a no-rise certification.

4.3.2 Roadway Crossings

Bridge overpasses are recommended at roadway crossings to provide residential connectivity for various alternatives. These bridge spans were sized based on horizontal and vertical geometries developed for the roadway and based on LADOTD design guidelines, and are used only to provide a preliminary estimation of the bridge size. At the time of final design, a comprehensive study of each bridge should be conducted. The following assumptions were made when the bridges were being sized:

- The Bridge would be a Type IV Girder bridge
- Bridge Embankment would be able to be placed up to 15 feet in elevation
- The vertical clearance requirements are based on LADOTD Bridge Design Manual (2005)

Freeway and Arterials = 16.5 FT (min)
Rural Roads = 15.5 FT (min)

4.4 Hydraulic Design Criteria

4.4.1 Culverts

Major hydraulic crossings were sized for the 50 year storm event under future land use conditions. The criteria for determining whether a structure would be sized as a culvert or a bridge can be found in Table 4-5.

Table 4-5: Structure Criteria

Design Discharge Cfs	Structure Type
Below 250	Pipe Only
250-750	Pipe or Reinforced Concrete Box (RCB)
750-1,000	Pipe, RCB, or Bridge
Above 1,000	Bridge

Source: LADOOTD Hydraulic Design Guidelines – Off-System Bridge Replacement and Rehabilitation Program

LADOTD HYDR1120 Hydraulic Analysis of Culverts program was used as the primary designing mechanism in order to calculate the headwater, tailwater, and the outlet velocity at the major cross drain culvert locations. More information about the hydraulic design criteria and calculations is available in the Hydrologic and Hydraulic Report included in the appendix to the EIS. Culvert structures were sized based on LADOTD guidelines (LADOTD 1987 – Table 1.8).

The proposed structures were also analyzed to ensure that the peak runoff for the 100 year storm event did not overtop the crown of the road.

The following assumptions were made for culvert calculations:

- Allowable Differential Head < one foot for the 50 year design storm.
- The structure slope was assumed to be equivalent to the channel slope downstream of the culvert.
- Structures with high outlet velocities - assumed greater than nine fps, shall require discharge erosion protection at the time of final design (LADOTD 1987).
- For low fills: a one foot minimum must be upheld between the shoulder of the road and the average headwall elevations (LADOTD 1987).
- For high fills: a three foot maximum must be upheld between the top of the pipe and the average headwall elevations (LADOTD 1987).
- The crown elevation of the roadway must not overtop for the 100 year design storm.

Due to the lack of field survey data, the inverts along the channels are unknown at this time. Although LiDAR is available, this data is not sufficient because LiDAR does not penetrate through water; therefore the LiDAR elevation is not representative of the channel bottom. The culverts inverts were estimated using the following equation:

$$Channel\ Invert = Crown\ Elevation - 4\ ft - Culvert\ Diameter$$

The four feet of cover includes one foot of pavement material, one foot of base material, one foot of subbase material and one foot to ensure that the subbase does not become inundated. At locations where the culvert invert appeared to be higher than the LiDAR elevation, the

culvert invert was reduced to be equal to the LiDAR invert. It is assumed that the culverts will be buried such that they are flush with the natural ground.

Minor Cross Culverts

According to the LADOTD Hydraulics Manual (page 73), on long continuous grades which are unbroken by lateral outfalls, "equalizers" shall be used at intervals of approximately 1,000 to 1,500 feet. Equalizer shall be 24 inch diameter pipe, or round equivalent pipe arch. The purpose of the equalizer pipes is to distribute the flow between the channels on either side of the road. In the design phase of the project, more detailed field investigations would need to be completed in order to properly locate the best location for these minor cross drain culverts. At this phase of the study only the number of equalizer pipes for each alternative was determined, therefore exact locations were not provided.

4.4.2 Roadside Ditches

Roadside Ditches will be necessary to convey surface flows adjacent to the roadway to a nearby water crossing, bridge or culvert, in order to prevent water from ponding along the side of the roadway. The typical cross sections illustrate the typical roadside ditch geometry. Typically the roadside ditches are utilized in upland area roadway cut conditions and are generally used on the upstream side of the highway to convey the surface waters to the nearest cross culvert. The downstream side of the highway may not require roadside ditches, as the typical condition is for the surface waters to sheet flow away from the roadway.

Roadside ditches should be avoided in wetland areas to minimize impacts to the wetland. There is a potential for roadside ditches to drain the wetlands in an undesirable manner and create additional impacts to the wetlands. The typical roadway cross sections in wetland areas should be elevated above the wetlands and be constructed with equalizer pipes to evenly distribute the surface waters across the roadway. As described in "Minor Cross Culverts" of Section 4.4.1, the equalizer pipes are typically 24 inches in diameter and spaced at 1,000 to 1,500 foot intervals.

4.5 Complete Streets

On July 18, 2010 Secretary of LADOTD Sherri H. LeBas, P.E signed the LADOTD Complete Streets Policy that set the foundation for the State to work toward a comprehensive transportation network that incorporates all modes of transportation. As stated in the policy:

"On all new and reconstruction roadway projects, LDOTD will provide bicycle accommodations appropriate to the context of the roadway - in urban and suburban areas, bicycle lanes are the preferred bikeway facility type on arterials and collectors. The provision of a paved shoulder of sufficient width, a shared use trail or a marked shared lane may also suffice, depending on context."

This project adheres to the policies set forth by the State Department of Transportation for Complete Streets. The typical section for all roadway segments incorporates 8-10 foot paved shoulders to accommodate bicycle travel. For typical rural arterial segments, sidewalks are not recommended because of the long distances between destination points. Other modes of transportation, such as bus transit, are considered for the project. Though no current bus transit systems extend into these areas of the Parish, the design of the roadways would allow for future bus stops to be established throughout the corridor with minor improvements.

Airport Road in Slidell is the only area of the project located in an urbanized zone. There is an existing sidewalk that extends along the entire east side of the roadway with a gap of approximately 800 feet between Scenic Drive and Sunset Drive. It is recommended that sidewalks be maintained along Airport Road and the gap be connected to provide continuous access.

4.6 Roundabouts

Roundabouts are an alternative design to the standard signalized intersection and have been proven to provide increased safety at intersections. The following are reasons for the increased safety at roundabouts:

- Elimination of head on collisions
- Reduction of potential conflict points
- Reduced vehicular speeds

Roundabouts can provide benefits to intersections in addition to the increased safety, which include; Operational Performance, Access Management**,** Environmental Factors**,** Traffic Calming**,** Pedestrian Safety**,** Aesthetics**,** Land Use, and Ongoing Operations and Maintenance Costs. The Traffic Study Report for this EIS has identified two locations within the project area that may be considered for roundabouts:

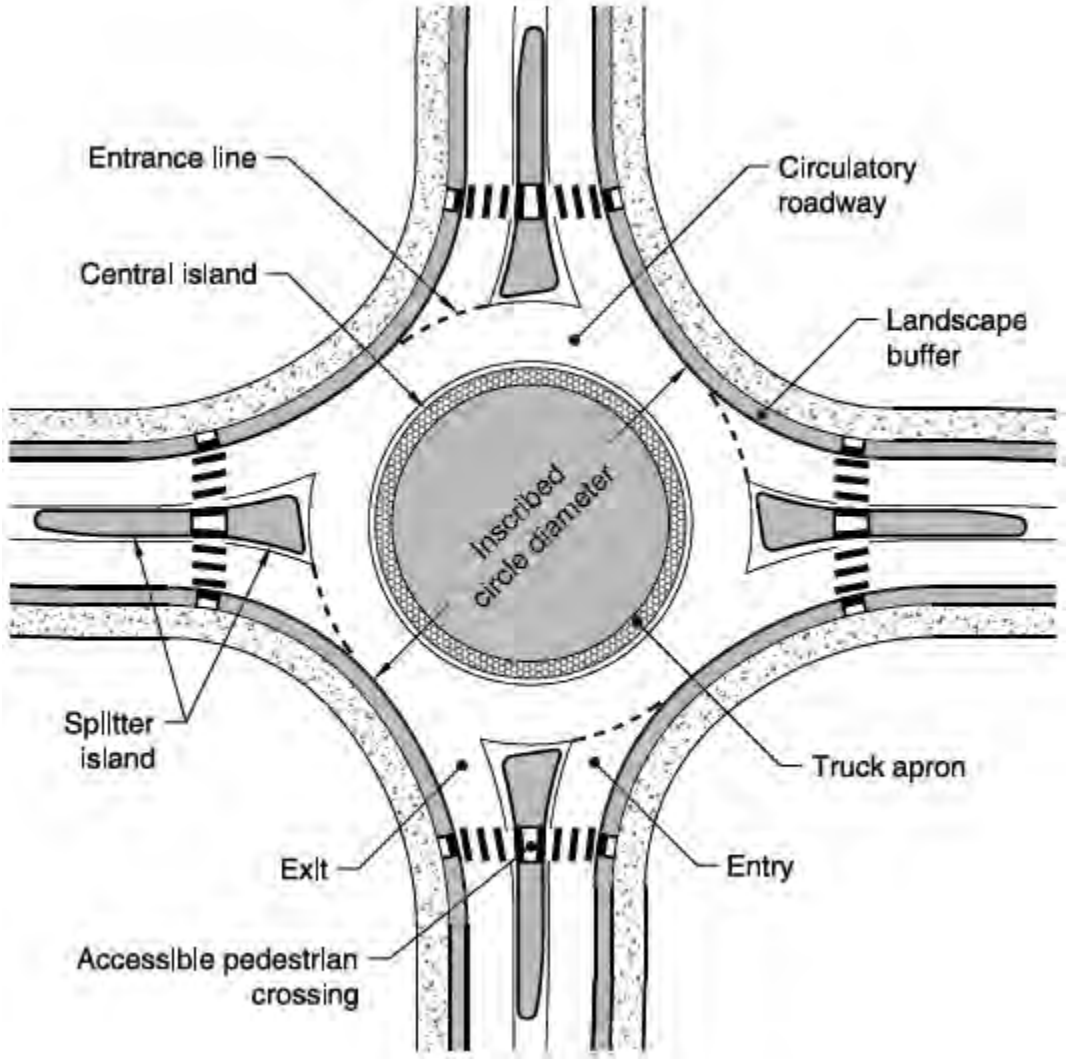
Roundabout Locations to Consider

- Alternative B/O at the intersection of proposed LA 3241 and LA 21
- Alternative J at the intersection of proposed LA 3241 and LA 36

The alternatives presented in this Study do not incorporate roundabouts into the proposed design alternatives, though roundabouts may be considered during the design phase as a substitute to signalized intersections at the locations indicated above. Per LADOTD EDSM VI.1.1.5 “Roundabout Study and Approval”, a comprehensive investigation and report will be required and recommended by the District and approved by the Chief Engineer. Comprehensive roundabout studies were not performed for this project. Therefore the signalized intersections are included in the alignment design alternatives.

The design of roundabouts shall comply with LADOTD EDSM VI.1.1.6 for Roundabout Design. The following Figure 4-4, illustrates the typical design features of a standard roundabout.

Figure 4-4: Roundabout Design Features



Source: FHWA, Roundabouts – Technical Summary FHWA-SA-10-006

SECTION 5.0 ALTERNATIVES DEVELOPMENT PROCESS

NEPA guidelines for an EIS require that the practicable alternatives be explored and objectively evaluated along with the No Build Alternative, which provides the basis for evaluating impacts and benefits of the alternatives considered. USACE defines practicable alternatives as those that are "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." The USACE regulatory analysis also requires a detailed analysis of alternative highway alignments, as well as alternative project site plans, to demonstrate the avoidance and minimization of impacts on the aquatic resources to the extent possible.

Pursuant to the goals of NEPA, public participation is a component of the EIS process. It promotes open communication between the public and the CEMVN, which facilitates better decision-making. For this reason, a range of reasonable alternatives to meet the purpose and need of the proposed action was formulated through input by the CEMVN, LADOTD, local government agencies, the public, stakeholders, and cooperating resource agencies. These alternatives were composed of a number of alignment corridors for the proposed highway. Numerous input opportunities were used during the alternative development and evaluation process, including the following:

Public Meetings

June 25-27, 2002; June 18 and July 22-24, 2003; July 27-29, 2004

Numerous public meetings have been held to gather input from local residents and stakeholders regarding potential highway corridor alignments.

Interagency Meetings

Regularly scheduled meetings held with the cooperating agency representatives to discuss the project.

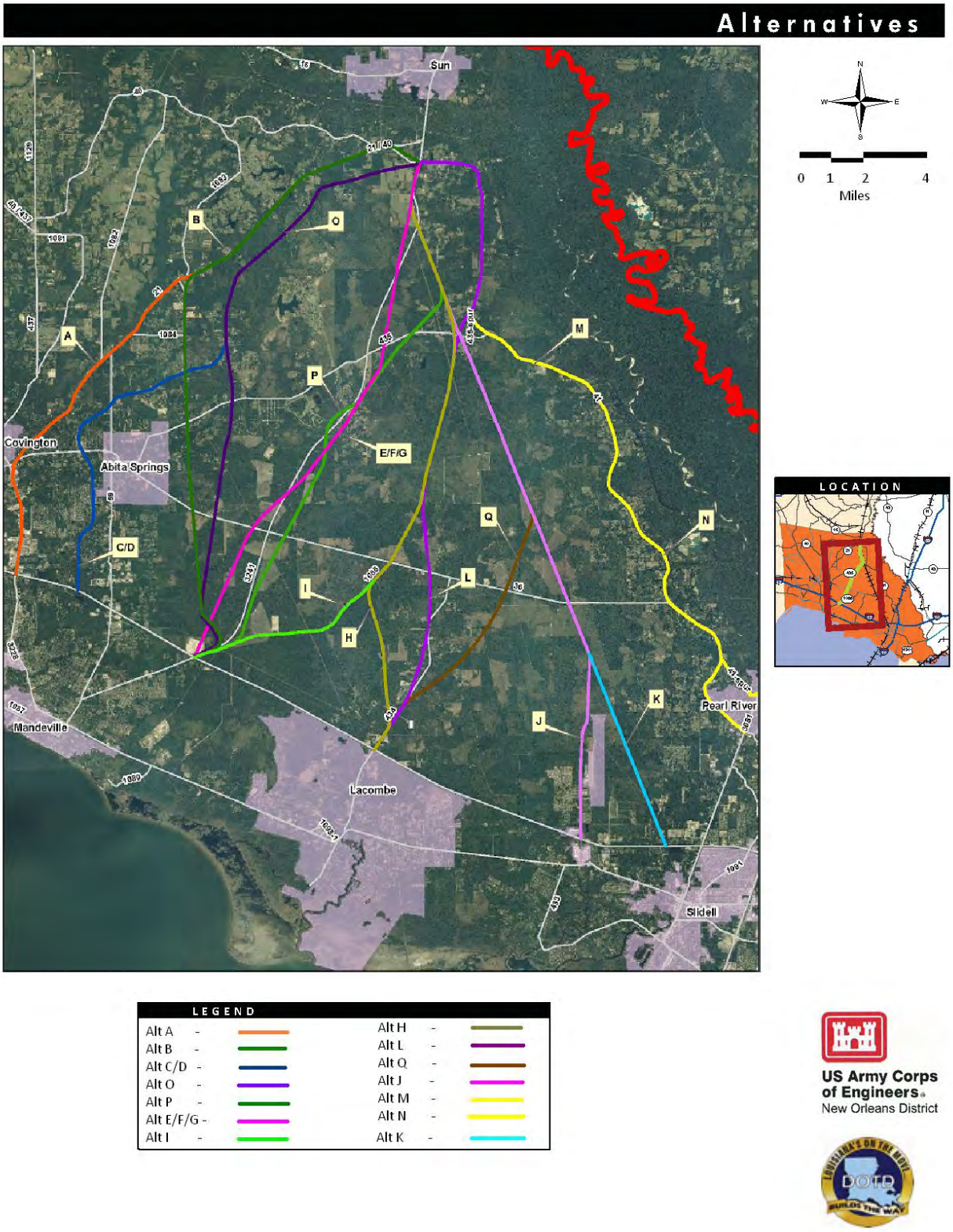
Scoping Meeting

January 22, 2009

A scoping meeting was held to solicit public comments on issues or concerns that should be addressed in the EIS.

During LADOTD's alternatives development process for the preparation of the Preliminary EA, 64 alternatives were developed and then further reduced to 17 alternatives (Burk-Kleinpeter 2004). The alternatives reflected a wide range of alignments throughout the project area, utilizing existing roadways and new alignments. The 17 alignments were further revised to minimize impacts to the human and natural environment, which resulted in Alternatives C and D being combined into Alternative C/D, and Alternatives E, F, and G being combined into Alternative E/F/G. At the request of the Interagency Team, one additional alternative was added that combined Alternative B and Alternative O into Alternative B/O, which minimized impacts to existing residences from Alternative B and minimized land impact from Alternative O by using the existing LA 21 route instead of constructing a new road parallel to LA 21. These revisions resulted in a total of 13 alternatives to be considered along with the no build alternative and are shown in Figure 5-1.

Figure 5-1: Project Build Alternatives



5.1 Alternatives

A range of reasonable alternatives to meet the purpose and need of the project was formulated through input by the CEMVN, LADOTD, local government agencies, the public, stakeholders, and cooperating resource agencies. The alternatives development process resulted in a total of 13 alternatives, plus the No Build Alternative, to be considered for the proposed action. These alternatives are composed of a number of alternative alignment corridors for the proposed highway. Below are brief descriptions of each alternative illustrated in Figure 5-1, plus the No Build Alternative:

No Build Alternative:

Under the No Build Alternative, the CEMVN would not issue any permits for the proposed highway project. The CEQ-required No Build Alternative in the EIS serves as a benchmark against which the applicant's Preferred Alternative and other alternatives can be evaluated. If the proposed highway is not constructed, project-related impacts would be avoided.

Build Alternatives:

Alternative A
Alternative A would widen LA 21 from Bush to US 190 between Covington and Abita Springs, connecting to I-12 at the US 190 interchange (Exit 63). LA 21 would require that it be improved to current LADOTD design guidelines by widening and using super-elevations. This route would continue to follow a meandering path from Bush in a generally southwesterly direction. Much of the alignment would require continued access for residents and businesses along the corridor or substantial right of way acquisitions for Control of Access.

Alternative B/O
Alternative B/O would widen LA 21 to a 4-lane highway from Bush to just north of Waldheim, then continue as a new 4-lane roadway about halfway between Alternatives B and O before capturing Alternative O just north of LA 435, terminating at LA 1088 near I-12. This alternative uses as much of existing highway alignments and non-wetland areas as possible to minimize impacts to the human and natural environment. The segment along LA 21 would require continued access for residents and businesses.

Alternative C/D
Alternative C/D would construct a new highway parallel to LA 21, with a bypass west of Abita Springs to meet I-12 between LA 59 and US 190. This would require a new interchange to be constructed between the existing LA 21 (Exit 65) and US 190 (Exit 63) interchanges.

Alternative E/F/G
Alternative E/F/G would construct a new highway from Bush to meet with LA 1088 at I-12. The CEMVN determined that this alternative would convert 40 acres of wetlands in the Talisheek Pine Flatwood/Savanna Mitigation Bank to roadway embankment, drain an undetermined

amount of additional wetlands, and isolate approximately 375 acres to the east of the highway (CEMVN 2008).

Alternatives H, I, and L
Alternatives H and L would widen LA 41 to Talisheek, then south along Alternative I. Alternative I would be a new road along the abandoned railroad corridor south of Talisheek, connecting to LA 36, then widen to LA 1088 to I-12. The CEMVN determined that all three alternatives would convert approximately 58 acres of wetlands in the Bayou Lacombe Mitigation Bank to roadway embankment and drain an undetermined amount of additional wetlands (CEMVN 2008).

Alternative J
Alternative J would construct a 4-lane highway following the abandoned railroad corridor from Bush to a point due north of the Slidell Municipal Airport. From this point, the proposed route would connect to Airport Road, which ties into I-12 at an existing interchange (Exit 80). Airport Road would require continued access for residents and businesses along the roadway or substantial right of way acquisitions for Control of Access.

Alternative K
Alternative K would construct a new highway along the abandoned railroad corridor to meet I-12 near US 11. A new interchange would be required, which would be located 0.95 miles west of the US 11 interchange.

Alternatives M and N
Alternatives M and N would widen LA 41 to Pearl River. Alternative M would bypass Pearl River to the west and connect to I-59 and then to I-12. Alternative N would go through Pearl River and connect to I-59 and then to I-12. Even though LA 41 can be brought up to current LADOTD design guidelines by widening and using super-elevations, it would not achieve a high-speed arterial link between Bush and I-12.

Alternative P (LADOTD's Preferred Alternative)
Alternative P would construct a 4-lane highway beginning at the intersection of LA 41 and LA 40 in Bush and proceed southward to LA 1088. The proposed route would utilize an abandoned railroad corridor from Bush to Talisheek, before turning southwesterly on a new alignment to connect with LA 1088 north of I-12. Crossings of existing highways would be at grade.

Alternative Q
Alternative Q would construct a 4-lane highway following the abandoned railroad corridor from Bush to approximately 1.7 miles north of LA 36, where it would head southeasterly to connect with I-12 at the LA 434 (Exit 74).

5.2 Alternatives Screening Analysis

The process of screening alternatives results in a refinement of alternatives utilized for further analysis. The criteria used in the screening process were based on the purpose and need and

the Fatal Flaws criteria developed during the EA. These criteria were developed in coordination with LADOTD and CEMVN. In general, the criteria considered the adequacy of the alternatives to meet the purpose and need for the project and the impacts to environmentally sensitive areas that would be prohibitive to mitigate.

The 13 build alternatives, plus the No Build Alternative, were evaluated through an alternatives screening analysis to access the feasibility of each alternative. The alternatives screening analysis consisted of two phases; ***Phase 1 – Fatal Flaws Approach*** and ***Phase 2 – Purpose and Need Evaluation***. Phase I (described in 1.4.1) involved a fatal flaws approach in which any alternative that was determined to be fatally flawed was not carried forward to the second alternative screening phase. Phase II (described in 1.4.2) involved evaluating the remaining alternatives against the project purpose and need. Alternatives that were not considered fatally flawed and met the project purpose and need were considered practicable alternatives to be carried forward.

5.2.1 Phase 1 – Fatal Flaws Approach

The Fatal Flaws analysis was developed to eliminate alternatives that had significant impacts to environmentally sensitive areas and would be prohibitive to mitigate or permit for construction. The three criteria that were identified as fatal flaws were:

1. ***Wetland Mitigation Banks***
   If the alternative directly impacted an existing wetland mitigation bank in the project area that did not have any mitigation bank credits available, it was determined to be flawed. Both Talisheek Pine Wetlands Mitigation Bank and Bayou Lacombe Mitigation Bank do not have available mitigation credits.

2. ***Military Installations***
   Direct impacts to Camp Villere, the Louisiana Army/Air National Guard camp located near Slidell, would prohibit the construction of the alternative.

3. ***New Interchange within 1.0 miles of an existing Interchange***
   If an alternative required the creation of a new interchange within 1.0 miles of an existing interchange, it would not meet AASHTO and LADOTD requirements for interchange spacing and would be considered fatally flawed.

As a result of the Phase 1 - Fatal Flaws Approach described above, the following alternatives were not considered practicable alternatives:

- *Alternative E/F/G* – Direct impacts to the Talisheek Pines Wetlands Mitigation Bank.
- *Alternatives H, I, and L* – Direct impacts to the Bayou Lacombe Wetland Mitigation Bank.
- *Alternative K* – Requires a new interchange to be constructed within 1.0 miles of the US 11 interchange (Exit 83), therefore not meeting AASHTO requirements for interchange spacing.

5.2.2 Phase 2 – Purpose and Need Evaluation

Based on the results of the Phase I screening analysis using the fatal flaws approach, the eight remaining alternatives (A, C/D, J, M, N, P, Q, and B/O) were carried forward to the Phase II analysis. The eight remaining alternative alignments were evaluated against the project purpose and need, as defined during the development of the EA. Any alternative that did not meet all four of the following criteria listed below was not carried forward to a detailed impacts analysis:

1. ***Legislative Mandate*** – Satisfies the TIMED program requirement.

2. ***Arterial Linkages*** – Provides a logical, direct, modern, high-speed, 4-lane arterial connection from the southern terminus of the current modern 4-lane arterial portion of LA 21 to I-12.

3. ***Traffic Diversion*** – Diverts through-traffic that originates in Washington and northern St. Tammany Parishes from segments of existing routes in southern suburban areas, thereby freeing capacity for local trips on those existing routes.

4. ***Economic Benefits*** – Support and enhance the existing and currently developing economic activities in Washington Parish by providing a travel time savings.

As a result of the Phase 2 – Purpose and Need Evaluation described above, the following alternatives were not considered practicable alternatives:

- *Alternative A, C/D, M and N* – These alignments did not provide the Arterial Linkage and Economic Benefits of the other alignments and were not considered for further analysis.

Table 5-1 presents the results of the Phase 1 and 2 alternatives screening analysis.

Table 5-1: Alternatives Screening Matrix

EVALUATION CRITERIA	ALTERNATIVES													
	NB*	A	B/O	C/D	E/F/G	H	I	J	K	L	M	N	P	Q
FATAL FLAWS														
1. Directly Impacts to Wetland Mitigation Bank					Y	Y	Y			Y				
2. Directly Impacts a Military Installation														
3. Require New Interchange that does not meet AASHTO spacing requirement									Y					
PURPOSE AND NEED														
1. Legislative Mandate - Construct 4-Lane Highway	N													
2. Arterial Linkage - High Speed/ 4-Lane connection from exist southern terminus of LA-21 to I-12.	N	N		N							N	N		
3. Traffic Diversion - Free traffic for local trips on congested routes.	N													
a. LA-21 Assessment	N	N												
b. US 190 Assessment		N									N			
4. Economic Benefits - Support and enhance developing economic activities in Washington Parish.		N		N							N	N		
ALTERNATIVES THAT MEET CRITERIA:			**B/O**					**J**					**P**	**Q**

*NB = No-Build Alternative

Source: Technical Memoranda (1-21), I-12 to Bush Corridor Study, Burk-Kleinpeter, Inc.

Based on the results of the alternatives screening process through the *Phase I – Fatal Flaws Approach* and *Phase 2 – Purpose and Need Evaluation*, four alternatives met both sets of criteria; Alternative B/O, Alternative P, Alternative Q, and Alternative J, see Table 5-1. These four alternatives were therefore considered practicable and reasonable alternatives to carry forward for a detailed analysis to determine the most practicable and least damaging alternative.

SECTION 6.0 LINE AND GRADE ALTERNATIVES

The *Alternatives Screening Process* in Section 5.0 produced four alternatives that satisfied the established criteria for the project. The horizontal and vertical alignments for each of the build alternatives were developed from digital orthophoto quarter quads (DOQQ) and Light Detection and Ranging Data (LiDAR) information. Topographic field surveys were not conducted for the development of the alignments. Horizontal and vertical alignments may require minor shifts or adjustments as the design proceeds with more detail and topographic field surveys are performed. Alternative B/O, Alternative P, Alternative Q, and Alternative J, along with the No-Build Alternative are described below:

The **No-Build Alternative** is defined as the alternative in which no improvements would be constructed. The CEMVN would not issue any permits for the proposed highway project and project-related impacts due to construction of the new highway would be avoided. The No Build Alternative serves as the benchmark to which other alternatives can be evaluated.

Alternative B/O is defined as the western alternative that would widen LA 21 to a 4-lane highway from Bush to just north of Waldheim, then continue southerly as a new 4-lane roadway where it would connect to I-12 at the LA 1088 interchange.

Alternative P is defined as the central alternative that would begin at the intersection of LA 41 and LA 40 in Bush and proceed southward to LA 1088. The proposed route would utilize an abandoned railroad corridor from Bush to Talisheek, before turning southwesterly on a new alignment to I-12 at the LA 1088 interchange.

Alternative Q is defined as the eastern alternative that would construct a 4-lane highway from the intersection of LA 41 and LA 40 in Bush following the abandoned railroad corridor to approximately 1.7 miles north of LA 36, where it would head southeasterly to connect with I-12 at the LA 434 Interchange (Exit 74).

Alternative J is defined as the second eastern alternative that would construct a 4-lane highway from the intersection of LA 41 and LA 40 in Bush and follow the abandoned railroad corridor to a point due north of the Slidell Municipal Airport. From this point, the proposed route would connect to Airport Road, which ties into I-12 at an existing interchange (Exit 80).

This section describes each alternative in detail and the proposed conditions in relation to:

- **Roadway Classifications**
- **Drainage/Floodplains**
- **Utilities**
- **Design Considerations**
- **Land Use**
- **Traffic**

The Project Plates (Appendix A) of this Report illustrate the project alternatives in greater detail. These plates include information pertaining to existing aerial photography of the project area, proposed horizontal and vertical geometry, typical cross sections, proposed right of way data, proposed roadway classifications and design criteria, required drainage features, and preliminary 2007 flood insurance rate map data.

6.1 No Build Alternative

For the No Build Alternative, the proposed highway would not be constructed and any project-related impacts as a result of new construction would be avoided. The CEMVN would not issue any permits for construction of a new modern, high-speed, 4-lane highway between I-12 and Bush. This ensures that there would be no direct or indirect impacts to threatened and endangered species, wetlands, environmentally sensitive areas, aquatic resources, or historic sites as a result of this project. As a result, the existing roadway network in the region would remain in its current condition and continue to serve as the transportation network to travel between Bush and I-12. The No Build Alternative in the EIS serves as a benchmark against which build alternatives can be evaluated.

The No Build Alternative does not provide for the construction of a new highway from Bush to I-12; however, currently planned projects will still be constructed and will be considered in the future models for traffic analysis. The potential environmental impacts that occur as a result of the other planned transportation projects are considered an element of the base condition and are not considered impacts as a result of the proposed highway.

The following shown in Figure 6-1 is a list of existing planned road projects in the Regional Planning Commission's (New Orleans Metropolitan Planning Area) Annual Listing of Obligated Projects for 2010:

Figure 6-1: New Orleans MPO 2010 Projects List

Annual Listing of Obligated Highway Projects

Fiscal Year 2009

Jefferson, Orleans, Plaquemines, St. Bernard, St. Tammany, St. Charles and St. John Parishes, Louisiana

Project No.	Route & Description	Sponsor	Improvement Type	Funding Source	Total Cost	Total Federal	Obligation Date
ST. TAMMANY PARISH							
030-01-0020	LA 21 (LA 36 - LA 1084)	DOTD	Cold Plane, Patch & Overlay	St. Gen.	1,261,126	N/A	Nov-08
058-01-0026	LA 41 (LA 41 in Pearl River)	DOTD	3-lane	STP HAZ	1,251,686	1,001,348	Dec-08
281-04-0021	LA 435 Bridges	DOTD	Bridge Replacement	FBRON	4,909,077	3,927,261	Jan-09
454-04-0076	I-12 Tang. Ph. Line - US 190 (Covington)	DOTD	Cold Plane, Drainage, OLY	IM	12,453,000	11,207,700	Feb-09
852-06-0008	LA 1077 - LA 25	DOTD	Asphalt Overlay	NFA	2,346,085	N/A	Mar-09
662-42-0011	Building Construction/Site Improvement	DOTD	Bldg. Const/Site Improv.	ER100	1,539,413	1,539,413	Apr-09
713-52-0100	Carr Drive Bridge	St. Tammany	Bridge Replacement	FBROFF	2,373,415	1,898,732	May-09
006-08-0038	US 90 East Pearl River Repairs	DOTD	Installation of Barrier System	St. Cash	497,000	N/A	Jun-09
279-01-0012	LA 437 (Jct. US 190 Bypass - Jct. LA 1129)	DOTD	C.P., Patch and Overlay	STP FLEX	2,841,037	2,272,830	Jun-09
281-03-0022	LA 59 @ I-12	St. Tammany	Intersection Improvements	ARRA	2,945,457	2,945,457	Jun-09
453-01-0058	I-59 @ US 11/LA 1090	St. Tammany	Interchange Improvements	ARRA	1,268,570	1,268,570	Jun-09
018-04-0046	US 11	St. Tammany	Interchange Improvements	ARRA	5,099,518	5,099,518	Jul-09
006-07-0046	US 90 Middle Pearl River	DOTD	Scour Repair Piers 2&3	FBRON	559,370	447,496	Aug-09
454-04-0038	I-12 (LA 1088 @ I-12)	DOTD	New Interchange	NHS	12,167,090	9,733,672	Sep-09
				Fiscal Year 2009	**51,511,844**		

Source: Regional Planning Commission, Annual Listing of Obligated Projects for the New Orleans Metropolitan Planning Area and the Mandeville/Covington and Slidell Planning Areas, September 2010

6.2 Alternative B/O

Alternative B/O is defined as the alternative that would begin at the intersection of I-12 and LA 1088 with the construction of a new 4-lane highway, then turn north approximately 1.0 miles east of LA 1083 and widen LA 21 from Waldheim to Bush. Heading north from I-12, the highway would intersect with LA 1088, then head northerly crossing LA 36 approximately 0.6 miles southeast of Abita Springs. Heading north on the new alignment, it would cross LA 435 at a point approximately 0.5 miles northeast from Abita Springs, then follow LA 21 to Bush. This alternative would be approximately 19.5 miles long, with 7.0 miles on existing alignment and 12.5 miles on new alignment.

6.2.1 Roadway Classifications

Alternative B/O is divided into three roadway classifications:

Suburban Arterial (SA-1) – The suburban arterial roadway classification was used from the southern connection with I-12 to approximately 0.8 miles north. This segment of roadway follows the existing LA 1088 alignment and continues through the first horizontal curve. Existing LA 1088 in this area (CS 852-11) is classified as a rural local road. The area to the south of I-12 is classified as urban. The suburban arterial classification was used to satisfy the need to construct an "arterial highway" and because LADOTD design guidelines indicate that suburban sections should be used "on rural roadway section that adjoins a roadway section currently classified as urban."

Rural Arterial (RA-3) – The rural arterial roadway classification was used for the majority of the alignment from the terminus of the SA-1 section, 0.8 miles north of I-12, to the intersection with LA 21 approximately 12.1 miles north. This section satisfies the need to "construct a modern, high-speed, 4-lane arterial highway". The area is in a rural setting and does not adjoin any existing urban areas. The RA-3 classification is a 70 mph design speed. This segment is proposed as a Control of Access area.

Rural Arterial (RA-2) – The rural arterial roadway classification continues along the section that follows existing LA 21 for approximately 6.6 miles. Existing LA 21 is classified as a minor arterial in LADOTD roadway inventory (CS 030-01). Due to the number of residents and businesses along the existing LA 21 corridor, this section is not Control of Access. The RA-2 classification was used to reduce the design speed to 60 mph to provide safety for vehicles entering and exiting the highway. Existing LA 21 is classified as a Principal Arterial at the connection in Bush (CS 303-02).

6.2.2 Drainage/Floodplains

The watershed for this area was modeled separately and is included in the "Hydraulics and Hydrology Report". Alternative B/O travels through several drainage basins from I-12 to Bush. These are Little Creek, Ponchitolawa Creek, Southwind Branch, LA 36 North Tributary, Abita River, Long Branch, Simmons Creek, Talisheek Creek, and Bogue Chitto River Tributary.

There are 23 proposed culvert crossings and seven proposed bridges (Table 6-1) along Alternative B/O. Bridges cross Ponchitolawa Creek, English Branch, Abita Creek, and Long Branch. Roadside ditches will be required along the alignment to convey surface water to the nearest culvert or bridge crossings. Equalizer culverts are required at 1000-1500 foot intervals in areas to disperse flows across the highway and it was determined that approximately 75 24-Inch equalizer culverts would be needed along Alternative B/O.

Where the alignment crosses through the floodplain, the roadway profile will be maintained at three feet above the base flood elevation (BFE), with bridges at six feet above BFE.

Table 6-1: ALT B/O Bridge Locations

Structure No.	Channel
4	Little Creek
8	Ponchitolawa Creek
13	English Branch
14	English Branch
15	English Branch
18	Abita Creek
26	Tenmile Branch

6.2.3 Utilities

Alternative B/O begins at Station 16+70 on LA 1088, which has overhead electrical lines that extend along the west side of the highway. It is anticipated that these lines will need to be relocated. The Alternative crosses Koch Gateway and Gulf South Pipeline Co. transmission lines between Stations 30+00 and 37+00. Provisions will be made to maintain roadway elevation fill over any buried gas transmission lines, in order to avoid excavation and impacts to those lines.

There are Southern Natural Gas Co. transmission lines at approximately Station 327+00, between Stations 335+00 and 340+00, and at approximately Station 356+00. See provisions statement above.

Alternative B/O crosses LA 435 at approximately Station 436+00. There are overhead electric lines that run along the south side of the highway, and it is anticipated that these electrical lines will need to be relocated. There are no gas transmission lines in the vicinity.

Alternative B/O crosses LA 1084 at approximately Station 550+00, where overhead electric lines are anticipated to need relocation. There are no gas transmission lines in the vicinity.

Alternative B/O meets LA 21 at Station 682+03 and continues to LA 41 where it ends at Station 1050+00. There are overhead electric lines that run along the west side of the LA 21 and the east side of LA 41. It is anticipated that all of the electric lines along this portion will need to be relocated. There are no transmission lines in the vicinity.

6.2.4 Design Considerations

The following design considerations were addressed for Alternative B/O:

Residential Connectivity **-** Lowes Drive, Sanders Road, and Cleland Road are bisected by the alignment, which cuts off access for the residents east of those roads to LA 21. There is access back to LA 435, which is approximately 3.0 miles to the south. It is recommended to provide an overpass at the central roadway (Sanders Road) to provide the residents with access to the west.

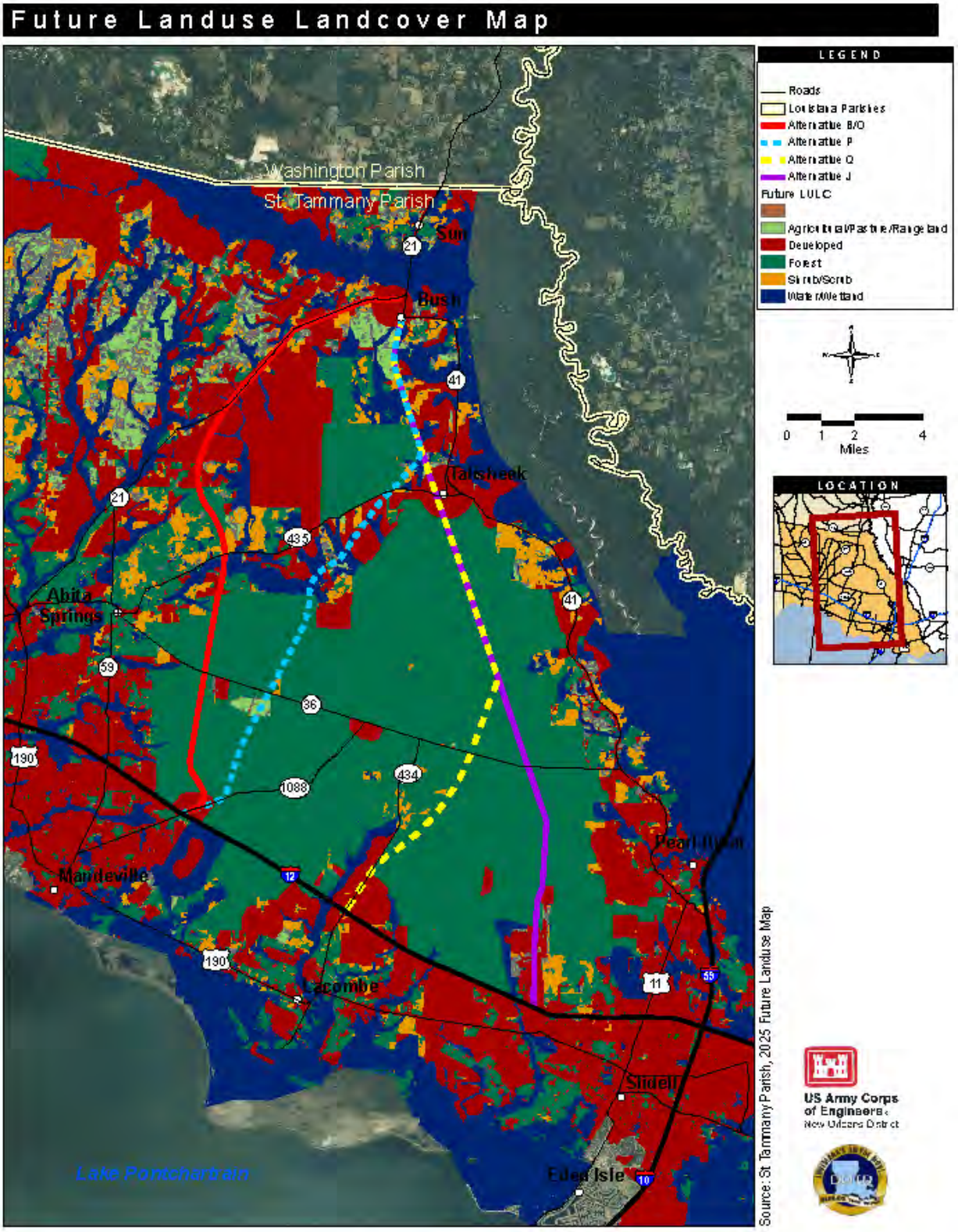
Intersection with LA 21 at northern terminus – The existing intersection of LA 21 and LA 41 in Bush is a "T" intersection, requiring northbound traffic on LA 21 to come to a stop condition before proceeding northbound. The proposed intersection for Alternative B/O re-aligns the intersection to remove the "T" intersection and provide continuous flow of traffic along the new highway segment.

Alignment Follows Existing LA 21 **-** The proposed Alternative B/O follows the existing LA 21 roadway for approximately 5.5 miles. Between Stations 950+00 to 1020+00, existing LA 21 has commercial businesses abutting the roadway, with driveway connections. For this area the alignment follows along the existing highway and the existing alignment has multiple curves, including broken back and reverse curves that do not meet current LADOTD design guidelines. Realignment of the road is required and will impact businesses in this area.

6.2.5 Land Use

The majority of the existing Alternative B/O is a mix of shrub/scrub, forest, water/wetland and very little development. The northern region above LA 435 consists of primarily agricultural/pasture/rangeland and development surrounded by shrub/scrub, forest and water/wetland. Future land use projections shown in Figure 6-2 show development along existing LA 21 and around the LA 1088/I-12 Interchange.

Figure 6-2: St. Tammany Parish Future Land Use Map



6.2.6 Traffic

The projected traffic volumes for Alternative B/O are presented in the supplemental Traffic Study Report, prepared by Urban Systems, Inc., and are included in Appendix B of this Study.

Signalized intersections are recommended at the following locations for Alternative B/O:

- I-12 at LA 1088 East Bound On/Off Ramps
- I-12 at LA 1088 West Bound On/Off Ramps
- Alternative B/O at LA 36
- Alternative B/O at LA 21
  (Roundabout may be considered at this location)

Based on the results of the Traffic Study Report, travel time savings and level of service improvements result from the construction of this alternative with approximately 35 percent of the traffic on LA 21, 20 percent of the traffic on LA 59, and 15 percent of the traffic on LA 41 diverted to the new highway.

6.3 Alternative P

Alternative P is defined as the alternative that would begin at the interchange of I-12 and LA 1088 with the construction of a new 4-lane highway to approximately 1.0 miles north of Talisheek, then north approximately 3.5 miles to Bush. Heading north from I-12, the highway would intersect with LA 1088, then head northeasterly crossing LA 36 approximately 2.4 miles southeast of Abita Springs. Heading northeast on the new alignment, it would cross LA 435 at a point approximately 1.5 miles west from Talisheek, then to Bush. This alternative would be approximately 17.4 miles long, with 1.2 miles on existing alignment and 16.2 miles on new alignment. The proposed route will utilize an abandoned railroad corridor for a distance of approximately 2.5 miles from Bush to Talisheek.

6.3.1 Road Classifications

Alternative P is divided into three roadway classifications:

Suburban Arterial (SA-1) – The suburban arterial roadway classification was used from the southern connection with I-12 to approximately 1.5 miles north. This segment of roadway follows the existing LA 1088 alignment and continues through the first horizontal curve. Existing LA 1088 in this area (CS 852-11) is classified as a rural local road. The area to the south of I-12 is classified as urban. The suburban arterial classification was used to satisfy the need to construct an "arterial highway" and because LADOTD design guidelines indicate that suburban sections should be used "on rural roadway section that adjoins a roadway section currently classified as urban."

Rural Arterial (RA-3) – The rural arterial roadway classification was used for the majority of the alignment from the terminus of the SA-1 section, 1.5 miles north of I-12, to 0.7 miles south of the intersection with LA 21, approximately 15.2 miles north. This section satisfies the need to "construct a modern, high-speed, 4-lane arterial highway". The area is in a rural setting and does not adjoin any existing urban areas. The RA-3 classification is a 70 mph design speed. This segment is proposed as a Control of Access area.

Rural Arterial (RA-2) – The rural arterial roadway classification continues for the final 0.7 miles before connecting with the existing LA 41/21 in Bush. The RA-2 classification was used to merge the existing LA 41/21 section which has a reduced median width of approximately 42 feet. Existing LA 21 is classified as a Principal Arterial at the connection in Bush (CS 303-02).

6.3.2 Drainage/Floodplain

The watershed for this area was modeled separately and is included in the "Hydraulics and Hydrology Report". Alternative P travels through five drainage basins from I-12 to Bush. These are Little Creek, Ponchitolawa Creek, Abita River, Talisheek Creek, Little Brushy Branch and Bogue Chitto River Tributary.

There are 26 proposed culvert crossings and seven proposed bridges along Alternative P, as shown in Table 6-2. Bridges cross Talisheek Creek and Little Brushy Branch. Roadside ditches

will be required along the alignment to convey surface water to the nearest culvert or bridge crossings.

Where the alignment crosses through the floodplain, the roadway profile will be maintained at three feet above the base flood elevation (BFE), with bridges at six feet above BFE.

Table 6-2: ALT P Bridge Locations

Structure No.	Channel
5	Little Creek
8	Ponchitolawa Creek
14	English Branch
15	English Branch (FEMA Trib 1)
16	English Branch
17	Double Branch
26	Talisheek Creek

It should be noted that bridge structure No. 8 had a 50 year peak flow rate of 955 cfs, which is less than the 1,000 cfs standard set for this project. However, due to the sizing of the structure located along HWY 36 and the details of this study, it was considered to be a bridge.

6.3.2 Design Considerations

The following design considerations were addressed for Alternative P:

Residential Connectivity **-** The proposed alignment bisects two local roadways, Peg Keller Road and Bob Levy Road, which are the only access routes to LA 36 for many residents. At these locations, the proposed highway will be elevated to overpass the existing roadways in order to maintain access for the residents.

Intersections **-** Intersections are to be provided at major road crossings only (LA 1088, LA36, LA 435, and LA 40/41). The intersection with LA 435 is at a skew of approximately 35 degrees, which is not acceptable. The proposed design re-aligns LA 435 to intersect with the proposed LA 3241 to the south in order to provide an acceptable design angle for the intersection.

6.3.4 Utilities

Alternative P begins at the westbound on/off ramps for I-10 at LA 1088, where overhead electric lines extend on the west side of LA 1088. The electrical lines will require relocation for the segment of new highway that follows the existing LA 1088 alignment, approximately 500 linear feet. At Station 1240+00 where Alternative P crosses LA 36, there are overhead electric

lines that run along the south side of the highway. It is anticipated that provisions will be made to relocate these lines. There are no transmission lines in the vicinity.

There are overhead electric lines that run along the east side of Peg Keller Road. It is anticipated that these lines will need to be rerouted underground at this location, in order to incorporate the required overpass at Station 1477+13.00. There are no transmission lines in the vicinity.

Alternative P crosses LA 435 at Station 1620+00. Overhead electric lines run on both the north and south sides of the highway and it is anticipated that these lines will need to be relocated. There are no transmission lines in the vicinity. Bob Levy Road at Station 1670+15 includes overhead electric lines that run on the west side of the road and are anticipated to be relocated in order to integrate a bridge in the alternative. There are no transmission lines in the vicinity.

Overhead electric lines run along the south side of LA 40/41 and the east side of LA 41 heading north. It is anticipated that these lines will be relocated to allow for Alternative P to tie in at this intersection. There are no transmission lines in the vicinity.

As the alignment proceeds to the north, it crosses the Koch Gateway and Gulf South Pipeline Co. gas transmission lines at approximately Station 1037+00. At approximately 1207+00 the alignment crosses Southern Natural Gas Co. transmission lines. The roadway elevation was maintained approximately four feet above existing ground where the alignment crosses buried gas lines to avoid relocation of the existing gas lines. It is anticipated that the existing gas lines will need protection during construction activities and may require casing sleeves for the segments that will be located under the future roadway sections.

6.3.5 Land Use

The southern portion of Alternative P begins at I-12, where there is a mix of shrub/scrub, forest, water/wetland and very little development. This continues along the corridor northeast along LA 1088, easing north to cross LA 36, interspersed with a few areas of agricultural/pasture/rangeland, northeast toward LA 435, then north toward Bush, where there is primarily agricultural/pasture/rangeland and development. Future development is projected in the Talisheek area.

6.3.6 Traffic

The projected traffic volumes for Alternative P are presented in the supplemental Traffic Study Report, prepared by Urban Systems, Inc., and are included in Appendix B of this Study.

Signalized intersections are recommended at the following locations for Alternative P:

- I-12 at LA 1088 East Bound On/Off Ramps
- I-12 at LA 1088 West Bound On/Off Ramps
- Alternative P at LA 36

Based on the results of the Traffic Study Report, travel time savings and level of service improvements result from the construction of this alternative with approximately 40 percent of the traffic on LA 21, 16 percent of the traffic on LA 59, and 46 percent of the traffic on LA 41 diverted to the new highway.

6.4 Alternative Q

Alternative Q is defined as the alternative that would include new construction of a 4-lane highway beginning at the existing I-12 and LA 434 interchange (Exit 74). It would tie into LA 434, and then follow an abandoned railroad corridor from a point approximately 1.7 miles north of LA 36 to Bush. This alternative would be approximately 20.0 miles long, with 9.8 miles using the abandoned railroad embankment, 8.7 miles on new alignment, and 1.3 miles on existing roadway. The majority of the alternative (17.2 miles) consists of a RA-3 typical cross section, which would have a ROW width of 250 feet. The northern 0.7 miles of the route would have a RA-2 cross section, while the southern 1.9 miles will have suburban arterial SA-1 cross section.

6.4.1 Road Classification

Alternative Q is divided into three roadway classifications:

Suburban Arterial (SA-1) – The suburban arterial roadway classification was used from the southern connection with I-12 at LA 434 to approximately 2.0 miles north. This segment of roadway follows the existing LA 434 alignment until it curves to the east at approximately Station 3100+00. Existing LA 434 in this location is classified as a minor collector (CS 852-12). The area to the south of I-12 is considered urban. The suburban arterial classification was used to satisfy the need to construct an "arterial highway" and because LADOTD design guidelines indicate that suburban sections should be used "on rural roadway section that adjoins a roadway section currently classified as urban."

Rural Arterial (RA-3) – The rural arterial roadway classification (RA-3) was used for the majority of the alignment from the terminus of the SA-1 section, 2.0 miles north of I-12, to 0.7 miles south of the intersection with LA 21, a distance of approximately 17.3 miles. This section satisfies the need to "construct a modern, high-speed, 4-lane arterial highway". The area is in a rural setting and does not adjoin any existing urban areas. The RA-3 classification is a 70 mph design speed. The majority of this segment is proposed as a Control of Access area, with the exception of the segment that extends through the area of Talisheek, approximately 2.0 miles, which will be standard right of way to allow access to residents in the area that currently access LA 435 through Rheusaw Parker Road and Boyd Davis Road.

Rural Arterial (RA-2) – The rural arterial roadway classification continues for the final 0.7 miles before connecting with the existing LA 41/21 in Bush. The RA-2 classification was used merge to the existing LA 41/21 section which has a reduced median width of approximately 42 feet. Existing LA 21 is classified as a Principal Arterial at the connection in Bush (CS 303-02).

6.4.2 Drainage/Floodplain

The watershed for this area was modeled separately and is included in the "Hydraulics and Hydrology Report." Alternative Q travels through six drainage basins from I-12 to Bush. These are Big Branch Bayou, two portions of Bayou Lacombe, Talisheek Creek, Little Brushy Branch and Bogue Chitto River Tributary.

Alternative Q crosses the least number of channels. There are 24 proposed culvert crossings and three proposed bridges along Alternative Q. Roadside ditches will be required along the alignment to convey surface water to the nearest culvert or bridge crossings. The three bridge locations are listed in Table 6-3.

Where the alignment crosses through the floodplain, the roadway profile will be maintained at three feet above the base flood elevation (BFE), with bridges at six feet above BFE.

Table 6-3: ALT Q Bridge Locations

Structure No.	Channel
10	Un-named Tributary to Bayou Lacombe
15	Un-named Tributary To Bayou Lacombe
19	Talisheek Creek

It should be noted that according to the Louisiana Department of Wildlife and Fisheries (LDWF), Bayou Lacombe is designated as a Scenic River and the alignment should avoid this channel all together.

The realignment of the Little Brushy Bayou channel detailed in Alternative P will also be required for Alternative Q.

6.4.3 Utilities

Alternative Q begins at the LA 434 and I-12 interchange and extends along existing LA 434 for approximately 1.3 miles. There are overhead electric lines that run along the east side of the highway that will require relocation. The alignment proceeds to the north and crosses LA 36 at Station 3312+40. Overhead electric lines run along the south side of LA 36 and will be relocated as part of this project.

Further to the north, Alternative Q crosses Peg Keller Road at approximately Station 3545+00. There are overhead electric lines that run along the east side of the road that will require relocation for the project. There are overhead electric lines that run along the south side of LA 435, which Alternative Q crosses at Station 3738+60. It is anticipated that these lines will need to be relocated. Alternative Q terminates at Station 4031+20 at the intersection of LA 40 and LA 41. Overhead electric lines run along the south side of LA 40/41 and the east side of LA 41 heading north. It is anticipated that these electrical lines will need to be relocated for the project. There are no gas transmission lines in the vicinity of these locations.

There is a Koch Gateway Pipeline Co. gas transmission line that travels crosses Alternative Q at approximately Station 3007+00. The alignment also crosses a Gulf South Pipeline Co. gas transmission line at approximately Station 3270+00 and Koch Gateway, Gulf South and WFS-NLG Pipeline Co. gas transmission lines between Stations 3285+00 and 3290+00. The roadway elevation was maintained approximately four feet above existing ground where the alignment crosses buried gas lines to avoid relocation of the existing gas lines. It is anticipated that the existing gas lines will need protection during construction activities and may require casing sleeves for the segments that will be located under the future roadway sections.

6.4.4 Design Considerations

The following design considerations were addressed for Alternative Q:

Residential Connectivity – The proposed alignment crosses Firetower Road at approximately Station 3160+00, which is the only access to approximately 15 houses. This area of highway is Control of Access, so a roadway overpass is proposed to maintain Firetower Road and access for the residents to the south of the proposed highway.

Lee Road and Will Gaines Road are also bisected by the alignment. These are rural dirt roads and are primarily used as timber routes and not for traffic. Therefore, an overpass of these roads is not cost justified and it is recommended that each road be terminated at the right of way to the new highway. Access is still maintained in each direction back to LA 435 or LA 41.

The alignment crosses LA 36 in the area of Talisheek. Through this area, the proposed highway follows the old railroad corridor, which also runs along Rheusway Parker Road and Boyd Davis Road. Many residents in this area utilize these roads for access back to LA 36. It is recommended that access is allowed through this area for approximately 2.0 miles to provide access to residents along Rheusway Parker Road and Boyd Davis Road.

LA 434 / I-12 Interchange – The LA 434 overpass at I-12 is currently a two lane roadway. The proposed configuration has the outermost lanes merging with the eastbound on/off ramps. Based on the traffic results, the existing bridge over I-12 is adequate to support the projected traffic volumes and no additional structures or travel lanes are required. Signalized intersections will be required at both the eastbound and westbound ramp intersections at LA 434.

LA 434 – There is currently commercial development along LA 434 north of the eastbound I-12 ramps. Development includes a distribution center, commercial development center, and a hospital and medical center. Access will need to be maintained for these businesses.

6.4.5 Land Use

The southern end of Alternative Q begins at the intersection of I-12 and LA 434, where there is some development and a mix of shrub/scrub, forest and water/wetland. The mix of shrub/scrub, forest and water/wetland continues as the corridor breaks away from LA 434, crosses LA 36, then continues northwest until it reaches the developed area of Talisheek. The land then becomes a mix of agricultural/pasture/rangeland, forest and water/wetland until reaching the developed community of Bush to the north, which is surrounded by shrub/scrub, forest and water/wetland. Future development is projected near LA 434 and the Talisheek area.

6.4.6 Traffic

The projected traffic volumes for Alternative Q are presented in the supplemental Traffic Study Report, prepared by Urban Systems, Inc., and are included in Appendix B of this Study.

Signalized intersections are recommended at the following locations for Alternative Q:

- I-12 at LA 434 East Bound On/Off Ramps
- I-12 at LA 434 West Bound On/Off Ramps

Based on the results of the Traffic Study Report, travel time savings and level of service improvements result from the construction of this alternative with approximately 18 percent of the traffic on LA 21, 6 percent of the traffic on LA 59, and 70 percent of the traffic on LA 41 diverted to the new highway.

6.5 Alternative J

Alternative J is defined as the alternative that would construct a new 4-lane highway from an existing interchange at I-12 (Exit 80), connecting to Airport Road. The proposed route would continue to a point directly north of the Slidell Municipal Airport, where it would then follow the abandoned railroad corridor to Bush. This proposed route would be approximately 21.1 miles long, with 14.2 miles using the abandoned railroad embankment, 5.4 miles on new alignment, and 1.5 miles of existing roadway. The majority of the route (17.5 miles) consists of a RA-3 typical cross section, which would have a ROW width of 250 feet. The northern 0.7 miles of the route consists of a RA-2 cross section, which would have a ROW width of 250 feet. There would be limited access to the route except at Bush and where the highway crosses LA 435, LA 36, and connects to Airport Road. The existing Airport Road bridge over I-12 does not provide capacity required for Alternative J. A new bridge and interchange improvements are required, as indicated in the Traffic Study.

6.5.1 Road Classification

Alternative J is divided into three roadway classifications:

Urban Arterial (UA-2) – The urban arterial roadway classification was used from the southern connection with I-12 along Airport Road to the Slidell Municipal Airport, a distance of approximately 2.9 miles. This segment of roadway follows the existing Airport Road alignment, which is not a part of the State highway system. Existing Airport Road in this location is classified as a major collector and is located in a designated urbanized area.

Rural Arterial (RA-3) – The rural arterial roadway classification (RA-3) was used for the majority of the alignment from the terminus of the UA-2 section, 2.9 miles north of I-12, to 0.7 miles south of the intersection with LA 21, a distance of approximately 17.5 miles. This section satisfies the need to "construct a modern, high-speed, 4-lane arterial highway". The area is in a rural setting and does not adjoin any existing urban areas. The RA-3 classification is a 70 mph design speed. The majority of this segment is proposed as a Control of Access area, with the exception of the segment that extends through the area of Talisheek, approximately 2.0 miles, which will be standard right of way to allow access to residents in the area that currently access LA 435 through Rheusaw Parker Road and Boyd Davis Road.

Rural Arterial (RA-2) – The rural arterial roadway classification continues for the final 0.7 miles before connecting with the existing LA 41/21 in Bush. The RA-2 classification was used to merge the existing LA 41/21 section which has a reduced median width of approximately 42 feet. Existing LA 21 is classified as a Principal Arterial at the connection in Bush (CS 303-02).

6.5.2 Drainage/Floodplain

The watershed for this area was modeled separately and is included in the "Hydraulics and Hydrology Report." Alternative J travels through six drainage basins from I-12 to Bush. These are two Bayou Liberty Tributaries, Bayou Lacombe, Talisheek Creek, Little Brushy Branch and Bogue Chitto River Tributary.

There are 24 proposed culvert crossings and six proposed bridges along Alternative J. Bridges cross Bayou Liberty, Bayou Lacombe, and Talisheek Creek. Roadside ditches will be required along the alignment to convey surface water to the nearest culvert or bridge crossings.

Where the alignment crosses through the floodplain, the roadway profile will be maintained at three feet above the base flood elevation (BFE), with bridges at six feet above BFE.

Table 6-4: ALT J Bridge Locations

Structure No.	Channel
2	Liberty Bayou Tributary
6	Liberty Bayou Tributary (FEMA Trib 3)
8	Liberty Bayou Tributary (FEMA Trib 3)
15	Bayou Lacombe Tributary
20	Bayou Lacombe Tributary
24	Talisheek Creek

The realignment of the Little Brushy Bayou channel detailed in Alternative P will also be required for Alternative J.

6.5.3 Utilities

Alternative J begins at Station 5010+55 on Airport Road where there are overhead electric lines on the west side of the roadway. The electrical lines follow Airport Road for the length of the roadway, with many service line crossings throughout the road. It is anticipated that the joint poles and service lines be relocated as part of the project. The beginning of the alignment, approximately the southern 3000 feet, also has a closed drainage system that will require reconstruction for the construction of the roadway.

At the intersection of Airport Road and Grantham College Drive, at approximately station 5013+00, there is an existing signalized intersection that will require reconstruction or removal.

As Alternative J proceeds north, it crosses LA 36 at approximately Station 5380+00. There are overhead electric lines that run along the south side of LA 36 that will require relocation.

Alternative J crosses LA 435 further to the north at approximately Station 5832+00. There are overhead electric lines that run along the south side of LA 435 and it is anticipated that these lines will need to be relocated. The alignment ends at Station 6124+48, at the intersection of LA 40 and LA 41. Overhead electric lines run along the south side of LA 40/41 and the east side of LA 41 heading north. It is anticipated that these lines will need to be relocated. There are no gas transmission lines in the vicinity.

The Alternative crosses Gulf South Pipeline Co. transmission line at approximately Station 5368+00 and Koch Gateway, Gulf South and WFS-NLG Pipeline Co. pipelines between Stations 5379+00 and 5384+00. Alternative J crosses Exxon Mobile Pipeline Co. transmission lines at approximately Station 5447+00. The roadway elevation was maintained approximately four feet above existing ground where the alignment crosses buries gas lines to avoid relocation of the existing gas lines. It is anticipated that the existing gas lines will need protection during construction activities and may require casing sleeves for the segments that will be located under the future roadway sections.

6.5.4 Design Considerations

The following design considerations were addressed for Alternative J:

Residential Connectivity **-** Will Gaines Road and Peg Keller Road are bisected by the alignment and will be terminated at each end creating dead-end roads. These roads are rural dirt roads in these areas and not traffic routes. Standard right of way is proposed through Talisheek on the north and south sides of LA 36 for approximately 2.0 miles to provide access to residents along Rheusway Parker and Boyd Davis Road.

Airport Road **-** The southern connection to I-12 follows the existing Airport Road alignment. The proposed CL is offset to the west of the existing roadway with new construction of the median and southbound lanes to the west. There are existing drainage ditches for much of the roadway and an existing separated sidewalk along the eastern side of the road with overhead utilities, which will be maintained. The UC-2 typical section ranges from a 4-30 foot raised median, and 16 feet was selected for this area to allow room for left turn lanes and a four foot median. There are 22 side street connections that will need to be maintained. Median openings are only provided at the major street intersections at approximately 0.25 mile intervals. Traffic Demands may warrant signalized intersections.

Remove Bridge at LA 36 **-** The proposed roadway alignment follows the existing railroad corridor where it crosses LA 36. This is a separated grade crossing with LA 36 going over the existing railroad alignment. The proposed intersection will remove the existing LA 36 bridge and construct an at-grade intersection. This will require reconstruction of LA 36 for approximately 1000 feet on each side of the intersection. A detour may be required during construction or shift of the intersection to the south or north to allow LA 36 to remain open during construction.

I-12 at Airport Road/Northshore Boulevard Interchange -

The Traffic Study Report indicates that the current interchange at I-12 and Airport is heavily congested and will require additional capacity to accommodate the new highway. Two Stage 0 Studies have recently been completed for this interchange. The two Stage 0 studies are briefly described below and are included in Appendix C of this report:

I-12 @ Airport Road Single Point Urban Interchange - Stage 0 Report: Buchart Horn, Inc., 2011

This Stage 0 Study was completed in January of 2011 by Buchart Horn, Inc. and analyzed the feasibility of constructing a new single point urban interchange (SPUI) in replacement of the existing diamond interchange. The project was estimated to cost a total of $23.2 Million.

I-12 at Northshore Blvd and Airport Rd – Stage 0 Feasibility Study: Burk-Kleinpeter Inc., 2007

This Stage 0 Study was completed in December of 2007 and addressed the need to reduce congestion and add capacity at the interchange. The study analyzed four build alternatives, including the no build alternative. The recommended improvement option was to construct a new six-lane bridge with additional lane improvements at the ramp intersections to improve capacity. This alternative utilizes the existing rural diamond interchange configuration and was estimated to cost a total of $11.825 Million.

For Alternative J, the improvements for the interchange include a new 6-lane bridge structure with lane configuration requirements including an exclusive southbound right turn lane and two westbound right turn lanes at the westbound I-12 ramp along with an additional exclusive southbound left turn lane and two eastbound left turn lanes at the eastbound I-12 ramp. The proposed improvements also include modifications of the existing signalized intersections for both ramp intersections.

6.5.5 Land Use

The southern section of Alternative J begins at I-12 in a primarily developed area as it heads north, and then crosses shrub/scrub, forest and some water/wetland as it continues north toward LA 36, and then northwest toward the developed area of Talisheek. The land then continues as a mix of shrub/scrub, forest, and water/wetland with some agricultural/pasture/rangeland until reaching the community of Bush, where there is primarily development and agricultural/pasture/rangeland surrounded by shrub/scrub, forest and water/wetland. Future land use projections at Airline Drive include increased development.

6.5.6 Traffic

The projected traffic volumes for Alternative J are presented in the supplemental Traffic Study Report, prepared by Urban Systems, Inc., and are included in Appendix B of this Study.

Signalized intersections are recommended at the following locations for Alternative J:

- I-12 at Airport Road East Bound On/Off Ramps
- I-12 at Airport Road West Bound On/Off Ramps
- Alternative J at LA 36
  (Roundabout may be considered at this location)

Based on the results of the Traffic Study Report, travel time savings and level of service improvements result from the construction of this alternative with approximately 16 percent of

the traffic on LA 21, 6 percent of the traffic on LA 59, and 75 percent of the traffic on LA 41 diverted to the new highway.

SECTION 7.0 RIGHT OF WAY

Fenstermaker has prepared a supplemental report entitled "Conceptual Stage Relocation Plan" that contains a detailed analysis of the right of way impacts for each of the project alternatives. The Project Plates illustrate areas where right of way would be required for each alternative. The required right of way shown within the Project Plates is the minimal amount of right of way which would be required based upon geometric requirements and constructability of each of the alternatives. To determine required right of way, a computer model template was created using Bentley InRoads (V8i) of the proposed typical sections for each alternative. These templates were then modeled in a computer simulation, which when comparisons are made against the existing land topography, limits of construction were projected both from model results and engineering experience. These limits along with minimum horizontal clear distances as referenced in the Roadway Design Criteria section of this Study aided in the development of the necessary right of way required for each of the project alternatives.

The Conceptual Stage Relocation Plan has researched preliminary fair market values of land acquisition and property damages along the study corridor. Research has included reviewing comparable land and improved sales within the project area, primarily in St. Tammany Parish. Data was collected from field reviews, aerial photography, Google Maps, on-the-ground site visits, and census data. Field inspections were conducted to assess the properties for potential right of way acquisition. Table 7-1 illustrates the results of the right of way analysis:

Table 7-1: Right of Way Cost Comparison*

	ALT B/O	ALT P	ALT Q	ALT J
a. Land	$8,946,695	$5,833,814	$5,535,445	$13,421,171
b. Improvements	$4,465,000	$550,000	$210,000	$3,270,000
c. Damages	$2,283,000	$2,133,960	$1,274,000	$2,610,000
d. SUBTOTAL	**$15,694,695**	**$8,517,774**	**$7,019,445**	**$19,301,171**
e. Relocation (includes fees)	$865,000	$213,160	$436,460	$1,809,710
f. Fees (other than relocation)	$1,478,200	$1,367,500	$1,577,800	$2,576,000
g. Incidentals	$23,750	$21,250	$24,500	$40,000
h. Excess awards (dx10%)	$1,569,470	$851,777	$701,945	$1,930,117
j. SUBTOTAL 1 (NIC Mitigation)	**$19,631,115**	**$10,971,461**	**$9,760,150**	**$25,656,998**
k. Contingencies (jx5%)	$981,556	$548,573	$488,007	$1,282,850
l. SUB TOTAL 2	**$20,612,670**	**$11,520,034**	**$10,248,157**	**$26,939,848**
m. Mitigation**	$57,026,250	$50,250,536	$36,802,500	$48,317,143
n. TOTAL (l+m)	**$77,638,920**	**$61,770,570**	**$47,050,657**	**$75,256,991**

*Values for real estate are for estimation purposes only. Values are not to be used for negotiations or purchases. A full real estate study and appraisal must be conducted prior to the purchase of any real estate property.

**Mitigation costs are preliminary and could increase or decrease based on final engineering design of the roadway and environmental conditions.

SECTION 8.0 COST ESTIMATES

Opinions of probable costs have been developed for each of the four alternatives. Costs have been developed using major pay items and current unit prices. Minor pay items were not calculated, but are included in the 20% contingency increase to the construction costs. Unit prices for estimated construction costs were based upon several data sources to include the LADOTD weighted bid prices for the year 2009 and recent bid tabulations on projects within the State and project area. A comparative opinion of probable costs of all alternatives can be found in Table 8-1. A more detailed description of each cost estimate can be found in Tables 8-2 through 8-5**.**

Table 8-1: Opinion of Probable Costs Comparative

	Alternative B/O	**Alternative P**	**Alternative Q**	**Alternative J**
CONSTRUCTION*	$196,541,436	$186,832,634	$161,683,782	$184,345,401
ENGINEERING (10%)	$19,654,144	$18,683,263	$16,168,378	$18,434,540
RIGHT OF WAY	$20,612,670	$11,520,034	$10,248,157	$26,939,848
MITIGATION**	$57,026,250	$50,250,536	$36,802,500	$48,317,143
PROJECT TOTALS	**$293,834,500**	**$267,286,467**	**$224,902,817**	**$278,036,932**

*Construction Costs include 20% contingency

**Mitigation costs are preliminary and could increase or decrease based on final engineering design of the roadway and environmental conditions.

8.1 Construction Phasing

Construction phasing is an option to spread the funding over a longer period of time. Due to the size of this project, it is likely that the project will be constructed in phases to account for immediate funding limitations. The total project construction costs for the four alternatives are in the range of $180 - $200 Million and phasing the project into segments would allow the State to fund smaller construction projects. The anticipated start date for construction activities is in the year 2015, which would allow for environmental permitting and right of way acquisitions to be performed prior to the start of construction. If the Project is fully funded, it is estimated that the construction duration would be approximately four years. However, funding limitations may require the project to be segmented for up to six construction projects, which could extend the construction of the project to a 12 year period.

The project area is naturally divided into reasonable sections for construction phasing. There are two state routes that cross through the project area dividing the various alternatives into logical segments. LA 36 and La 435 extend through the project area in an east-west direction and are the only full access intersections proposed for the project. Each of these segments would function as an ***independent utility*** with ***logical termini***. Typical end points are major traffic generators, such as intersecting roadways, which would include the intersections with LA 36, LA 435 and LA 21. The definitions of independent utility and logical termini follow:

FHWA defines an independent utility as:

> *"…be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made (FHWA, 23 CFR §771.111(f))".*

While FHWA defines logical termini as:

1) *Rational end points for a transportation improvement, and*
2) *Rational end points for a review of environmental impacts.*

The logical segments are:

1) ***I-12 to LA 36*** – This segment provides the connection to I-12 and extends northerly to the first major crossing at LA 36.
2) ***LA 36 to LA 435*** – This segment would continue the proposed highway north to the intersection with LA 435, providing an extension of the first segment. Alternative B/O may continue to the intersection of LA 21 to provide additional connectivity.
3) ***LA 435 to LA 21/LA 41*** - This segment would complete the project, providing a high speed highway from I-12 to Bush.

Each of these segments of the proposed highway provides independent benefits to the regional transportation network if constructed on their own. The construction sequence would require the southern portions be constructed initially to provide the connection to I-12 and continue the segments in the northerly direction. The projects could also be divided so that that each of the segments construct only the northbound or southbound lanes for the initial three phases. This would allow a full two lane highway to be constructed from I-12 to Bush in a timely manner, and would allow the public to utilize the roadway while the remaining lanes are constructed. Per Federal requirements, the entire project will need to be permitted and all required right of way purchased prior to the start of construction.

Table 8-2: ALTERNATIVE B/O - OPINION OF PROBABLE COSTS

No.	Description	Unit	Unit Price	Quantity	Amount
1	Clearing and Grubbing	ACRE	$2,000	586	$1,172,364
2	Removal of Surfacing and Stabilized Base	SY	$8	19,937	$159,493
3	Removal of Bridge (LA 36 over RR)	EA	$100,000	0	$0
4	General Excavation	CY	$5	547,340	$2,736,699
5	Embankment	CY	$5	164,202	$821,010
6	Borrow (Vehicular Measurement)	CY	$15	2,477,324	$37,159,862
7	Geotextile Fabric	SY	$1	913,523	$1,141,903
8	Temporary Silt Fence	LF	$2	206,660	$413,320
9	Class II Base Course	CY	$65	261,318	$16,985,675
10	Lime Treatment (Type E)	TON	$300	12,949	$3,884,755
11	Subgrade Layer (12 in Thick)	SY	$7	913,523	$6,394,659
12	Superpave Asphalt Concrete	Ton	$90	275,916	$24,832,438
13	24" Storm Drain Pipe	LF	$120	12,060	$1,447,200
14	36" Cross Drain Pipe	LF	$120	0	$0
15	42" Cross Drain Pipe	LF	$150	360	$54,000
16	48" Cross Drain Pipe	LF	$175	720	$126,000
17	54" Cross Drain Pipe	LF	$200	2,340	$468,000
18	60" Cross Drain Pipe	LF	$250	6,840	$1,710,000
19	Catch Basin	EA	$3,700	67	$247,900
20	Reinforced Concrete Box Culvert (5' x 5')	LF	$500	0	$0
21	Reinforced Concrete Box Culvert (6' x 5')	LF	$600	720	$432,000
22	Reinforced Concrete Box Culvert (7' x 5')	LF	$700	1,980	$1,386,000
23	Reinforced Concrete Box Culvert (8' x 5')	LF	$800	0	$0
24	Cross Drain End Treatment (Headwall)	EA	$20,000	8	$160,000
25	Chain Link Fence and Gates	LF	$15	127,832	$1,917,480
26	Concrete Drive (6 in Thick)	SY	$50	8,250	$412,500
27	Concrete Curb	LF	$25	0	$0
28	Rip Rap (55 Lb)	CY	$300	180	$54,000
29	Mobilization	LS	$7,500,000	1	$7,500,000
30	Plastic Pavement Striping	LM	$25,000	39	$978,504
31	Signs	LS	$500,000	1	$500,000
32	Traffic Signal System	LS	$250,000	2	$500,000
33	Hydro-Seeding	Acre	$1,300	407	$528,702
34	Construction Layout	LS	$2,000,000	1	$2,000,000
35	Bridge (Type III Girder Spans)	SF	$120	230,040	$27,604,800
36	Bridge (Type IV Girder Spans)	SF	$140	101,655	$14,231,700
37	Noise Barriers	LS	$323,566	1	$323,566
38	Utility Relocations	LS	$5,000,000	1	$5,000,000
39	Interstate 12 Interchange Improvements	LS	$500,000	1	$500,000
		SUBTOTAL CONSTRUCTION ITEMS			**$163,784,530**
		CONTINGENCY (20%)			**$32,756,906**
		TOTAL CONSTRUCTION COST			**$196,541,436**

Table 8-3: ALTERNATIVE P - OPINION OF PROBABLE COSTS

No.	Description	Unit	Unit Price	Quantity	Amount
1	Clearing and Grubbing	ACRE	$2,000	508	$1,016,466
2	Removal of Surfacing and Stabilized Base	SY	$8	18,933	$151,464
3	Removal of Bridge (LA 36 over RR)	EA	$100,000	0	$0
4	General Excavation	CY	$5	570,629	$2,853,145
5	Embankment	CY	$5	171,189	$855,944
6	Borrow (Vehicular Measurement)	CY	$15	2,134,146	$32,012,186
7	Geotextile Fabric	SY	$1	830,455	$1,038,069
8	Temporary Silt Fence	LF	$2	181,280	$362,560
9	Class II Base Course	CY	$65	230,822	$15,003,443
10	Lime Treatment (Type E)	TON	$300	11,350	$3,405,063
11	Subgrade Layer (12 in Thick)	SY	$7	800,720	$5,605,040
12	Superpave Asphalt Concrete	Ton	$90	250,869	$22,578,171
13	24" Storm Drain Pipe	LF	$120	19,224	$2,306,880
14	36" Cross Drain Pipe	LF	$120	0	$0
15	42" Cross Drain Pipe	LF	$150	180	$27,000
16	48" Cross Drain Pipe	LF	$175	1,080	$189,000
17	54" Cross Drain Pipe	LF	$200	2,880	$576,000
18	60" Cross Drain Pipe	LF	$250	1,980	$495,000
19	Catch Basin	EA	$3,700	104	$384,800
20	Reinforced Concrete Box Culvert (5' x 5')	LF	$500	540	$270,000
21	Reinforced Concrete Box Culvert (6' x 5')	LF	$600	0	$0
22	Reinforced Concrete Box Culvert (7' x 5')	LF	$700	720	$504,000
23	Reinforced Concrete Box Culvert (8' x 5')	LF	$800	1,260	$1,008,000
24	Cross Drain End Treatment (Headwall)	EA	$20,000	10	$200,000
25	Chain Link Fence and Gates	LF	$15	158,932	$2,383,980
26	Concrete Drive (6 in Thick)	SY	$50	0	$0
27	Concrete Curb	LF	$25	0	$0
28	Rip Rap (55 Lb)	CY	$300	360	$108,000
29	Mobilization	LS	$7,500,000	1	$7,500,000
30	Plastic Pavement Striping	LM	$25,000	34	$858,333
31	Signs	LS	$500,000	1	$500,000
32	Traffic Signal System	LS	$250,000	1	$250,000
33	Hydro-Seeding	Acre	$1,300	344	$447,817
34	Construction Layout	LS	$2,000,000	1	$2,000,000
35	Bridge (Type III Girder Spans)	SF	$120	146,205	$17,544,600
36	Bridge (Type IV Girder Spans)	SF	$140	210,600	$29,484,000
37	Noise Barriers	LS	$1,174,900	1	$1,174,900
38	Utility Relocations	LS	$2,000,000	1	$2,000,000
39	Interstate 12 Interchange Improvements	LS	$600,000	1	$600,000
		SUBTOTAL CONSTRUCTION ITEMS			**$155,693,862**
		CONTINGENCY (20%)			**$31,138,772**
		TOTAL CONSTRUCTION COST			**$186,832,634**

Table 8-4: ALTERNATIVE Q - OPINION OF PROBABLE COSTS

No.	Description	Unit	Unit Price	Quantity	Amount
1	Clearing and Grubbing	ACRE	$2,000	576	$1,152,074
2	Removal of Surfacing and Stabilized Base	SY	$8	34,713	$277,707
3	Removal of Bridge (LA 36 over RR)	EA	$100,000	1	$100,000
4	General Excavation	CY	$5	426,099	$2,130,496
5	Embankment	CY	$5	127,830	$639,149
6	Borrow (Vehicular Measurement)	CY	$15	1,765,532	$26,482,978
7	Geotextile Fabric	SY	$1	932,475	$1,165,594
8	Temporary Silt Fence	LF	$2	206,240	$412,480
9	Class II Base Course	CY	$65	267,531	$17,389,539
10	Lime Treatment (Type E)	TON	$300	13,218	$3,965,351
11	Subgrade Layer (12 in Thick)	SY	$7	932,475	$6,527,327
12	Superpave Asphalt Concrete	Ton	$90	276,616	$24,895,411
13	24" Storm Drain Pipe	LF	$120	12,960	$1,555,200
14	36" Cross Drain Pipe	LF	$120	540	$64,800
15	42" Cross Drain Pipe	LF	$150	1,800	$270,000
16	48" Cross Drain Pipe	LF	$175	4,140	$724,500
17	54" Cross Drain Pipe	LF	$200	720	$144,000
18	60" Cross Drain Pipe	LF	$250	360	$90,000
19	Catch Basin	EA	$3,700	71	$262,700
20	Reinforced Concrete Box Culvert (5' x 5')	LF	$500	0	$0
21	Reinforced Concrete Box Culvert (6' x 5')	LF	$600	720	$432,000
22	Reinforced Concrete Box Culvert (7' x 5')	LF	$700	1,440	$1,008,000
23	Reinforced Concrete Box Culvert (8' x 5')	LF	$800	0	$0
24	Cross Drain End Treatment (Headwall)	EA	$20,000	6	$120,000
25	Chain Link Fence and Gates	LF	$15	158,016	$2,370,240
26	Concrete Drive (6 in Thick)	SY	$50	2,383	$119,167
27	Concrete Curb	LF	$25	0	$0
28	Rip Rap (55 Lb)	CY	$300	60	$18,000
29	Mobilization	LS	$7,500,000	1	$7,500,000
30	Plastic Pavement Striping	LM	$25,000	39	$976,515
31	Signs	LS	$500,000	1	$500,000
32	Traffic Signal System	LS	$250,000	0	$0
33	Hydro-Seeding	Acre	$1,300	393	$510,458
34	Construction Layout	LS	$2,000,000	1	$2,000,000
35	Bridge (Type III Girder Spans)	SF	$120	117,450	$14,094,000
36	Bridge (Type IV Girder Spans)	SF	$140	89,100	$12,474,000
37	Noise Barriers	LS	$964,800	1	$964,800
38	Utility Relocations	LS	$3,000,000	1	$3,000,000
39	Interstate 12 Interchange Improvements	LS	$400,000	1	$400,000
		SUBTOTAL CONSTRUCTION ITEMS			**$134,736,485**
		CONTINGENCY (20%)			**$26,947,297**
		TOTAL CONSTRUCTION COST			**$161,683,782**

Table 8-5: ALTERNATIVE J - OPINION OF PROBABLE COSTS

No.	Description	Unit	Unit Price	Quantity	Amount
1	Clearing and Grubbing	ACRE	$2,000	615	$1,229,645
2	Removal of Surfacing and Stabilized Base	SY	$8	26,333	$210,667
3	Removal of Bridge (LA 36 over RR)	EA	$100,000	0	$0
4	General Excavation	CY	$5	849,723	$4,248,615
5	Embankment	CY	$5	254,917	$1,274,585
6	Borrow (Vehicular Measurement)	CY	$15	952,556	$14,288,339
7	Geotextile Fabric	SY	$1	1,003,688	$1,254,610
8	Temporary Silt Fence	LF	$2	222,786	$445,572
9	Class II Base Course	CY	$65	288,019	$18,721,265
10	Lime Treatment (Type E)	TON	$300	14,227	$4,268,182
11	Subgrade Layer (12 in Thick)	SY	$7	1,003,688	$7,025,814
12	Superpave Asphalt Concrete	Ton	$90	298,596	$26,873,659
13	24" Storm Drain Pipe	LF	$120	14,040	$1,684,800
14	36" Cross Drain Pipe	LF	$120	0	$0
15	42" Cross Drain Pipe	LF	$150	0	$0
16	48" Cross Drain Pipe	LF	$175	900	$157,500
17	54" Cross Drain Pipe	LF	$200	2,700	$540,000
18	60" Cross Drain Pipe	LF	$250	4,320	$1,080,000
19	Catch Basin	EA	$3,700	98	$362,600
20	Reinforced Concrete Box Culvert (5' x 5')	LF	$500	0	$0
21	Reinforced Concrete Box Culvert (6' x 5')	LF	$600	720	$432,000
22	Reinforced Concrete Box Culvert (7' x 5')	LF	$700	1,440	$1,008,000
23	Reinforced Concrete Box Culvert (8' x 5')	LF	$800	0	$0
24	Cross Drain End Treatment (Headwall)	EA	$20,000	6	$120,000
25	Chain Link Fence and Gates	LF	$15	163,742	$2,456,130
26	Concrete Drive (6 in Thick)	SY	$50	4,400	$220,000
27	Concrete Curb	LF	$25	36,474	$911,850
28	Rip Rap (55 Lb)	CY	$300	120	$36,000
29	Mobilization	LS	$7,500,000	1	$7,500,000
30	Plastic Pavement Striping	LM	$25,000	42	$1,054,858
31	Signs	LS	$500,000	1	$500,000
32	Traffic Signal System	LS	$250,000	1	$250,000
33	Hydro-Seeding	Acre	$1,300	417	$542,679
34	Construction Layout	LS	$2,000,000	1	$2,000,000
35	Bridge (Type III Girder Spans)	SF	$120	204,525	$24,543,000
36	Bridge (Type IV Girder Spans)	SF	$140	0	$0
37	Noise Barriers	LS	$580,800	1	$580,800
38	Utility Relocations	LS	$6,000,000	1	$6,000,000
39	Interstate 12 Interchange Improvements	LS	$21,800,000	1	$21,800,000
		SUBTOTAL CONSTRUCTION ITEMS			**$153,621,168**
		CONTINGENCY (20%)			**$30,724,234**
		TOTAL CONSTRUCTION COST			**$184,345,401**

The following assumptions were used during preparation of the construction cost estimates:

8.2 Earthwork

- 30 percent of General Excavation material will be suitable for re-use as Embankment.
- Borrow material is measured as the vehicular measurement.
- Import Borrow will compact by 20 percent when placed on site, therefore 20 percent additional volume was added to the calculated Borrow volume.
- Borrow material will be available within a 50.0 mile radius of the project site.
  There currently are not any registered borrow sites within a 50.0 mile radius of the project site that have the capacity to supply 1-2 million cubic yards of suitable fill material for the project. Per conversations with LADOTD District 62 Engineers, it is anticipated that a contractor or materials supplier will purchase or create a site within Tangipahoa Parish, Washington Parish, St Tammany Parish, or the State of Mississippi within 50.0 miles of the project site when the project is approved for construction.
- Based on an available borrow site within 50.0 miles of the project site, it was estimated that borrow will cost $15/CY based on reasonable drive times at those distances. If a borrow site is not available within this distance, import borrow costs will increase.

8.3 Pavement

- Pavement quantities for all segments of the new arterial highway were calculated using the following pavement section:

  Travel Lanes
  - 8-Inches Superpave AC
  - 8-Inches Class II Aggregate Base
  - 12-Inches Subgrade Layer
  - Lime Treatment (9% by Volume)

  Shoulders
  - 2-Inches Superpave AC
    (Full Shoulder widths to be paved)
  - 14-Inches Class II Aggregate Base
  - 12-Inches Subgrade Layer

8.4 Bridges

- Type III Girder Span bridge will be used for all waterway crossings. Girder spans were used because they may be necessary to obtain a no-rise impact on local water surface elevations. If slab span bridges are determined feasible in the design phase, construction costs will decrease.
- Type IV Girder span bridges will be used for all bridges crossing over roadways.

- Pilings, test piles, bents, approach slabs, guardrail, reinforcing steel and miscellaneous bridge items are included in the square foot costs for Type III and Type IV girder span bridges.

8.5 Other

- Fencing will be placed along the right of way line for all Control of Access areas.
- Rip Rap is required at all culvert locations where the velocity is 10 feet per second.
- Flat headwalls and endwalls will be constructed at all box culvert locations.
- 24-inch diameter equalizer pipes are included in the quantities for 24-inch Storm Drain Pipe.
- Alternative J will require a new bridge over I-12 and reconstruction of the on and off ramps.
- For each alternative, the EB and WB Ramps at I-12 will require signalization.

8.6 Engineer's Disclaimer

The opinions of probable costs presented in this Report are based on engineering experience and judgment. However, the engineer does not have control over the costs presented by the contractor for labor, materials, equipment, or services. These costs can vary substantially based on a number of factors, including travel times, materials supply, gas prices, subcontractor costs, etc. The following criteria was used for the preparation of the cost estimates:

- The quantities are based on the conceptual plans presented in this Report.
- The unit costs were established by the engineer as a best estimate of the costs from research of construction unit costs used on similar projects.
- Percentages for contingencies are based on standard practices for the level of design presented in this Report.
- Any costs associated with additional work or services not included in this project will be additional costs and are not included in the “Opinion of Probable Costs”.
- All costs (construction, right of way, and mitigation) are based on 2010 unit dollar amounts and should be adjusted for future projects.

SECTION 9.0 REFERENCES

Engineering Directives and Standards (EDSMs), Louisiana Department of Transportation and Development, LADOTD website; http://webmail.dotd.la.gov/ppmemos.nsf?OpenDatabase&Start=1

English Design Guidelines, Louisiana Department of Transportation and Development, 2009, LADOTD website;http://www.dotd.louisiana.gov/highways/project_devel/design/road_design/Memoranda/English_Design_Guidelines.pdf

A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 2004.

FEMA Map Service Center, Federal Emergency Management Agency, http:\\msc.fema.gov

Metropolitan Transportation Plan, Regional Planning Commission, East St. Tammany/Slidell/Mandeville /Covington Urbanized Areas – Fiscal Years 2011- 2040, August 10, 2010.

NEPA and the Transportation Decision Making Process (Participant Workbook), Federal Highway Administration-National Highway Institute, Publication No. FHWA-NHI-08-005, October 2007.

New Directions 2025, St. Tammany Parish Government, http://www.stpgov.org/pdf/1179350027.pdf

St. Tammany Parish Road Plan - New Direction 2025, St. Tammany Parish Government, http://www.stpgov.org/pdf/1190146163.pdf

Preliminary Environmental Assessment, Department of the Army New Orleans Branch (CEMVN), Application Number MVN-2005-00037-MJ from Louisiana Department of Transportation and Development, August 21, 2008.

Roadside Design Guide, American Association of State Highway and Transportation Officials (AASHTO), 2006, 3rd Edition.

Roadway Design Procedures and Details, Louisiana Department of Transportation and Development (LADOTD), July 2002.

Technical Memoranda (1-21), I-12 to Bush Corridor Study, Department of the Army New Orleans Branch (CEMVN), prepared by Burk-Kleinpeter, Inc.

Roundabouts Technical Summary, U.S. Department of Transportation Federal Highway Administration, FHWA-SA-10-006.

I-12 @ Airport Road Single Point Urban Interchange – Stage 0 Report, Regional Planning Commission – New Orleans Metropolitan Region, RPC Project No. SL-1.10, Buchart Horn, Inc., January 2011.

APPENDIX A

PROJECT PLANS

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

VICINITY MAP

STATE PROJECT No.: 700-52-0198
USACE PERMIT No. MVN-2006-0037

I-12 TO BUSH EIS

ST. TAMMANY PARISH
ROUTE LA. HWY 3241

PLATE INDEX, TYPICAL SECTIONS, & PLATES

ALTERNATIVE BO
ALTERNATIVE P
ALTERNATIVE Q
ALTERNATIVE J

PRELIMINARY
NOT TO BE USED FOR CONSTRJCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

TITLE SHEET

I-12 TO BUSH
ST. TAMMANY PARISH

PROJECT ALTERNATIVES

LEGEND
- ALTERNATIVE B-O
- ALTERNATIVE P
- ALTERNATIVE Q
- ALTERNATIVE J

W / S / N / E

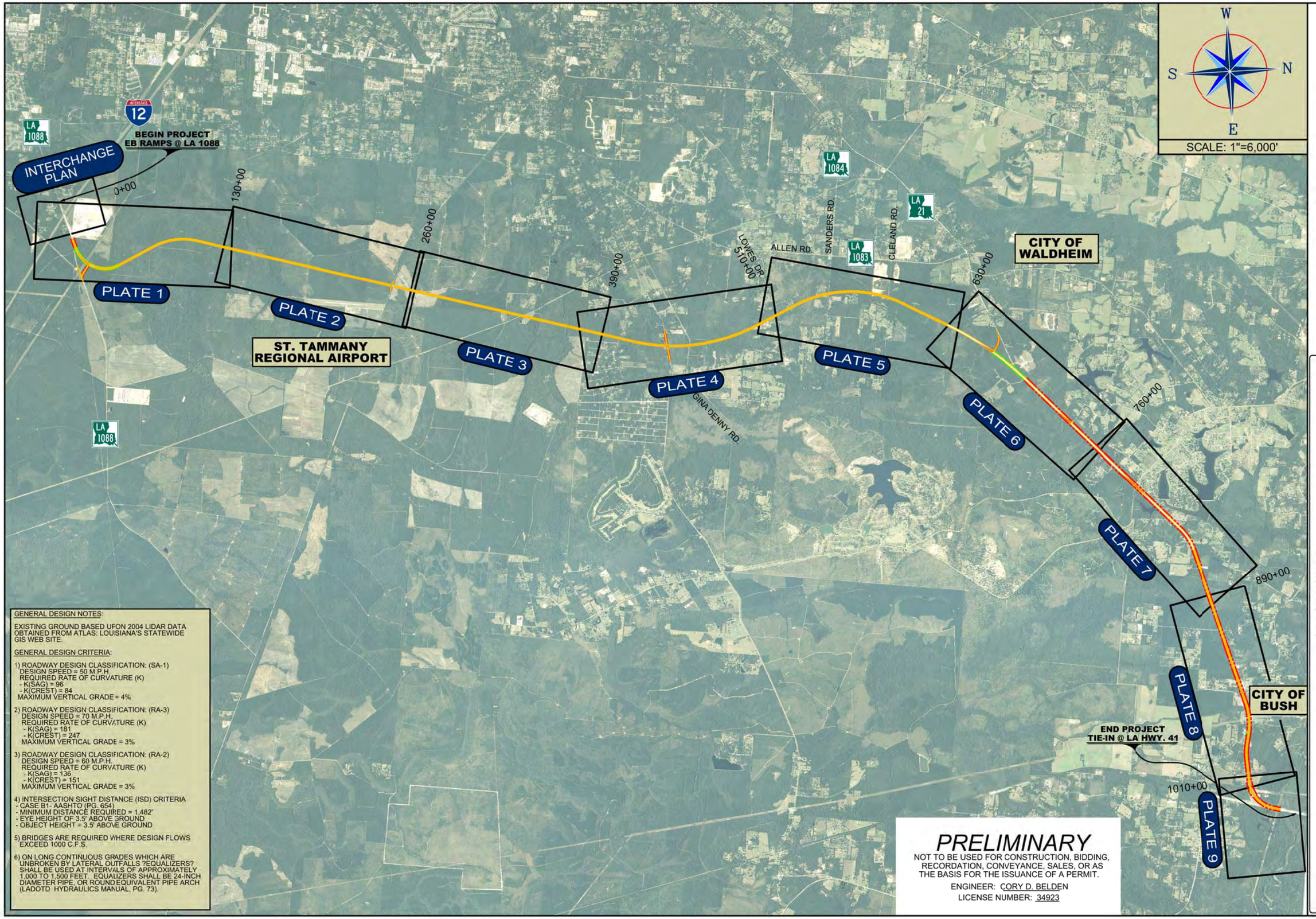
SCALE: 1"=8,000'

MANDEVILLE, LA
ABITA SPRINGS, LA
WALDHEIM, LA
BUSH, LA
LACOMBE, LA
SLIDELL AIRPORT
ST. TAMMANY REGIONAL AIRPORT
B-O
P
Q
J
LA 1088
LA 435
LA 40
LA 36
LA 434
LA 41
I-12
ALLEN RD.
LOWES DR.
SANDERS RD.
CLELAND RD.
FAUNTLEROY ROAD
BEN WILLIAMS ROAD
BURVANT ST.
GINA DENNY RD.
OAK KNOLL ROAD
CAMELIA ROAD
WOODLAND ROAD
DOLLY-T MITIGATION BANK
EDITH ROAD
RAILROAD AVENUE
BOB LEVY ROAD
JENKINS ROAD
WATTS ROAD
MOSSY HILL ROAD
MOSSY HILL MITIGATION BANK
BOYD DAVIS
PEARL RIVER
PEG KELLER ROAD
WILL GAINES RD
WILL GAINES EXTENDED
ARCHIE SINGLETARY ROAD
LEE ROAD
CC19 RD.
JOURNEY ROAD
PINE ST.

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVES

PLATE INDEX



GENERAL DESIGN NOTES:

EXISTING GROUND BASED UFON 2004 LIDAR DATA OBTAINED FROM ATLAS: LOUISIANA'S STATEWIDE GIS WEB SITE.

GENERAL DESIGN CRITERIA:

1) ROADWAY DESIGN CLASSIFICATION: (SA-1)
   DESIGN SPEED = 50 M.P.H.
   REQUIRED RATE OF CURVATURE (K)
   - K(SAG) = 96
   - K(CREST) = 84
   MAXIMUM VERTICAL GRADE = 4%

2) ROADWAY DESIGN CLASSIFICATION: (RA-3)
   DESIGN SPEED = 70 M.P.H.
   REQUIRED RATE OF CURVATURE (K)
   - K(SAG) = 181
   - K(CREST) = 247
   MAXIMUM VERTICAL GRADE = 3%

3) ROADWAY DESIGN CLASSIFICATION: (RA-2)
   DESIGN SPEED = 60 M.P.H.
   REQUIRED RATE OF CURVATURE (K)
   - K(SAG) = 136
   - K(CREST) = 151
   MAXIMUM VERTICAL GRADE = 3%

4) INTERSECTION SIGHT DISTANCE (ISD) CRITERIA
- CASE B1- AASHTO (PG. 654)
- MINIMUM DISTANCE REQUIRED = 1,482'
- EYE HEIGHT OF 3.5' ABOVE GROUND
- OBJECT HEIGHT = 3.5' ABOVE GROUND

5) BRIDGES ARE REQUIRED WHERE DESIGN FLOWS EXCEED 1000 C.F.S.

6) ON LONG CONTINUOUS GRADES WHICH ARE UNBROKEN BY LATERAL OUTFALLS ?EQUALIZERS? SHALL BE USED AT INTERVALS OF APPROXIMATELY 1,000 TO 1,500 FEET. EQUALIZERS SHALL BE 24-INCH DIAMETER PIPE, OR ROUND EQUIVALENT PIPE ARCH (LADOTD HYDRAULICS MANUAL, PG. 73).

PRELIMINARY

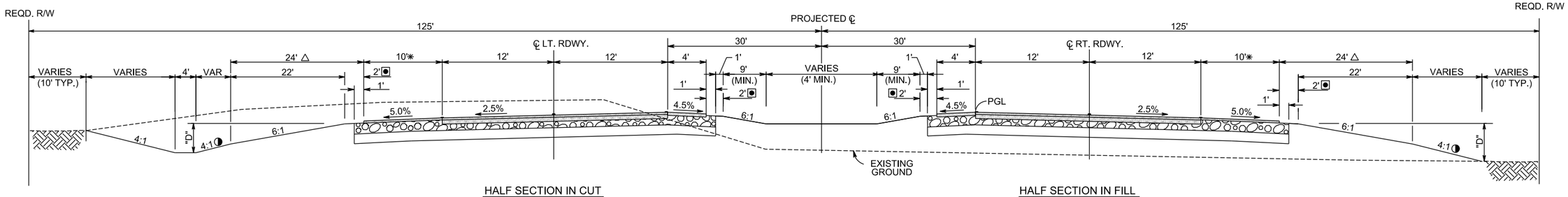
NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE BO



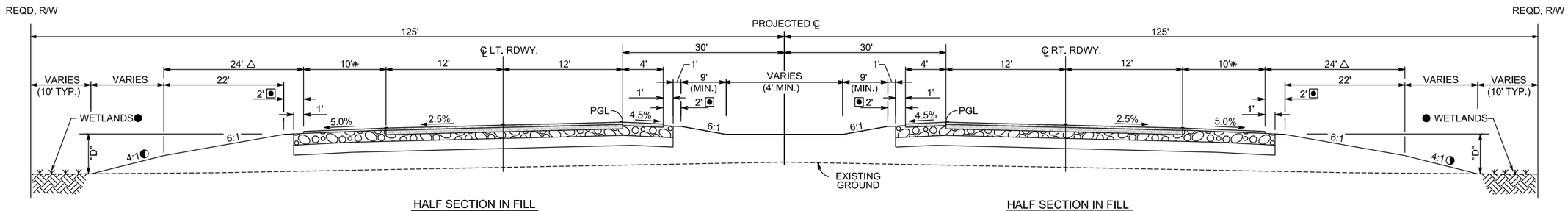
HALF SECTION IN CUT

HALF SECTION IN FILL

◑ 4:1 FORE SLOPES ALLOWED OUTSIDE OF CLEAR ZONE
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
◉ MAINTAIN ROADWAY SHOULDER SLOPE
✳ 2 - FOOT MINIMUM PAVED SHOULDER
FULL SHOULDER WIDTH TO BE PAVED FOR ADT OVER 5,000

TYPICAL SECTION

RURAL ARTERIAL (RA-3)
(DESIGN SPEED = 70 MPH)
(SEE PLATES FOR SECTION LIMITS)



HALF SECTION IN FILL

HALF SECTION IN FILL

TYPICAL SECTION (IN WETLANDS)

RURAL ARTERIAL (RA-3)
(DESIGN SPEED = 70 MPH)
(SEE PLATES FOR SECTION LIMITS)

◑ 4:1 FORE SLOPES ALLOWED OUTSIDE OF CLEAR ZONE
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
◉ MAINTAIN ROADWAY SHOULDER SLOPE
✳ 2 - FOOT MINIMUM PAVED SHOULDER
FULL SHOULDER WIDTH TO BE PAVED FOR ADT OVER 5,000
● ROADSIDE DITCHES SHALL NOT BE CONSTRUCTED IN WETLAND AREAS

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

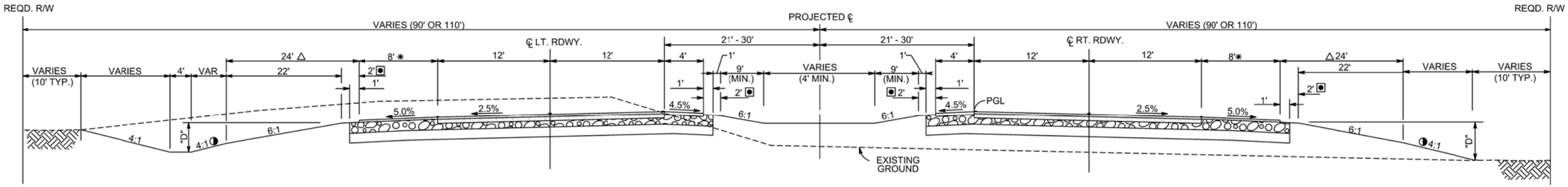
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

NOTE: PAVEMENT SECTION TO BE DETERMINED DURING DESIGN PHASE.

TYPICAL ROADWAY SECTIONS

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO

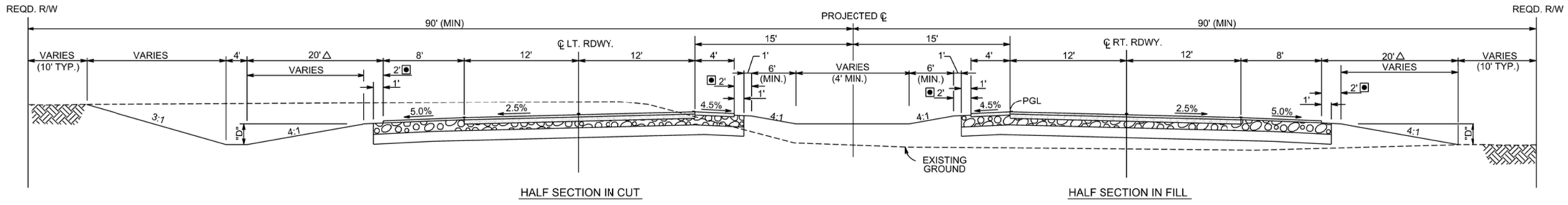


HALF SECTION IN CUT

HALF SECTION IN FILL

◑ TO BE USED WHEN "D" EXCEEDS 4'.
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
▣ MAINTAIN ROADWAY SHOULDER SLOPE
✳ 2 - FOOT MINIMUM PAVED SHOULDER
FULL PAVED SHOULDER SHOWN FOR CONSISTENCY WITH EXISTING AND PROPOSED ROADWAY SECTIONS

TYPICAL SECTION
RURAL ARTERIAL (RA-2)
(DESIGN SPEED = 60 MPH)
(SEE PLATES FOR SECTION LIMITS)



HALF SECTION IN CUT

HALF SECTION IN FILL

△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
▣ MAINTAIN ROADWAY SHOULDER SLOPE

TYPICAL SECTION
SUBURBAN ARTERIAL (SA-1)
(DESIGN SPEED = 50 MPH)
(SEE PLATES FOR SECTION LIMITS)

PRELIMINARY
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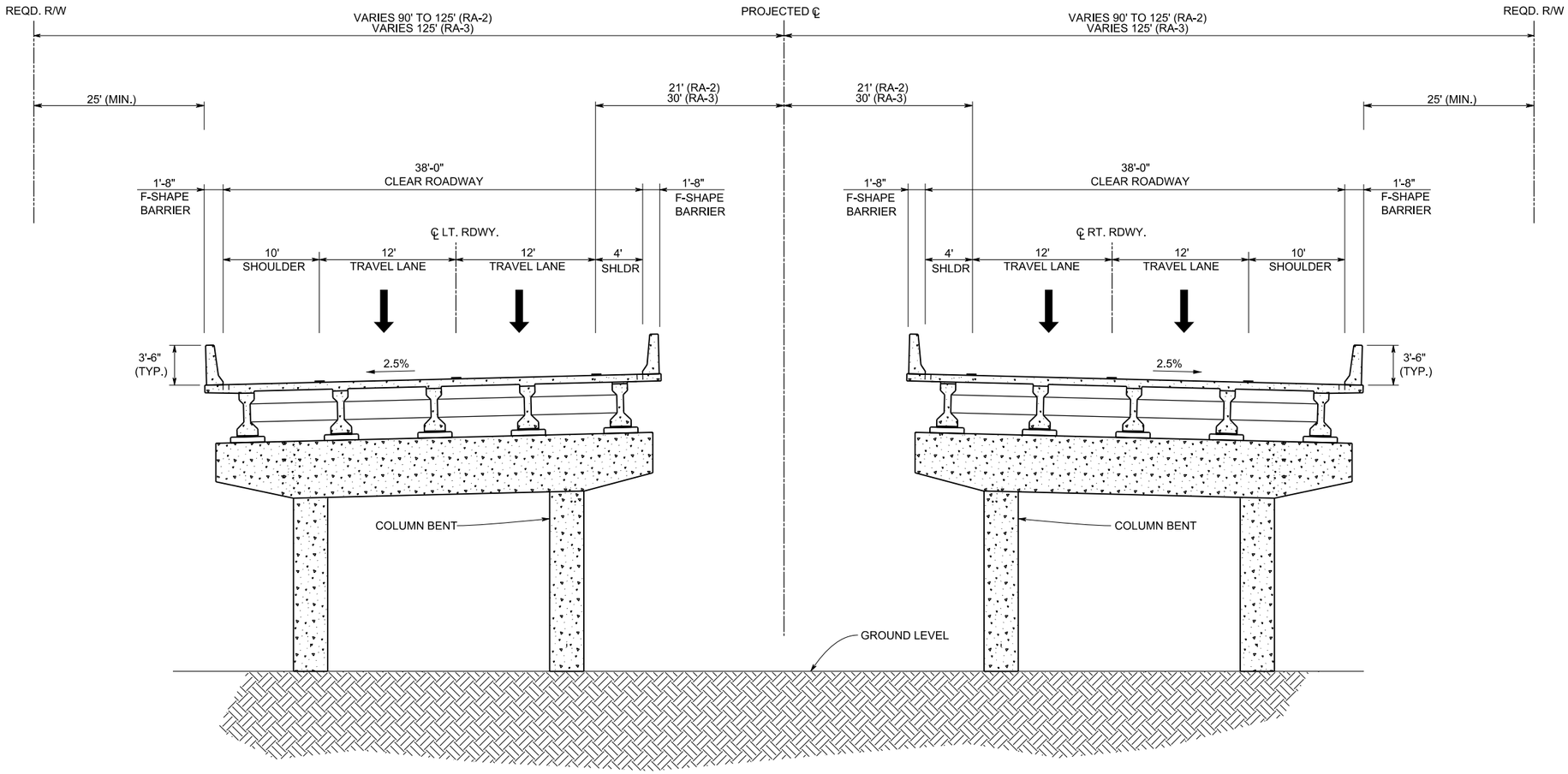
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

NOTE: PAVEMENT SECTION TO BE DETERMINED DURING DESIGN PHASE.

TYPICAL ROADWAY SECTIONS

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO



TYPICAL BRIDGE SECTION

RURAL ARTERIAL (RA-2)
(DESIGN SPEED = 60 MPH)
RURAL ARTERIAL (RA-3)
(DESIGN SPEED = 70 MPH)

PRELIMINARY

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ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

TYPICAL BRIDGE SECTION

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO

INTERCHANGE PLAN

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO

PLATE - 1

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO

SCALE: 1"=1,000'

I-12 / LA 1088 INTERCHANGE IMPROVEMENTS NOT SHOWN (UNDER CONSTRUCTION)

MATCHLINE (SEE INTERCHANGE PLAN)

WFS-NLG PIPELINE CO.

EXISTING GULF SOUTH PIPELINE CO. (10")

KOCH GATEWAY PIPELINE CO. (10")

REQ'D RIGHT OF WAY

STA 23+09.00 BEGIN LIMITED ACCESS

STA. 20+00.00 REQ'D CULVERT CROSSING

P.C. 23+09

R = 2100'

STA. 37+50.00.00

REQ'D RIGHT OF WAY & LIMITED ACCESS

SEE INSET "A"

SEE INSET "B"

KOCH GATEWAY PIPELINE CO. (30")

GULF SOUTH PIPELINE CO. (30")

EXISTING GULF SOUTH PIPELINE CO. (30")

STA. 34+58.00 REQ'D CULVERT CROSSING

P.I. 47+62

P.T. 59+33

STA. 60+67.00 REQ'D CULVERT CROSSING

STA. 69+23.00 BEGIN CONTROL OF ACCESS

LIMITS OF CONSTRUCTION

REQ'D RIGHT OF WAY & CONTROL OF ACCESS

P.C. 84+94

ABITA CREEK

STA. 86+75.00 BEGIN RECOD BRIDGE

STA. 91+26.00 END RECOD BRIDGE

P.I. 100+25

P.T. 114+24

R = 4100'

STA. 112+88.00 REQ'D CULVERT CROSSING

STA. 120+32.00 REQ'D CULVERT CROSSING

STA. 126+60.00 REQ'D CULVERT CROSSING

MATCHLINE STA. 130+00

REQ'D R/W & LIMITED ACCESS

SIGHT TRIANGLES

STA. 37+50.00.00

REQ'D R/W

LIMITS OF CONSTRUCTION

INSET "A"
SCALE: 1" = 400'

EXIST. R/W

REQ'D R/W

EXIST. R/W

LA HWY. 1088

INSET "B"
SCALE: 1" = 400'

MEDIAN OPENING

LEGEND

- 20 — BASE FLOOD ELEVATION (BFE)
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- FLOOD ZONE A
- FLOOD ZONE AE
- MITIGATION BANK

DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.

0.5% MINIMUM VERTICAL SLOPE FOR ROAD DRAINAGE THROUGH 0% SUPERELEVATION TRANSITION.

PROPOSED ROADWAY CLASSIFICATION (SA-1)

STA. 23+09.00

TRANSITION ZONE (ROADWAY CLASSIFICATION SA-1 TO RA-3)

STA. 59+33.00

PROPOSED ROADWAY CLASSIFICATION (RA-3)

LITTLE CREEK

BEGIN ALIGNMENT B/O TIE-IN @ LA HWY. 1088
P.V.I. STA. 16+70.00
ELEV. = 33.50'

P.V.I. STA.21+55.00
ELEV. = 36.00'
300' V.C.

P.V.I. STA.21+55.00
ELEV. = 34.50'
300' V.C.

P.V.I. STA.60+85.00
ELEV. = 37.50'
300' V.C.

P.V.I. STA.57+85.00
ELEV. = 36.00'
300' V.C.

P.V.I. STA.86+45.00
ELEV. = 39.00'
300' V.C.

P.V.I. STA.83+45.00
ELEV. = 37.50'
300' V.C.

P.V.I. STA.112+75.00
ELEV. = 39.00'
300' V.C.

P.V.I. STA.115+75.00
ELEV. = 37.50'
300' V.C.

S = 0.21% S = 0.50% S = 0.00% S = 0.50% S = 0.00% S = 0.50% S = 0.00% S = 0.50% S = 0.00%

EXISTING GROUND @ PGE

W.L. @ 32.21'

EXIST. WATERWAY REQ'D (2)48" CDP (OR EQUIVALENT CAPACITY) INV.= 26.18'

EXIST. WATERWAY REQ'D (3) 60" CDP (OR EQUIVALENT CAPACITY) INV.= 27.00'

EXIST. WATERWAY REQ'D (3) 54" CDP (OR EQUIVALENT CAPACITY) INV.= 29.00'

EXIST. WATERWAY REQ'D BRIDGE (450 FT)

EXIST. WATERWAY REQ'D (1) 42" CDP (OR EQUIVALENT CAPACITY) INV.= 29.0'

EXIST. WATERWAY REQ'D (1) 42" CDP (OR EQUIVALENT CAPACITY) INV.= 29.00'

EXIST. WATERWAY REQ'D (1) 54" CDP (OR EQUIVALENT CAPACITY) INV.= 29.00'

0+00 10+00 20+00 30+00 40+00 50+00 60+00 70+00 80+00 90+00 100+00 110+00 120+00 130+00

140 120 100 80 60 40 20 0 -20

PRELIMINARY

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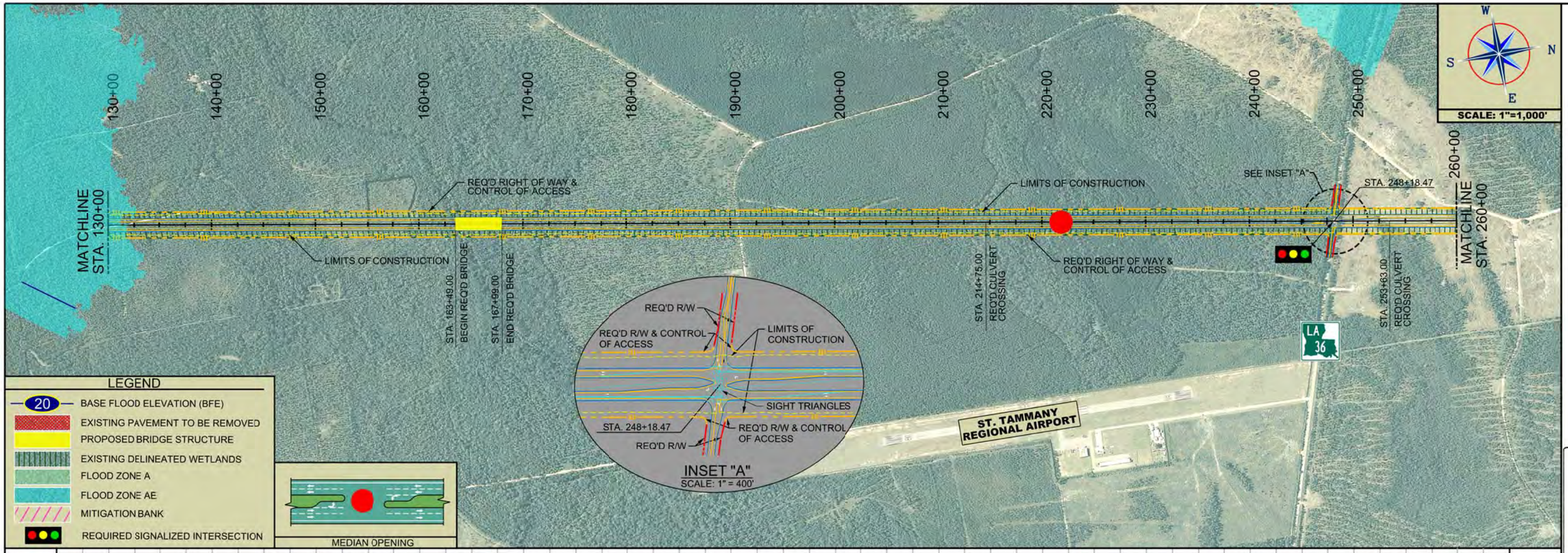
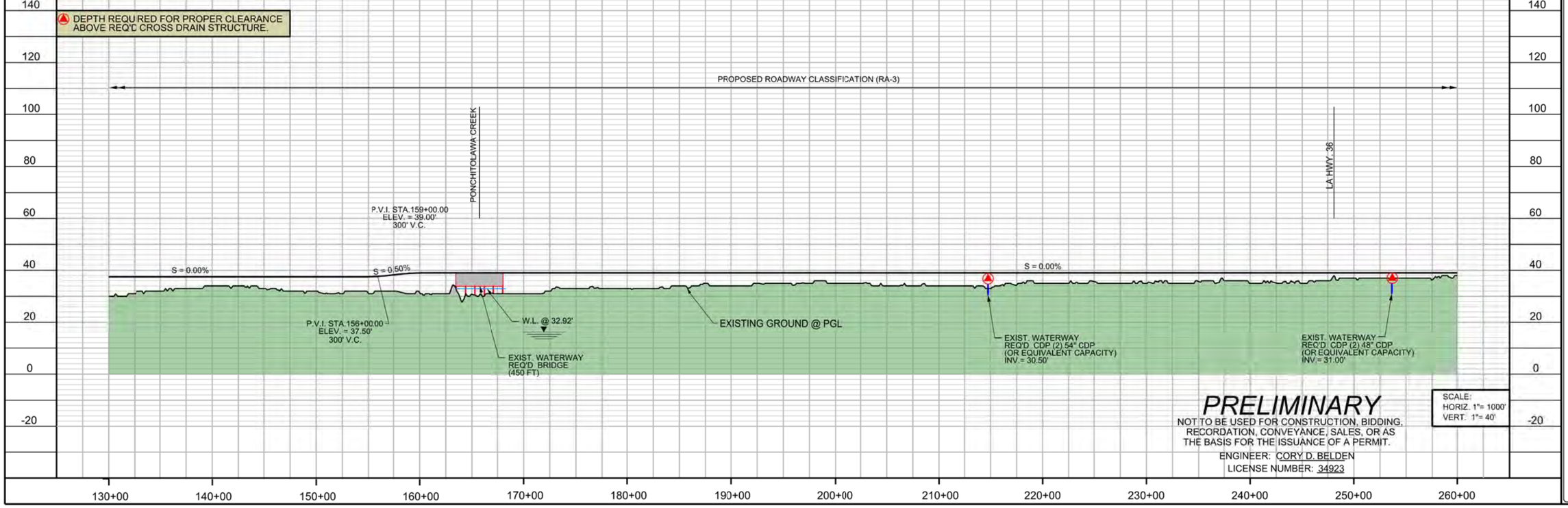
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 2





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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO

PLATE - 3

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO

W
S
N
E

SCALE: 1"=1,000'

260+00 270+00 280+00 290+00 300+00 310+00 320+00 330+00 340+00 350+00 360+00 370+00 380+00 390+00

36 37 38

MATCHLINE STA. 260+00

MATCHLINE STA. 390+00

REQ'D RIGHT OF WAY & CONTROL OF ACCESS

REQ'D RIGHT OF WAY & CONTROL OF ACCESS

LIMITS OF CONSTRUCTION

LIMITS OF CONSTRUCTION

STA. 282+66.00 REQ'D. CULVERT CROSSING

STA. 304+17.00 REQ'D. CULVERT CROSSING

STA. 334+75.00 BEGIN REQ'D. BRIDGE

STA. 336+25.00 END REQ'D. BRIDGE

STA. 345+51.00 BEGIN REQ'D. BRIDGE

STA. 348+51.00 END REQ'D. BRIDGE

STA. 367+19.00 BEGIN REQ'D. BRIDGE

STA. 372+59.00 END REQ'D. BRIDGE

STA. 380+24.00 REQ'D. CULVERT CROSSING

BURVANT ST.

SOUTHERN NATURAL GAS CO. (26")

SOUTHERN NATURAL GAS CO. (26")

SOUTHERN NATURAL GAS CO. (9")

SOUTHERN NATURAL GAS CO. (9")

SOUTHERN NATURAL GAS CO. (9")

SOUTHERN NATURAL GAS CO. (9")

LEGEND

- 20 — BASE FLOOD ELEVATION (BFE)
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- FLOOD ZONE A
- FLOOD ZONE AE
- MITIGATION BANK

MEDIAN OPENING

140 120 100 80 60 40 20 0 -20

DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D. CROSS DRAIN STRUCTURE.

PROPOSED ROADWAY CLASSIFICATION (RA-3)

ENGLISH BRANCH

ENGLISH BRANCH

ENGLISH BRANCH

P.V.I. STA.282+00.00 ELEV. = 43.00' 300' V.C.

S = 0.00%

S = 0.80%

P.V.I. STA.277+00.00 ELEV. = 39.00' 300' V.C.

EXIST. WATERWAY REQ'D. CDP (2) 54" CDP (OR EQUIVALENT CAPACITY) INV.= 34.40'

EXISTING GROUND @ PGL

EXIST. WATERWAY REQ'D. CDP (2) 54" CDP (OR EQUIVALENT CAPACITY) INV.= 34.50'

S = 0.00%

BFE = 37'

W.L. @ 37.00'

EXIST. WATERWAY REQ'D. BRIDGE (150 FT)

W.L. @ 37.00'

EXIST. WATERWAY REQ'D. BRIDGE (300 FT)

W.L. @ 37.00'

EXIST. WATERWAY REQ'D. BRIDGE (540 FT)

S = 0.50%

P.V.I. STA.385+00.00 ELEV. = 43.00' 300' V.C.

EXIST. WATERWAY REQ'D. (1) 60" CDP (OR EQUIVALENT CAPACITY) INV = 34.00'

260+00 270+00 280+00 290+00 300+00 310+00 320+00 330+00 340+00 350+00 360+00 370+00 380+00 390+00

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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

DEDICATED LEFT AND THROUGH-RIGHT LANES PROVIDED ON LA 435 ON EASTBOUND AND WESTBOUND DIRECTION

INSET "A"
SCALE: 1" = 400'
REQ'D R/W
LIMITS OF CONSTRUCTION
REQ'D R/W & CONTROL OF ACCESS
SIGHT TRIANGLES
STA. 436+12.45
REQ'D R/W & CONTROL OF ACCESS
REQ'D R/W

SCALE: 1"=1,000'

MATCHLINE STA. 390+00
MATCHLINE STA. 510+00
SEE INSET "A"
STA. 436+12.45
R = 12000'
LIMITS OF CONSTRUCTION
REQ'D RIGHT OF WAY & CONTROL OF ACCESS
BOEY JENKIN ROAD
P.T. 498+44
KEEN ROAD
SLICE ST
PINEVIEW ST
P.C. 413+16
STA. 417+16.00 REQ'D CULVERT CROSSING
STA. 421+82.00 BEGIN REQ'D BRIDGE
STA. 426+32.00 END REQ'D BRIDGE
STA. 442+09.00 REQ'D CULVERT CROSSING
LA HWY. 435
P.I. 457+69
STA. 475+71.00 REQ'D CULVERT CROSSING
390+00 400+00 410+00 420+00 430+00 440+00 450+00 460+00 470+00 480+00 490+00 500+00

MEDIAN OPENING

LEGEND
- 20 — BASE FLOOD ELEVATION (BFE)
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- FLOOD ZONE A
- FLOOD ZONE AE
- MITIGATION BANK

DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.

PROPOSED ROADWAY CLASSIFICATION (RA-3)

ABITA CREEK

P.V.I. STA.391+00.00
ELEV. = 46.00'
300' V.C.

S = 0.00%
BFE = 40'
S = 0.00%
S = 0.49%

W.L. @ 40.00'
EXIST. WATERWAY REQ'D BRIDGE (450 FT)
LA. HWY. 435
EXIST. WATERWAY REQ'D (3) 54" CDP (OR EQUIVALENT CAPACITY) INV.= 32.00'
EXIST. WATERWAY REQ'D (3) 60" CDP (OR EQUIVALENT CAPACITY) INV.= 37.00'
EXISTING GROUND @ PG
P.V.I. STA.455+00.00
ELEV. = 46.00'
500' V.C.
EXIST. WATERWAY REQ'D (4) 60" CDP (OR EQUIVALENT CAPACITY) INV.= 37.69'

140 120 100 80 60 40 20 0 -20

390+00 400+00 410+00 420+00 430+00 440+00 450+00 460+00 470+00 480+00 490+00 500+00 510+00

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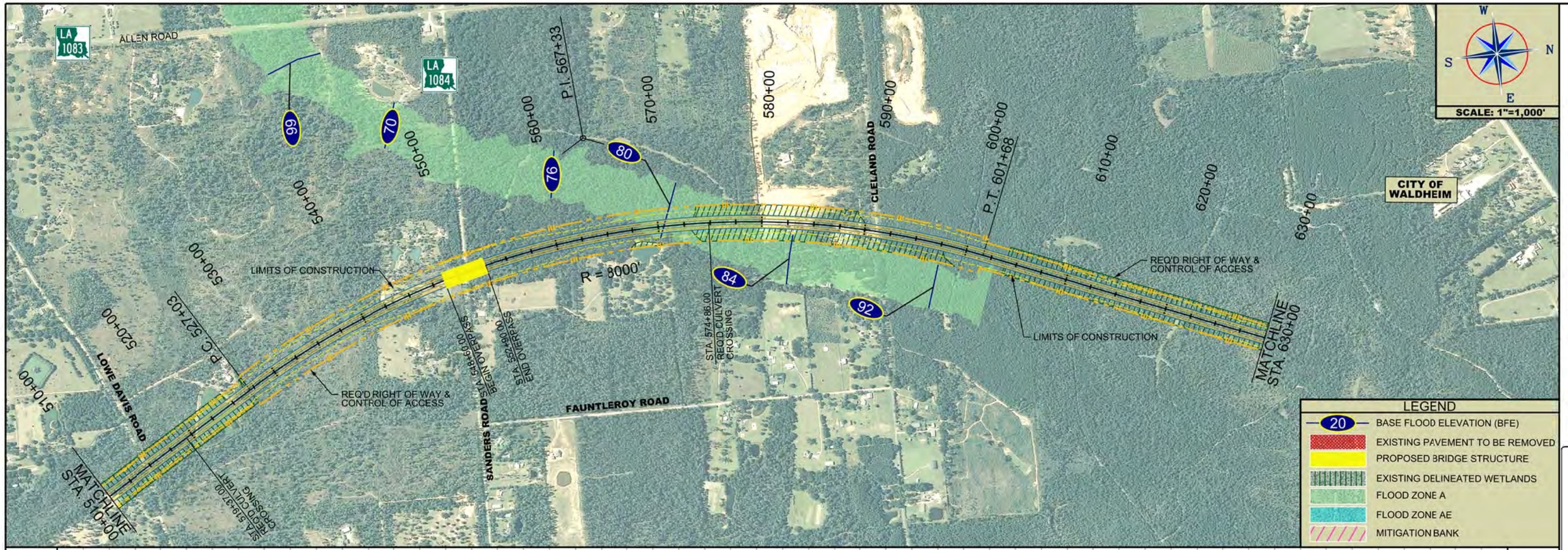
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

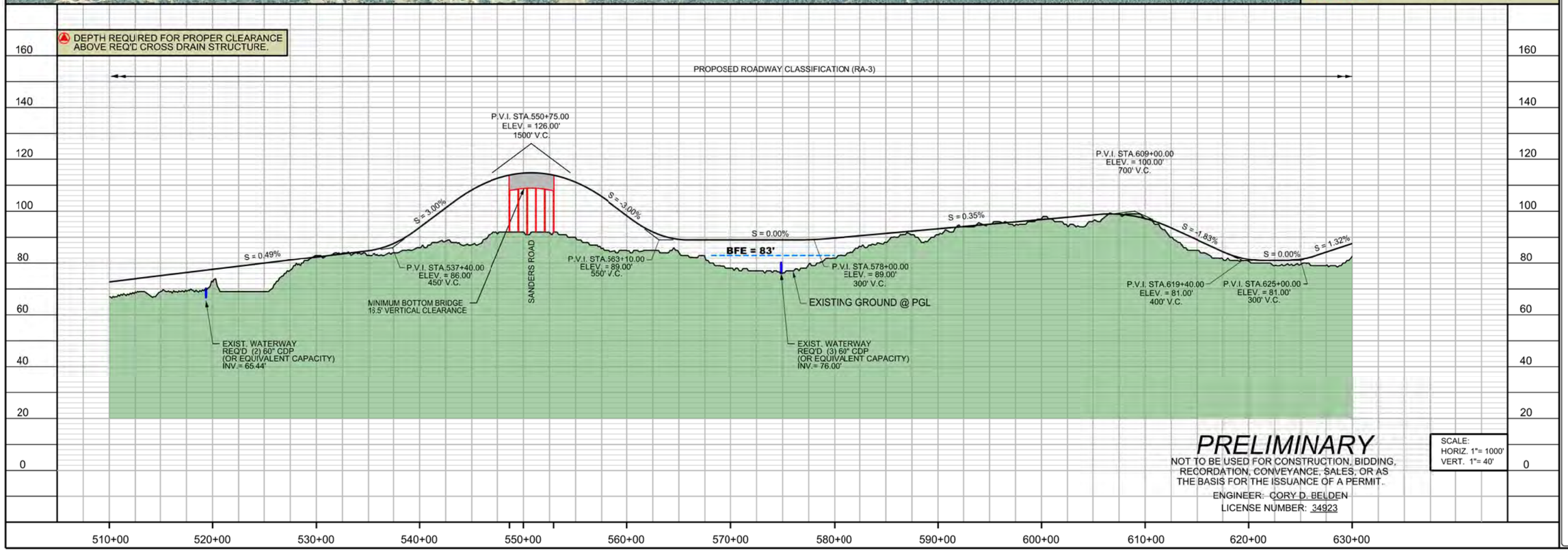
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 4

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO





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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

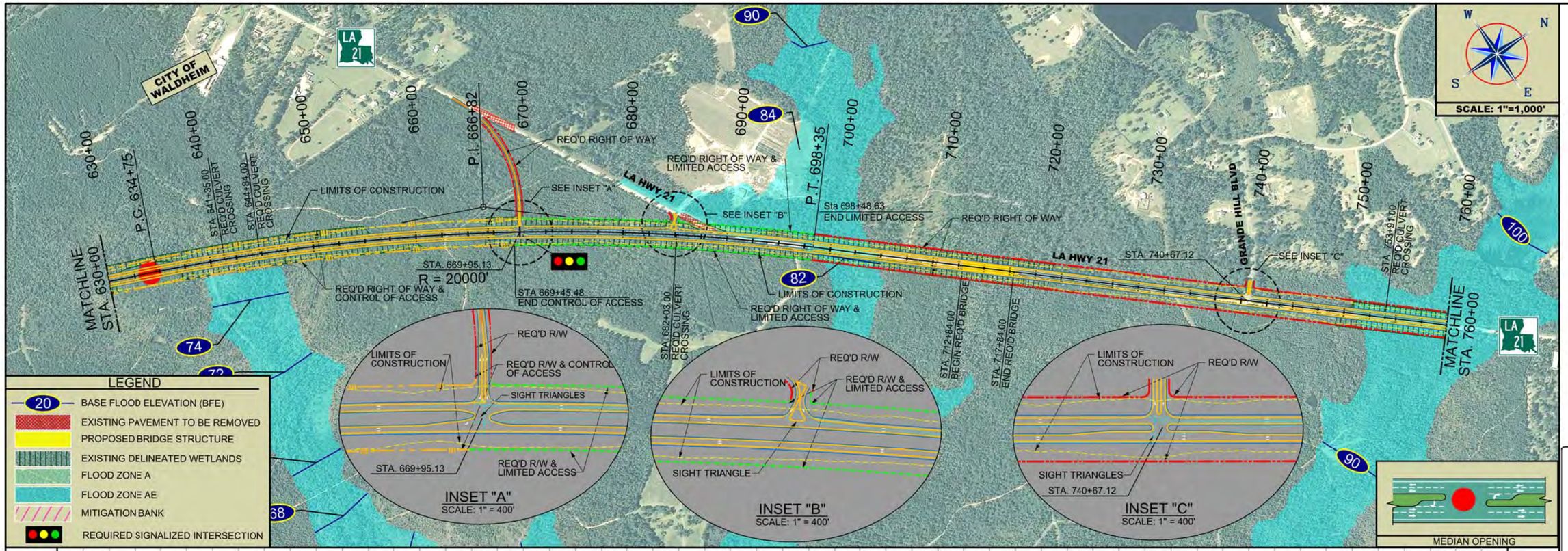
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

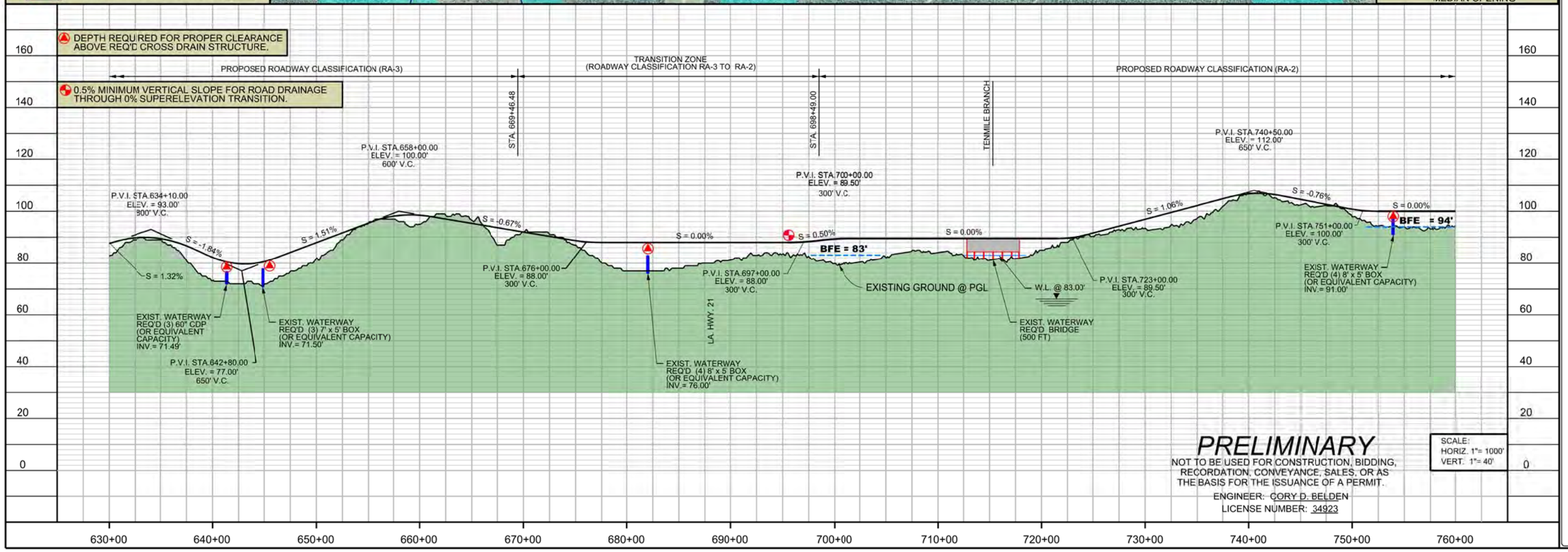
PLATE - 5

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO

PLATE - 6





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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

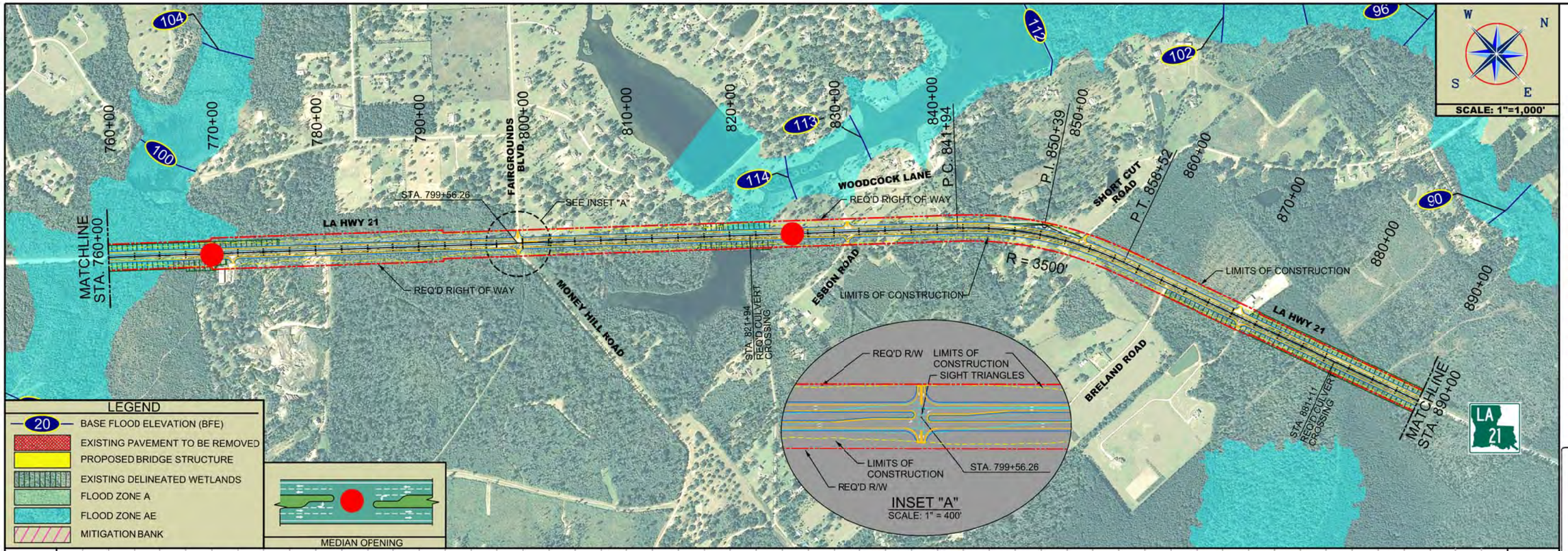
I-12 TO BUSH
ST. TAMMANY PARISH

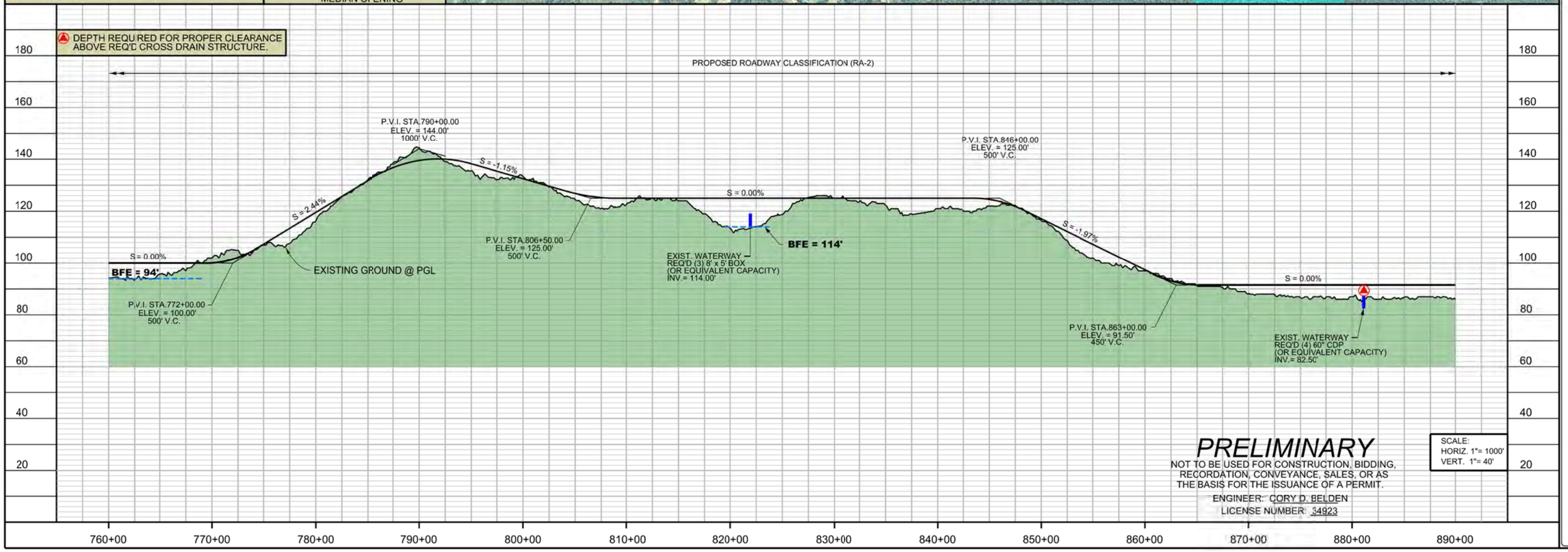
ALTERNATIVE - BO

PLATE - 7

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO





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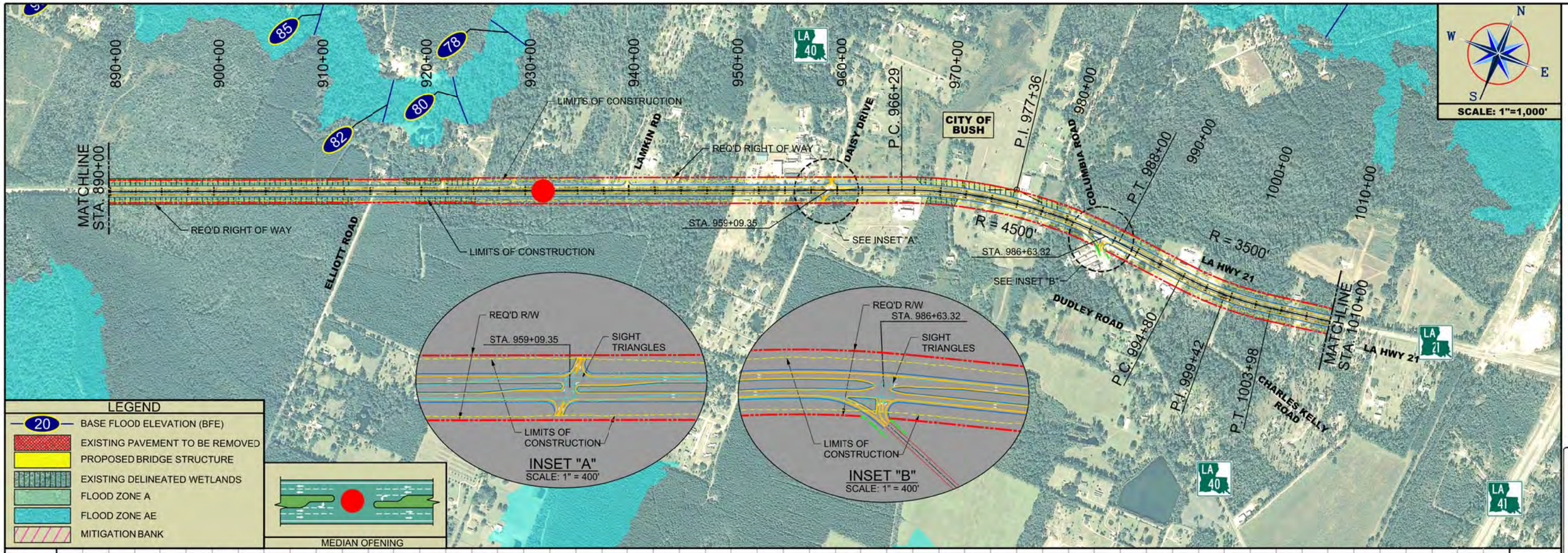
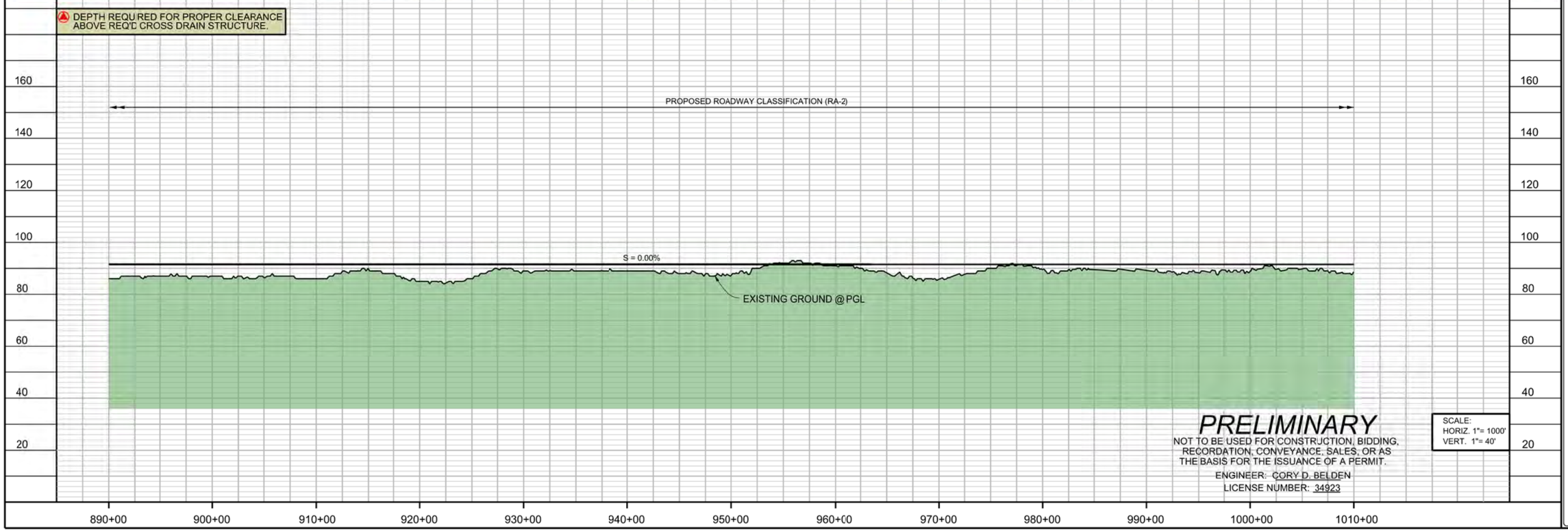
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'





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ENGINEER: CORY D. BELDEN

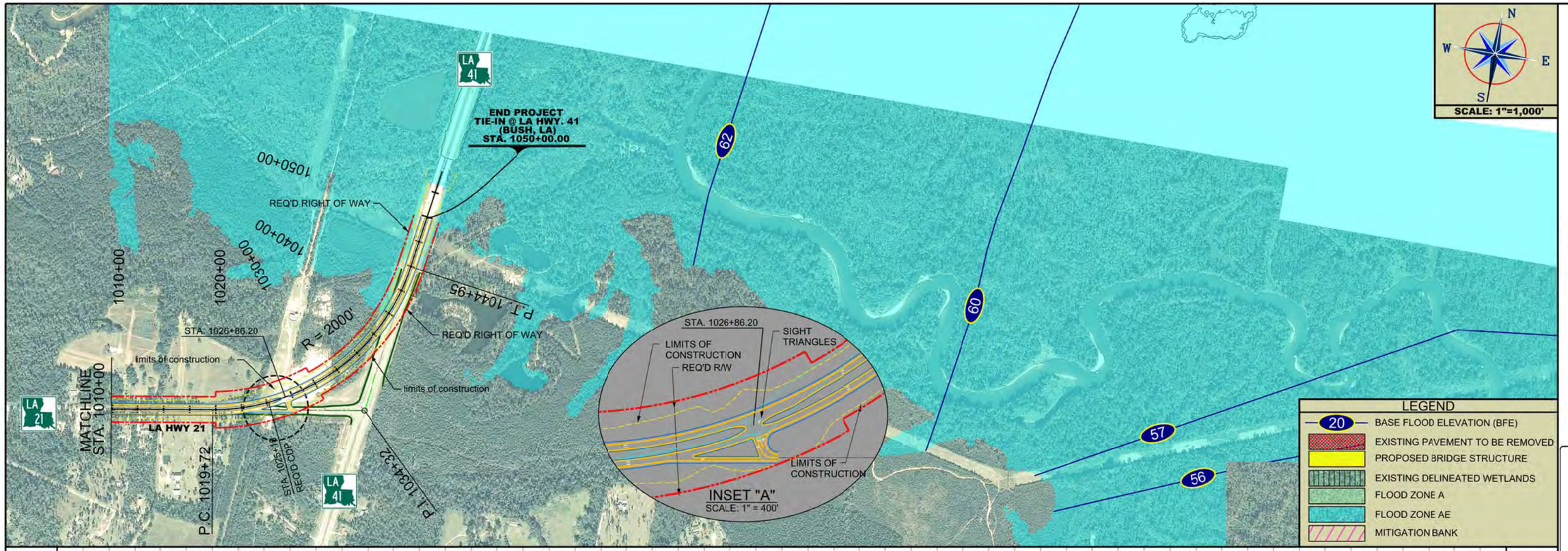
LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

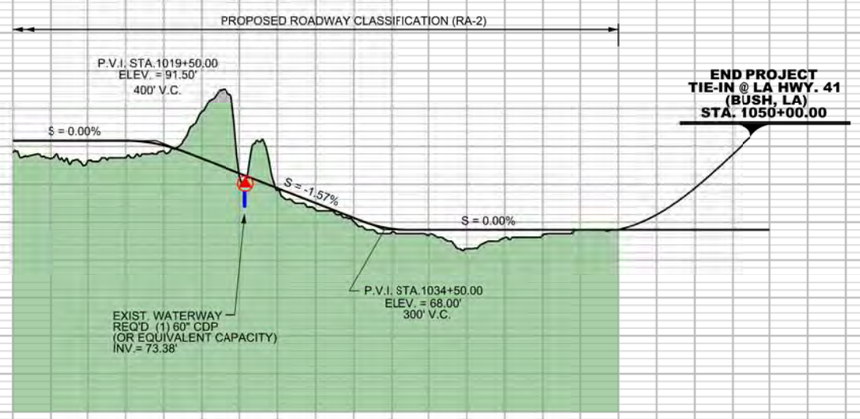
PLATE - 8

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO



DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.



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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 9

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - BO

PLATE INDEX

BEGIN PROJECT
EB RAMPS @ LA 1088

INTERCHANGE PLAN

1000+00

1050+00

1100+00

1150+00

1200+00

1250+00

1300+00

1350+00

1400+00

1450+00

1500+00

1550+00

1600+00

1650+00

1700+00

1750+00

1800+00

1850+00

1900+00

1923+0

END PROJECT
TIE-IN @ LA HWY. 41

ST. TAMMANY
REGIONAL AIRPORT

WALDHEIM, LA

ALLEN RD.

SANDERS RD.

CLELAND RD.

GINA DENNY RD.

CAMELIA ROAD

WOODLAND ROAD

BOB LEVY ROAD

RAILROAD AVENUE

JENKINS ROAD

WATTS ROAD

BUSH, LA

DOLLY-T
MITIGATION BANK

MOSSY HILL
MITIGATION BANK

PLATE 1

PLATE 2

PLATE 3

PLATE 4

PLATE 5

PLATE 6

PLATE 7

PLATE 8

LA 1088

INTERSTATE 12

LA 36

LA 435

LA 21

LA 40

LA 41

LA 41

W
S
N
E

SCALE: 1"=6,000'

GENERAL DESIGN NOTES:

EXISTING GROUND BASED UPON 2004 LIDAR DATA OBTAINED FROM ATLAS: LOUISIANA'S STATEWIDE GIS WEB SITE.

GENERAL DESIGN CRITERIA:

1) ROADWAY DESIGN CLASSIFICATION: (SA-1)
DESIGN SPEED = 50 M.P.H.
REQUIRED RATE OF CURVATURE (K)
- K(SAG) = 96
- K(CREST) = 84
MAXIMUM VERTICAL GRADE = 4%

2) ROADWAY DESIGN CLASSIFICATION: (RA-3)
DESIGN SPEED = 70 M.P.H.
REQUIRED RATE OF CURVATURE (K)
- K(SAG) = 181
- K(CREST) = 247
MAXIMUM VERTICAL GRADE = 3%

3) ROADWAY DESIGN CLASSIFICATION: (RA-2)
DESIGN SPEED = 60 M.P.H.
REQUIRED RATE OF CURVATURE (K)
- K(SAG) = 136
- K(CREST) = 151
MAXIMUM VERTICAL GRADE = 3%

4) INTERSECTION SIGHT DISTANCE (ISD) CRITERIA
- CASE B1- AASHTO (PG. 654)
- MINIMUM DISTANCE REQUIRED = 1,482'
- EYE HEIGHT OF 3.5' ABOVE GROUND
- OBJECT HEIGHT = 3.5' ABOVE GROUND

5) BRIDGES ARE REQUIRED WHERE DESIGN FLOWS EXCEED 1000 C.F.S.

6) ON LONG CONTINUOUS GRADES WHICH ARE UNBROKEN BY LATERAL OUTFALLS "EQUALIZERS" SHALL BE USED AT INTERVALS OF APPROXIMATELY 1,000 TO 1,500 FEET. EQUALIZERS SHALL BE 24-INCH DIAMETER PIPE, OR ROUND EQUIVALENT PIPE ARCH (LADOTD HYDRAULICS MANUAL, PG. 73).

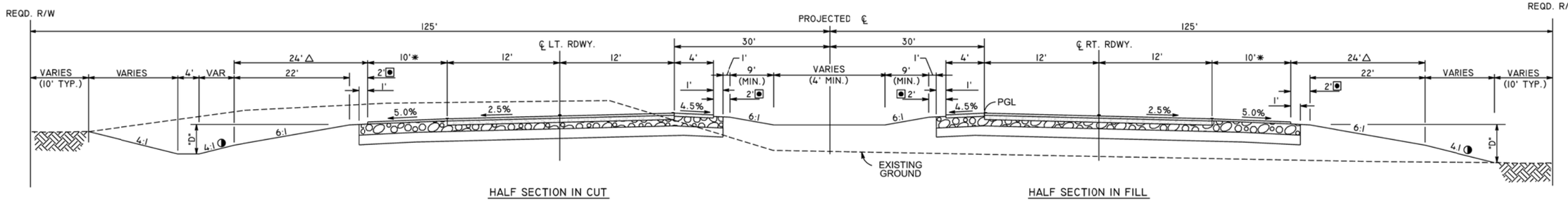
PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE P



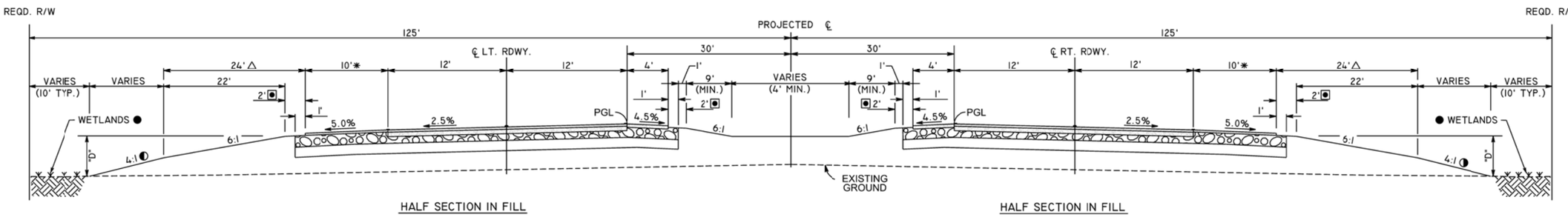
HALF SECTION IN CUT

HALF SECTION IN FILL

◑ 4:1 FORE SLOPES ALLOWED OUTSIDE OF CLEAR ZONE
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
◙ MAINTAIN ROADWAY SHOULDER SLOPE
✱ 2 - FOOT MINIMUM PAVED SHOULDER
FULL SHOULDER WIDTH TO BE PAVED FOR ADT OVER 5,000

TYPICAL SECTION (IN UPLANDS)

RURAL ARTERIAL (RA-3)
(DESIGN SPEED = 70 MPH)
(SEE PLATES FOR SECTION LIMITS)



HALF SECTION IN FILL

HALF SECTION IN FILL

◑ 4:1 FORE SLOPES ALLOWED OUTSIDE OF CLEAR ZONE
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
◙ MAINTAIN ROADWAY SHOULDER SLOPE
✱ 2 - FOOT MINIMUM PAVED SHOULDER
FULL SHOULDER WIDTH TO BE PAVED FOR ADT OVER 5,000
● ROADSIDE DITCHES SHALL NOT BE CONSTRUCTED IN WETLAND AREAS

TYPICAL SECTION (IN WETLANDS)

RURAL ARTERIAL (RA-3)
(DESIGN SPEED = 70 MPH)
(SEE PLATES FOR SECTION LIMITS)

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

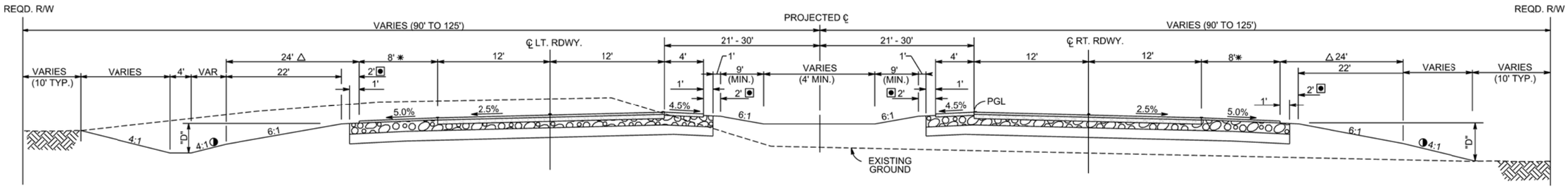
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

NOTE: PAVEMENT SECTION TO BE DETERMINED DURING DESIGN PHASE.

TYPICAL ROADWAY SECTIONS

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - P

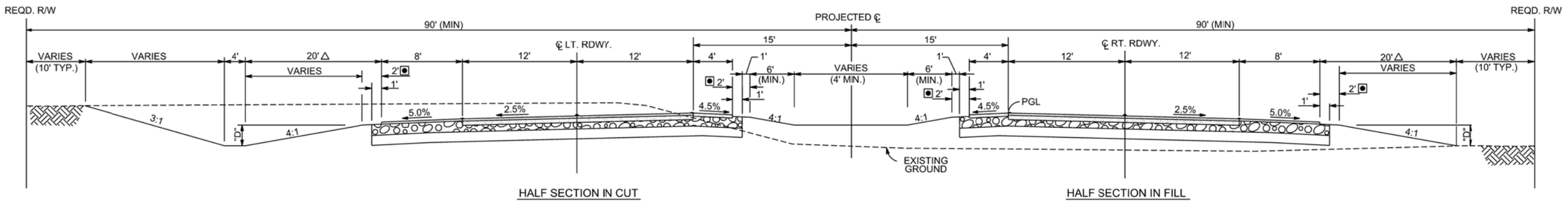


HALF SECTION IN CUT

HALF SECTION IN FILL

◑ TO BE USED WHEN "D" EXCEEDS 4'.
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
▣ MAINTAIN ROADWAY SHOULDER SLOPE
✱ 2 - FOOT MINIMUM PAVED SHOULDER
FULL PAVED SHOULDER SHOWN FOR CONSISTENCY WITH EXISTING AND PROPOSED ROADWAY SECTIONS

TYPICAL SECTION
RURAL ARTERIAL (RA-2)
(DESIGN SPEED = 60 MPH)
(SEE PLATES FOR SECTION LIMITS)



HALF SECTION IN CUT

HALF SECTION IN FILL

△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
▣ MAINTAIN ROADWAY SHOULDER SLOPE

TYPICAL SECTION
SUBURBAN ARTERIAL (SA-1)
(DESIGN SPEED = 50 MPH)
(SEE PLATES FOR SECTION LIMITS)

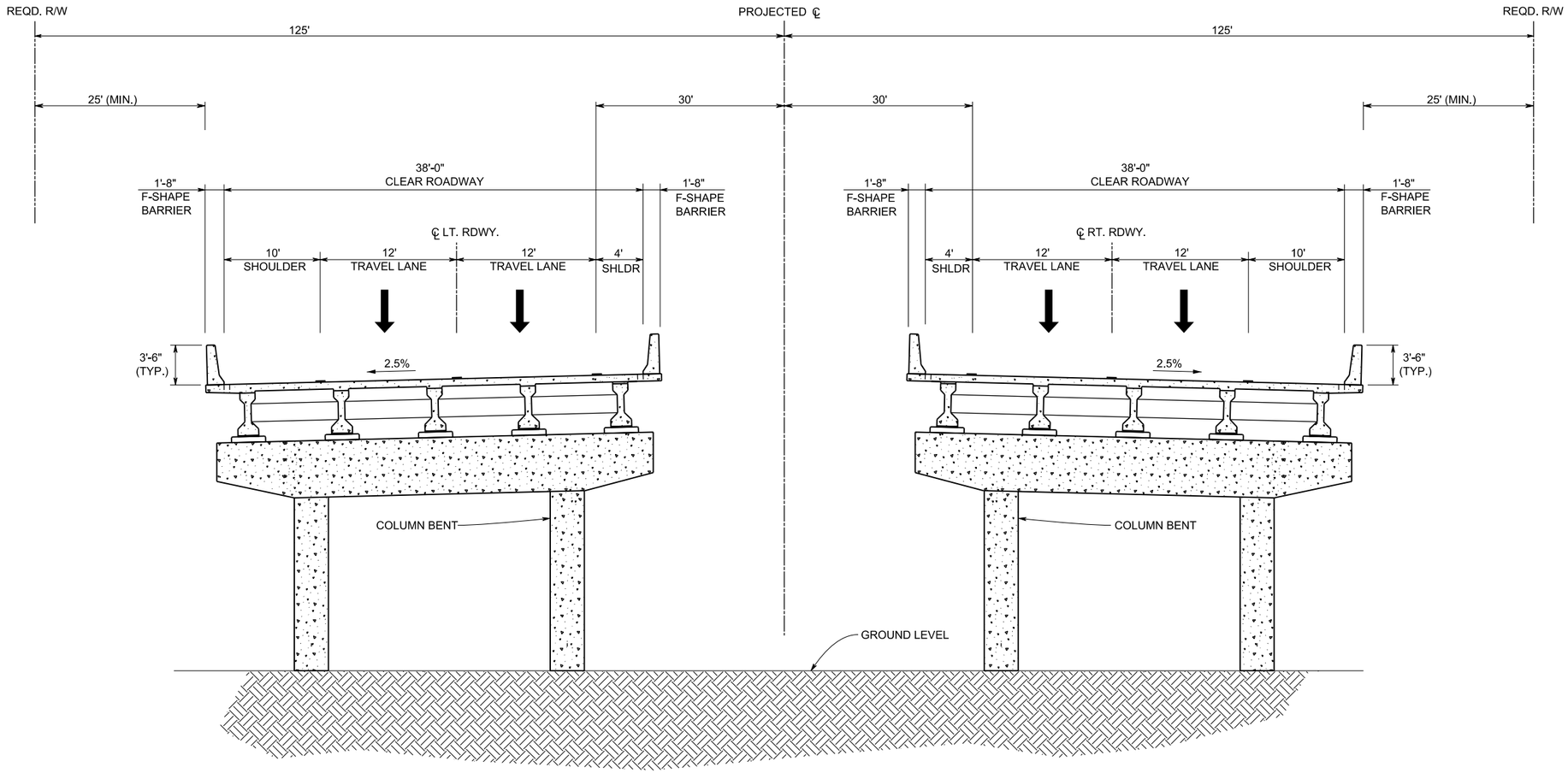
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

NOTE: PAVEMENT SECTION TO BE DETERMINED DURING DESIGN PHASE.

TYPICAL ROADWAY SECTIONS

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - P



TYPICAL BRIDGE SECTION

RURAL ARTERIAL (RA-3)

(DESIGN SPEED = 70 MPH)

PRELIMINARY

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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

TYPICAL BRIDGE SECTION

I-12 TO BUSH

ST. TAMMANY PARISH

ALTERNATIVE - P

INTERCHANGE PLAN

I-12 AND LA 1088 INTERCHANGE IMPROVEMENTS

INTERCHANGE IMPROVEMENTS CURRENTLY UNDER CONSTRUCTION UNDER DOTD CONTRACT 454-04-0038 TO CONSTRUCT A NEW BRIDGE OVER I-12 AND ASSOCIATED RAMP IMPROVEMENTS. PROJECT DOES NOT INCLUDE SIGNALIZATION AT THE EB AND WB RAMP TERMINI.

LEGEND

- CONSTRUCTION BY OTHERS
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- REQUIRED SIGNALIZED INTERSECTION

N W E S

SCALE: 1"=300'

MATCHLINE (SEE PLATE 1)

LA 1088

REQUIRED SIGNALIZED INTERSECTION

REQUIRED SIGNALIZED INTERSECTION

EXISTING BRIDGE

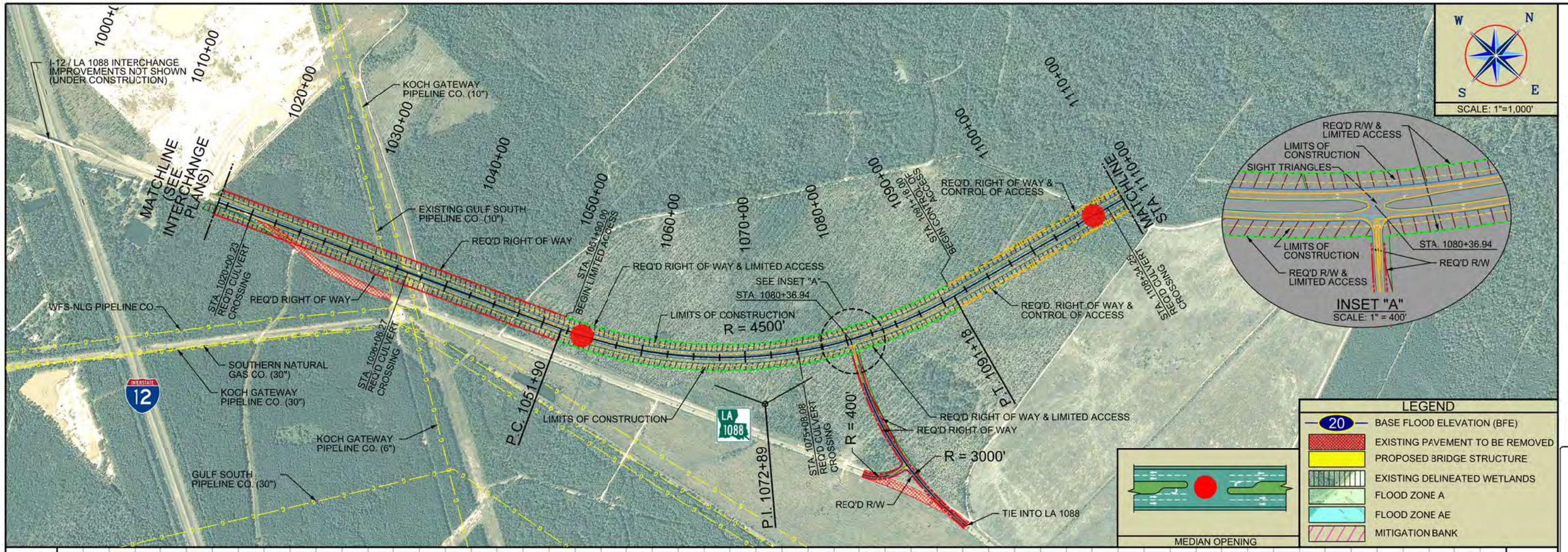
CONSTRUCTION BY OTHERS

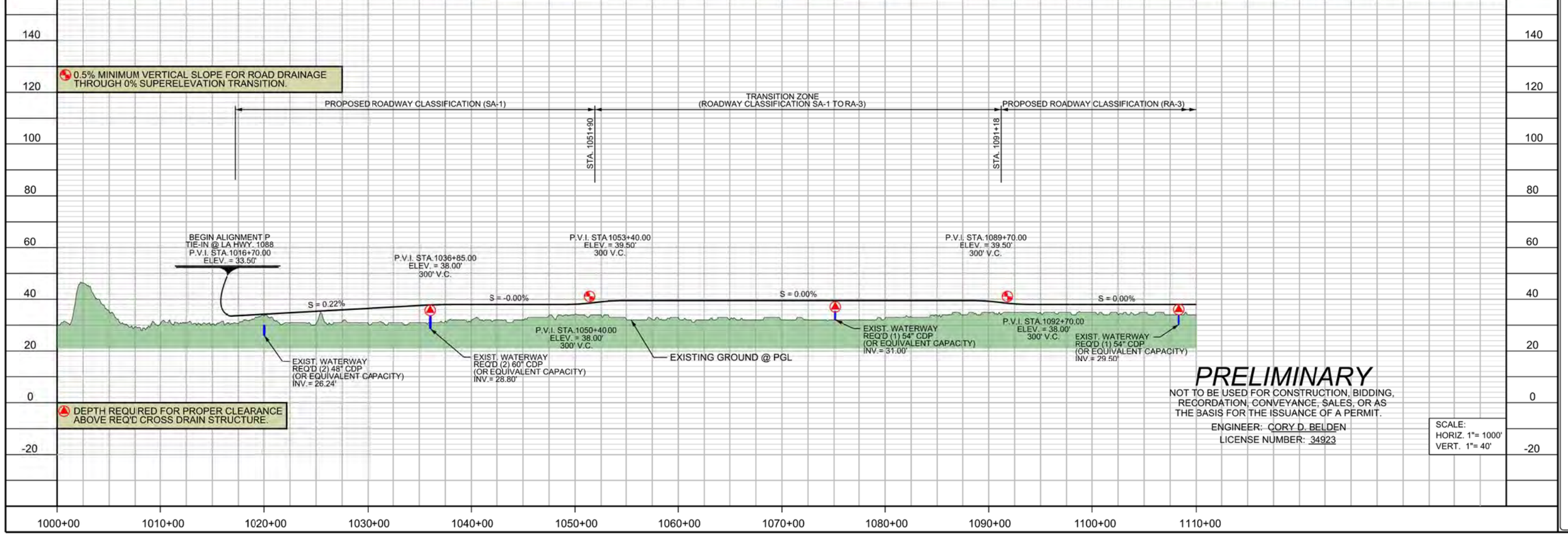
INTERSTATE 12

BEGIN PROJECT
EB RAMPS @ LA HWY. 1088

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - P





PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 1

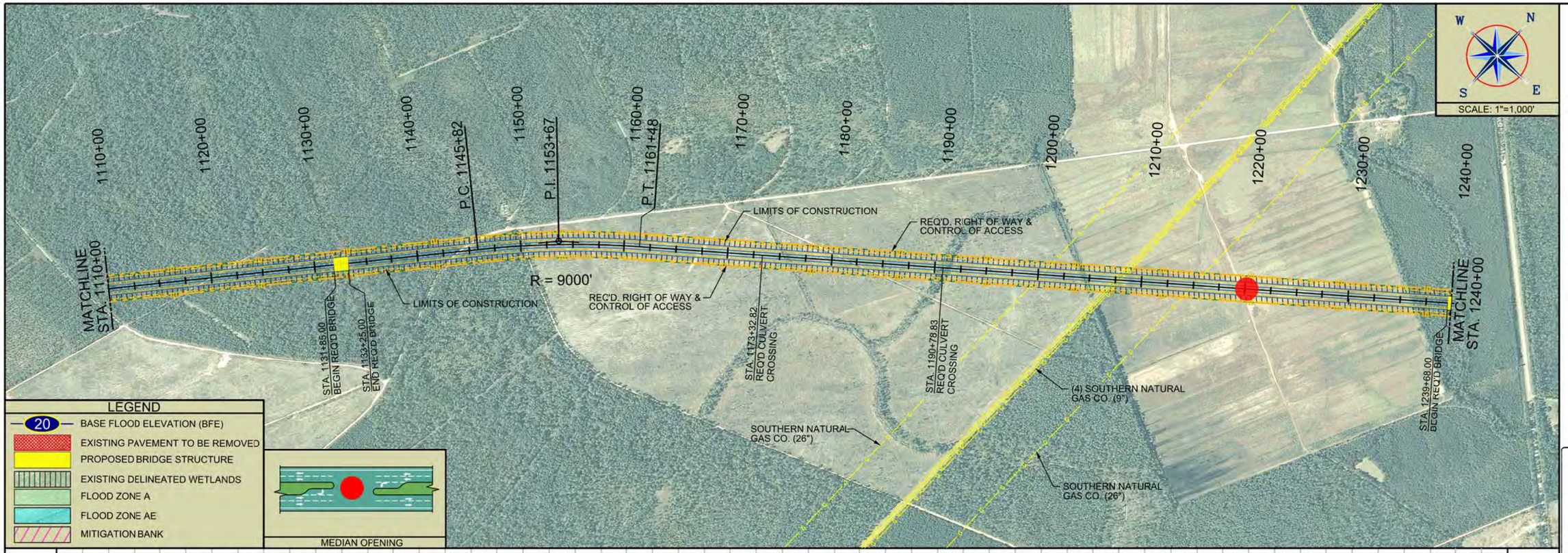
I-12 TO BUSH
ST. TAMMANY PARISH

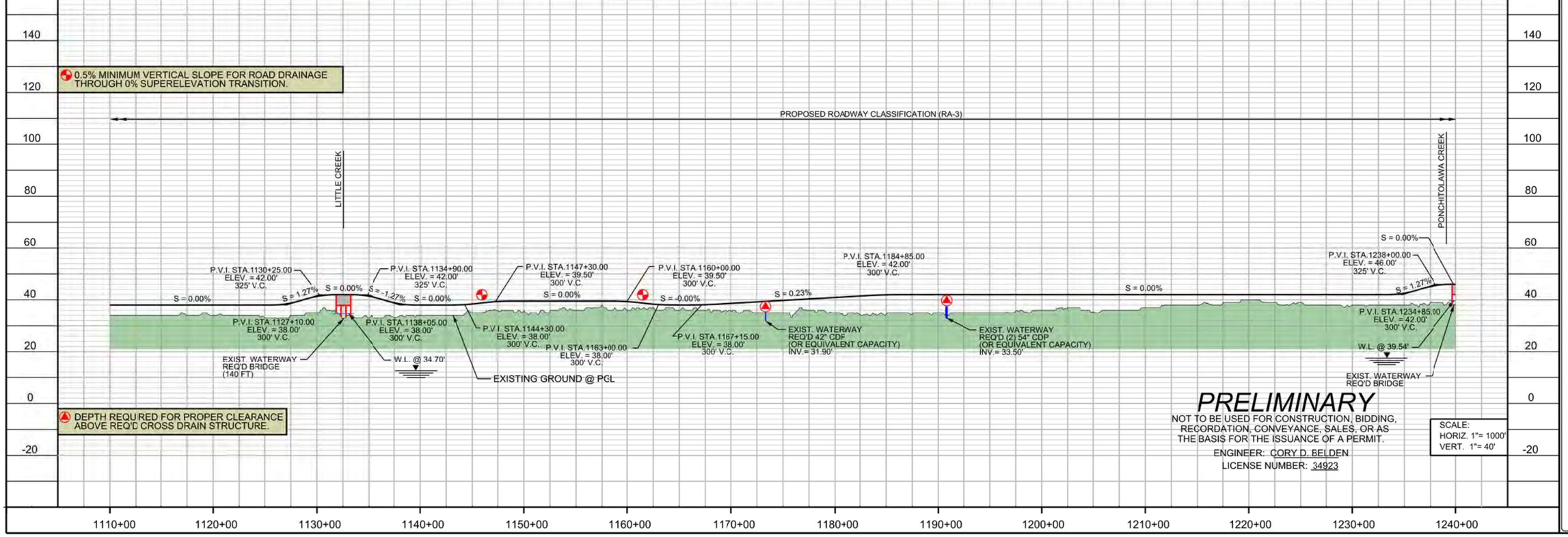
ALTERNATIVE - P

PLATE - 2

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - P





PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 3

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - P

LEGEND

- 20 — BASE FLOOD ELEVATION (BFE)
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- FLOOD ZONE A
- FLOOD ZONE AE
- MITIGATION BANK
- REQUIRED SIGNALIZED INTERSECTION

MEDIAN OPENING

W N S E

SCALE: 1"=1,000'

1240+00 1250+00 1260+00 1270+00 1280+00 1290+00 1300+00 1310+00 1320+00 1330+00 1340+00 1350+00 1360+00 1370+00

SEE INSET "A"

MATCHLINE STA. 1240+00

STA. 1246+57.89

REQ'D. RIGHT OF WAY & CONTROL OF ACCESS

LIMITS OF CONSTRUCTION

LIMITS OF CONSTRUCTION

REQ'D. RIGHT OF WAY & CONTROL OF ACCESS

MATCHLINE STA. 1370+00

STA. 1240+68.00 END REQ'D BRIDGE

LA 36

STA. 1263+11.90 REQ'D CULVERT CROSSING

STA. 1299+09.76 REQ'D CULVERT CROSSING

STA. 1332+34.91 REQ'D CULVERT CROSSING

STA. 1344+01.72 REQ'D CULVERT CROSSING

STA. 1359+51.37 REQ'D CULVERT CROSSING

P.C. 1361+81

44

140 120 100 80 60 40 20 0 -20

0.5% MINIMUM VERTICAL SLOPE FOR ROAD DRAINAGE THROUGH 0% SUPERELEVATION TRANSITION.

PROPOSED ROADWAY CLASSIFICATION (RA-3)

LA. HWY. 36

S = 0.00%

S = 0.50%

P.V.I. STA.1297+00.00
ELEV. = 48.00'
300' V.C.

S = 0.00%

B.F.E. = 44'

P.V.I. STA.1363+30.00
ELEV. = 50.50'
300' V.C.

S = 0.29%

EXISTING GROUND @ PGL

W.L. @ 39.54'

EXIST. WATERWAY
REQ'D BRIDGE

EXIST. WATERWAY
REQ'D (1) 54" CDP
(OR EQUIVALENT CAPACITY)
INV.= 37.50'

P.V.I. STA.1293+00.00
ELEV. = 46.00'
300' V.C.

EXIST. WATERWAY
REQ'D (2) 48" CDP
(OR EQUIVALENT CAPACITY)
INV.= 40.00'

EXIST. WATERWAY
REQ'D (1) 54" CDP
(OR EQUIVALENT CAPACITY)
INV.= 39.50'

EXIST. WATERWAY
REQ'D (3) 5'x5' BOX CULVERTS
(OR EQUIVALENT CAPACITY)
INV.= 39.00'

EXIST. WATERWAY
REQ'D (1) 48" CDP
(OR EQUIVALENT CAPACITY)
INV.= 40.00'

P.V.I. STA.1360+30.00
ELEV. = 48.00'
300' V.C.

DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.

1240+00 1250+00 1260+00 1270+00 1280+00 1290+00 1300+00 1310+00 1320+00 1330+00 1340+00 1350+00 1360+00 1370+00

REQ'D R/W & LIMITED ACCESS
LIMITS OF CONSTRUCTION
REQ'D R/W & CONTROL OF ACCESS
SIGHT TRIANGLES
STA. 1246+57.89
REQ'D R/W & CONTROL OF ACCESS
LIMITS OF CONSTRUCTION
REQ'D R/W & LIMITED ACCESS

INSET "A"
SCALE: 1" = 300'

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

LEGEND

- EMERGENCY MEDIAN OPENING
- 20 — BASE FLOOD ELEVATION (BFE)
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- FLOOD ZONE A
- FLOOD ZONE AE
- MITIGATION BANK

W N S E

SCALE: 1"=1,000'

MATCHLINE STA. 1370+00

P.I. 1382+33

STA. 1384+20.00 BEGIN REQ'D BRIDGE

STA. 1385+60.00 END REQ'D BRIDGE

R = 9000'

P.T. 1402+17

P.C. 1415+74

STA. 1411+00.00 BEGIN REQ'D BRIDGE

STA. 1417+00.00 END REQ'D BRIDGE

LIMITS OF CONSTRUCTION

R = 5000'

REQ'D. RIGHT OF WAY & CONTROL OF ACCESS

STA. 1444+15.00 BEGIN REQ'D BRIDGE

STA. 1447+55.00 END REQ'D BRIDGE

P.I. 1441+

P.T. 1463+91

P.C. 1475+99

STA. 1477+13.00 BEGIN REQ'D OVERPASS

STA. 1481+37.00 END REQ'D OVERPASS

PEG KELLER ROAD

P.I. 1493+13

STA. 1499+60.00 BEGIN REQ'D BRIDGE

R = 9000'

MATCHLINE STA. 1500+00

1370+00 1380+00 1390+00 1400+00 1410+00 1420+00 1430+00 1440+00 1450+00 1460+00 1470+00 1480+00 1490+00 1500+00

46 49 50 51 52 53 54 57 58

PROPOSED ROADWAY CLASSIFICATION (RA-3)

0.5% MINIMUM VERTICAL SLOPE FOR ROAD DRAINAGE THROUGH 0% SUPERELEVATION TRANSITION.

DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.

ENGLISH BRANCH

ENGLISH BRANCH (FEMA TRIB 7)

ENGLISH BRANCH

P.V.I. STA.1382+50.00 ELEV. = 56.00' 300' V.C.

P.V.I. STA.1387+25.00 ELEV. = 56.00' 325' V.C.

P.V.I. STA.1391+10.00 ELEV. = 53.50' 300' V.C.

P.V.I. STA.1400+65.00 ELEV. = 53.50' 300' V.C.

P.V.I. STA.1405+65.00 ELEV. = 56.00' 300' V.C.

P.V.I. STA.1414+20.00 ELEV. = 56.00' 300' V.C.

P.V.I. STA.1417+25.00 ELEV. = 53.50' 300' V.C.

P.V.I. STA.1439+30.00 ELEV. = 53.50' 300' V.C.

P.V.I. STA.1442+60.00 ELEV. = 56.00' 300' V.C.

P.V.I. STA.1449+05.00 ELEV. = 56.00' 300' V.C.

P.V.I. STA.1452+30.00 ELEV. = 54.00' 300' V.C.

P.V.I. STA.1463+90.00 ELEV. = 54.00' 350' V.C.

P.V.I. STA.1480+25.00 ELEV. = 84.00' 1125' V.C.

P.V.I. STA.1489+37.00 ELEV. = 60.00' 500' V.C.

P.V.I. STA.1494+00.00 ELEV. = 60.00' 300' V.C.

P.V.I. STA.1497+70.00 ELEV. = 63.00' 375' V.C.

S = 0.29% S = 0.00% S = -0.65% S = -0.00% S = 0.50% S = -0.00% S = -0.82% S = 0.00% S = 0.76% S = 0.00% S = -0.62% S = 0.00% S = 1.83% S = -2.62% S = 0.00% S = 0.81% S = -0.00%

BFE = 50'

BFE = 50'

BFE = 57'

MINIMUM BOTTOM BRIDGE 16.5' VERTICAL CLEARANCE

EXIST. WATERWAY REQ'D BRIDGE (140 FT)

EXIST. WATERWAY REQ'D BRIDGE (400 FT)

EXIST. WATERWAY REQ'D BRIDGE (340 FT)

W.L. @ 50.00'

EXISTING GROUND @ PGL

PEG KELLER ROAD

120 100 80 60 40 20 0 -20

PRELIMINARY

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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

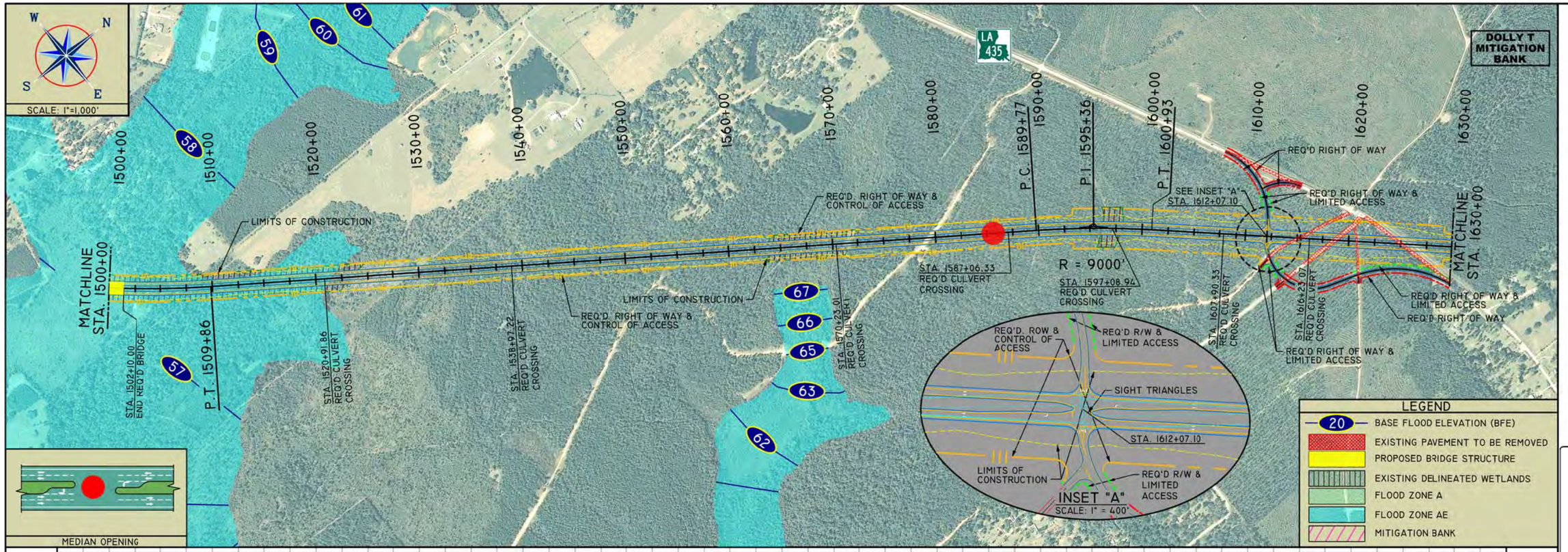
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

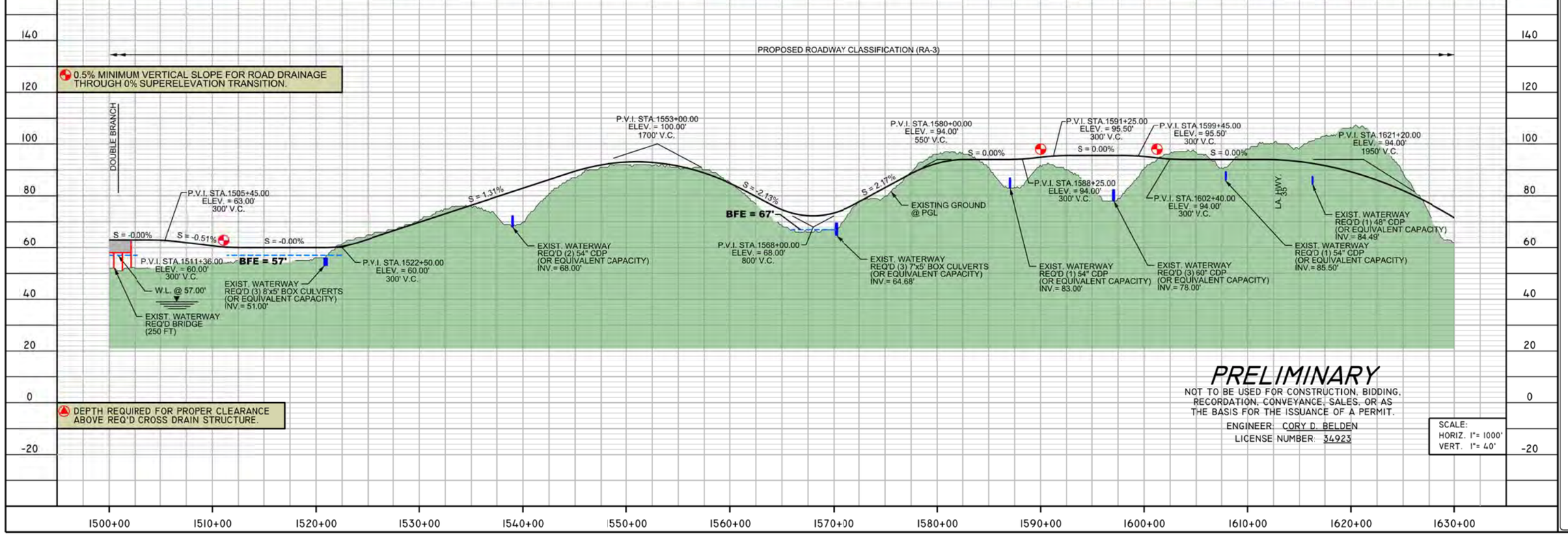
PLATE - 4

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - P

PLATE - 5





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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - P

PLATE - 6

DOLLY T MITIGATION BANK

LA 435

MATCHLINE STA. 1630+00

MATCHLINE STA. 1750+00

1630+00 1640+00 1650+00 1660+00 1670+00 1680+00 1690+00 1700+00 1710+00 1720+00 1730+00 1740+00 1750+00

62 61 60 59 58 63

STA. 1638+16.31 REQ'D CULVERT CROSSING

STA. 1648+51.00 BEGIN REQ'D BRIDGE

STA. 1652+70.00 END REQ'D BRIDGE

STA. 1667+84.00 BEGIN REQ'D OVERPASS

STA. 1672+84.00 END REQ'D OVERPASS

P.C. 1678+48

STA. 1682+22.47 REQ'D CULVERT CROSSING

P.I. 1702+11.8

STA. 1701+32.97 REQ'D CULVERT CROSSING

P.T. 1721+17

STA. 1725+61.00 REQ'D CULVERT CROSSING

R = 4000'

REQ'D. RIGHT OF WAY & CONTROL OF ACCESS

LIMITS OF CONSTRUCTION

REQ'D. RIGHT OF WAY & CONTROL OF ACCESS

LIMITS OF CONSTRUCTION

W N S E

SCALE: 1"=1,000'

MEDIAN OPENING

LEGEND

- 20 — BASE FLOOD ELEVATION (BFE)
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- FLOOD ZONE A
- FLOOD ZONE AE
- MITIGATION BANK

PROPOSED ROADWAY CLASSIFICATION (RA-3)

0.5% MINIMUM VERTICAL SLOPE FOR ROAD DRAINAGE THROUGH 0% SUPERELEVATION TRANSITION.

TALISHEEK CREEK

P.V.I. STA.1670+15.00
ELEV. = 97.50'
1500' V.C.

MINIMUM BOTTOM BRIDGE
16.5' VERTICAL CLEARANCE

S = -2.54%

S = 0.00%

P.V.I. STA.1633+80.00
ELEV. = 62.00'
475' V.C.

EXIST. WATERWAY
REQ'D (1) 30" CDP
(OR EQUIVALENT CAPACITY)
INV.= 55.50'

P.V.I. STA.1645+50.00
ELEV. = 65.00'
300' V.C.

P.V.I. STA.1642+50.00
ELEV. = 62.00'
300' V.C.

S = 0.00%

BFE = 59'

W.L. @ 59.00'

EXIST. WATERWAY
REQ'D 3BRIDGE
(420 FT)

S = 3.00%

P.V.I. STA.1659+30.00
ELEV. = 65.00'
550' V.C.

BOB LEVY ROAD

S = 3.00%

BFE = 62'

P.V.I. STA.1681+00.00
ELEV. = 65.00'
550' V.C.

EXIST. WATERWAY
REQ'D (3) 54" CDP
(OR EQUIVALENT CAPACITY)
INV.= 56.85'

EXISTING GROUND @ PGL

S = 0.00%

EXIST. WATERWAY
REQ'D (4) 8'x5' BOX CULVERTS
(OR EQUIVALENT CAPACITY)
INV.= 56.00'

P.V.I. STA.1719+65.00
ELEV. = 65.00'
300' V.C.

P.V.I. STA.1722+80.00
ELEV. = 69.00'
325' V.C.

S = 1.27%

EXIST. WATERWAY
REQ'D (4) 7'x5' BOX CULVERTS
(OR EQUIVALENT CAPACITY)
INV.= 60.00'

S = 0.00%

DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.

140 120 100 80 60 40 20 0 -20

1630+00 1640+00 1650+00 1660+00 1670+00 1680+00 1690+00 1700+00 1710+00 1720+00 1730+00 1740+00 1750+00

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - P

PLATE - 7

DOLLY T MITIGATION BANK

1750+00 1760+00 1770+00 1780+00 1790+00 1800+00 1810+00 1820+00 1830+00 1840+00 1850+00 1860+00 1870+00 1880+00

MATCHLINE STA. 1750+00

LIMITS OF CONSTRUCTION

REQ'D RIGHT OF WAY & CONTROL OF ACCESS

REQ'D. RIGHT OF WAY & CONTROL OF ACCESS

STA. 1780+79.20 REQ'D CULVERT CROSSING

LIMITS OF CONSTRUCTION

STA. 1820+71.23 REQ'D CULVERT CROSSING

P.C. 1832+29

P.I. 1846+23

P.T. 1859+49

R = 5000'

REQ'D RIGHT OF WAY & LIMITED ACCESS

STA. 1872+13.00 BEGIN REQ'D CHANNEL REALIGNMENT

SEE INSET "A"

MATCHLINE STA. 1880+00

STA. 1870+64.00 BEGIN REQ'D CHANNEL REALIGNMENT

STA. 1872+31.05 REQ'D CULVERT CROSSING

REQ'D DRAINAGE SERVITUDE

73 74 69 82 74 68 70 67 71 77 79 63 62 76 56

N W S E

SCALE: 1"=1,000'

INSET "A"
SCALE: 1" = 500'

CONTROL OF ACCESS

CHANNEL REALIGNMENT 2.140 ACRES

CHANNEL REALIGNMENT 2.613 ACRES

DRAINAGE SERVITUDE

MATCHLINE STA. 1880+00

LEGEND

- EMERGENCY MEDIAN OPENING
- 20 — BASE FLOOD ELEVATION (BFE)
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- FLOOD ZONE A
- FLOOD ZONE AE
- MITIGATION BANK

PROPOSED ROADWAY CLASSIFICATION (RA-3)

0.5% MINIMUM VERTICAL SLOPE FOR ROAD DRAINAGE THROUGH 0% SUPERELEVATION TRANSITION.

DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.

P.V.I. STA.1778+00.00 ELEV. = 69.00' 300' V.C.

P.V.I. STA.1786+00.00 ELEV. = 73.50' 300' V.C.

P.V.I. STA.1830+75.00 ELEV. = 73.50' 300' V.C.

P.V.I. STA.1833+75.00 ELEV. = 76.50' 300' V.C.

P.V.I. STA.1858+00.00 ELEV. = 76.50' 300' V.C.

P.V.I. STA.1861+00.00 ELEV. = 79.00' 300' V.C.

S = 0.00% S = 0.56% S = 0.00% S = 0.00% S = 0.20%

EXISTING GROUND @ PGL

EXIST. WATERWAY REQ'D (2) 60" CDP (OR EQUIVALENT CAPACITY) INV.= 61.42'

EXIST. WATERWAY REQ'D (2) 54" CDP (OR EQUIVALENT CAPACITY) INV.= 64.00'

BFE = 69' BFE = 73' BFE = 74'

EXIST. WATERWAY REQ'D (3) 54" CDP (OR EQUIVALENT CAPACITY) INV.= 69.50'

140 120 100 80 60 40 20 0 -20

1750+00 1760+00 1770+00 1780+00 1790+00 1800+00 1810+00 1820+00 1830+00 1840+00 1850+00 1860+00 1870+00 1880+00

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

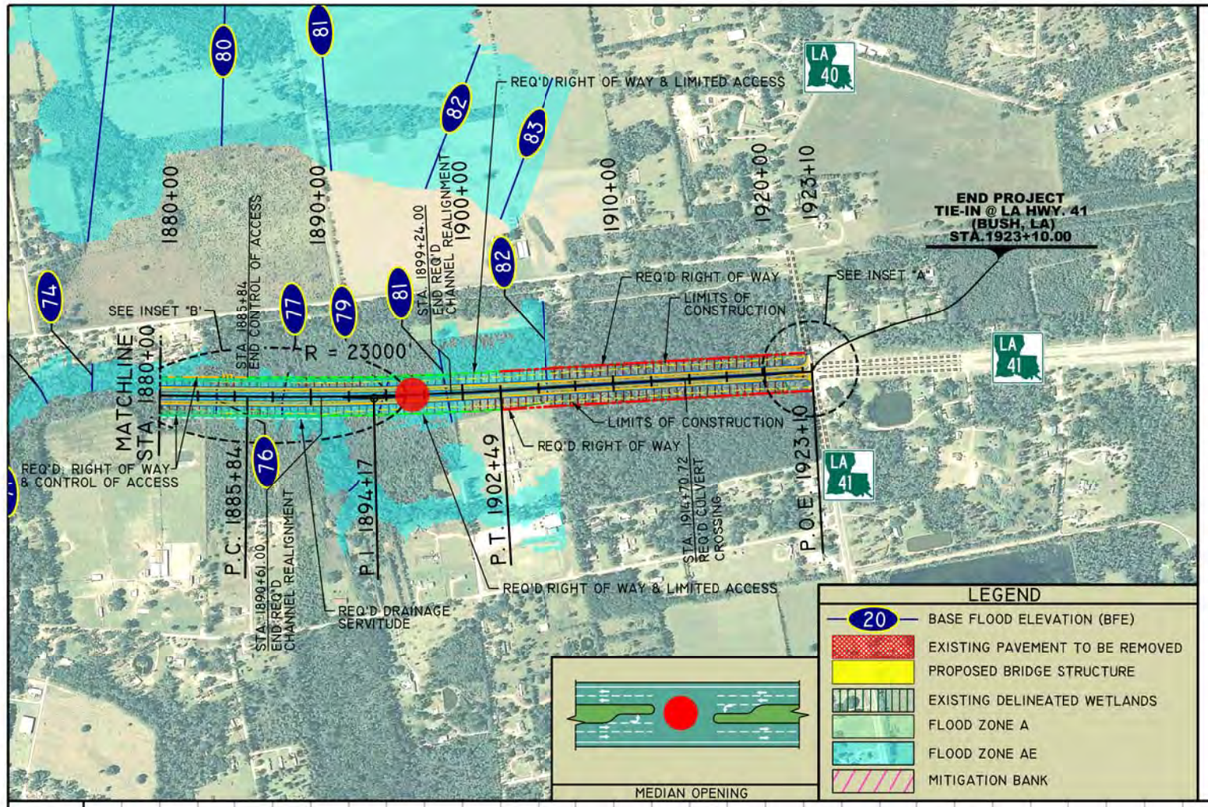
ENGINEER: CORY D. BELDEN

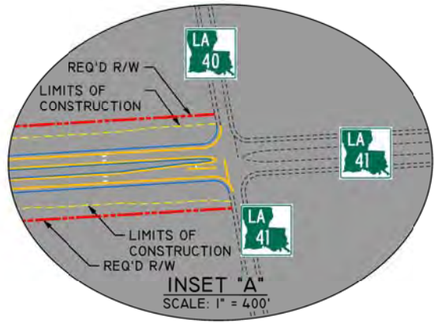
LICENSE NUMBER: 34923

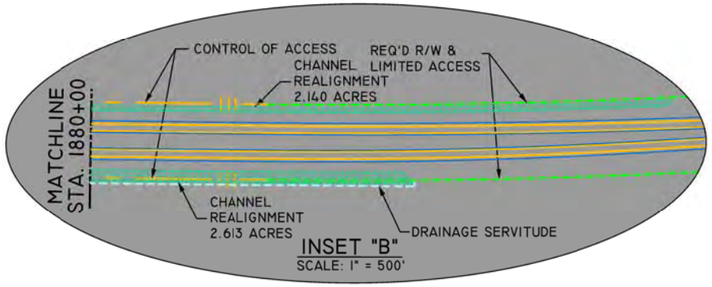
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

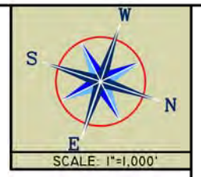
I-12 TO BUSH
ST. TAMMANY PARISH

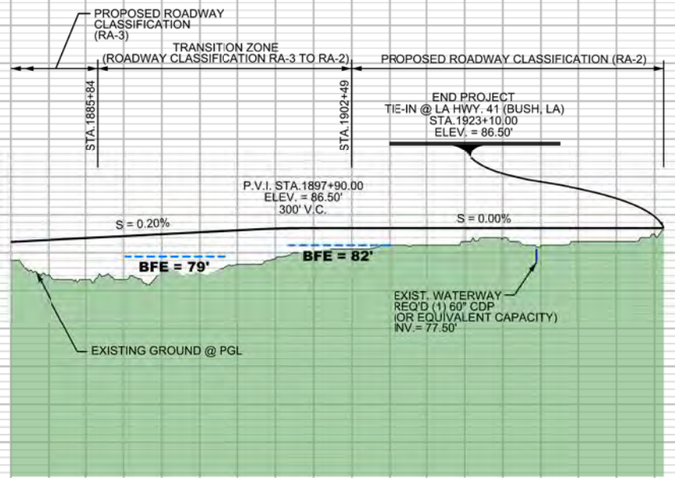
ALTERNATIVE - P











DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 8

I-12 TO BUSH

ST. TAMMANY PARISH

ALTERNATIVE - P

PLATE INDEX

BEGIN PROJECT
EB RAMPS @ LA HWY. 434

INTERCHANGE PLAN

PLATE 1

PLATE 2

PLATE 3

PLATE 4

PLATE 5

PLATE 6

PLATE 7

PLATE 8

5000+00
3050+00
3100+00
3150+00
3200+00
3250+00
3300+00
3350+00
3400+00
3450+00
3500+00
3550+00
3600+00
3650+00
3700+00
3750+00
3800+00
3850+00
3900+00
3950+00
4000+00

INTERSTATE 12

LA 1088

LA 434

LA 36

LA 435

LA 41

ST. TAMMANY REGIONAL AIRPORT

BAYOU LACOMBE

MOSSY HILL MITIGATION BANK

DOLLY-T MITIGATION BANK

WALDHEIM, LA

BUSH, LA

GINA DENNY RD.

SANDERS RD

CLELAND RD

ALLEN RD.

CAMELIA ROAD

WOODLAND ROAD

BOB LEVY ROAD

WATTS ROAD

JENKINS ROAD

RAILROAD AVENUE

END PROJECT
TIE-IN @ LA HWY. 41

W
S
N
E

SCALE: 1"=6,000'

GENERAL DESIGN NOTES:

EXISTING GROUND BASED UPON 2004 LIDAR DATA OBTAINED FROM ATLAS: LOUISIANA'S STATEWIDE GIS WEB SITE.

GENERAL DESIGN CRITERIA:

1) ROADWAY DESIGN CLASSIFICATION: (SA-1)
DESIGN SPEED = 50 M.P.H.
REQUIRED RATE OF CURVATURE (K)
- K(SAG) = 96
- K(CREST) = 84
MAXIMUM VERTICAL GRADE = 4%

2) ROADWAY DESIGN CLASSIFICATION: (RA-3)
DESIGN SPEED = 70 M.P.H.
REQUIRED RATE OF CURVATURE (K)
- K(SAG) = 181
- K(CREST) = 247
MAXIMUM VERTICAL GRADE = 3%

3) ROADWAY DESIGN CLASSIFICATION: (RA-2)
DESIGN SPEED = 60 M.P.H.
REQUIRED RATE OF CURVATURE (K)
- K(SAG) = 136
- K(CREST) = 151
MAXIMUM VERTICAL GRADE = 3%

4) INTERSECTION SIGHT DISTANCE (ISD) CRITERIA
- CASE BI- AASHTO (PG. 654)
- MINIMUM DISTANCE REQUIRED = 1,482'
- EYE HEIGHT OF 3.5' ABOVE GROUND
- OBJECT HEIGHT = 3.5' ABOVE GROUND

5) BRIDGES ARE REQUIRED WHERE DESIGN FLOWS EXCEED 1000 C.F.S.

6) ON LONG CONTINUOUS GRADES WHICH ARE UNBROKEN BY LATERAL OUTFALLS "EQUALIZERS" SHALL BE USED AT INTERVALS OF APPROXIMATELY 1,000 TO 1,500 FEET. EQUALIZERS SHALL BE 24-INCH DIAMETER PIPE, OR ROUND EQUIVALENT PIPE ARCH (LADOTD HYDRAULICS MANUAL, PG. 73).

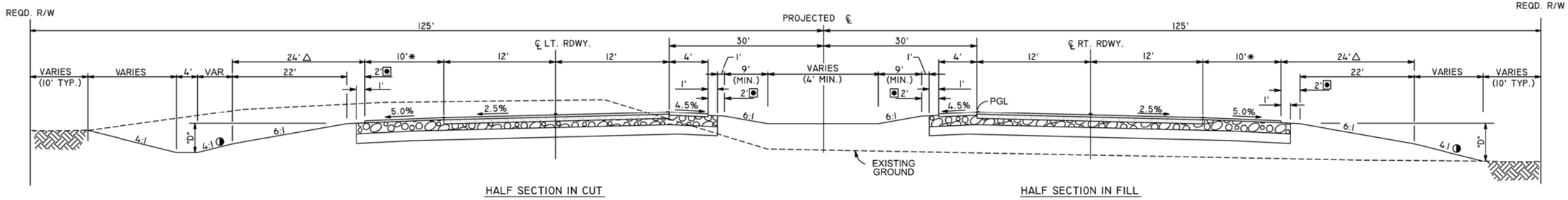
PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE Q

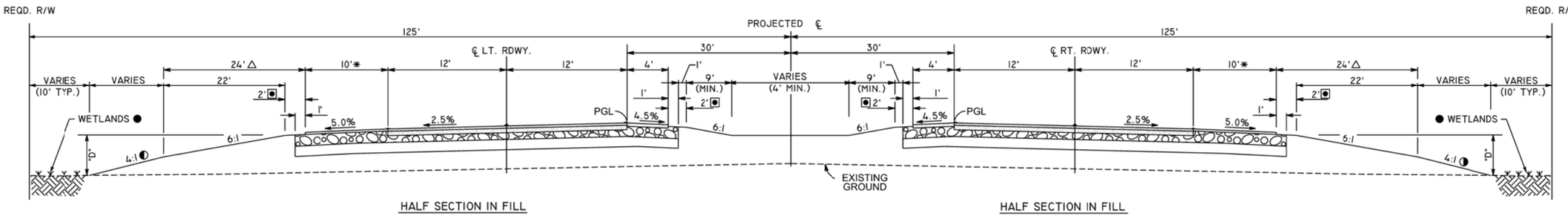


HALF SECTION IN CUT

HALF SECTION IN FILL

◑ 4:1 FORE SLOPES ALLOWED OUTSIDE OF CLEAR ZONE
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
◙ MAINTAIN ROADWAY SHOULDER SLOPE
✳ 2 - FOOT MINIMUM PAVED SHOULDER
FULL SHOULDER WIDTH TO BE PAVED FOR ADT OVER 5,000

TYPICAL SECTION
RURAL ARTERIAL (RA-3)
(DESIGN SPEED = 70 MPH)
(SEE PLATES FOR SECTION LIMITS)



HALF SECTION IN FILL

HALF SECTION IN FILL

TYPICAL SECTION (IN WETLANDS)
RURAL ARTERIAL (RA-3)
(DESIGN SPEED = 70 MPH)
(SEE PLATES FOR SECTION LIMITS)

◑ 4:1 FORE SLOPES ALLOWED OUTSIDE OF CLEAR ZONE
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
◙ MAINTAIN ROADWAY SHOULDER SLOPE
✳ 2 - FOOT MINIMUM PAVED SHOULDER
FULL SHOULDER WIDTH TO BE PAVED FOR ADT OVER 5,000
● ROADSIDE DITCHES SHALL NOT BE CONSTRUCTED IN WETLAND AREAS

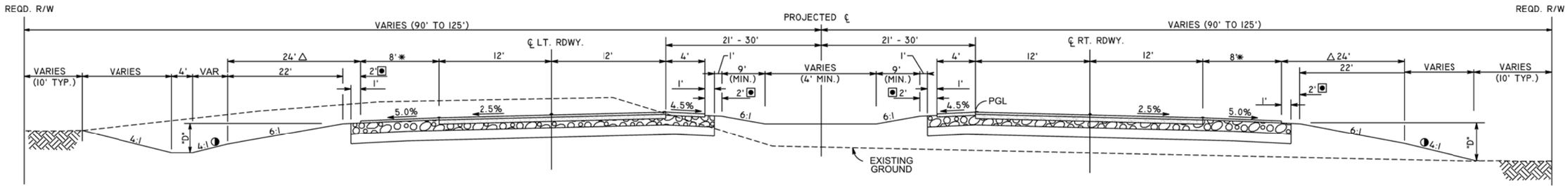
NOTE: PAVEMENT SECTION TO BE DETERMINED DURING DESIGN PHASE.

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

TYPICAL ROADWAY SECTIONS

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - Q

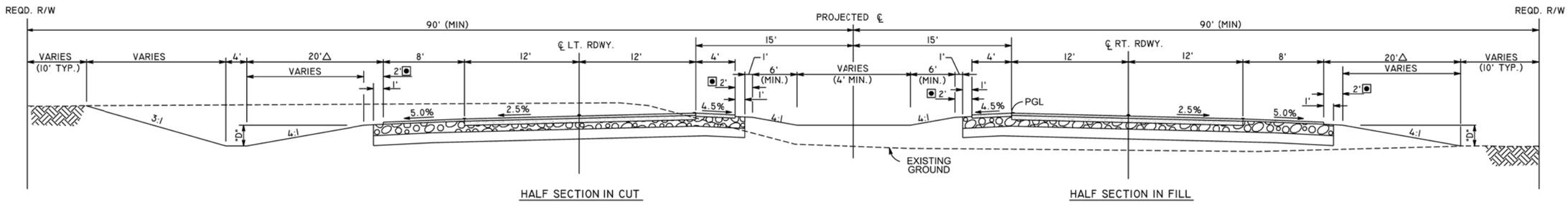


HALF SECTION IN CUT

HALF SECTION IN FILL

◑ TO BE USED WHEN "D" EXCEEDS 4'.
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
◉ MAINTAIN ROADWAY SHOULDER SLOPE
✱ 2 - FOOT MINIMUM PAVED SHOULDER
FULL PAVED SHOULDER SHOWN FOR CONSISTENCY WITH EXISTING AND PROPOSED ROADWAY SECTIONS

TYPICAL SECTION
RURAL ARTERIAL (RA-2)
(DESIGN SPEED = 60 MPH)
(SEE PLATES FOR SECTION LIMITS)



HALF SECTION IN CUT

HALF SECTION IN FILL

△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
◉ MAINTAIN ROADWAY SHOULDER SLOPE
✱ FOR ADT LESS THAN 2,000 SHOULDER WITDTH MAY BE 6 FT.

TYPICAL SECTION
SUBURBAN ARTERIAL (SA-1)
(DESIGN SPEED = 50 MPH)
(SEE PLATES FOR SECTION LIMITS)

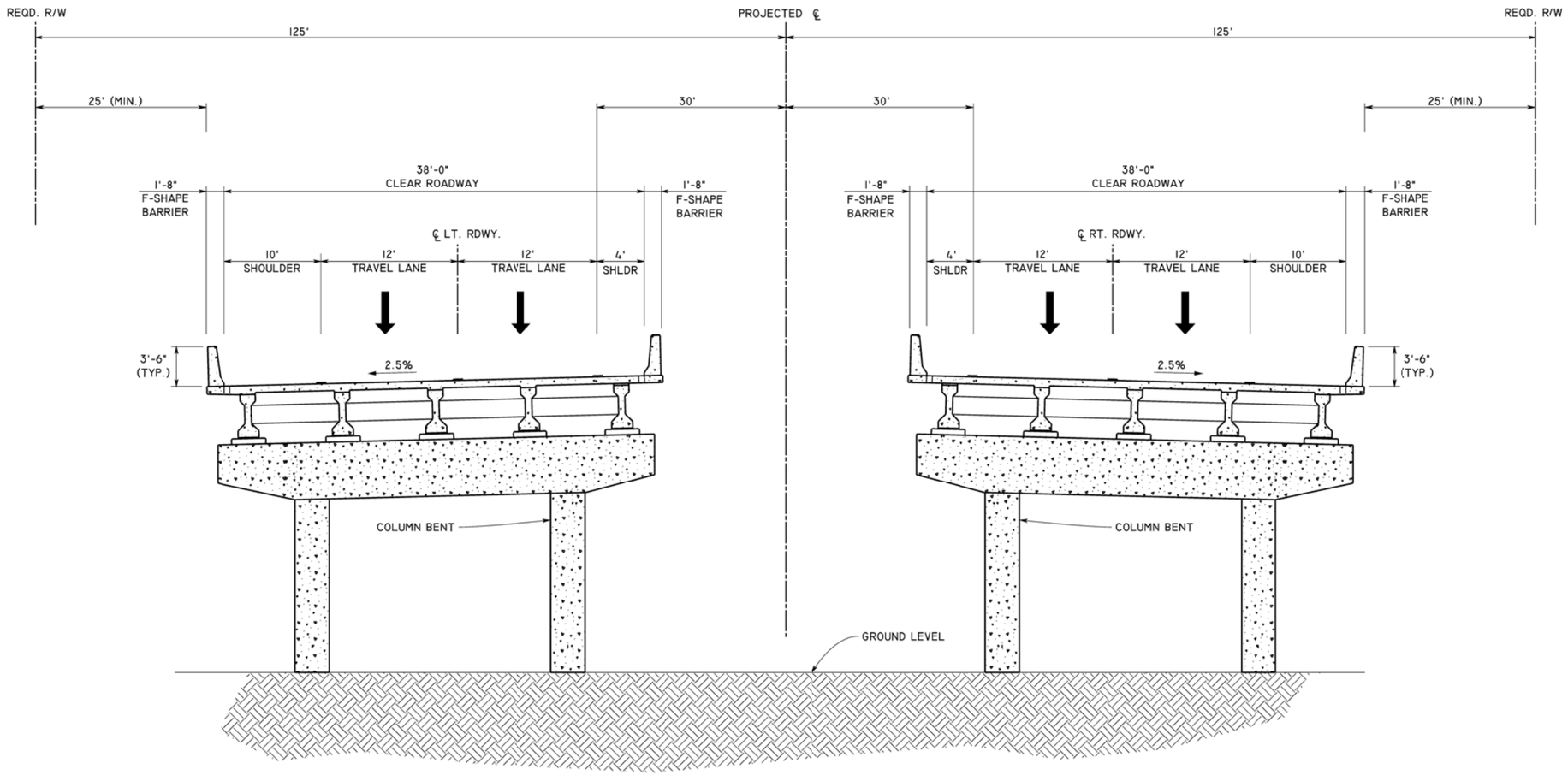
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

NOTE: PAVEMENT SECTION TO BE DETERMINED DURING DESIGN PHASE.

TYPICAL ROADWAY SECTIONS

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - Q



TYPICAL BRIDGE SECTION
RURAL ARTERIAL (RA-3)
(DESIGN SPEED = 70 MPH)

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

TYPICAL BRIDGE SECTION

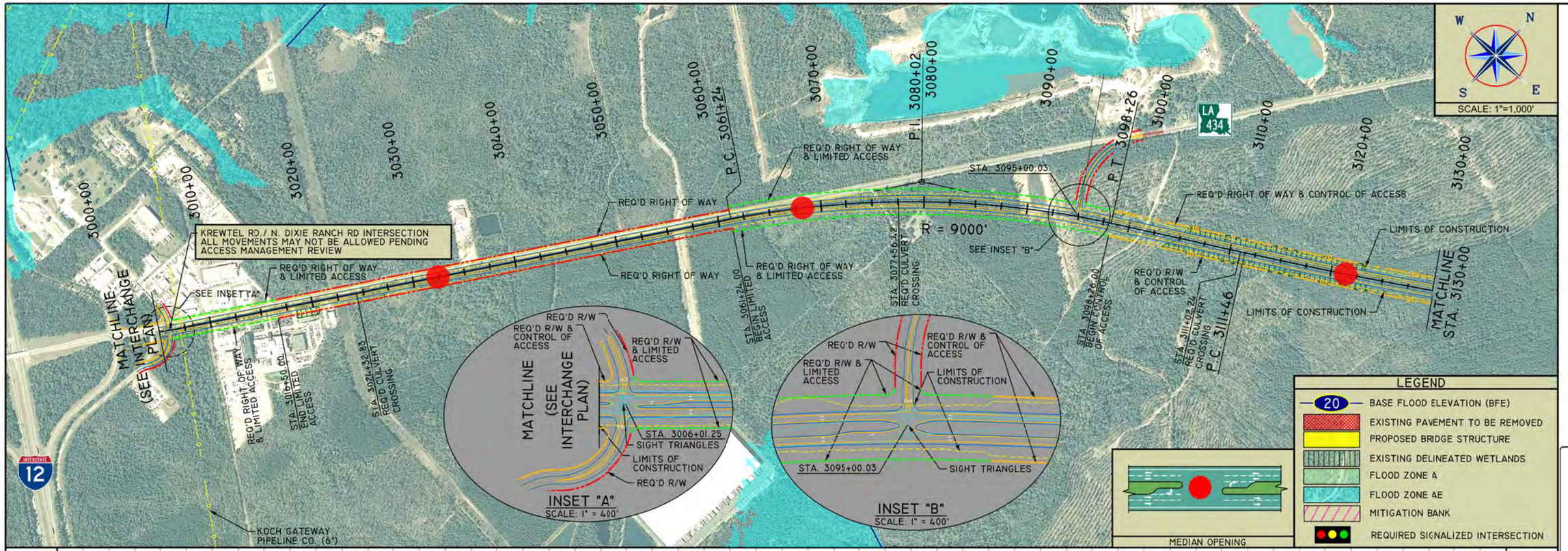
I-12 TO BUSH
ST. TAMMANY PARISH

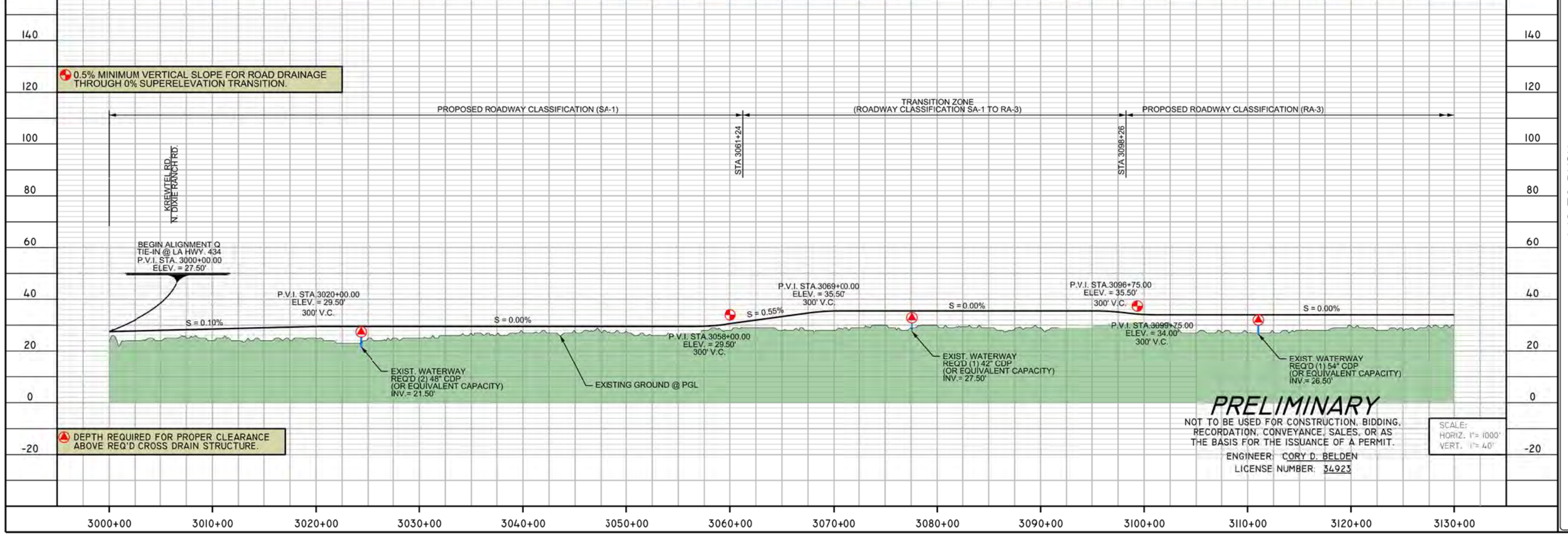
ALTERNATIVE - Q

INTERCHANGE PLAN

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - Q





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ENGINEER: CORY D. BELDEN

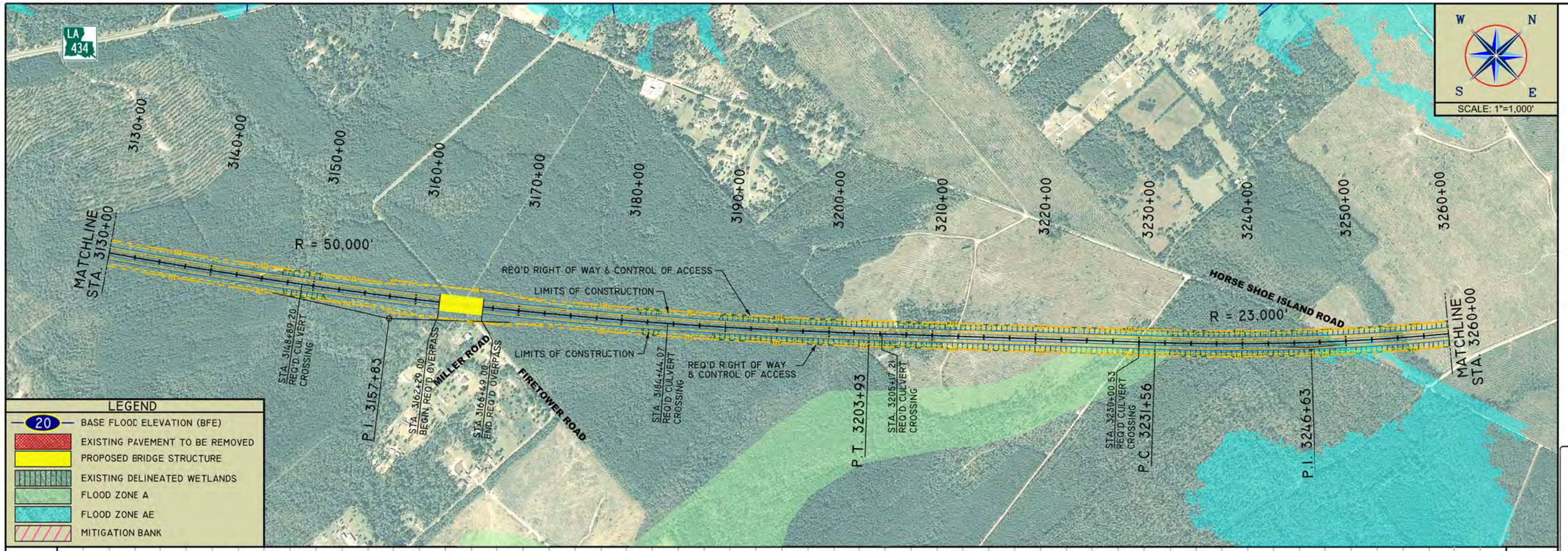
LICENSE NUMBER: 34923

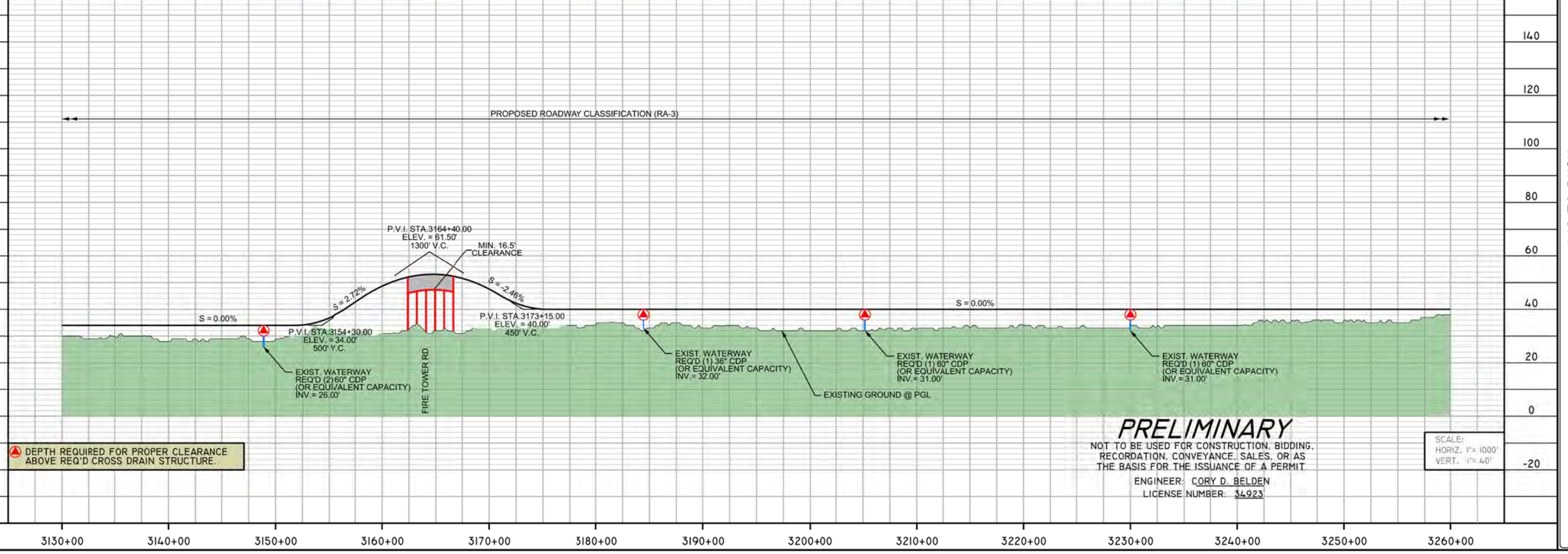
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 1

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - Q





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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 2

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - Q

PLATE - 3

GULF SOUTH PIPELINE CO. (30")
KOCH GATEWAY PIPELINE CO. (30")
GULF SOUTH PIPELINE CO. (30")
WFS-NLG PIPELINE CO.
LA 36
BAYOU LACOMBE
3260+00
3270+00
3280+00
3290+00
3300+00
3310+00
3320+00
3330+00
3340+00
3350+00
3360+00
3370+00
3380+00
3390+00
MATCHLINE STA. 3260+00
P.T. 3261+65
STA. 3270+28.02 REQ'D CULVERT CROSSING
P.C. 3292+37
SEE INSET "A"
STA. 3321+28.70
R = 18.000'
REQ'D RIGHT OF WAY & CONTROL OF ACCESS
LIMITS OF CONSTRUCTION
LIMITS OF CONSTRUCTION
REQ'D RIGHT OF WAY & CONTROL OF ACCESS
STA. 3355+38.11 REQ'D CULVERT CROSSING
STA. 3388+12.00 BEGIN REQ'D BRIDGE
MATCHLINE STA. 3390+00
P.I. 3389+07
W N S E
SCALE: 1"=1,000'

REQ'D R/W & CONTROL OF ACCESS
REQ'D R/W & LIMITED ACCESS
STA. 3321+28.70
SIGHT TRIANGLES
REQ'D R/W & LIMITED ACCESS
REQ'D R/W & CONTROL OF ACCESS
INSET "A"
SCALE: 1" = 400'

LEGEND
- 20 — BASE FLOOD ELEVATION (BFE)
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- FLOOD ZONE A
- FLOOD ZONE AE
- MITIGATION BANK

MEDIAN OPENING

PROPOSED ROADWAY CLASSIFICATION (RA-3)

0.5% MINIMUM VERTICAL SLOPE FOR ROAD DRAINAGE THROUGH 0% SUPERELEVATION TRANSITION.

DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.

P.V.I. STA.3293+85.00 ELEV. = 41.50' 300' V.C.
P.V.I. STA.3290+85.00 ELEV. = 40.00' 300' V.C.
P.V.I. STA.3300+00.00 ELEV. = 41.50' 300' V.C.
P.V.I. STA.3355+00.00 ELEV. = 47.50' 300' V.C.
S = 0.00%
S = 0.00%
S = 0.11%
S = 0.00%
EXIST. WATERWAY REQ'D (1) 48" CDP (OR EQUIVALENT CAPACITY) INV.= 32.00'
EXISTING GROUND @ PGL
EXIST. WATERWAY REQ'D (4) 52" CDP (OR EQUIVALENT CAPACITY) INV.= 37.00'
EXIST. WATERWAY REQ'D BRIDGE (500 FT)
W.L. @ 40.29'
BAYOU LACOMBE TRIBUTARY

80 60 40 20 0 -20

3260+00 3270+00 3280+00 3290+00 3300+00 3310+00 3320+00 3330+00 3340+00 3350+00 3360+00 3370+00 3380+00 3390+00

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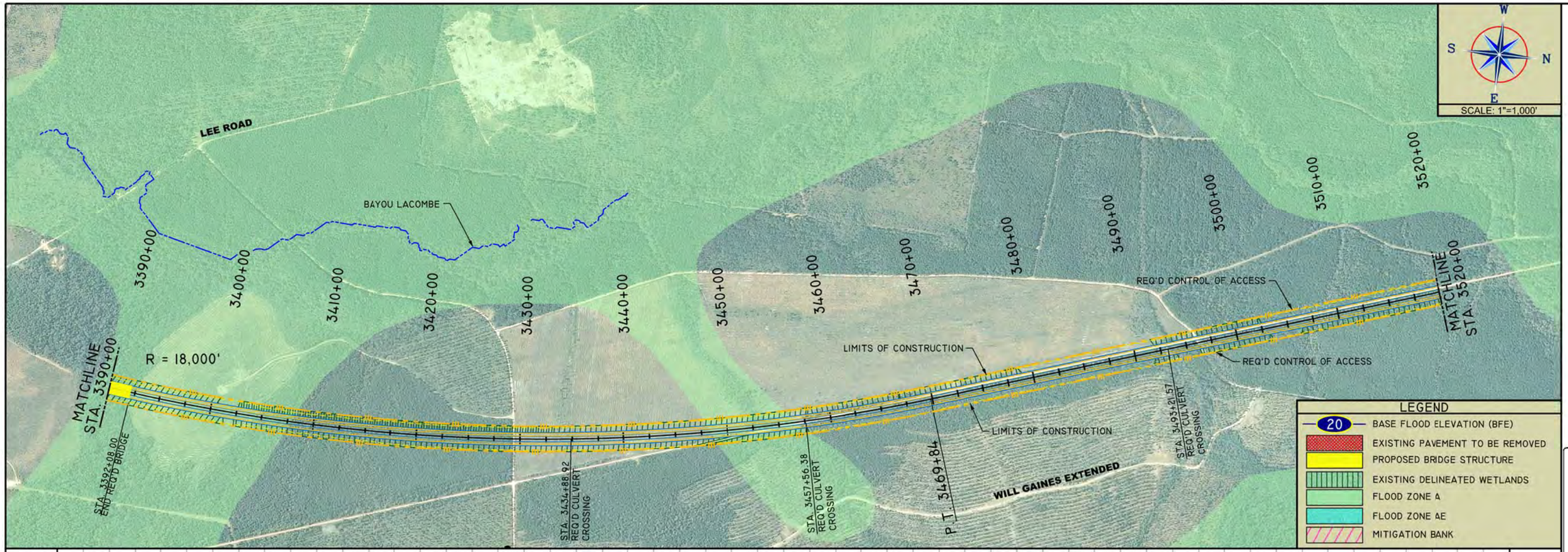
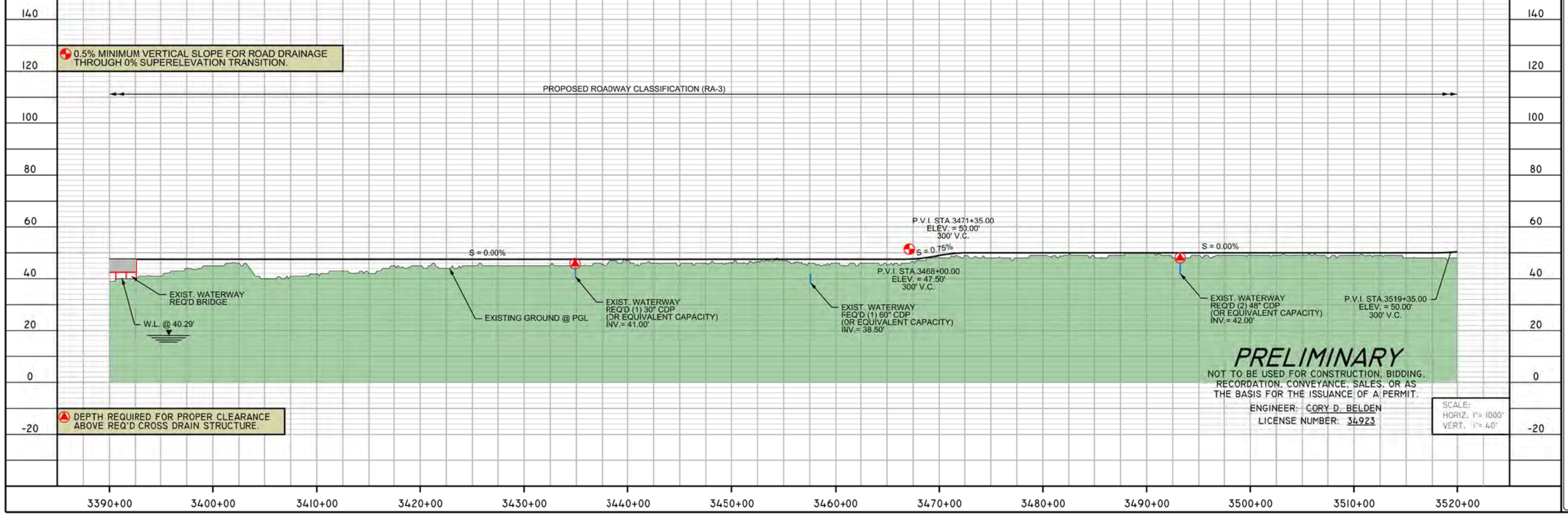
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - Q





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ENGINEER: CORY D. BELDEN

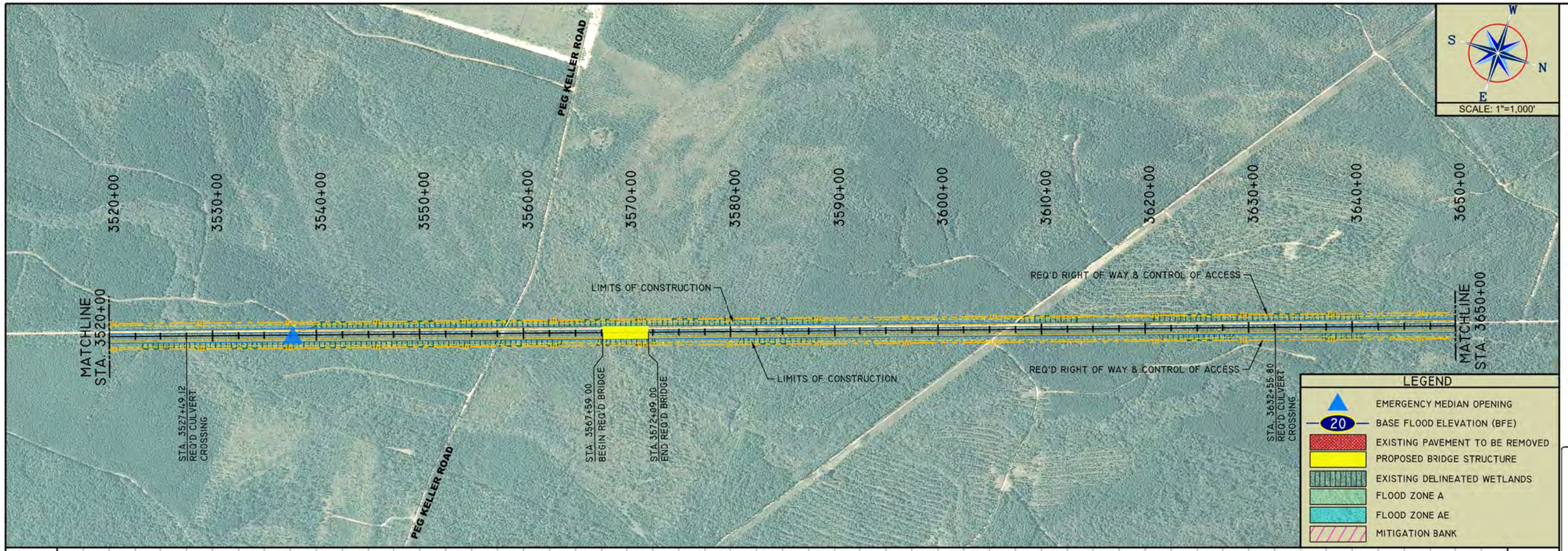
LICENSE NUMBER: 34923

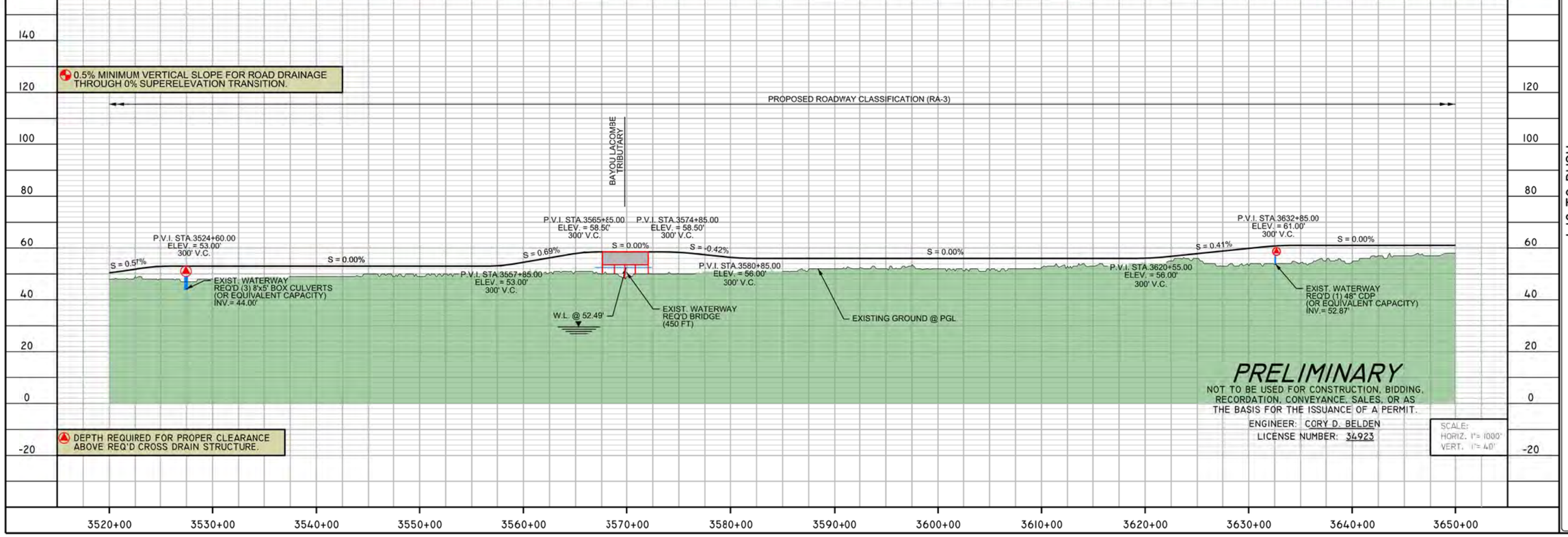
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 4

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - Q





PRELIMINARY

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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

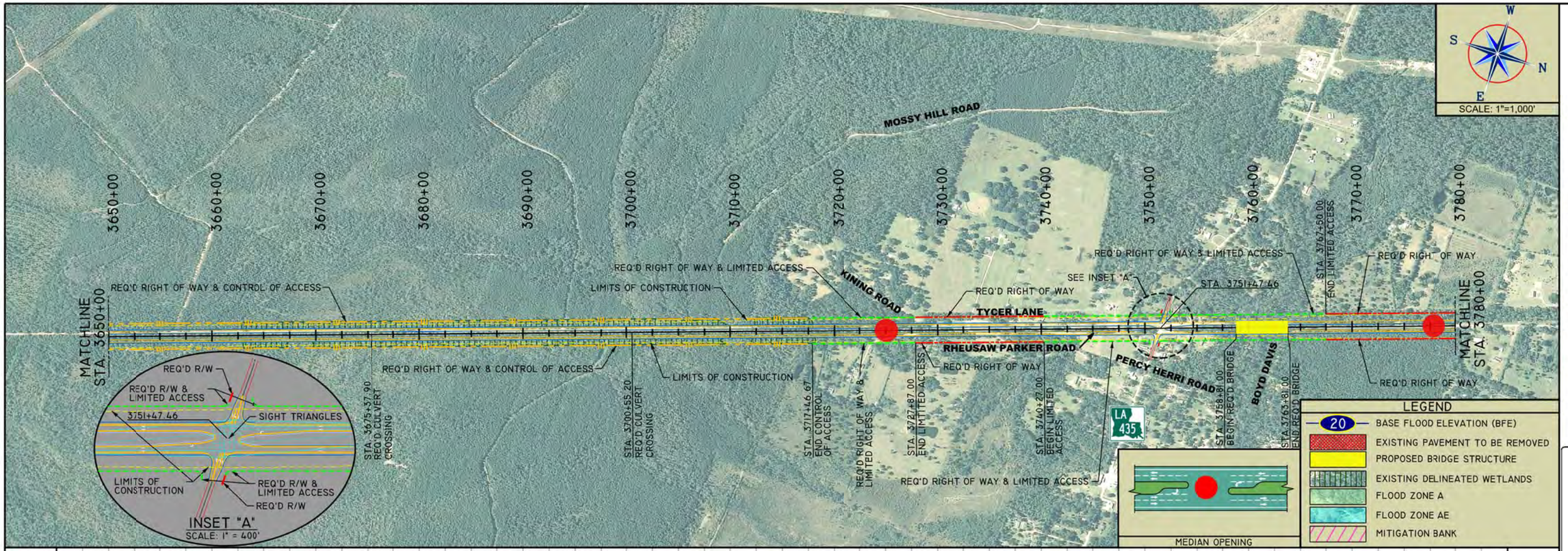
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

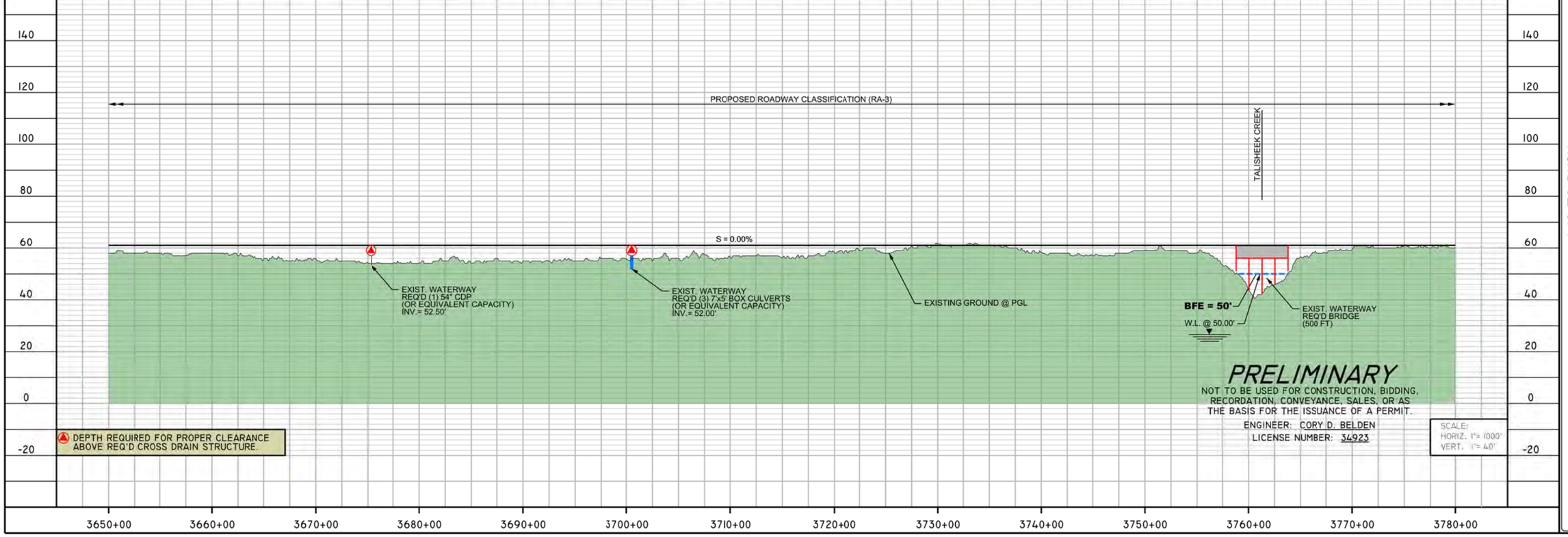
PLATE - 5

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - Q

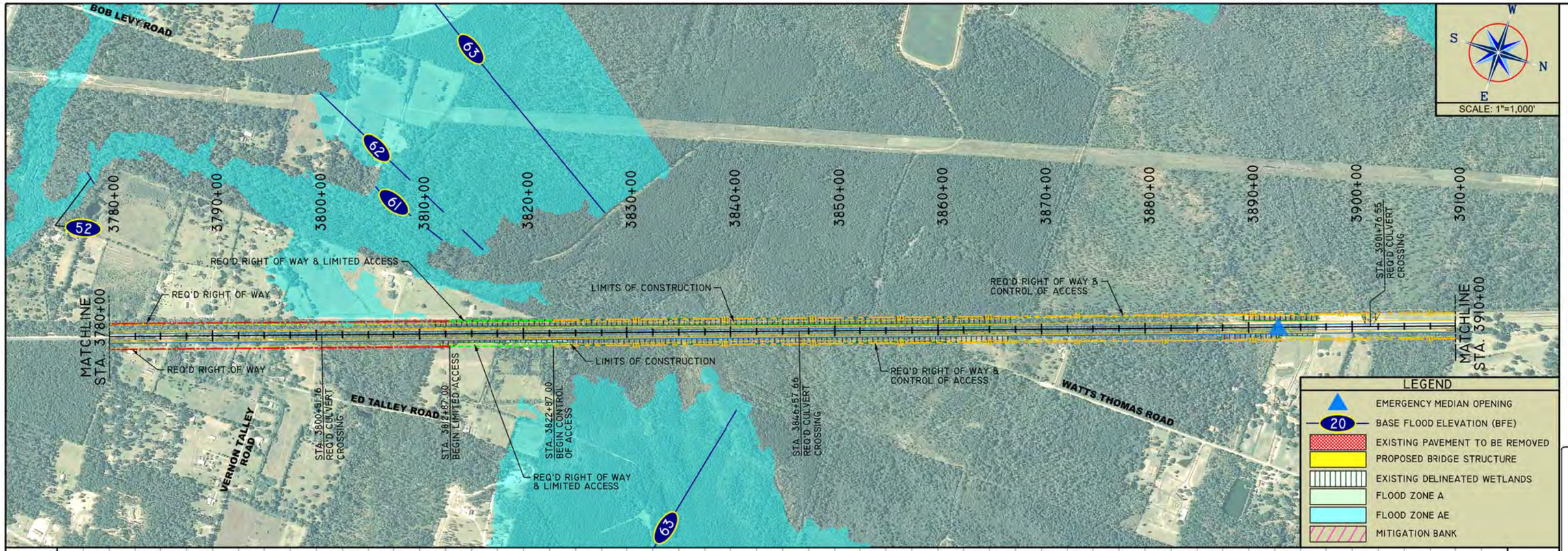
PLATE - 6

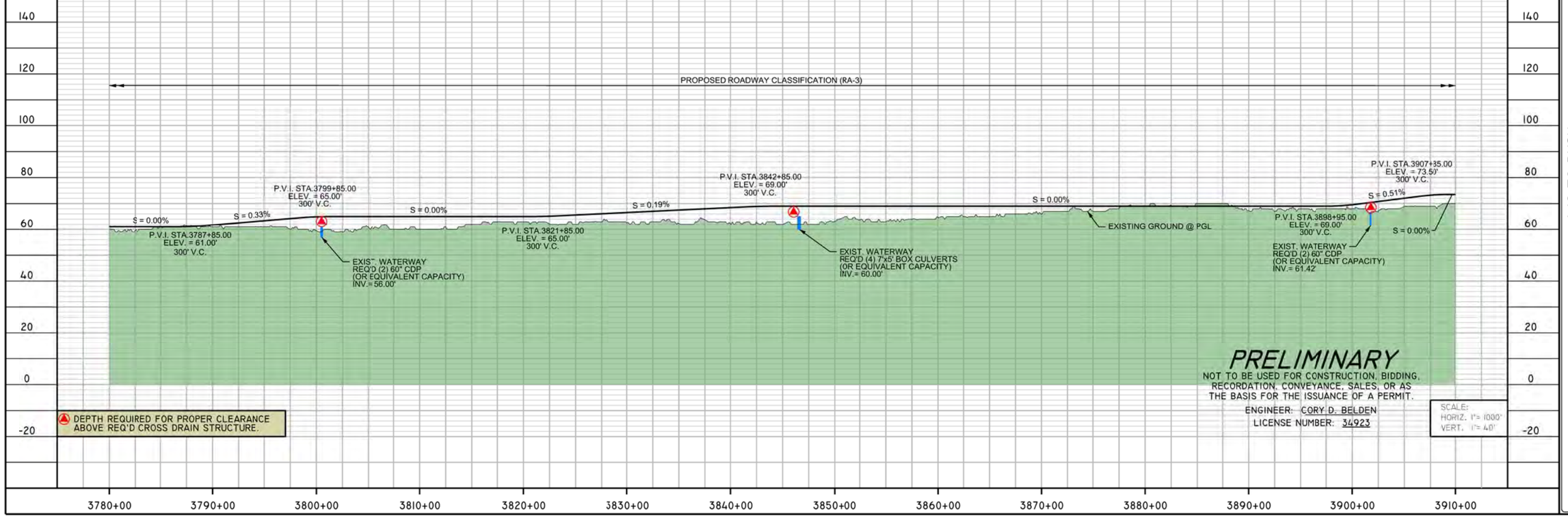




I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - Q





DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.

PRELIMINARY

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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

SCALE: HORIZ. 1"= 1000' VERT. 1"= 40'

PLATE - 7

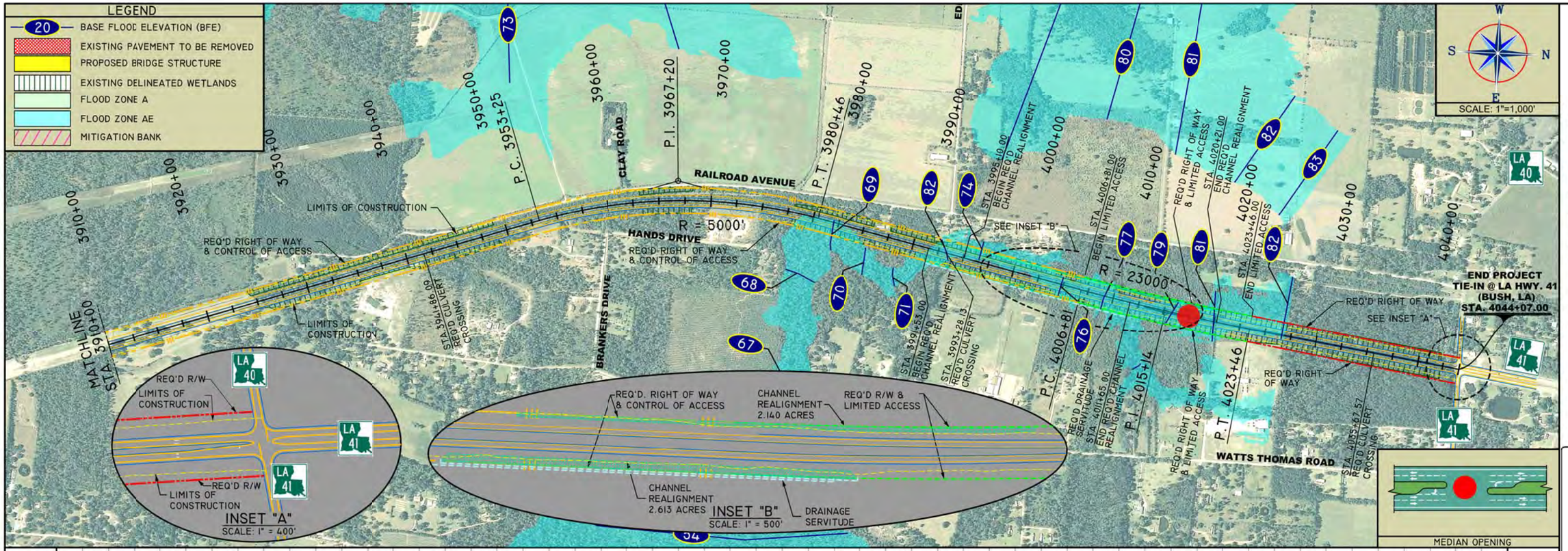
I-12 TO BUSH

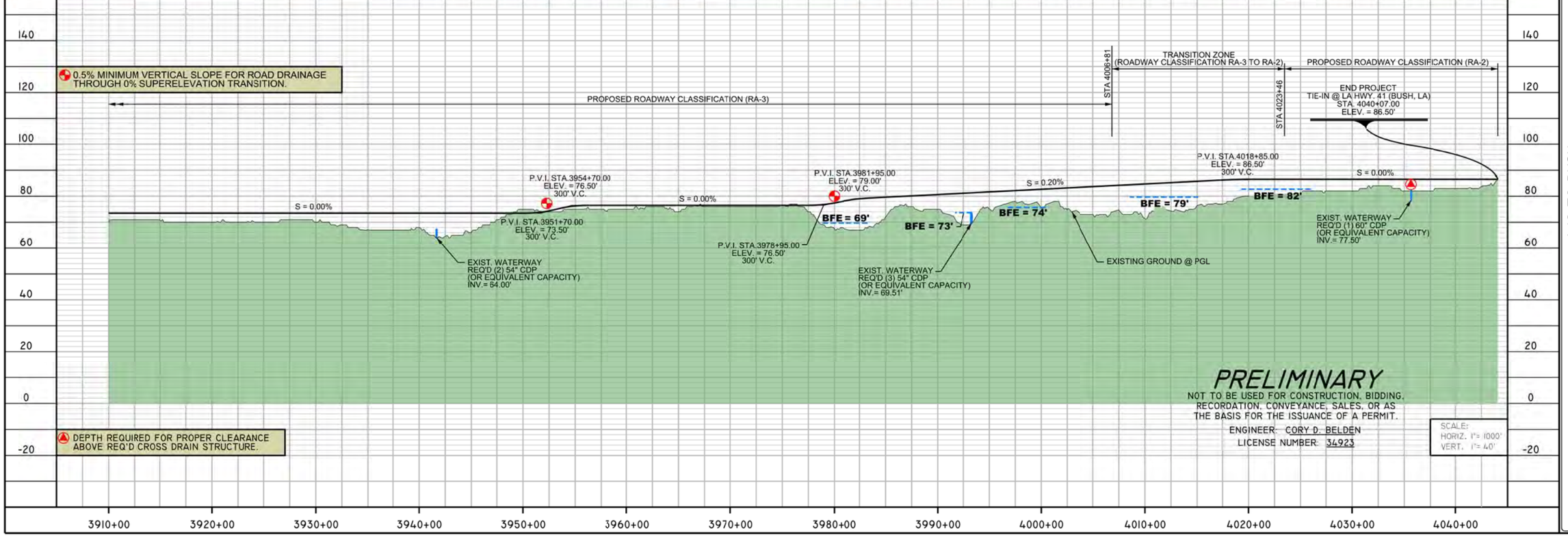
ST. TAMMANY PARISH

ALTERNATIVE - Q

LEGEND

- 20 — BASE FLOOD ELEVATION (BFE)
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- FLOOD ZONE A
- FLOOD ZONE AE
- MITIGATION BANK





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ENGINEER: CORY D. BELDEN

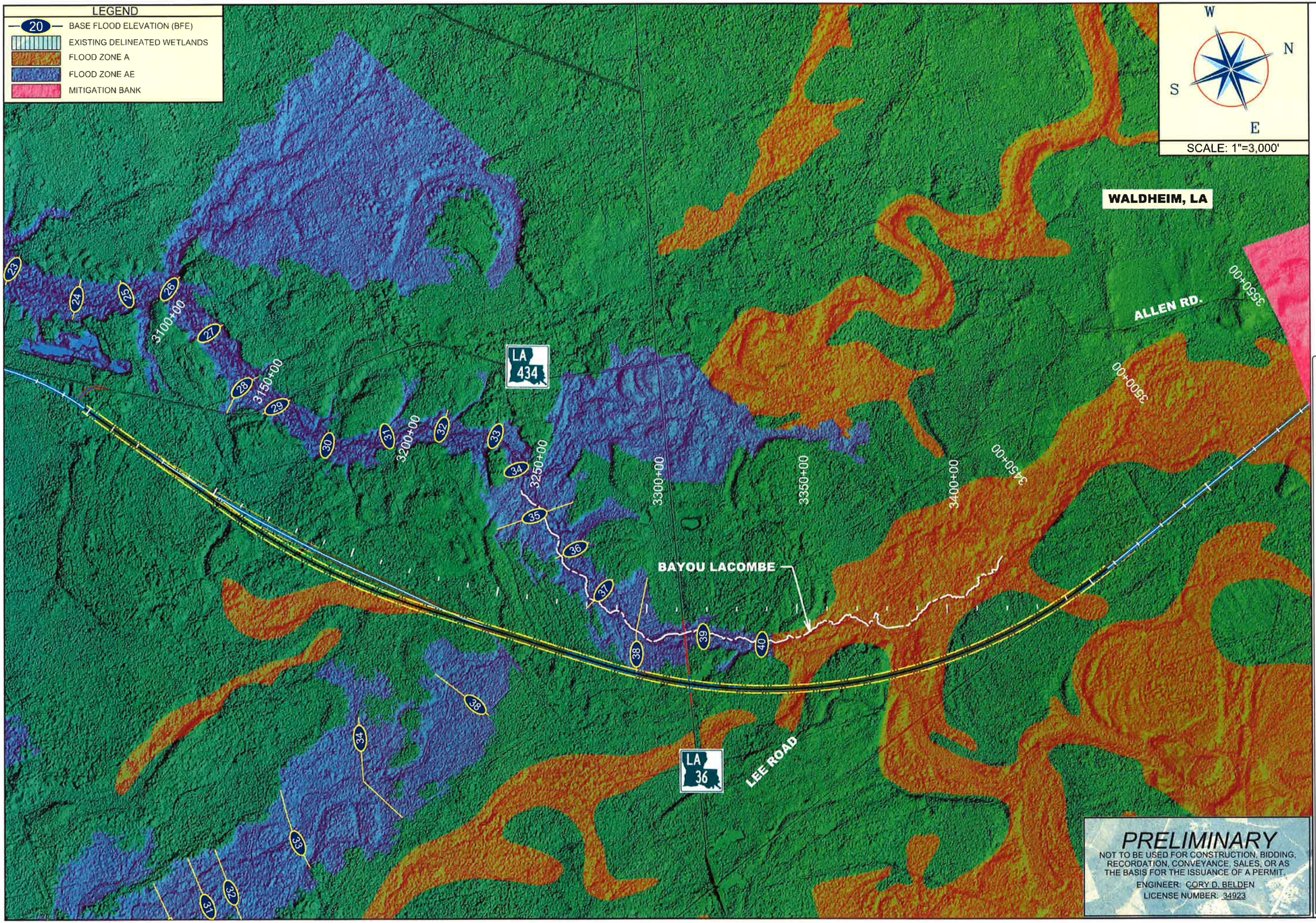
LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 8

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - Q


LEGEND
20 BASE FLOOD ELEVATION (BFE)
EXISTING DELINEATED WETLANDS
FLOOD ZONE A
FLOOD ZONE AE
MITIGATION BANK
W
N
S
E
SCALE: 1"=3,000'
WALDHEIM, LA
ALLEN RD.
LA 434
3100+00
3150+00
3200+00
3250+00
3300+00
3350+00
3400+00
3450+00
3500+00
3550+00
BAYOU LACOMBE
LA 36
LEE ROAD
23
24
25
26
27
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40
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923
BAYOU LACOMBE BYPASS
I-12 TO BUSH
ST. TAMMANY PARISH
ALTERNATIVE Q

PLATE INDEX

GENERAL DESIGN NOTES:

EXISTING GROUND BASED UPON 2004 LIDAR DATA OBTAINED FROM ATLAS: LCUISIANA'S STATEWIDE GIS WEB SITE.

GENERAL DESIGN CRITERIA:

1) ROADWAY DESIGN CLASSIFICATION: (UA-2)
DESIGN SPEED = 45 M.P.H.
REQUIRED RATE OF CURVATURE (K)
- K(SAG) = 79
- K(CREST) = 61
MAXIMUM VERTICAL GRADE = 8%

2) ROADWAY DESIGN CLASSIFICATION: (RA-3)
DESIGN SPEED = 70 M.P.H.
REQUIRED RATE OF CURVATURE (K)
- K(SAG) = 181
- K(CREST) = 247
MAXIMUM VERTICAL GRADE = 3%

3) ROADWAY DESIGN CLASSIFICATION: (RA-2)
DESIGN SPEED = 60 M.P.H.
REQUIRED RATE OF CURVATURE (K)
- K(SAG) = 136
- K(CREST) = 151
MAXIMUM VERTICAL GRADE = 3%

4) INTERSECTION SIGHT DISTANCE (ISD) CRITERIA
- CASE B1- AASHTO (PG. 654)
- MINIMUM DISTANCE REQUIRED = 1,482'
- EYE HEIGHT OF 3.5" ABOVE GROUND
- OBJECT HEIGHT = 3.5" ABOVE GROUND

5) BRIDGES ARE REQUIRED WHERE DESIGN FLOWS EXCEED 1000 C.F.S.

6) ON LONG CONTINUOUS GRADES WHICH ARE UNBROKEN BY LATERAL OUTFALLS "EQUALIZERS" SHALL BE USED AT INTERVALS OF APPROXIMATELY 1,000 TO 1,500 FEET. EQUALIZERS SHALL BE 24-INCH DIAMETER PIPE, OR ROUND EQUIVALENT PIPE ARCH (LADOTD HYDRAULICS MANUAL, PG. 73).

W
S N
E

SCALE: 1"=8,000'

ST. TAMMANY REGIONAL AIRPORT

WALDHEIM, LA

SANDERS RD

CLELAND RD

ALLEN RD

GINA DENNY RD

CAMELIA ROAD

LA 1088

INTERSTATE 12

LA 1083

LA 36

LA 435

LA 434

LA 21

LA 40

LA 41

END PROJECT
TIE-IN @ LA HWY. 41

BUSH, LA

DOLLY-T MITIGATION BANK

MOSSY HILL MITIGATION BANK

RAILROAD AVENUE

BOB LEVY ROAD

BEGIN PROJECT
TIE-IN @ NORTHSHORE BLVD.

INTERCHANGE PLAN

5050+00
5100+00
5150+00
5200+00
5250+00
5300+00
5350+00
5400+00
5450+00
5500+00
5550+00
5600+00
5650+00
5700+00
5750+00
5800+00
5850+00
5900+00
5950+00
6000+00
6050+00
6100+00
6124+48

PLATE 1
PLATE 2
PLATE 3
PLATE 4
PLATE 5
PLATE 6
PLATE 7
PLATE 8
PLATE 9

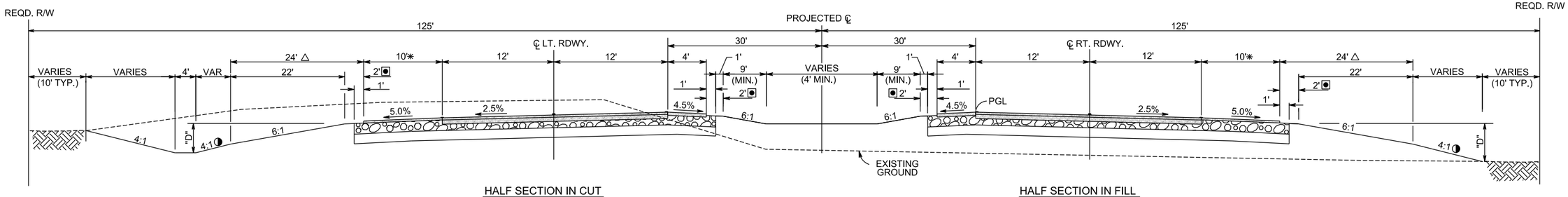
PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE J



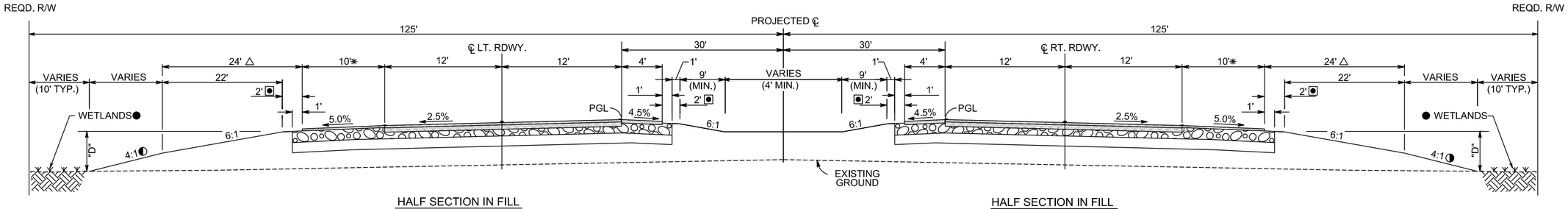
HALF SECTION IN CUT

HALF SECTION IN FILL

◑ 4:1 FORE SLOPES ALLOWED OUTSIDE OF CLEAR ZONE
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
⊡ MAINTAIN ROADWAY SHOULDER SLOPE
✳ 2 - FOOT MINIMUM PAVED SHOULDER
FULL SHOULDER WIDTH TO BE PAVED FOR ADT OVER 5,000

TYPICAL SECTION

RURAL ARTERIAL (RA-3)
(DESIGN SPEED = 70 MPH)
(SEE PLANS FOR SECTION LIMITS)



HALF SECTION IN FILL

HALF SECTION IN FILL

TYPICAL SECTION (IN WETLANDS)

RURAL ARTERIAL (RA-3)
(DESIGN SPEED = 70 MPH)
(SEE PLATES FOR SECTION LIMITS)

◑ 4:1 FORE SLOPES ALLOWED OUTSIDE OF CLEAR ZONE
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
⊡ MAINTAIN ROADWAY SHOULDER SLOPE
✳ 2 - FOOT MINIMUM PAVED SHOULDER
FULL SHOULDER WIDTH TO BE PAVED FOR ADT OVER 5,000
● ROADSIDE DITCHES SHALL NOT BE CONSTRUCTED IN WETLAND AREAS

NOTE: PAVEMENT SECTION TO BE DETERMINED DURING DESIGN PHASE.

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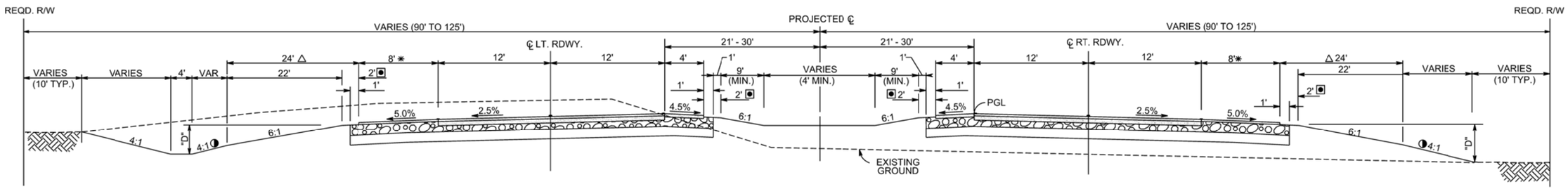
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

TYPICAL ROADWAY SECTIONS

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - J

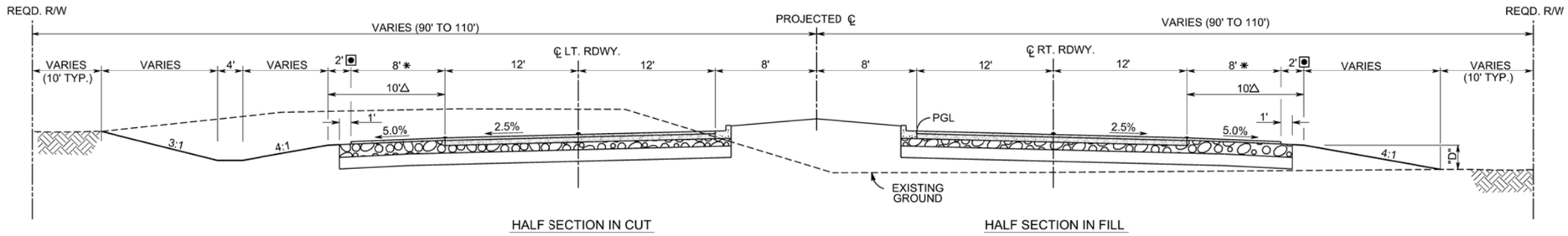


HALF SECTION IN CUT

HALF SECTION IN FILL

◑ TO BE USED WHEN "D" EXCEEDS 4'.
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
▣ MAINTAIN ROADWAY SHOULDER SLOPE
✳ 2 - FOOT MINIMUM PAVED SHOULDER
FULL PAVED SHOULDER SHOWN FOR CONSISTENCY WITH EXISTING AND PROPOSED ROADWAY SECTIONS

TYPICAL SECTION
RURAL ARTERIAL (RA-2)
(DESIGN SPEED = 60 MPH)
(SEE PLATES FOR SECTION LIMITS)



HALF SECTION IN CUT

HALF SECTION IN FILL

▣ MAINTAIN ROADWAY SHOULDER SLOPE
△ TO BE CONSTRUCTED FREE OF OBSTRUCTIONS
✳ PAVED SHOULDERS SHOWN IN LIEU OF CURB.
SHOULDERS TO ALLOW FOR BICYCLE LANES AND INCREASED SAFETY.
CURBED OUTSIDE SHOULDERS WOULD REQUIRE ADDITIONAL DRAINAGE COLLECTION SYSTEM.

TYPICAL SECTION
URBAN ARTERIAL (UA-2)
(DESIGN SPEED = 45 MPH)
(SEE PLATES FOR SECTION LIMITS)

NOTE: PAVEMENT SECTION TO BE DETERMINED DURING DESIGN PHASE.

PRELIMINARY
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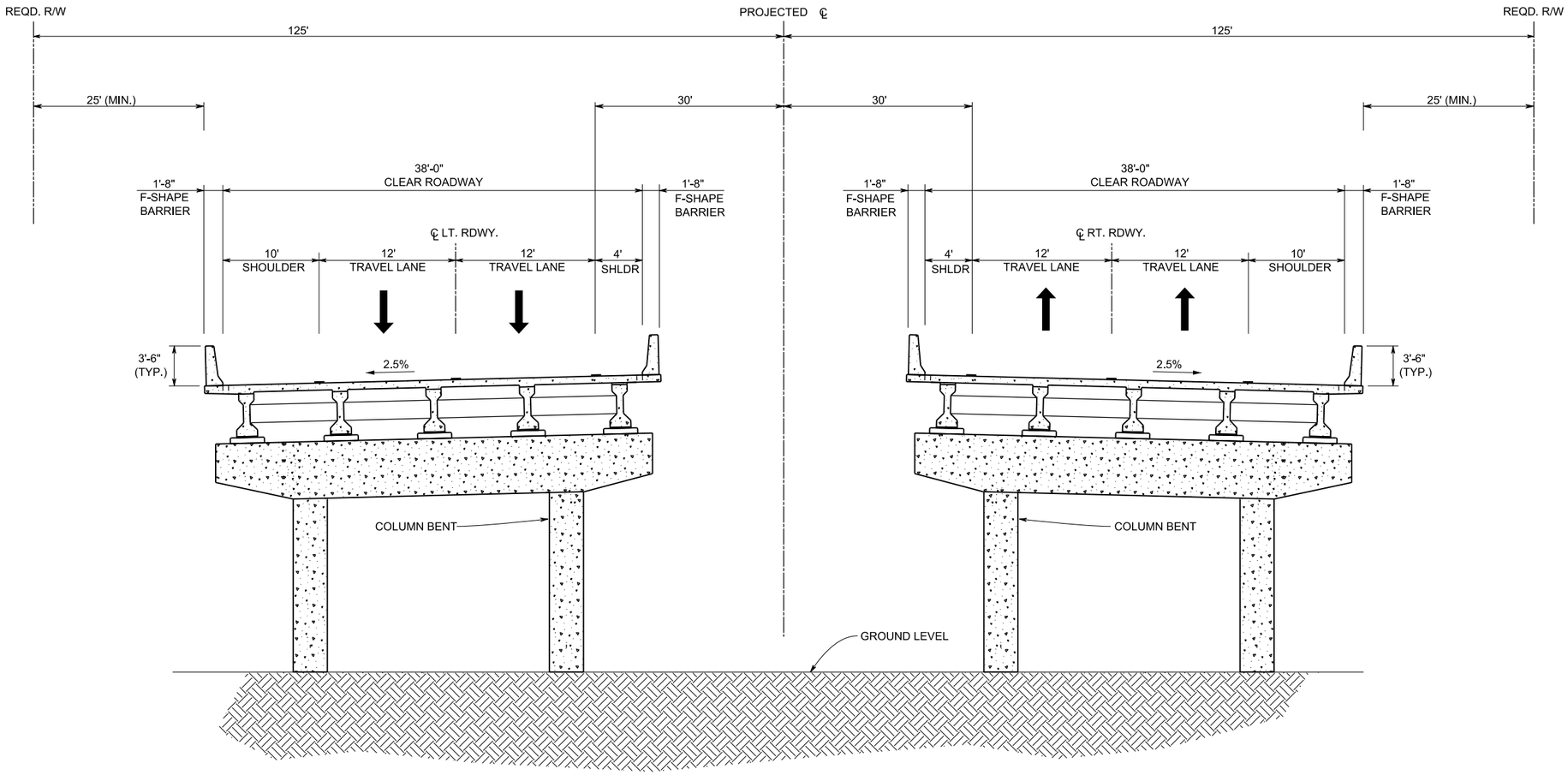
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

TYPICAL ROADWAY SECTIONS

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - J



TYPICAL BRIDGE SECTION

RURAL ARTERIAL (RA-3)

(DESIGN SPEED = 70 MPH)

PRELIMINARY

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ENGINEER: CORY D. BELDEN

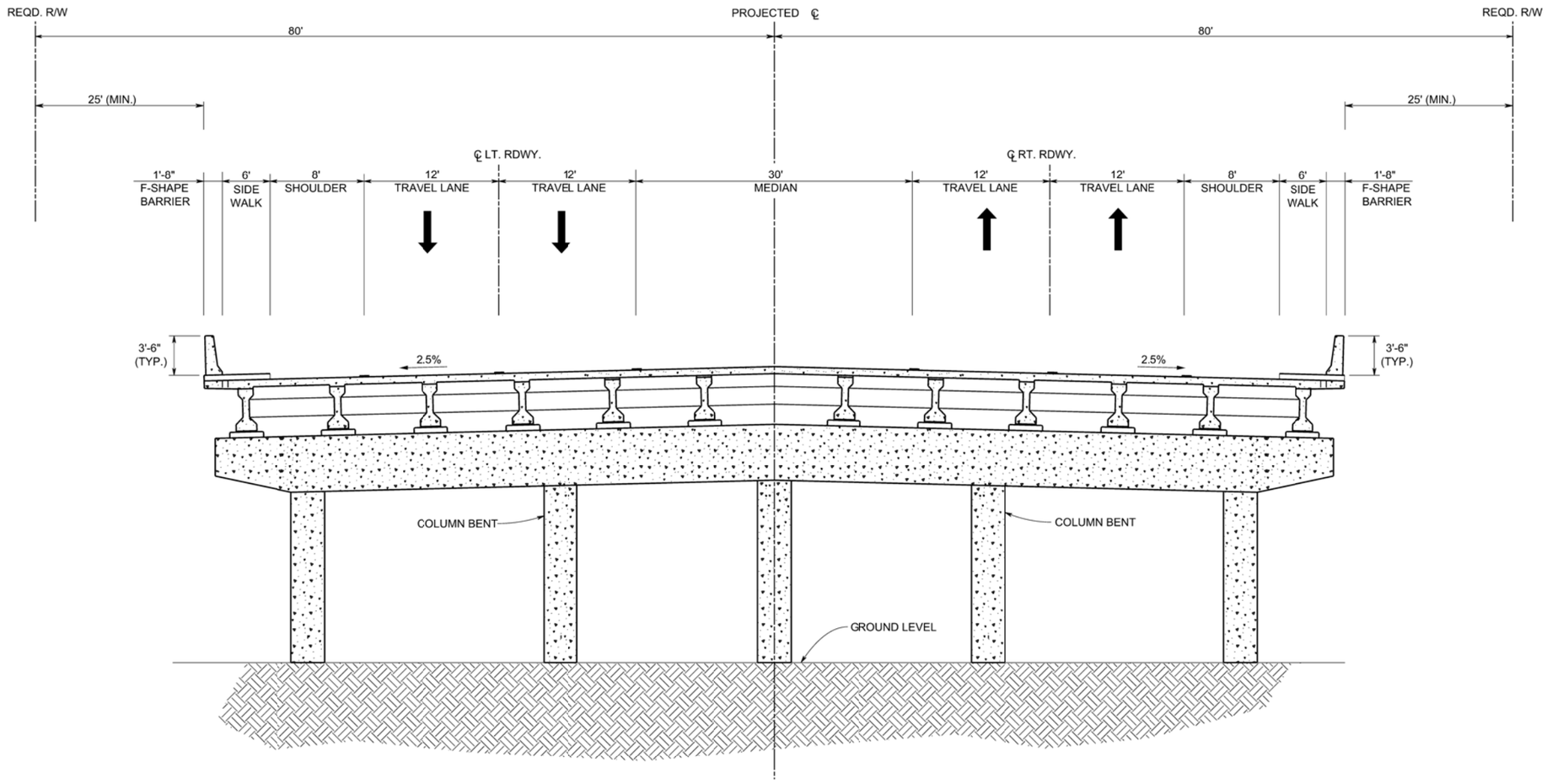
LICENSE NUMBER: 34923

TYPICAL BRIDGE SECTION

I-12 TO BUSH

ST. TAMMANY PARISH

ALTERNATIVE - J



TYPICAL BRIDGE SECTION

URBAN ARTERIAL (UA-1)

(DESIGN SPEED = 45 MPH)

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ENGINEER: CORY D. BELDEN

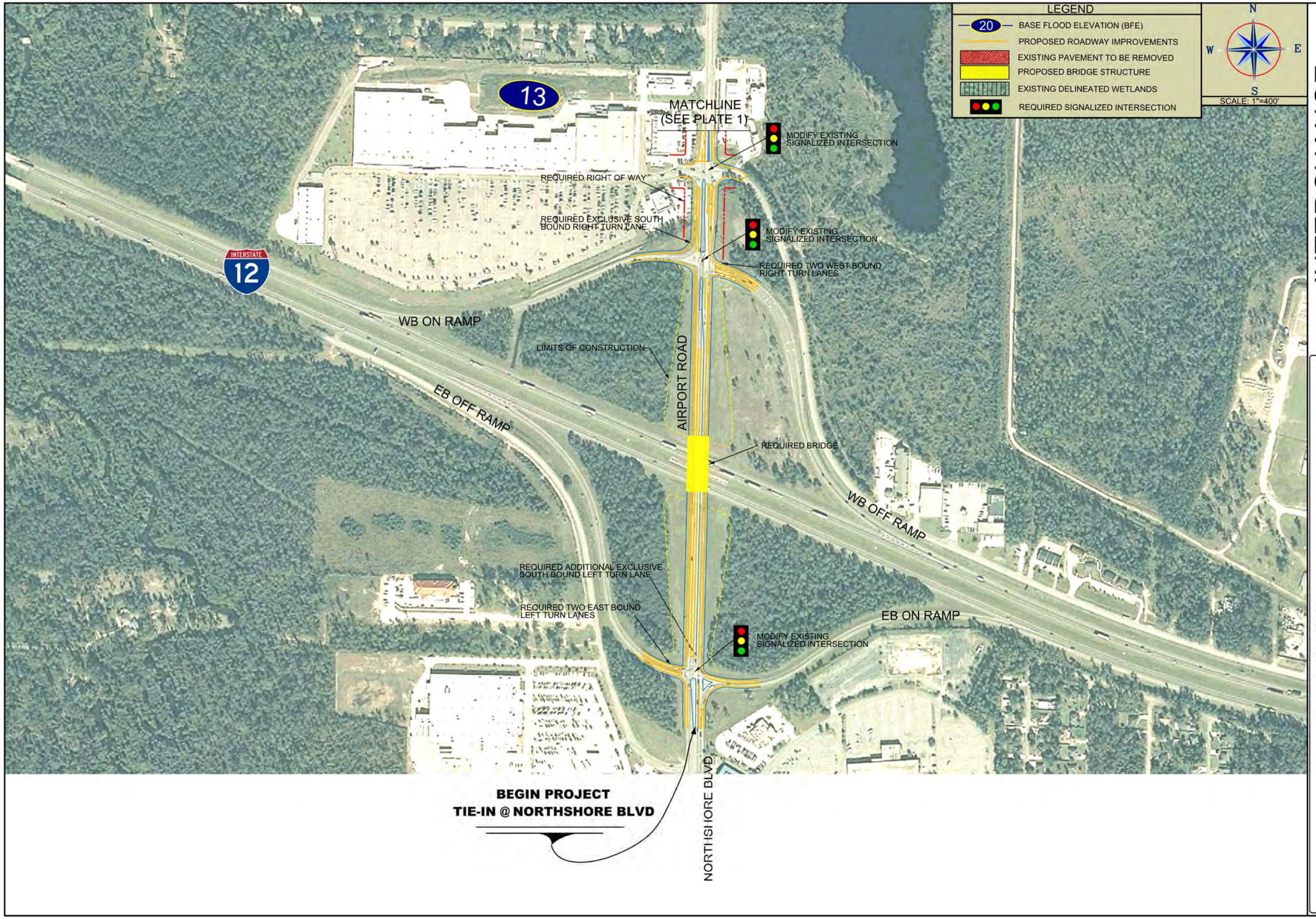
LICENSE NUMBER: 34923

TYPICAL BRIDGE SECTION

I-12 TO BUSH

ST. TAMMANY PARISH

ALTERNATIVE - J



INTERCHANGE PLAN

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - J

PLATE - 1

MEDIAN OPENING

PARTIAL MEDIAN OPENING

AS REQ'D.

AS REQ'D.

LEGEND

- 20 — BASE FLOOD ELEVATION (BFE)
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- FLOOD ZONE A
- FLOOD ZONE AE
- MITIGATION BANK
- REQUIRED SIGNALIZED INTERSECTION

W S N E

SCALE: 1"=1,000'

INTERSTATE 12

13

5010+00 5020+00 5030+00 5040+00 5050+00 5060+00 5070+00 5080+00 5090+00 5100+00 5110+00 5120+00 5130+00 5140+00 5150+00

MATCHLINE (SEE INTERCHANGE PLAN)

STA. 5013+78.30 REQ'D CULVERT CROSSING

STA. 5021+26.00 BEGIN REQ'D BRIDGE

STA. 5025+51.00 END REQ'D BRIDGE

STA. 5026+67.96 REQ'D CULVERT CROSSING

STA. 5038+63.83 REQ'D CULVERT CROSSING

LIMITS OF CONSTRUCTION

REQ'D. RIGHT OF WAY

LIMITS OF CONSTRUCTION

SEE INSET "A"

SEE NOTE 1

STA. 5090+61.45

P.C. 5100+30

P.I. 5104+83

P.T. 5109+36

STA. 5110+12 BEGIN LIMITED ACCESS

REQ'D. RIGHT OF WAY & LIMITED ACCESS

STA. 5138+38.04 REQ'D CULVERT CROSSING

MATCHLINE STA. 5150+00

R = 23000'

REQ'D. RIGHT OF WAY

STA. 5084+88.23 REQ'D CULVERT CROSSING

REQ'D RIGHT OF WAY & LIMITED ACCESS

STA. 5098+29.00 BEGIN REQ'D BRIDGE

STA. 5100+79.90 END REQ'D BRIDGE

STA. 5085+61.45

SIGHT TRIANGLES

STA. 5090+61.45

REQ'D. R/W

LIMITS OF CONSTRUCTION

REQ'D R/W & LIMITED ACCESS

INSET "A"
SCALE: 1" = 200'

NOTE 1: DESIGN EXCEPTION REQUIRED FOR MEDIAN OPENINGS LESS THAN 1/4 MILES APART. SPACING = 500 FT.

DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.

140 120 100 80 60 40 20 0 -20 -40

PROPOSED ROADWAY CLASSIFICATION (UA-2)

TRANSITION ZONE (ROADWAY CLASSIFICATION UA-2 TO RA-3)

LIBERTY BAYOU TRIBUTARY

LIBERTY BAYOU TRIBUTARY (FEMA TRIB 3)

STA. 5110+12

BEGIN ALIGNMENT J
P.V.I. STA.5013+93.00
ELEV. = 17.00'

P.V.I. STA.5020+00.00
ELEV. = 19.00'
300' V.C.

S = 0.00%

BFE = 13'

P.V.I. STA.5017+00.00
ELEV. = 17.00'
300' V.C.

EXIST. WATERWAY REQ'D (1) 60" CDP (OR EQUIVALENT CAPACITY) INV.= 8.00'

W.L. @ 13.00'

EXIST. WATERWAY REQ'D (1) 54" CDP (OR EQUIVALENT CAPACITY) INV.= 10.50'

EXIST. WATERWAY REQ'D BRIDGE (425 FT)

S = 0.00%

EXIST. WATERWAY REQ'D (1) 54" CDP (OR EQUIVALENT CAPACITY) INV.= 10.50'

P.V.I. STA.5068+00.00
ELEV. = 19.00'
300' V.C.

S = 0.88%

P.V.I. STA.5076+00.00
ELEV. = 26.00'
300' V.C.

S = 0.00%

BFE = 22'

EXISTING GROUND @ PGL

EXIST. WATERWAY REQ'D (2) 60" CDP (OR EQUIVALENT CAPACITY) INV.= 17.00'

P.V.I. STA.5089+00.00
ELEV. = 26.00'
300' V.C.

S = 0.25%

P.V.I. STA.5097+00.00
ELEV. = 28.00'
300' V.C.

W.L. @ 22.00'

BFE = 23'

EXIST. WATERWAY REQ'D BRIDGE (250 FT)

S = 0.00%

P.V.I. STA.5143+00.00
ELEV. = 28.00'
300' V.C.

EXIST. WATERWAY REQ'D (1) 54" CDP (OR EQUIVALENT CAPACITY) INV.= 18.50

S = 0.00%

P.V.I. STA.5148+00.00
ELEV. = 33.00'
300' V.C.

S = 1.00%

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ENGINEER: CORY D. BELDEN

LICENSE NUMBER: 34923

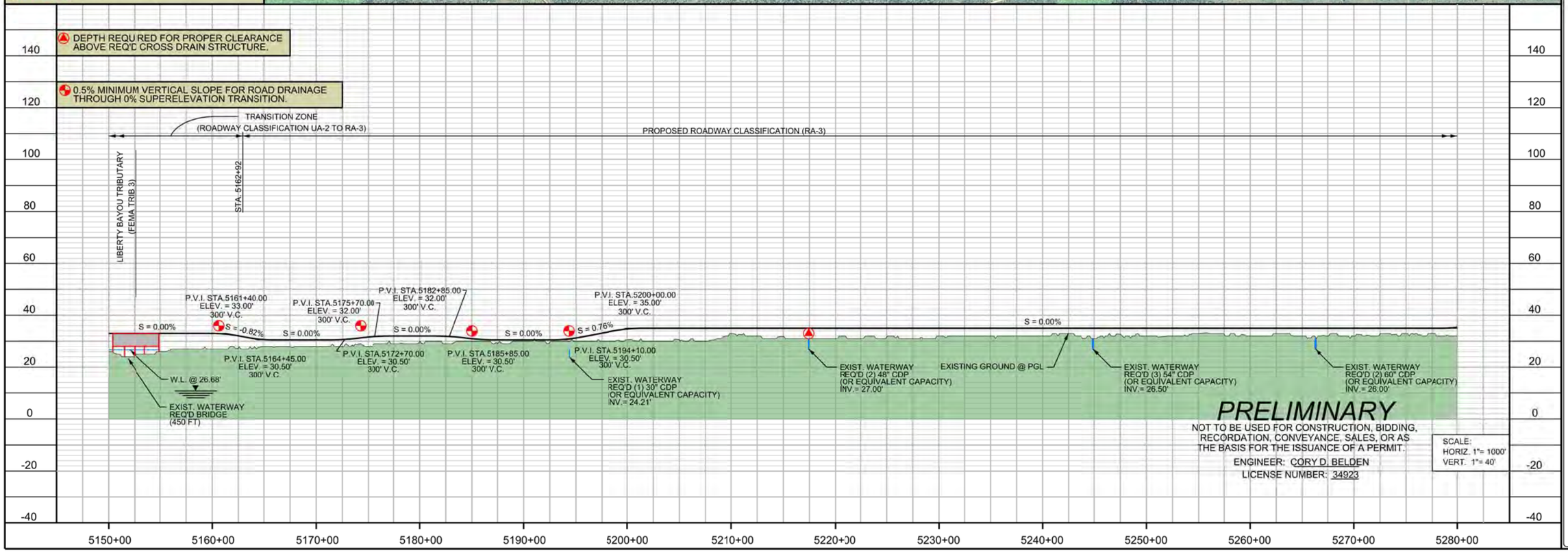
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

5010+00 5020+00 5030+00 5040+00 5050+00 5060+00 5070+00 5080+00 5090+00 5100+00 5110+00 5120+00 5130+00 5140+00 5150+00

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - J

PLATE - 2



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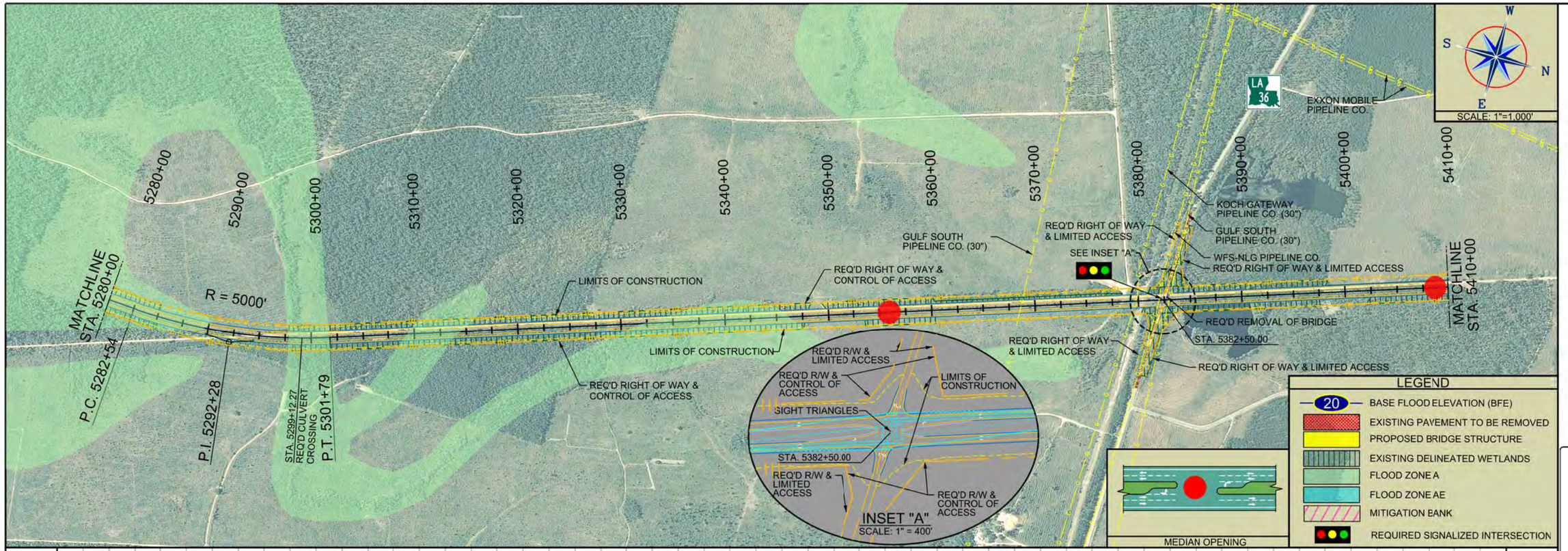
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - J



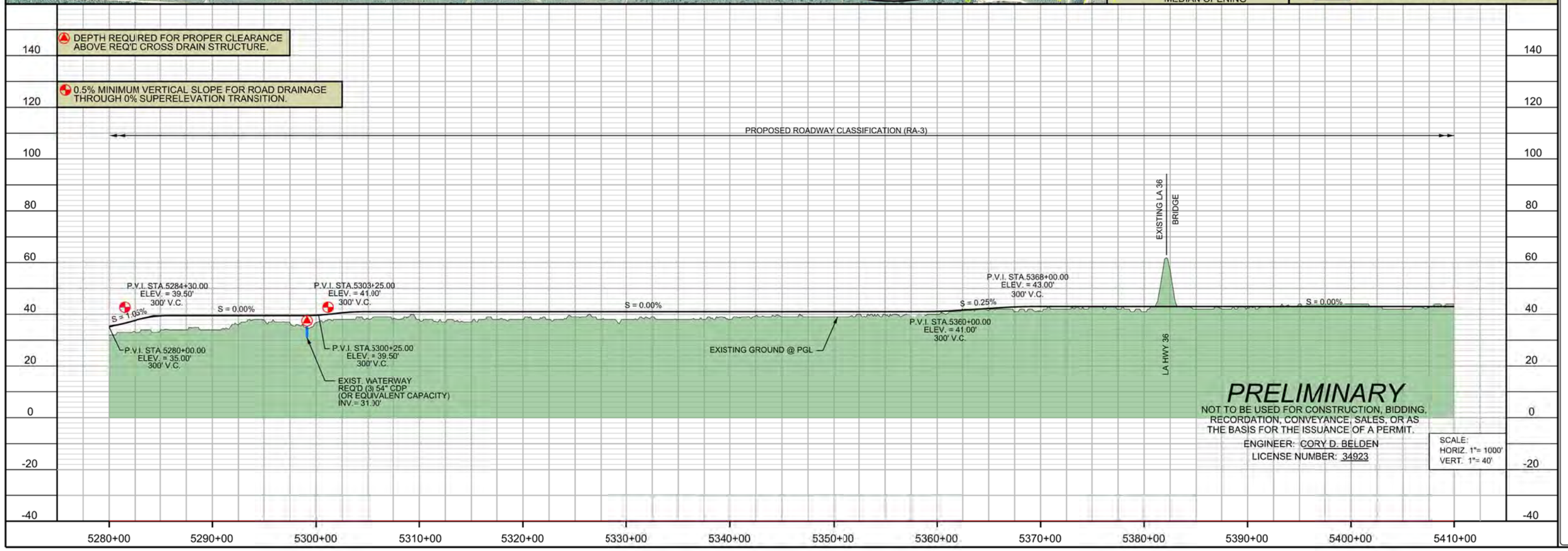
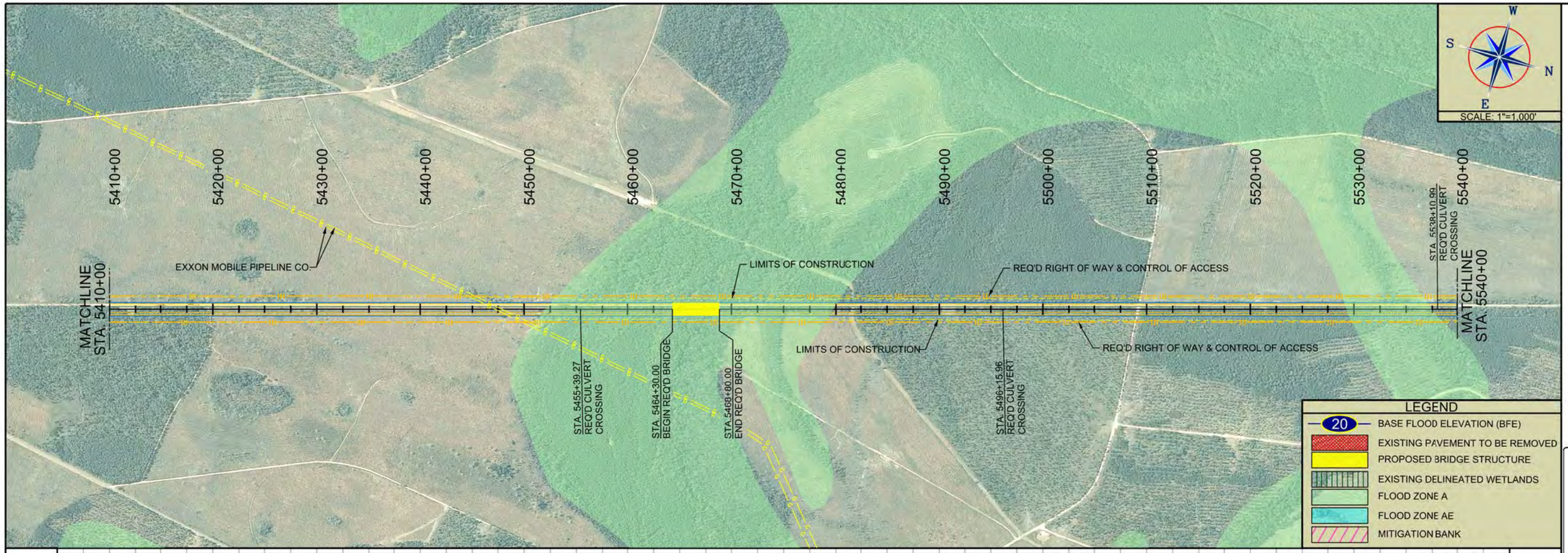
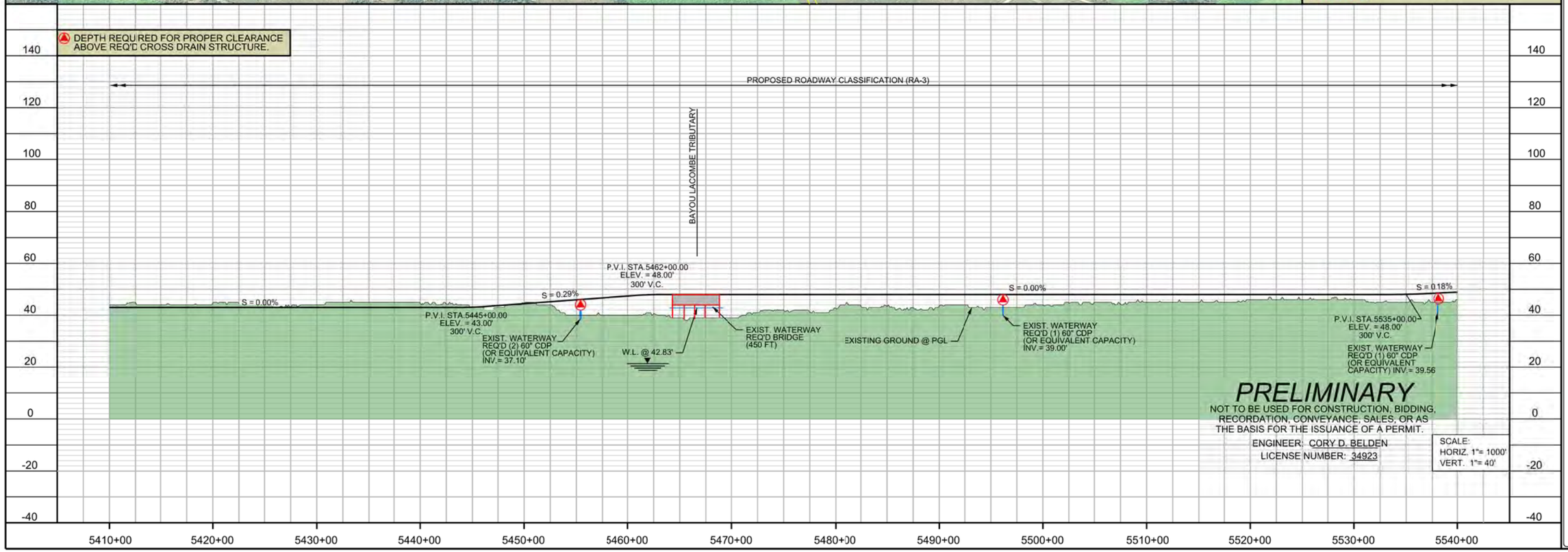


PLATE - 3

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - J





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ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

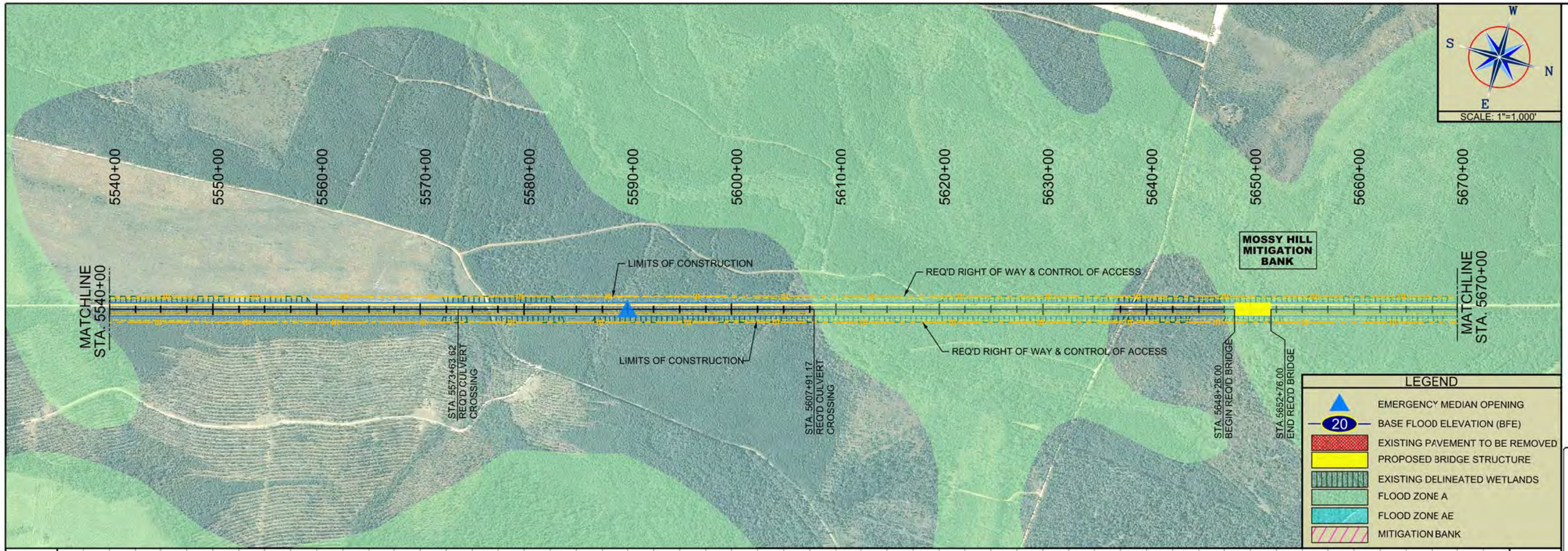
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

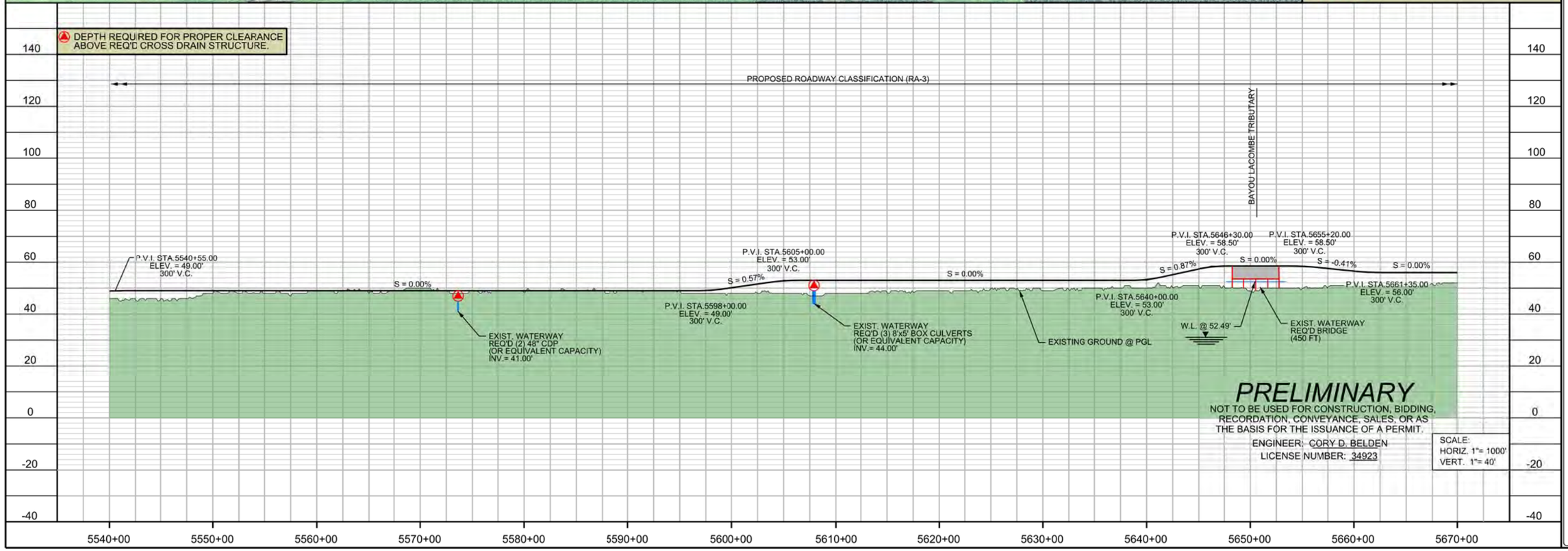
PLATE - 4

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - J

PLATE - 5





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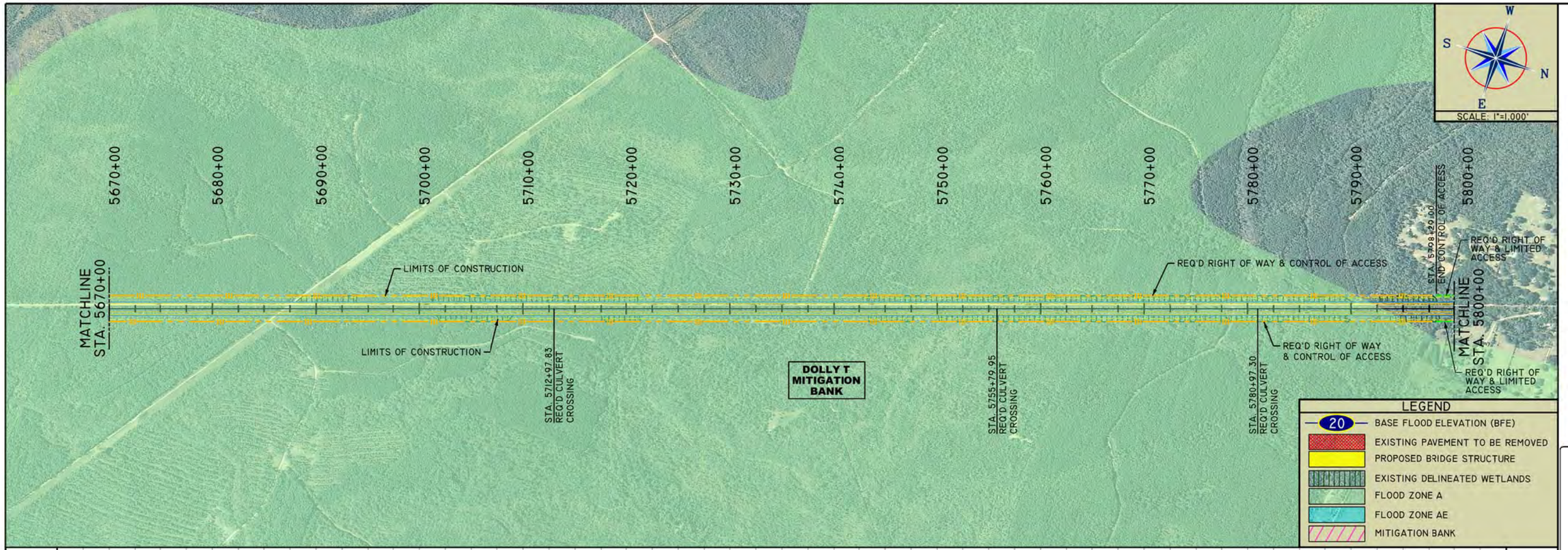
ENGINEER: CORY D. BELDEN

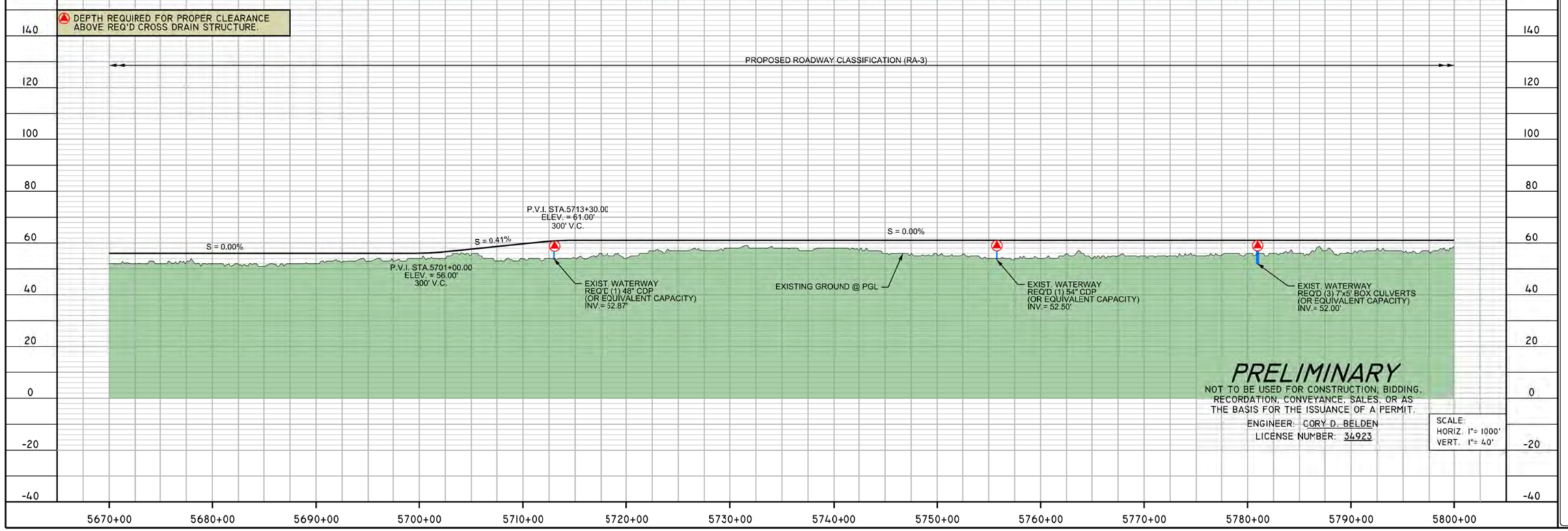
LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - J





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LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 6

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - J

PLATE - 7

MOSSY HILL ROAD

LA 435

5800+00 5810+00 5820+00 5830+00 5840+00 5850+00 5860+00 5870+00 5880+00 5890+00 5900+00 5910+00 5920+00 5930+00

63 62 61 52 51 50

STA. 5831+96.53

SCALE: 1"=1,000'

DOLLY T MITIGATION BANK

REQ'D RIGHT OF WAY & LIMITED ACCESS

KINING ROAD

REQ'D RIGHT OF WAY

REQ'D RIGHT OF WAY & LIMITED ACCESS

SEE INSET "A"

TYCER LANE

MATCHLINE STA. 5800+00

RHEUSAW PARKER ROAD

PERCY HERRI ROAD

REQ'D RIGHT OF WAY & LIMITED ACCESS

STA. 5806+29.00 END LIMITED ACCESS

REQ'D RIGHT OF WAY

STA. 5820+69.00 BEGIN LIMITED ACCESS

STA. 5839+21.00 BEGIN REQ'D BRIDGE

BOYD DAVIS

STA. 5864+21.00 END REQ'D BRIDGE

STA. 5865+30.00 END LIMITED ACCESS

REQ'D RIGHT OF WAY

LIMITS OF CONSTRUCTION

REQ'D RIGHT OF WAY & LIMITED ACCESS

STA. 5903+29.00 BEGIN CONTROL OF ACCESS

REQ'D RIGHT OF WAY & CONTROL OF ACCESS

STA. 5926+99.68 REQ'D CULVERT CROSSING

MATCHLINE STA. 5930+00

REQ'D RIGHT OF WAY & LIMITED ACCESS

STA. 5880+93.20 REQ'D CULVERT CROSSING

ED TALLEY ROAD

STA. 5893+29.00 BEGIN LIMITED ACCESS

REQ'D RIGHT OF WAY & CONTROL OF ACCESS

INSET "A"
SCALE: 1" = 400'

REQ'D R/W
REQ'D R/W & LIMITED ACCESS
SIGHT TRIANGLES
STA. 5831+96.53
REQ'D R/W & LIMITED ACCESS
LIMITS OF CONSTRUCTION
REQ'D R/W

MEDIAN OPENING

LEGEND

- 20 — BASE FLOOD ELEVATION (BFE)
- EXISTING PAVEMENT TO BE REMOVED
- PROPOSED BRIDGE STRUCTURE
- EXISTING DELINEATED WETLANDS
- FLOOD ZONE A
- FLOOD ZONE AE
- MITIGATION BANK

DEPTH REQUIRED FOR PROPER CLEARANCE ABOVE REQ'D CROSS DRAIN STRUCTURE.

PROPOSED ROADWAY CLASSIFICATION (RA-3)

TALISHEEK CREEK

LA HWY 435

BFE = 50'
W.L. @ 50.00'

EXIST. WATERWAY REC'D BRIDGE (500 FT)

S = 0.00%

P.V.I. STA.5868+20.00
ELEV. = 61.00'
300' V.C.

S = 0.33%

P.V.I. STA.5880+30.00
ELEV. = 65.00'
300' V.C.

S = 0.00%

EXIST. WATERWAY REQ'D (2) 60" CDP (OR EQUIVALENT CAPACITY) INV.= 56.00'

P.V.I. STA.5902+30.00
ELEV. = 65.00'
300' V.C.

S = 0.19%

EXISTING GROUND @ PGL

P.V.I. STA.5923+30.00
ELEV. = 69.00'
300' V.C.

S = 0.00%

EXIST. WATERWAY REQ'D (4) 7'x5' BOX CULVERTS (OR EQUIVALENT CAPACITY) INV.= 60.00'

140 120 100 80 60 40 20 0 -20 -40

5800+00 5810+00 5820+00 5830+00 5840+00 5850+00 5860+00 5870+00 5880+00 5890+00 5900+00 5910+00 5920+00 5930+00

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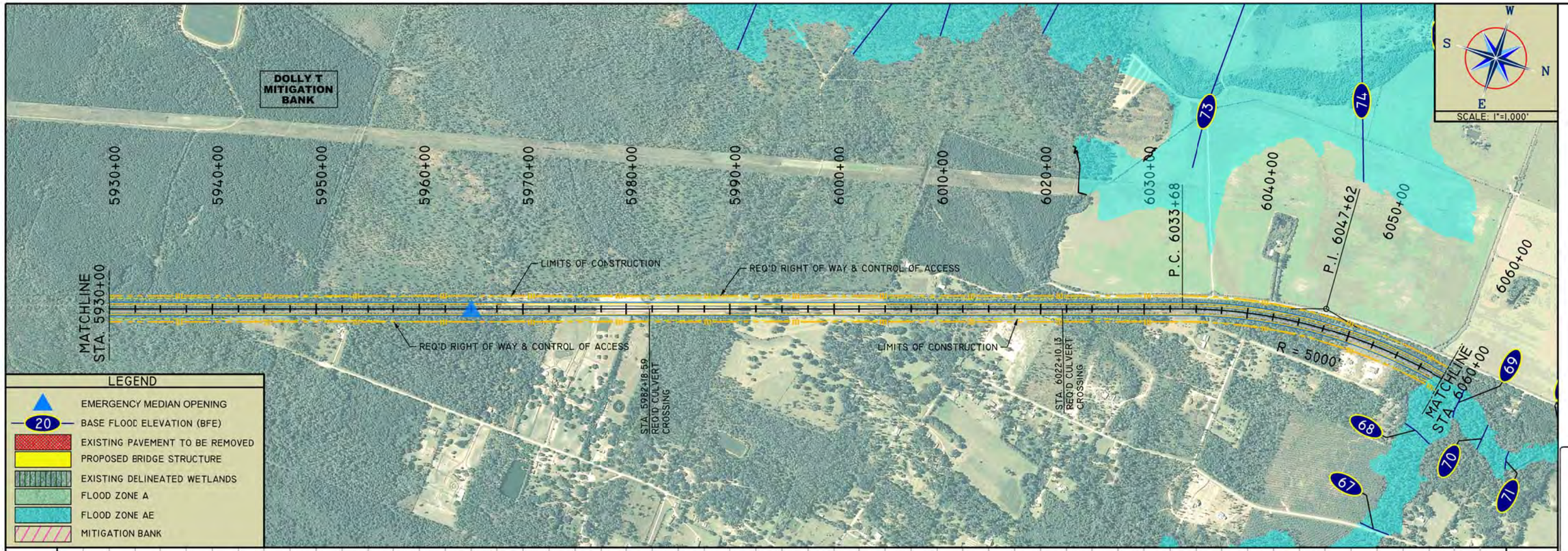
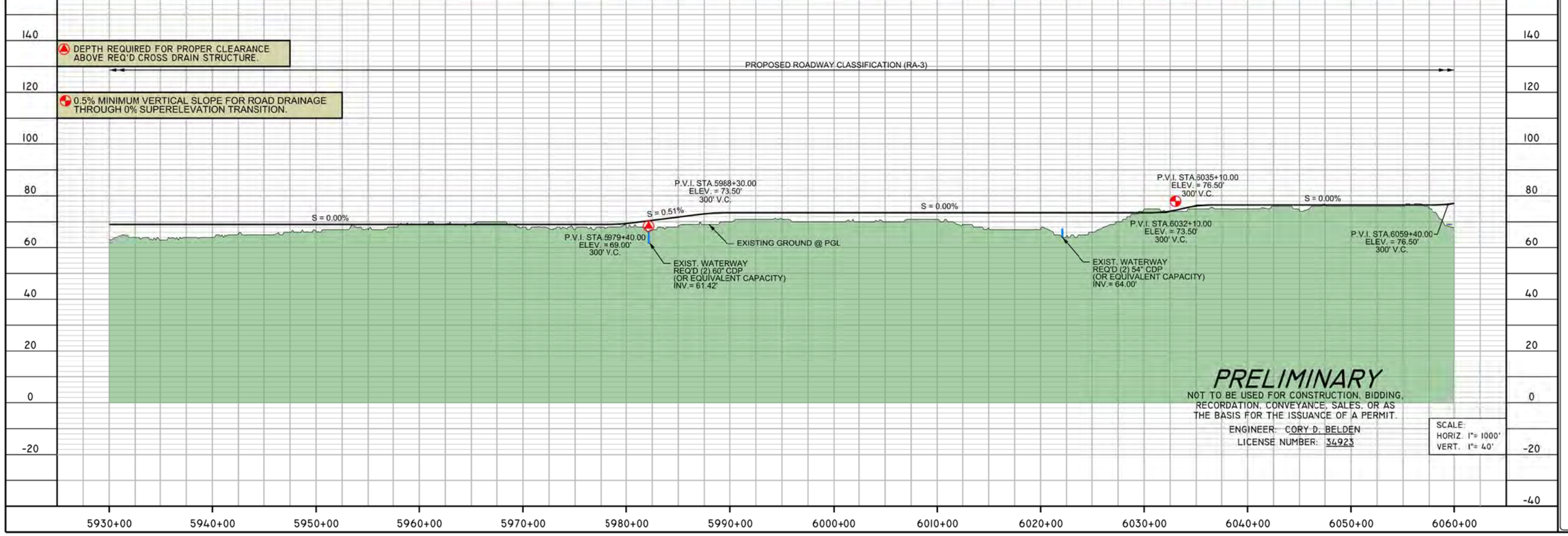
ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - J





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ENGINEER: CORY D. BELDEN

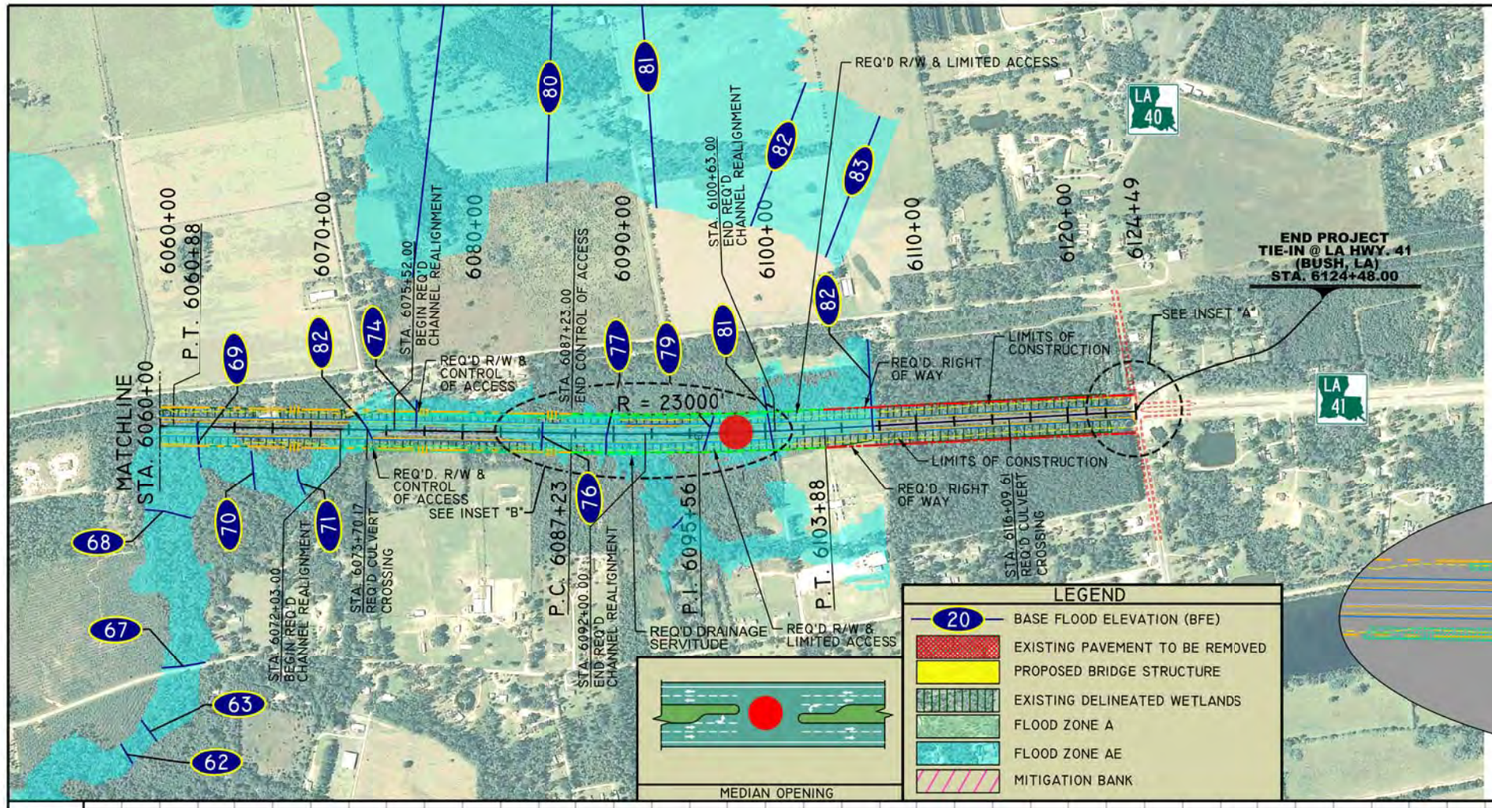
LICENSE NUMBER: 34923

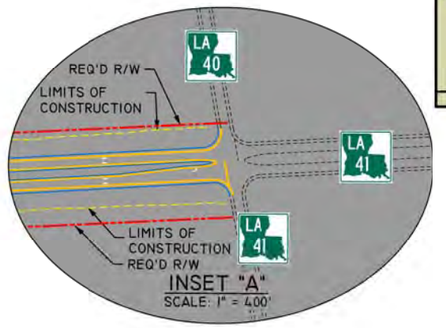
SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

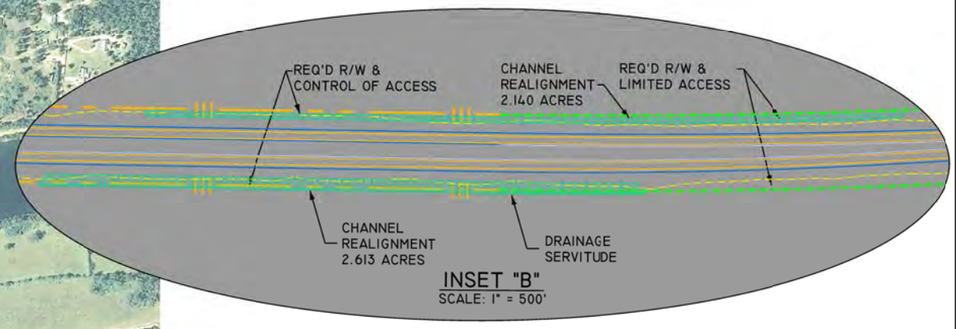
PLATE - 8

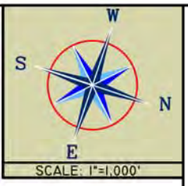
I-12 TO BUSH
ST. TAMMANY PARISH

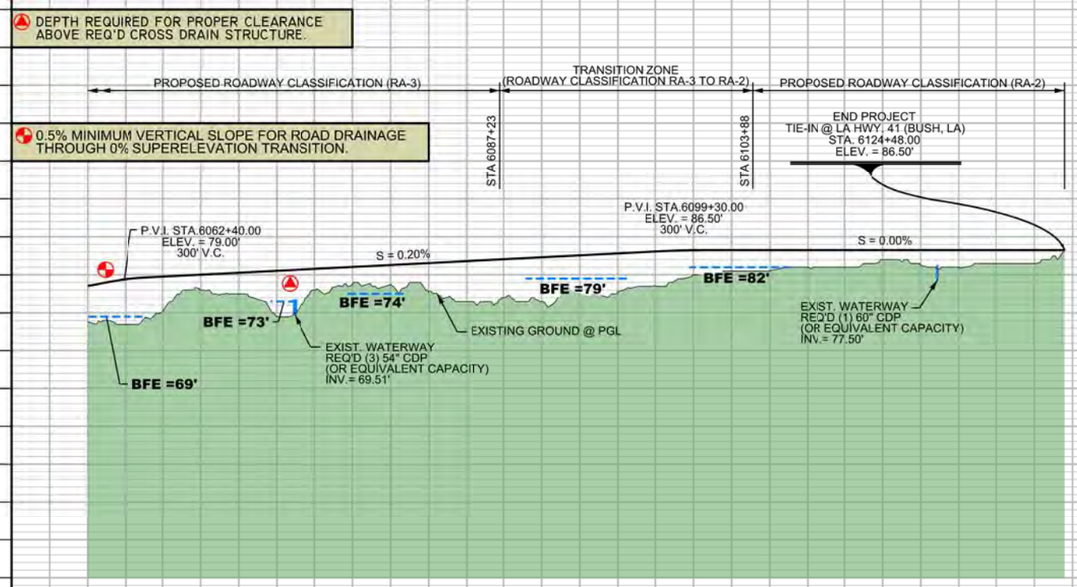
ALTERNATIVE - J











PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

ENGINEER: CORY D. BELDEN
LICENSE NUMBER: 34923

SCALE:
HORIZ. 1"= 1000'
VERT. 1"= 40'

PLATE - 9

I-12 TO BUSH
ST. TAMMANY PARISH

ALTERNATIVE - J

APPENDIX B

TRAFFIC DATA

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- X — Average Daily Traffic

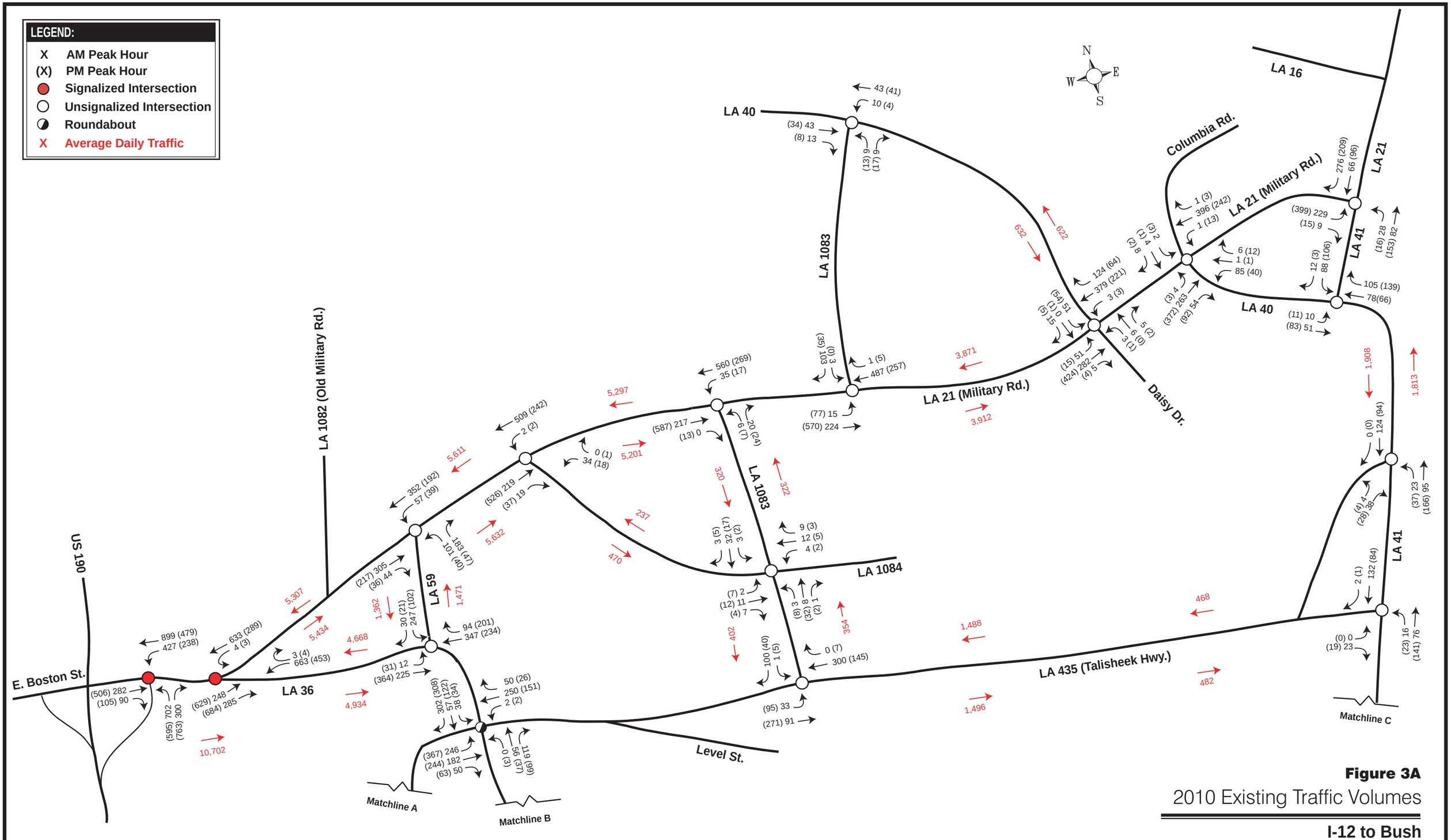


Figure 3A

2010 Existing Traffic Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- X — Average Daily Traffic

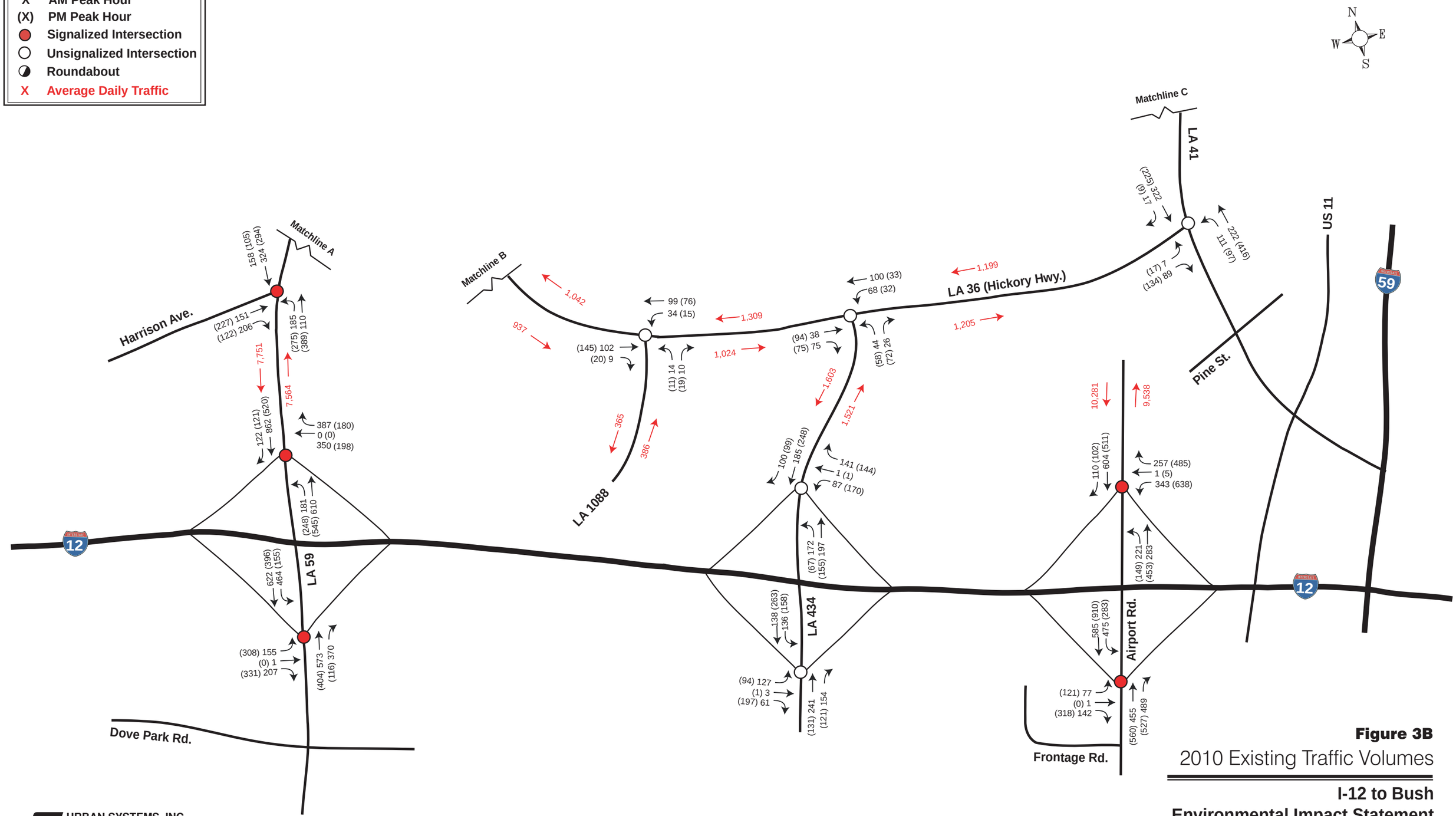


Figure 3B

2010 Existing Traffic Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout

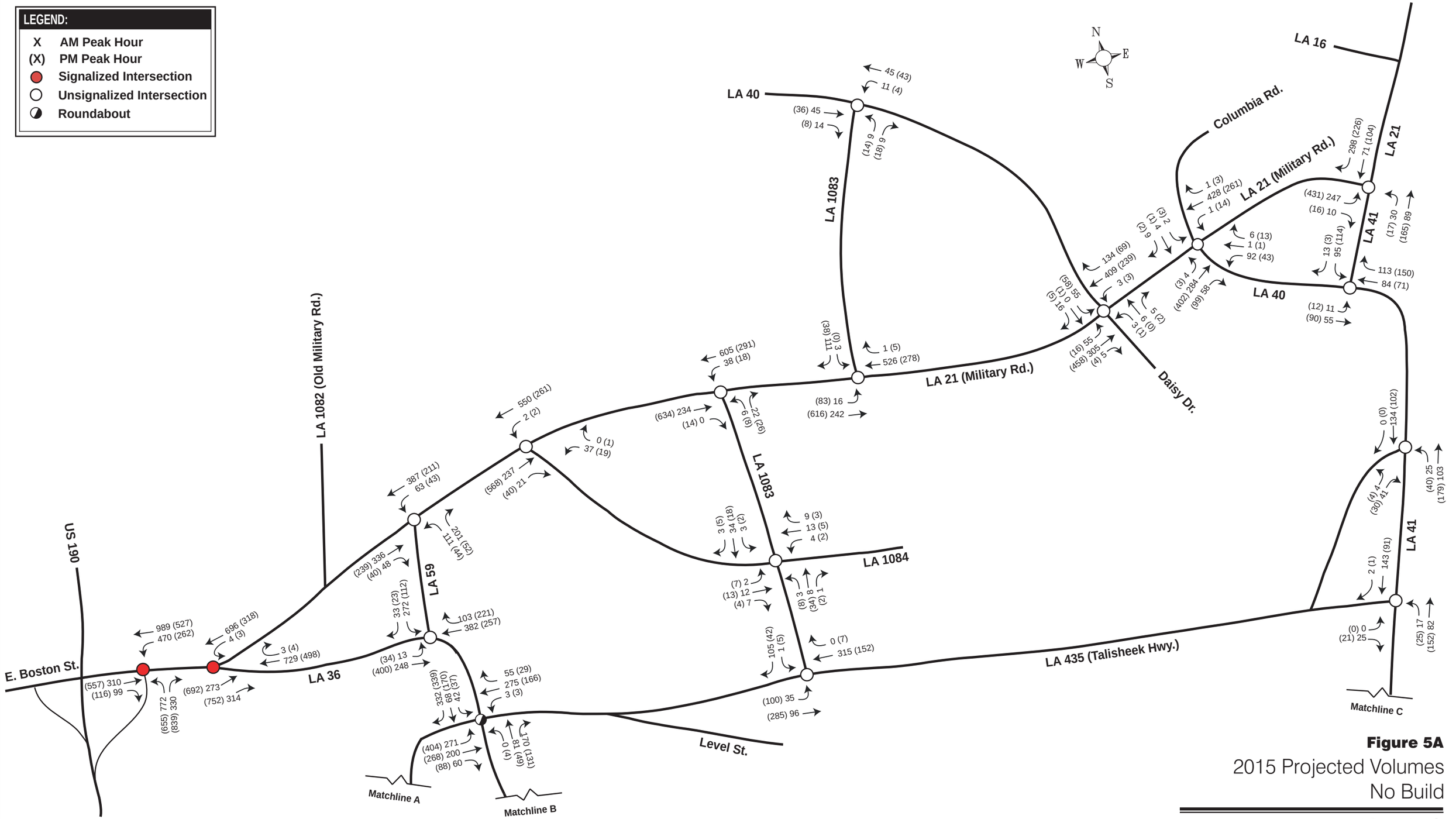


Figure 5A

2015 Projected Volumes
No Build

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout

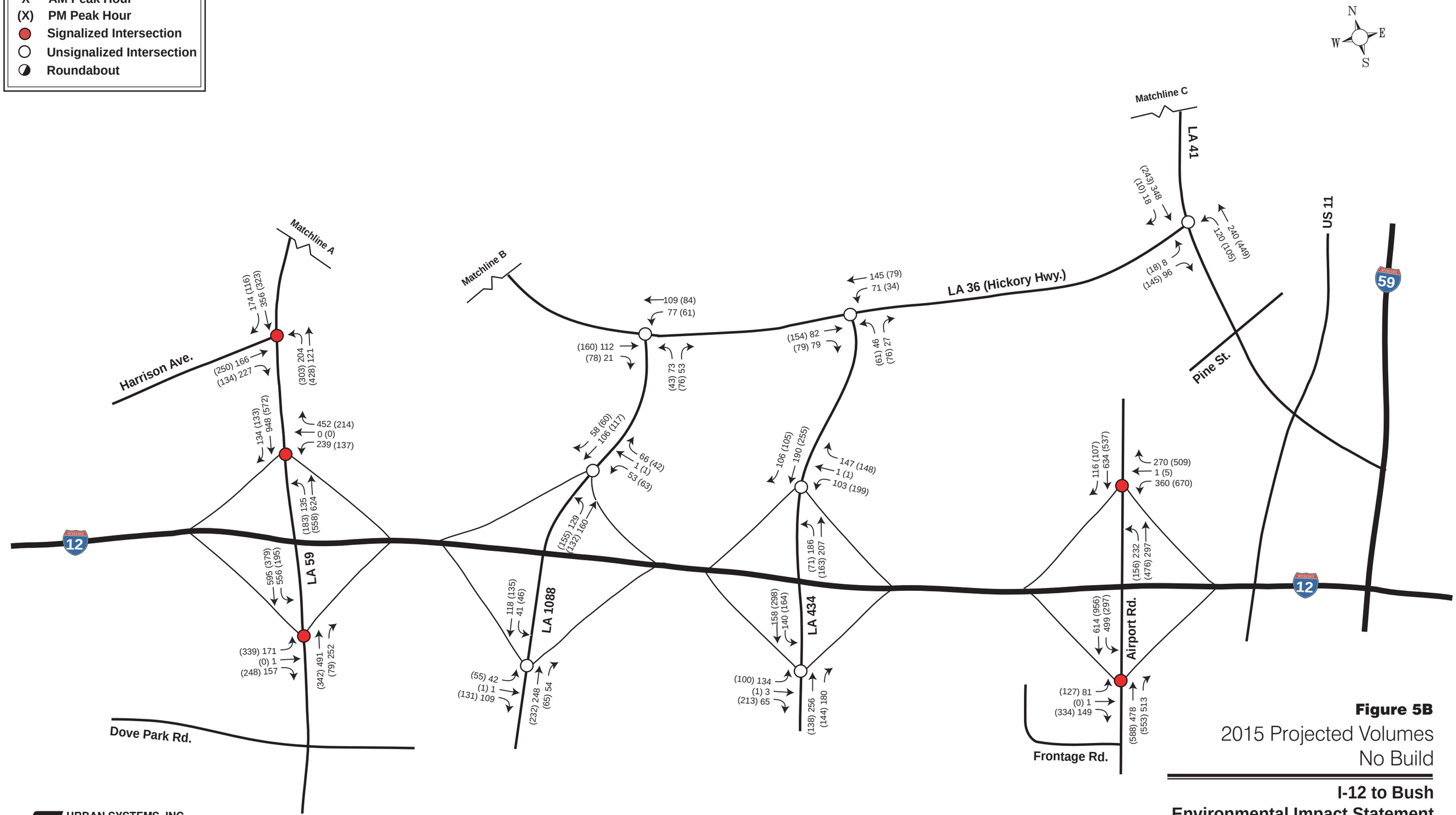


Figure 5B

2015 Projected Volumes
No Build

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout

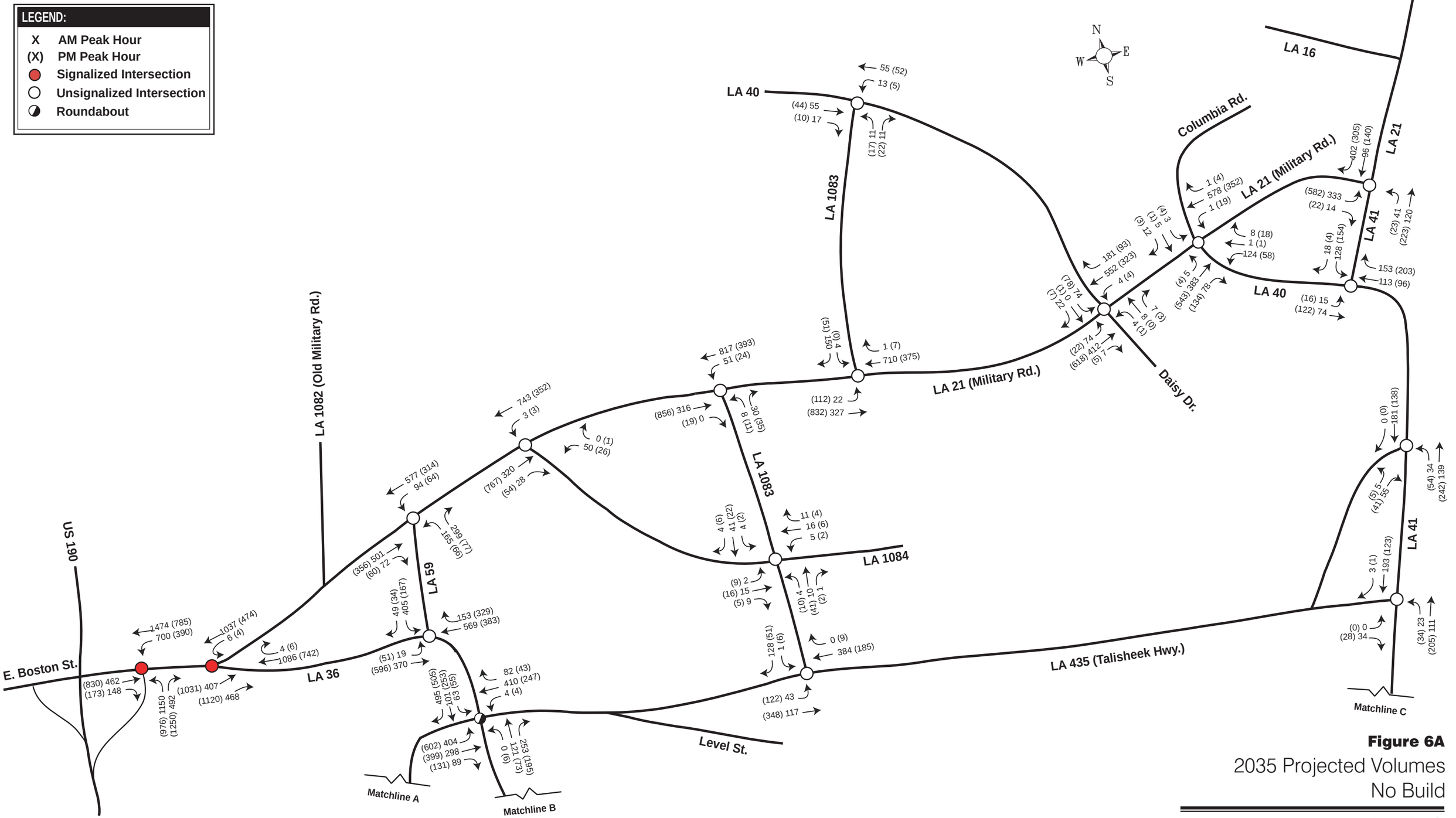


Figure 6A

2035 Projected Volumes
No Build

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

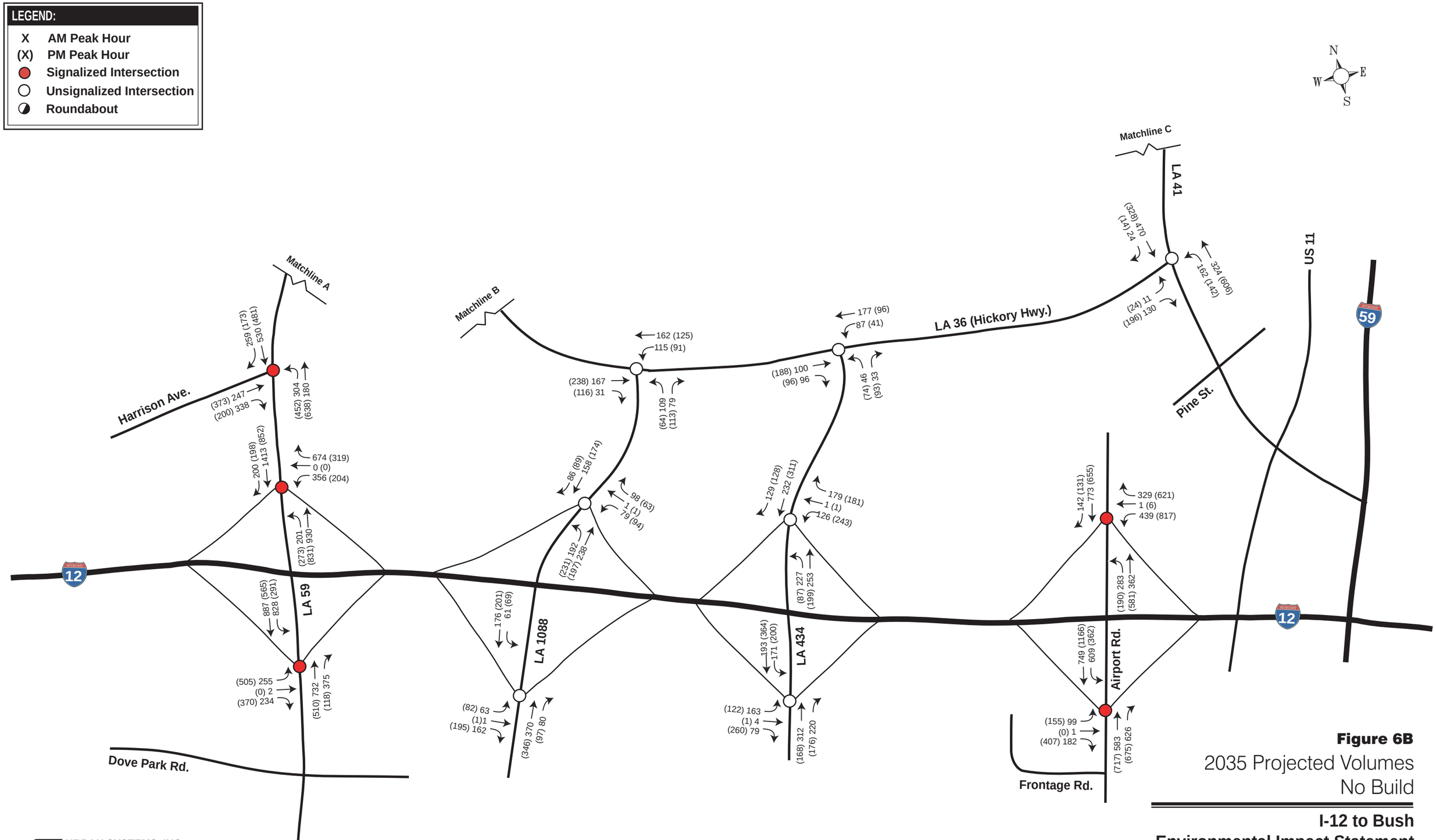


Figure 6B

2035 Projected Volumes
No Build

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X AM Peak Hour
- (X) PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative B/O

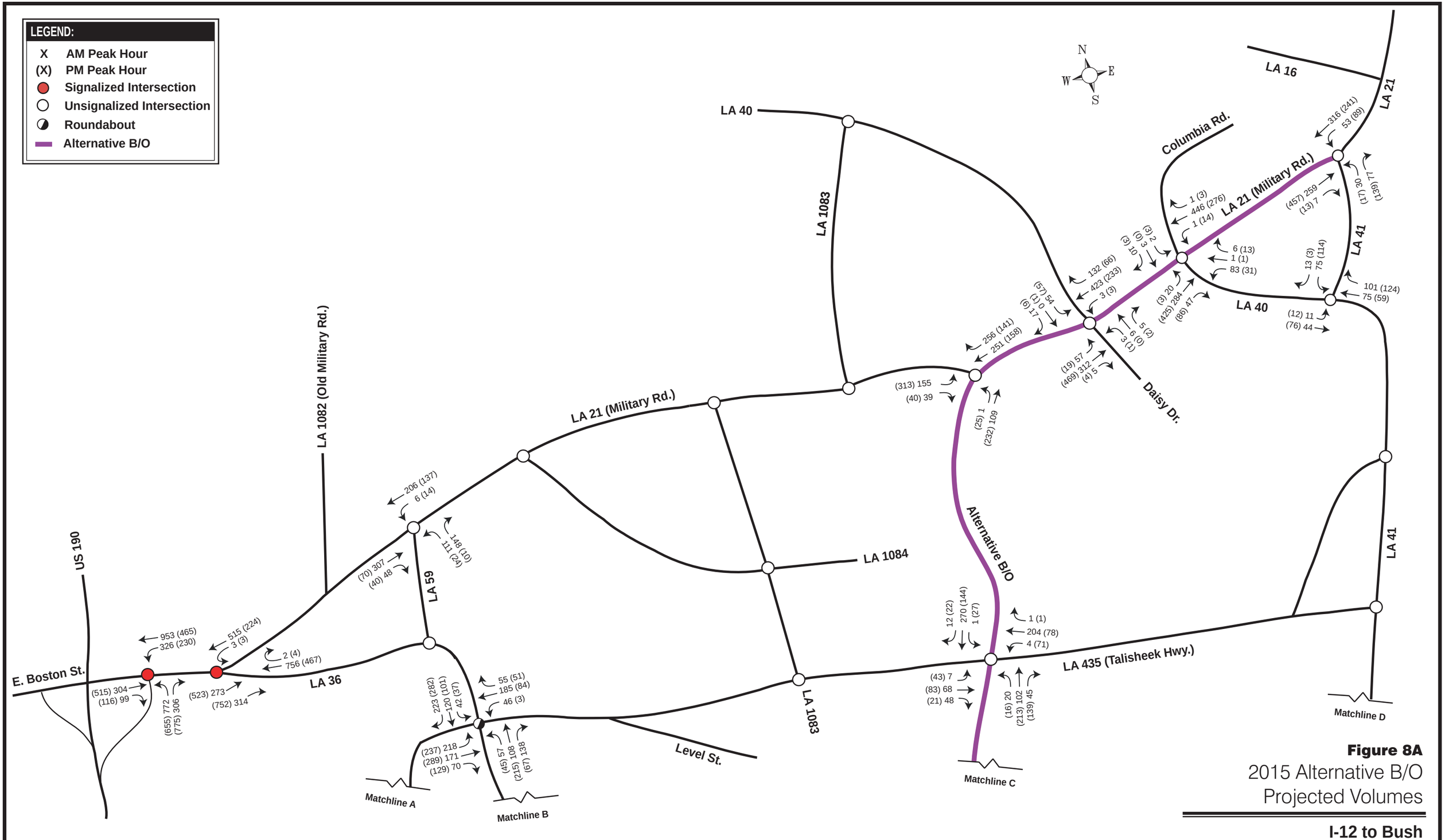


Figure 8A
2015 Alternative B/O
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X AM Peak Hour
- (X) PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative B/O

Matchline A

Matchline B

Matchline C

Matchline D

Harrison Ave.

LA 36 (Hickory Hwy.)

LA 41

LA 59

LA 1088

LA 434

US 11

Pine St.

Airport Rd.

Dove Park Rd.

Frontage Rd.

I-12

I-59

N

E

S

W

116 (114)
823 (488)
398 (190)
0 (0)
239 (137)
(183) 135
(477) 582
531 (324)
495 (166)
(314) 160
(0) 1
(248) 157
(286) 460
(57) 283
58 (102)
246 (115)
17 (18)
(173) 48
(193) 120
(126) 158
56 (26)
148 (24)
16 (18)
(167) 109
(153) 58
(21) 8
2 (20)
126 (162)
419 (245)
2 (1)
(321) 161
(45) 226
385 (79)
329 (343)
156 (127)
1 (1)
53 (63)
(155) 129
(369) 234
208 (249)
179 (145)
(213) 116
(1) 1
(131) 109
(310) 248
(65) 54
15 (9)
316 (233)
(17) 5
(143) 72
522 (418)
114 (105)
95 (105)
169 (218)
139 (118)
1 (1)
103 (199)
(71) 197
(163) 196
147 (274)
130 (151)
(100) 132
(1) 3
(213) 61
(138) 256
(144) 180

Figure 8B
2015 Alternative B/O
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative P

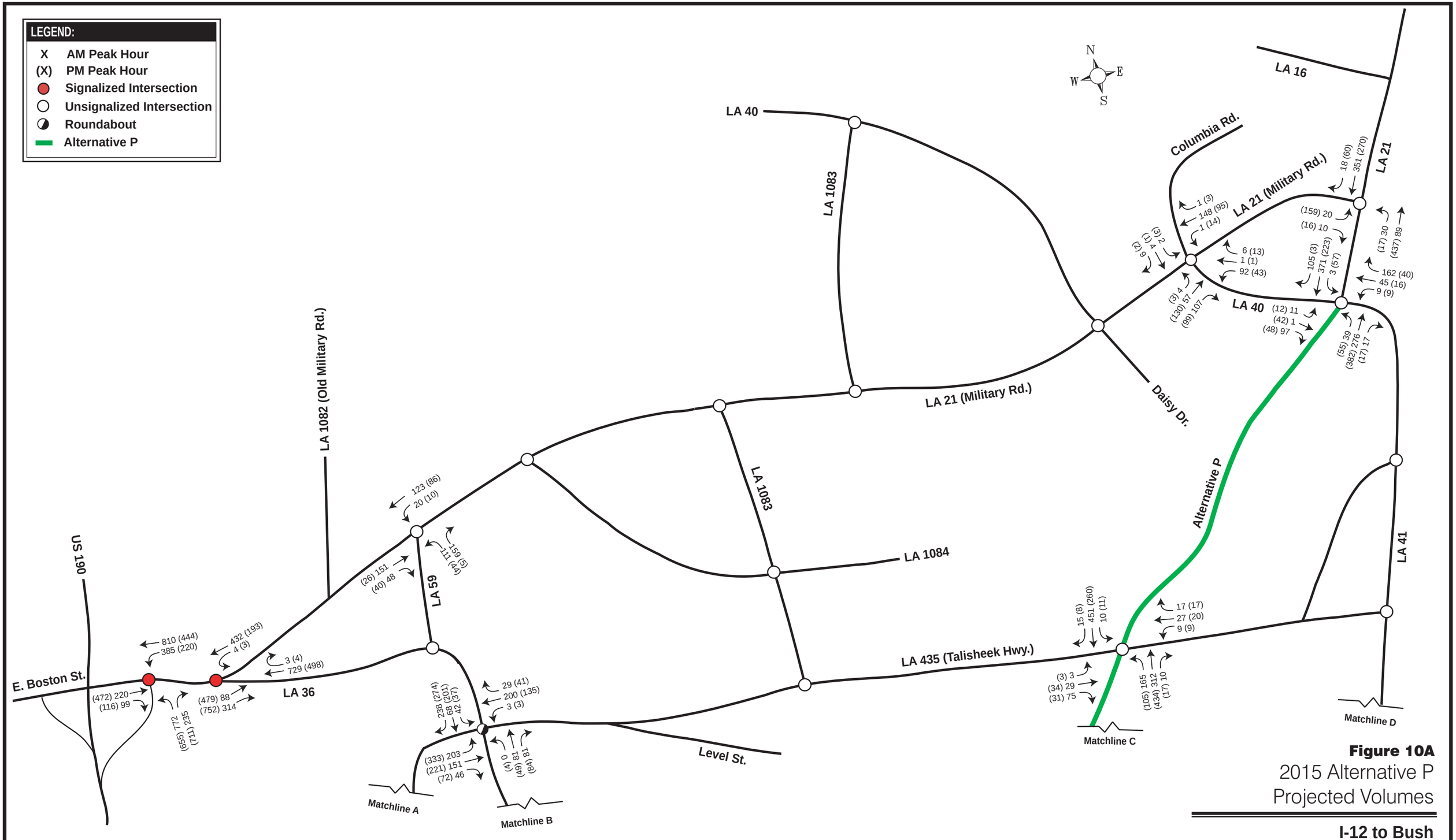


Figure 10A
2015 Alternative P
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

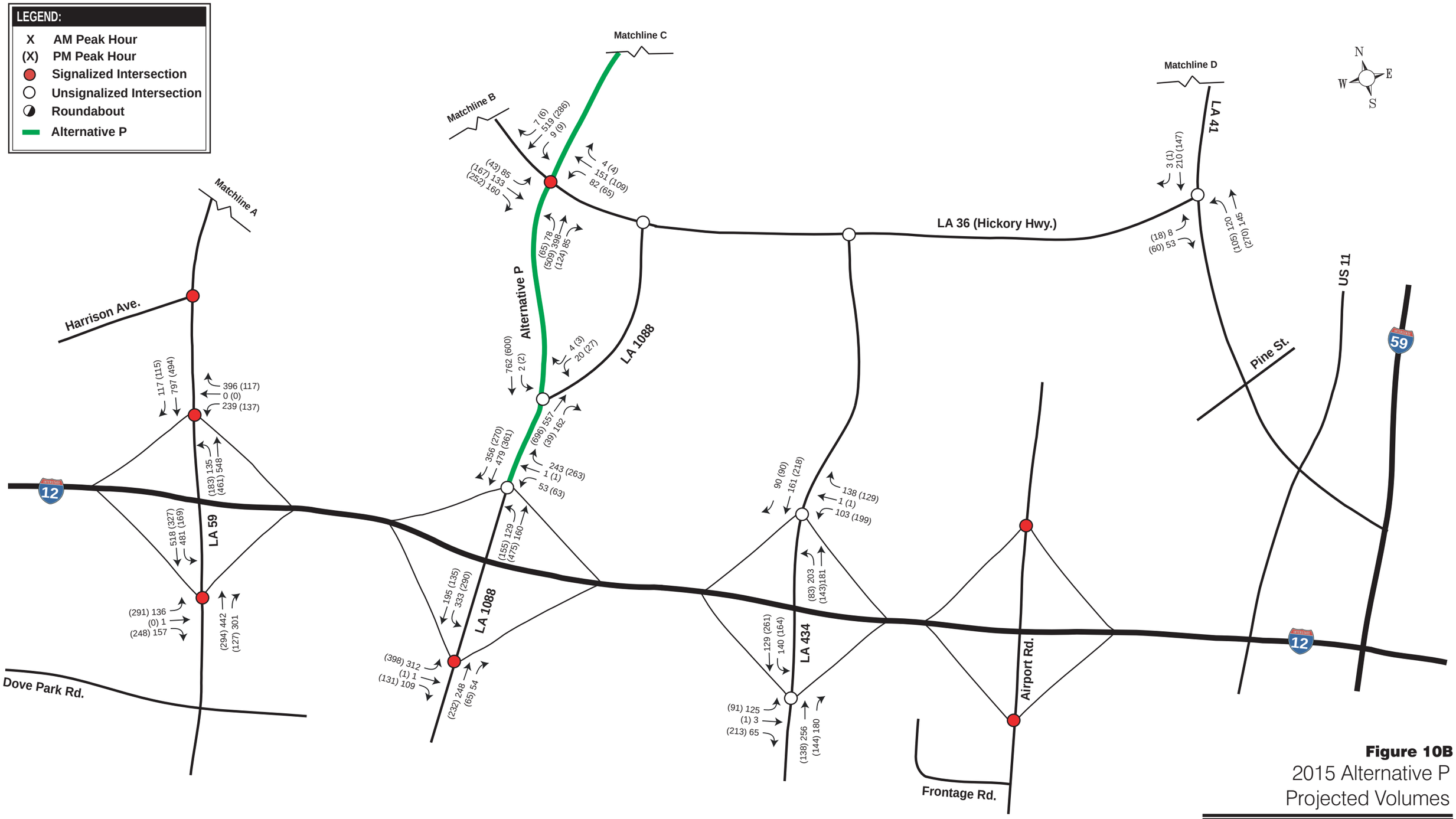


Figure 10B
2015 Alternative P
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X AM Peak Hour
- (X) PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative Q

N W E S

LA 40
LA 1083
LA 16
Columbia Rd.
LA 21
LA 21 (Military Rd.)
LA 41
LA 40
Daisy Dr.
Alternative Q
LA 1082 (Old Military Rd.)
US 190
LA 59
LA 1084
LA 36
E. Boston St.
Level St.
LA 435 (Talisheek Hwy.)
Matchline A
Matchline B
Matchline C
Matchline D

314 (160)
27 (15)
(93) 302
(40) 48
111 (44)
163 (5)
940 (493)
447 (245)
623 (267)
4 (3)
3 (4)
729 (498)
(498) 294
(116) 99
(655) 772
(752) 312
(546) 239
(752) 314
296 (311)
68 (170)
42 (37)
55 (29)
217 (150)
3 (3)
(349) 233
(256) 170
(100) 72
(11) 17
(4) 81
525 (104)
179 (141)
190 (189)
1 (3)
309 (176)
1 (14)
(231) 174
(16) 10
(3) 2
(1) 4
(2) 9
6 (13)
1 (1)
90 (41)
13 (3)
207 (130)
8 (73)
(17) 30
(165) 169
62 (44)
47 (23)
2 (2)
(3) 4
(202) 211
(99) 59
(12) 11
(46) 7
(44) 48
(45) 40
(303) 147
(4) 5
2 (3)
250 (169)
5 (4)
8 (7)
34 (30)
7 (7)
(2) 1
(6) 16
(8) 44
(39) 87
(343) 183
(5) 4

Figure 11A
2015 Alternative Q
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X AM Peak Hour
- (X) PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative Q

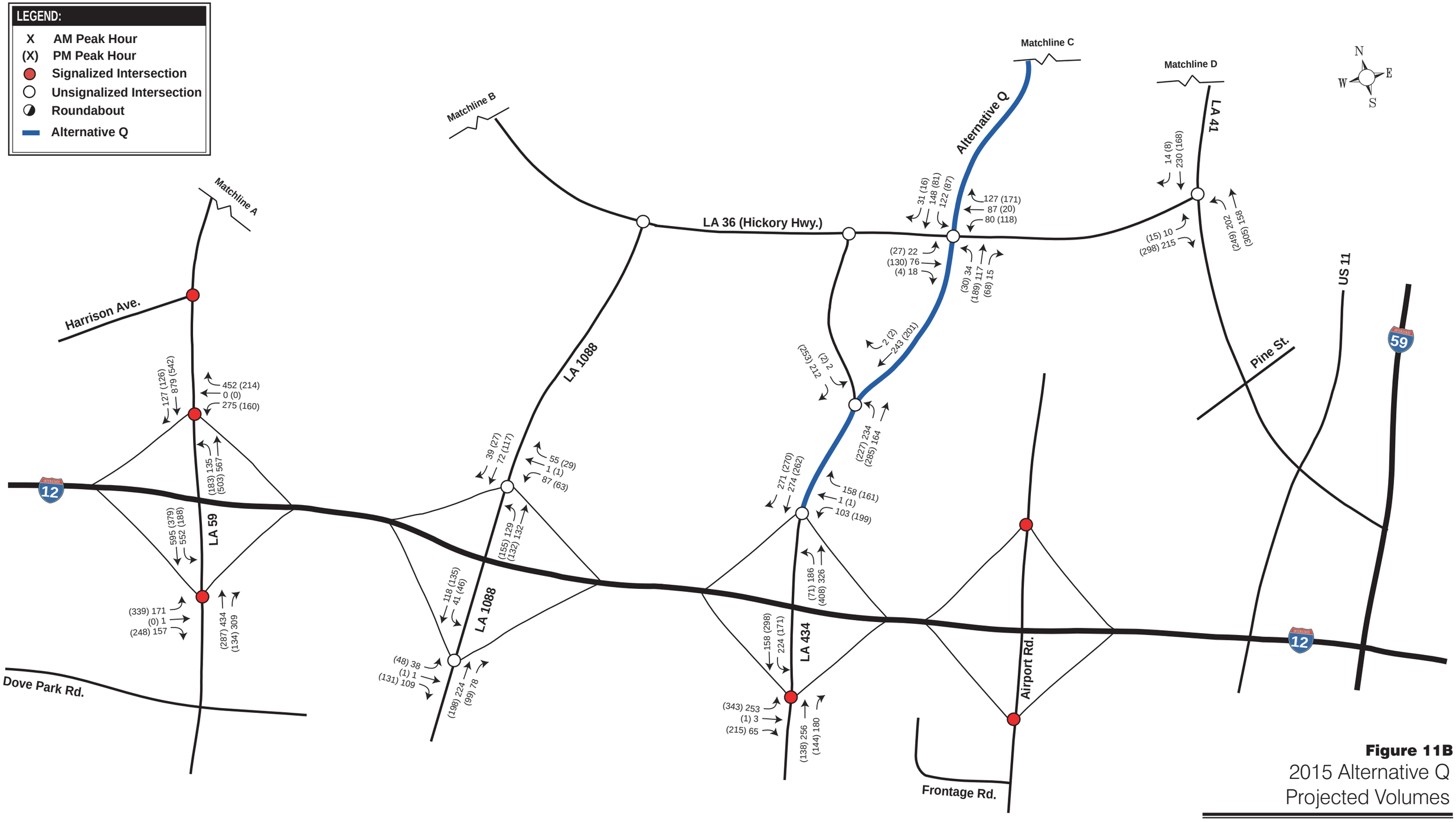


Figure 11B
2015 Alternative Q
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X AM Peak Hour
- (X) PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative J

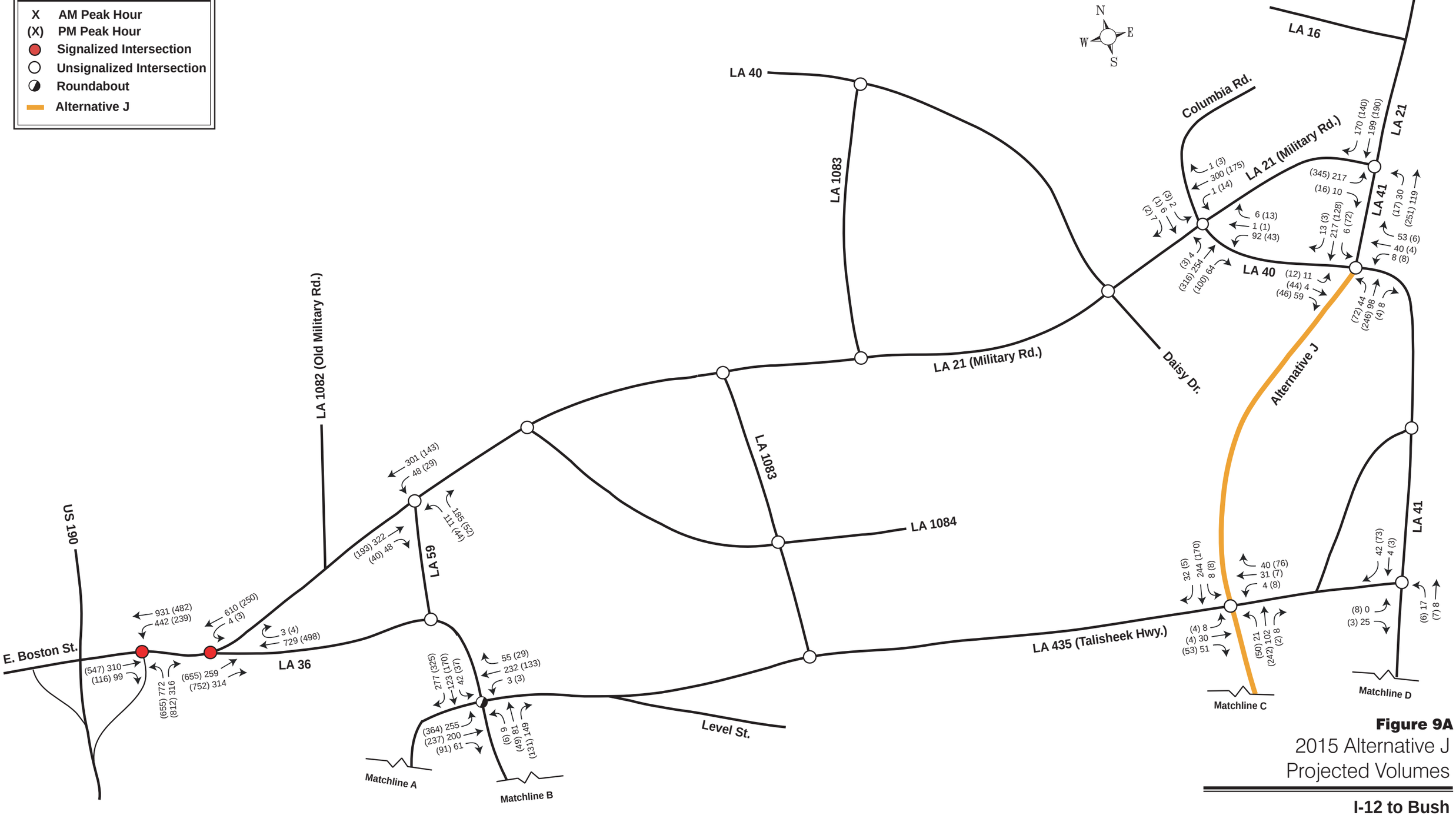


Figure 9A
2015 Alternative J
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative J

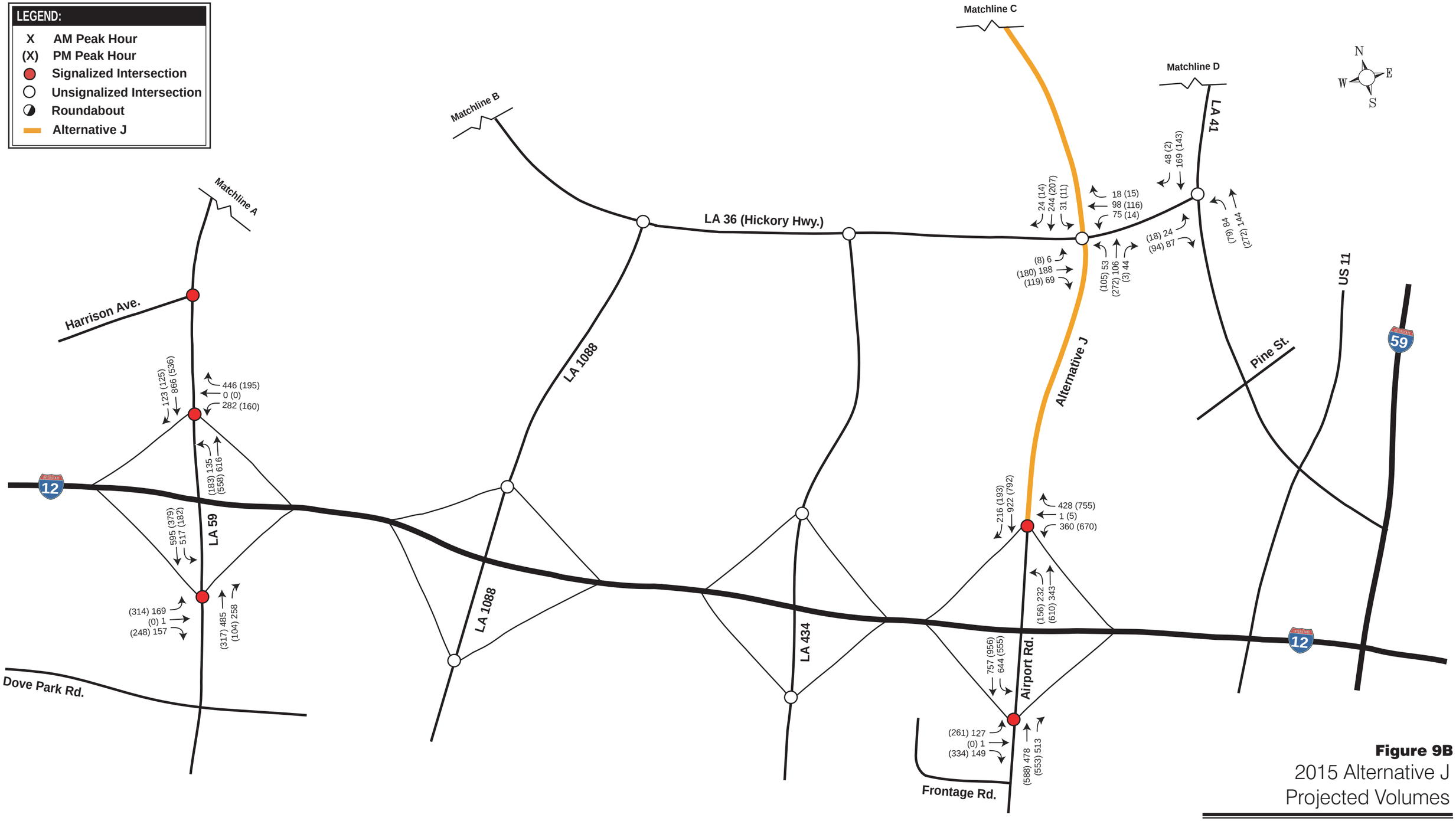


Figure 9B
2015 Alternative J
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative B/O

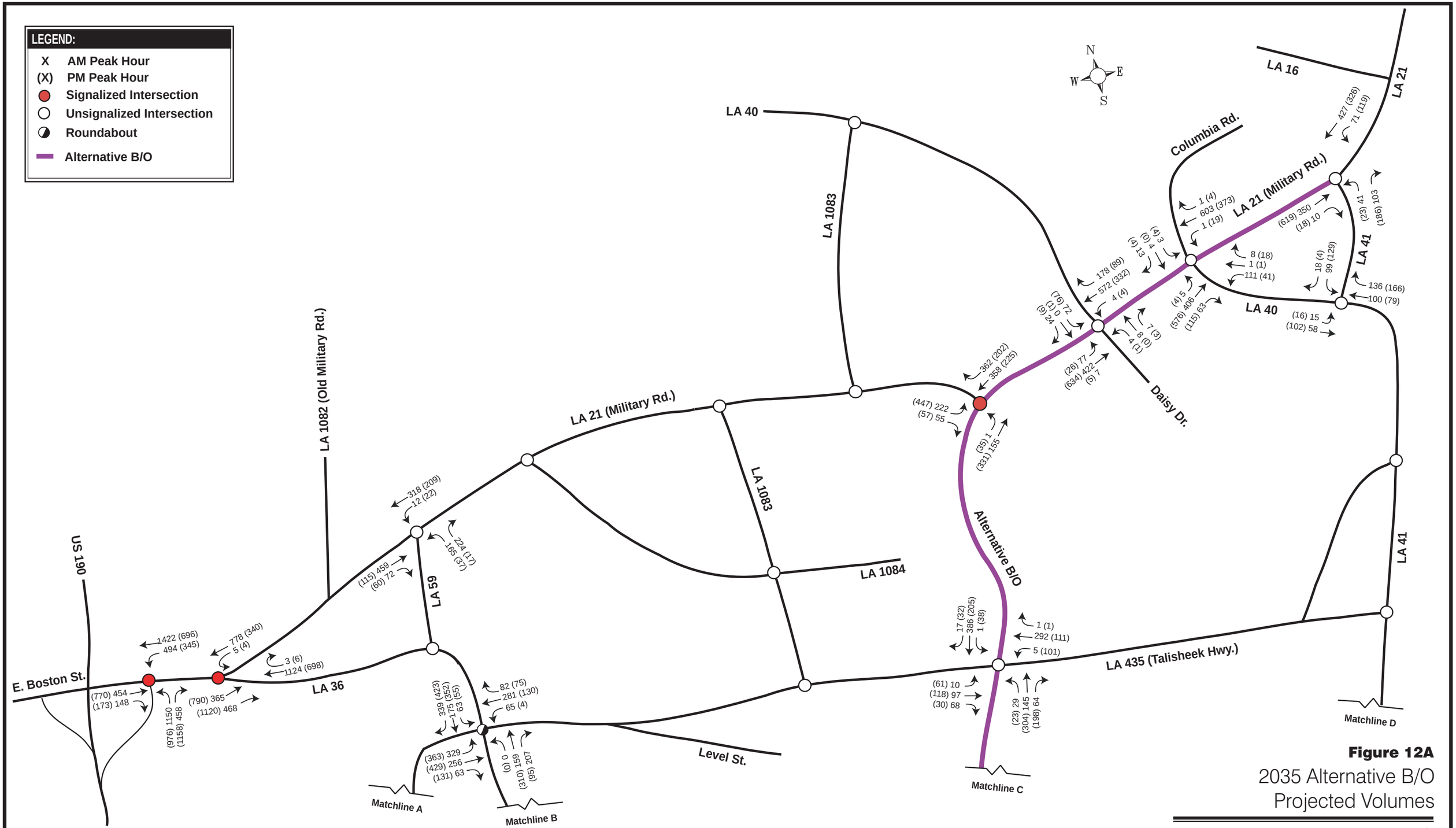


Figure 12A
2035 Alternative B/O
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative B/O

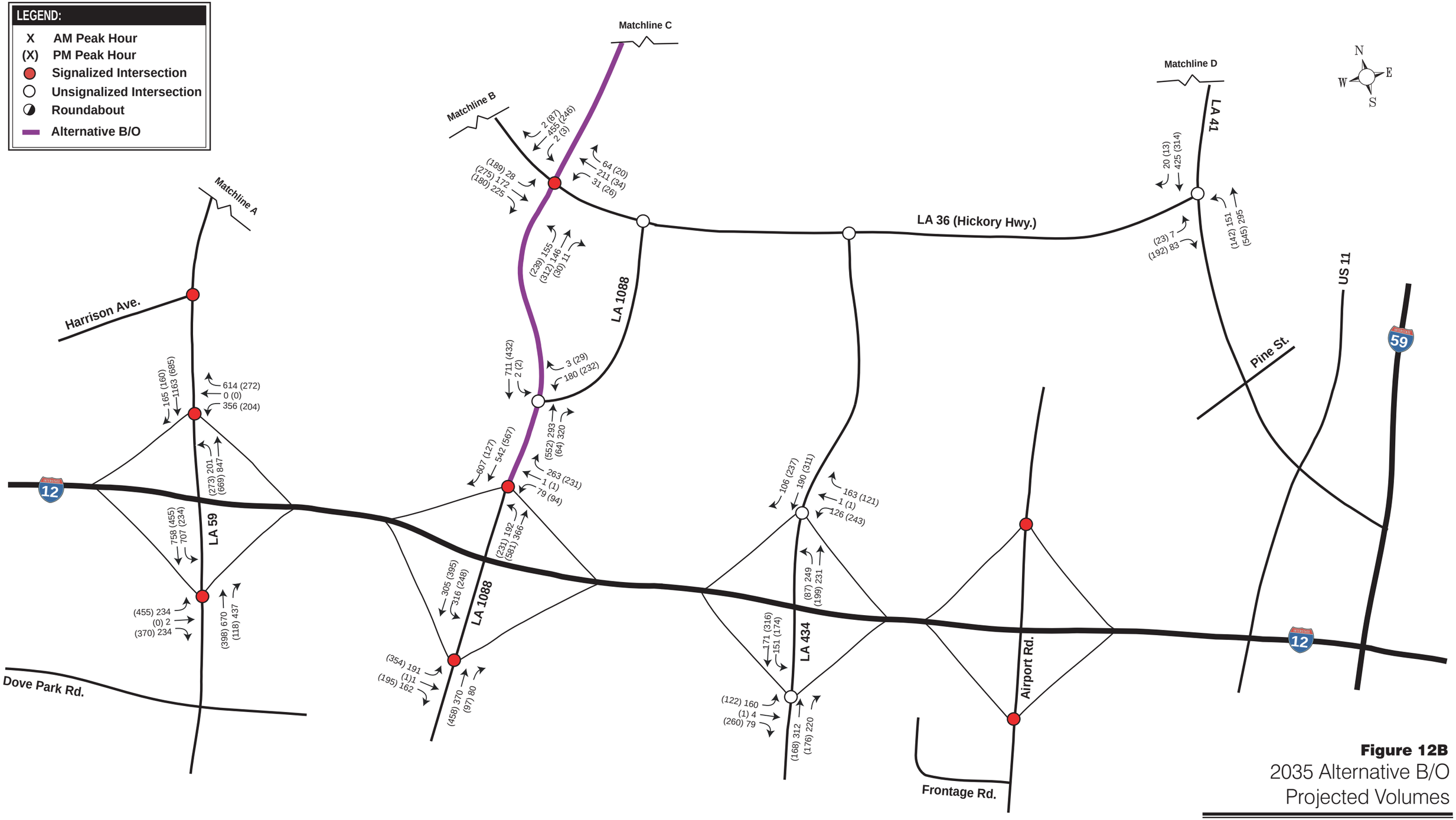


Figure 12B
2035 Alternative B/O
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative P

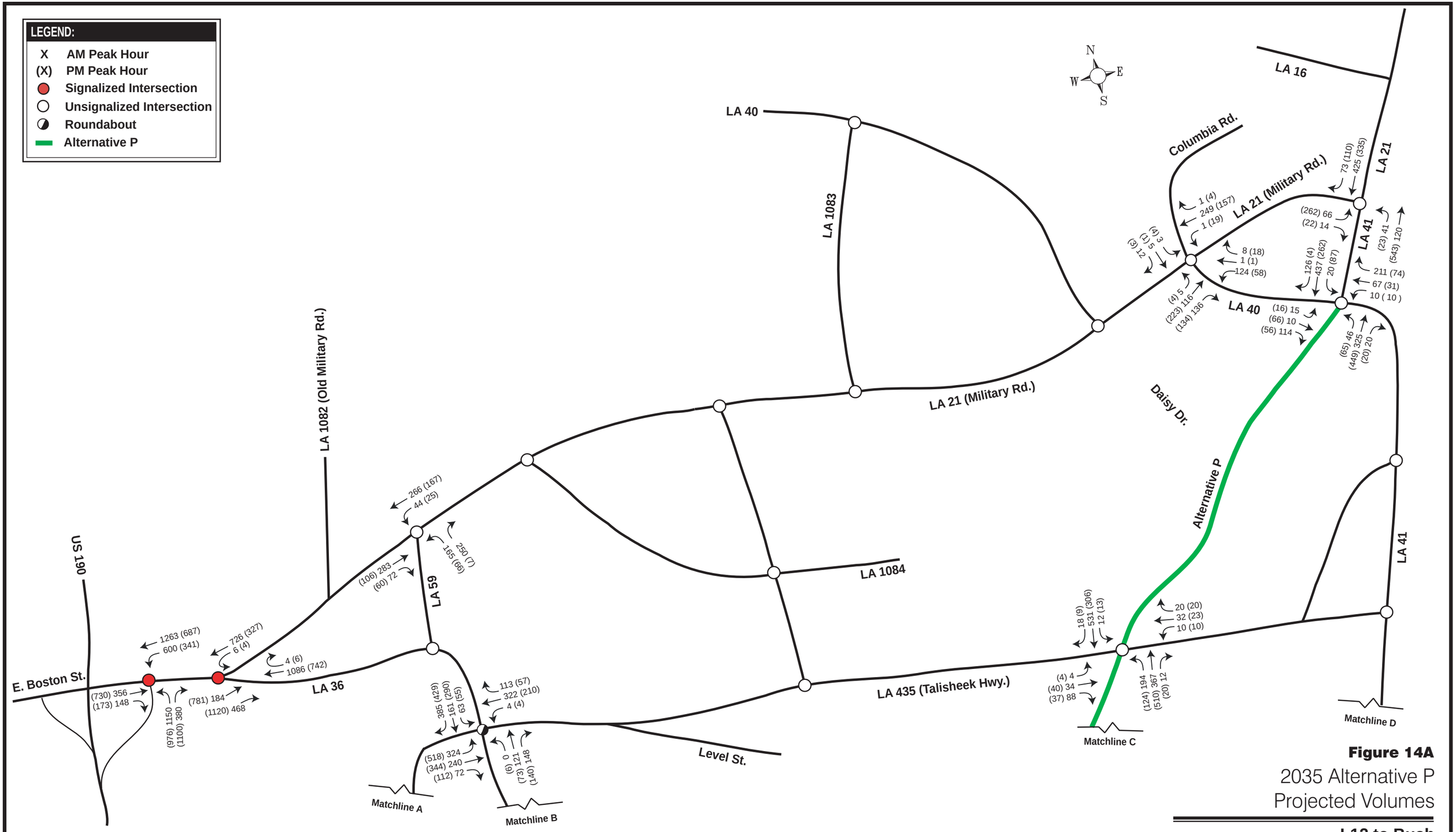


Figure 14A
2035 Alternative P
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative P

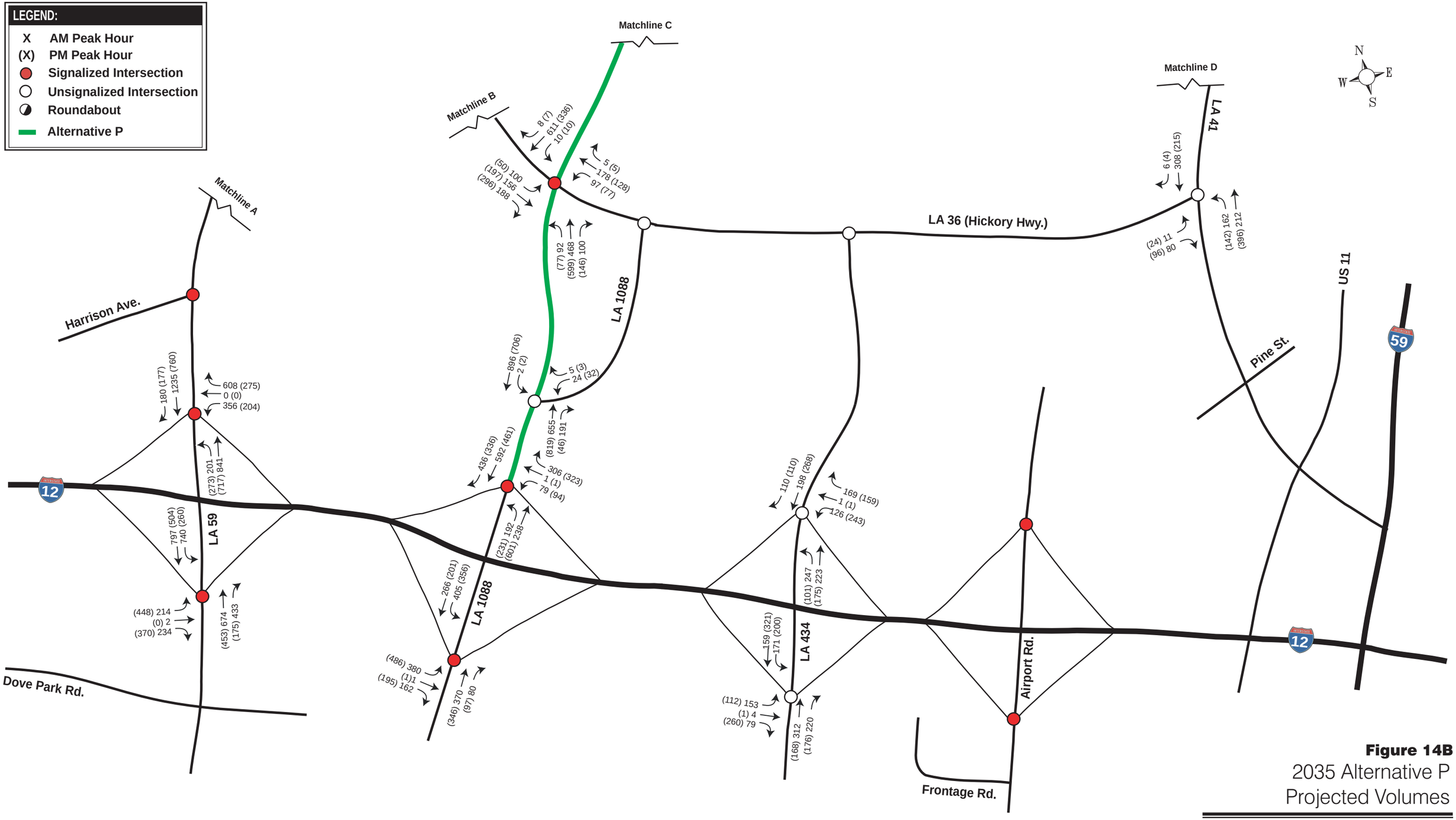


Figure 14B
2035 Alternative P
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative Q

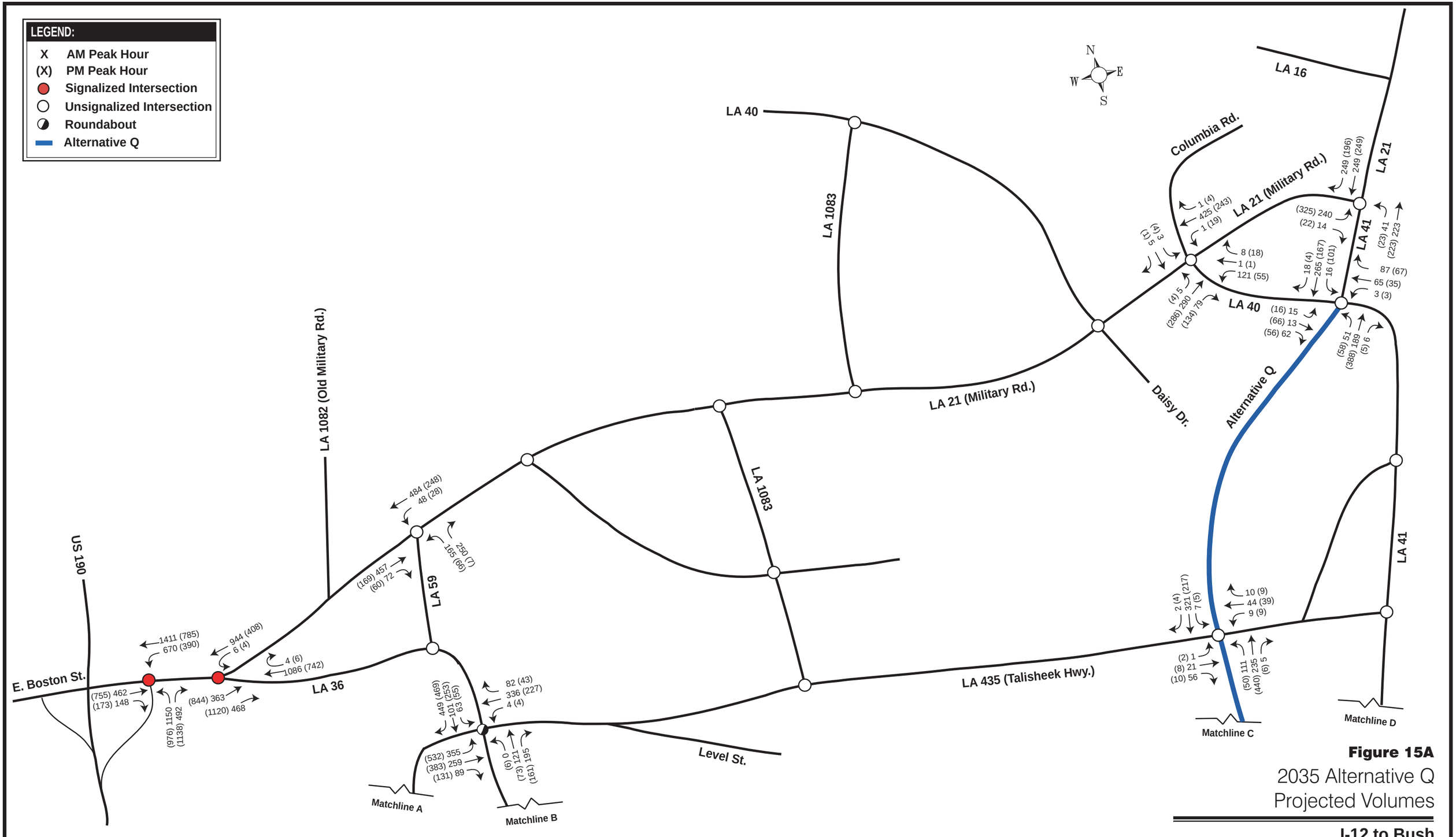


Figure 15A

2035 Alternative Q
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X AM Peak Hour
- (X) PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative Q

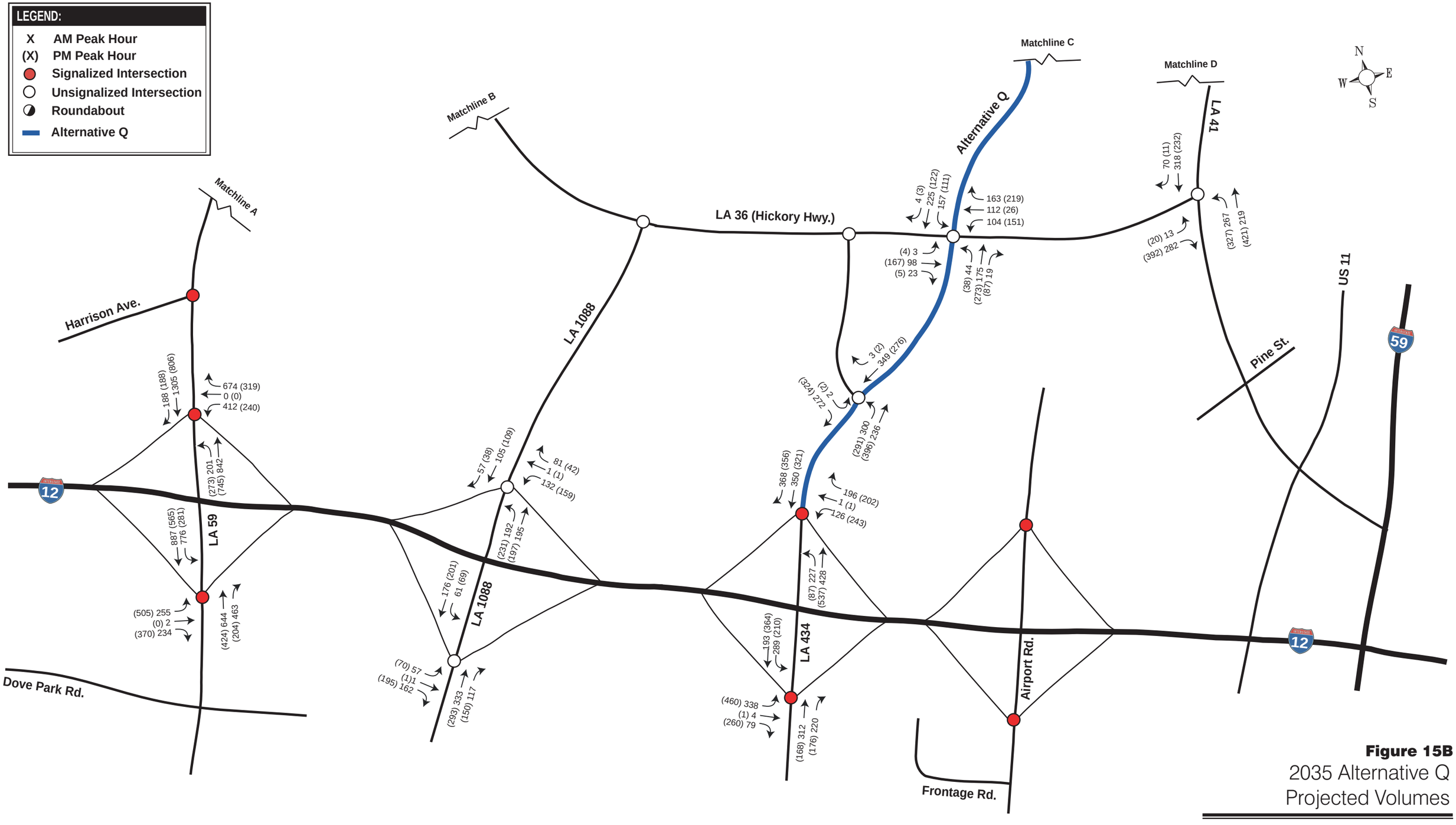


Figure 15B
2035 Alternative Q
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative J

N W E S

LA 40
LA 1083
LA 16
Columbia Rd.
LA 21
LA 21 (Military Rd.)
242 (198)
256 (247)
1 (4)
418 (245)
1 (19)
(474) 296
(22) 14
(4) 3
(1) 7
(3) 10
8 (18)
1 (1)
124 (58)
LA 41
(23) 41
(331) 157
18 (4)
271 (160)
17 (101)
78 (8)
58 (6)
10 (10)
(4) 5
(435) 346
(135) 85
LA 40
(16) 15
(65) 10
(58) 74
(90) 55
(308) 122
(5) 10
LA 1082 (Old Military Rd.)
LA 21 (Military Rd.)
Daisy Dr.
Alternative J
470 (229)
75 (47)
279 (77)
165 (66)
(298) 484
(60) 72
LA 59
US 190
LA 1084
(41) 10
LA 41
53 (91)
8 (13)
40 (6)
305 (212)
10 (10)
50 (95)
39 (9)
5 (10)
(10) 0
(5) 34
(10) 23
(10) 11
LA 435 (Talisheek Hwy.)
(5) 10
(5) 38
(66) 64
(63) 26
(303) 127
(2) 10
Matchline C
Matchline D
1401 (729)
666 (362)
930 (389)
6 (4)
4 (6)
1086 (742)
E. Boston St.
LA 36
(818) 462
(173) 148
(976) 1150
(1216) 475
(985) 390
(1120) 468
426 (488)
170 (253)
63 (55)
82 (43)
356 (206)
4 (4)
(552) 384
(360) 298
(131) 89
0 (9)
121 (73)
227 (191)
Level St.
Matchline A
Matchline B

Figure 13A
2035 Alternative J
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

LEGEND:

- X — AM Peak Hour
- (X) — PM Peak Hour
- Signalized Intersection
- Unsignalized Intersection
- Roundabout
- Alternative J

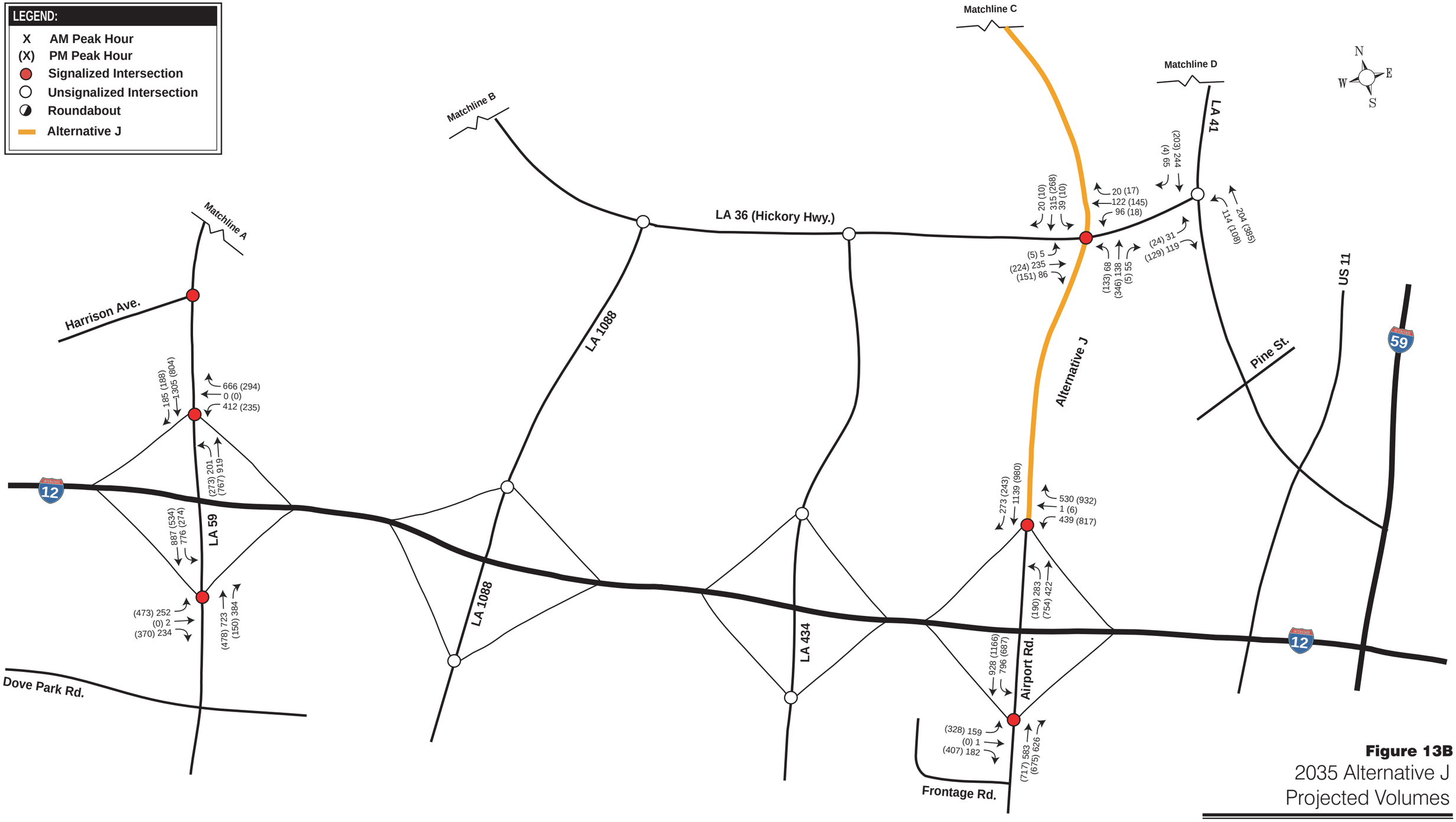


Figure 13B
2035 Alternative J
Projected Volumes

I-12 to Bush
Environmental Impact Statement

NOT TO SCALE
FOR PLANNING PURPOSES ONLY

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NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-085

APPENDIX C

PREVIOUS REPORTS

I-12 @ Airport Rd Single Point Urban Interchange

St. Tammany, LA

STAGE 0 REPORT

REGIONAL PLANNING COMMISSION
FOR JEFFERSON, ORLEANS, PLAQUEMINES, ST. BERNARD AND ST. TAMMANY PARISHES
Serving the New Orleans Metropolitan Region

BUCHART HORN, INC.
Strengthening Communities

SP. No. 736-52-0062

Federal Project No. PL-0011(033)

RPC Project No. SL-1.10

January, 2011

TABLE OF CONTENTS

1.0 Introduction

In April of 2010, the New Orleans Regional Planning Commission selected Buchart Horn, Inc. to conduct a Stage 0 study evaluating the feasibility of reconstructing the existing I-12 @ Airport Rd. interchange from a traditional "diamond" interchange to a single point urban interchange (SPUI). As part of the study, data was collected verifying the existing traffic conditions and land use in way of the interchange. Projected traffic conditions for the existing diamond interchange were compared to the projected conditions of a SPUI. This information, along with an estimated project cost and impacts were compiled to form a Stage 0 Planning and Feasibility Report.

The SPUI concept evaluated in this study was developed for the purpose of assessing its practical feasibility. The concept was developed to an appropriate level of detail as to provide a rational basis for the comparison of various measures of effectiveness (avg. intersection delay, LOS, ROW footprint, etc) of the existing interchange and the SPUI concept. Design elements presented as part of the concept were developed in accordance with guidance found in *AASHTO Geometric Design of Highways and Streets* (Ch 10) and the National Cooperative Highway Research Program Report No. 345 – S*ingle Point Urban Interchange Design and Operations Analysis.* It should be noted that neither a topographic or geotechnical survey were included in the scope of this study; and to that end, there are design elements that were not developed to the level of detail necessary in subsequent stages of the project delivery process. Contingencies have been incorporated into quantity and cost estimates to account for the use of limited information.

2.0 Existing Conditions

2.1 Land Use

The I-12 @ Airport Rd. interchange is located in the southeast region of St. Tammany Parish. The interchange services Northshore Blvd. to the south and Airport Rd. to the north. Northshore Blvd. runs for approximately ½ mile south of the interchange to US-190 and provides access to a large commercial development consisting of Walmart, Sam's Club, the Northshore Square Shopping Center and several other businesses. Airport Rd. runs for approximately 2.5 miles north of the interchange where it terminates at the Slidell Airport. In addition to serving as the primary access road to the Slidell Airport and several businesses, Airport Rd. also provides access to residential developments north of I-12.

2.2 Interchange Geometric Layout

The I-12 @ Airport Rd. interchange is a traditional diamond interchange providing east and westbound access to I-12 from Airport Rd. and Northshore Blvd. The interchange is configured such that the minor road (Airport Rd.) overpasses the major road (I-12).

The intersection of Airport Rd. and I-12 eastbound on and off-ramps is signalized. Two through-lanes, one of which has a left turn option, accommodate southbound movements and eastbound I-12 access. One through-lane and one dedicated right turn lane accommodate northbound movements and eastbound I-12 access, respectively. Just south of this intersection, Northshore Blvd. intersects with Frontage Rd; this intersection is unsignalized. Frontage Rd. provides alternate access to the commercial development on the west side of Northshore Blvd as well as several hotels.

The intersection of Airport Rd. and I-12 westbound on and off-ramps is also signalized. A single through-lane and a dedicated left turn lane accommodate northbound through traffic and westbound I-12 access movements, respectively. Two through-lanes and a dedicated right turn lane at this intersection accommodate southbound through traffic and westbound I-12 access movements. Just north of this intersection, Airport Rd. also intersects with Grantham College Dr. This intersection provides access to a densely commercialized development on the west side of Airport Rd. as well as a fueling station on the east side.

Through movements along Airport Rd. between the ramps are accommodated by two lanes in the southbound direction and one lane in the northbound direction. Both I-12 off-ramps facilitate exclusive right turn movements and through-lanes with left turn options. In addition, the I-12 westbound off-ramp also has a dedicated left turn lane. Exhibits showing the existing geometry can be found in Appendix A.

2.3 Existing Traffic Conditions

As a separate effort associated with this study, traffic counts were taken at several intersections throughout the project corridor. These counts were used to assess existing traffic conditions as well as validate traffic counts used in a previous study provided as a reference; *Interstate 12 at Northshore Boulevard and Airport Road – Stage 0 Feasibility Study*, Burk-Klienpeter, Inc, Dec. 2007 (referenced study). Turning movement counts were taken at the following five intersections:

- Airport Rd. @ Grantham College Dr.
- Airport Rd. @ I-12 WB Ramp
- Airport Rd. @ I-12 EB Ramp
- Northshore Blvd. @ Frontage Rd.
- Northshore Blvd. @ Starbucks/Shopping Center Entrance

A tabulation of these counts can be found in Appendix C. The level of service (LOS) and vehicle delay for the intersections were determined using Synchro 6. Below is a summary of the data including approach delays. Data from the full analysis can also be found in Appendix C.

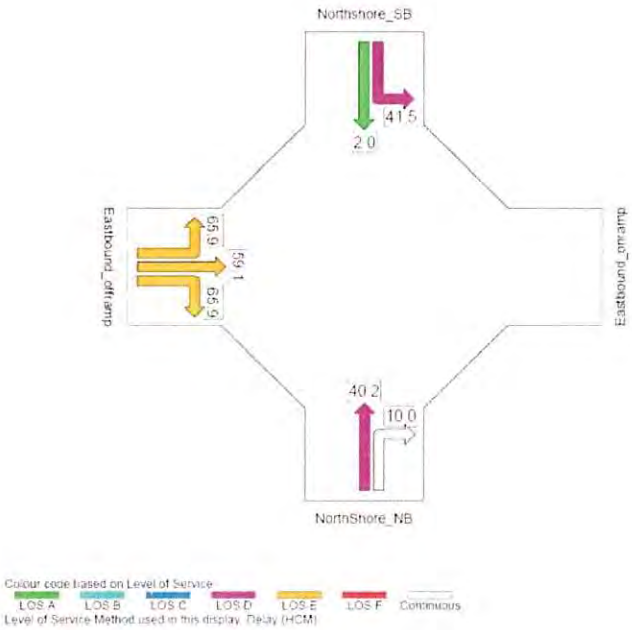
No.	Intersection	Existing Yr 2010 AM		Existing Yr 2010 PM	
		Approach LOS	Intersection LOS	Approach LOS	Intersection LOS
1	*Airport Rd at Grantham College Drive*				
	Northbound: Airport Rd	A (5.0 sec)	A (8.4 sec)	B (16.1 sec)	C(20.7 sec)
	Southbound: Airport Rd	A (8.1 sec)		B (11.8 sec)	
	Eastbound: Target Store Entrance	B (18.3 sec)		D (38.0 sec)	
	Westbound: Grantham College Dr	C (21.0sec)		D (43.4 sec)	
2	*Airport Rd at I-12 WB Ramp*				
	Northbound: Airport Rd	A (4.0 sec)	B (17.0 sec)	B (14.5 sec)	C(22.5 sec)
	Southbound: Airport Rd	B (10.5 sec)		C (22.8 sec)	
	Westbound: WB I-12 Ramp	D (39.2 sec)		C (27.5 sec)	
3	*Airport Rd at I-12 EB Ramp*				
	Northbound: Airport Rd	B (10.9 sec)	B (11.4 sec)	C (26.7 sec)	C(23.4 sec)
	Southbound: Airport Rd	A (5.9 sec)		B (11.7 sec)	
	Eastbound: EB I-12 Ramp	D (41.4 sec)		D (46.0 sec)	
4	*North Shore Blvd at Frontage Road*				
	Northbound: Northshore Blvd	Free Flow	A (0.2 sec)	Free Flow	A (0.4 sec)
	Southbound: Airport Rd	Free Flow		Free Flow	
	Eastbound: Frontage Rd	A (9.8 sec)		B (12.2 sec)	
5	*North Shore Blvd at Starbucks/ Shopping Center Entrance*				
	Northbound: Northshore Blvd	A (1.7 sec)	A (4.3 sec)	B (14.4 sec)	B (16.4 sec)
	Southbound: Northshore Blvd	A (1.6 sec)		B (10.5 sec)	
	Eastbound: Starbucks Entrance	D (46.7 sec)		D (41.8 sec)	
	Westbound: Shopping Center Entrance	D (42.9 sec)		D (40.5 sec)	

Consistent with information found in the referenced study, the results of the capacity analysis indicate a considerable delay at the east and westbound approaches of Grantham College Dr., the I-12 east and westbound off-ramps as well as the access driveways servicing Starbucks and the North Shore Square Shopping Center.

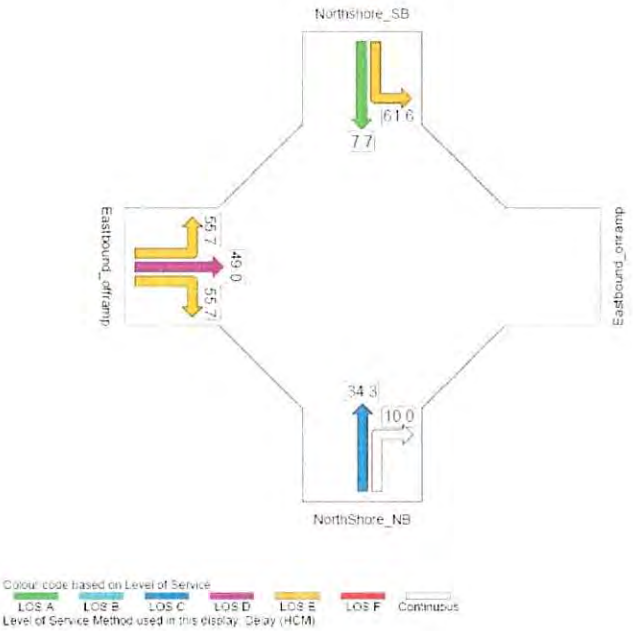
2.4 Projected Traffic Conditions

To assess the future performance and operation of the existing interchange, existing traffic counts at Airport Rd.'s intersection with I-12 east and westbound ramps found in the referenced study were projected out 20 years at a rate of 2%/yr. The intersections were evaluated using

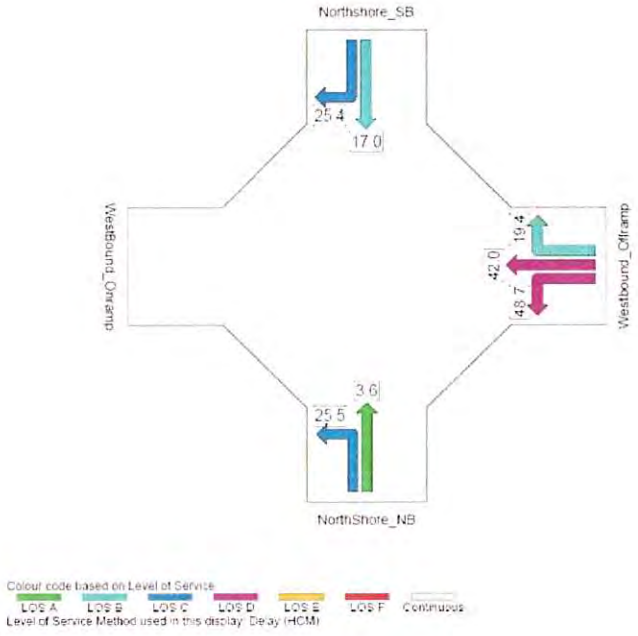
Sidra software. Below are the average delay and LOS output diagrams for each ramp intersection.



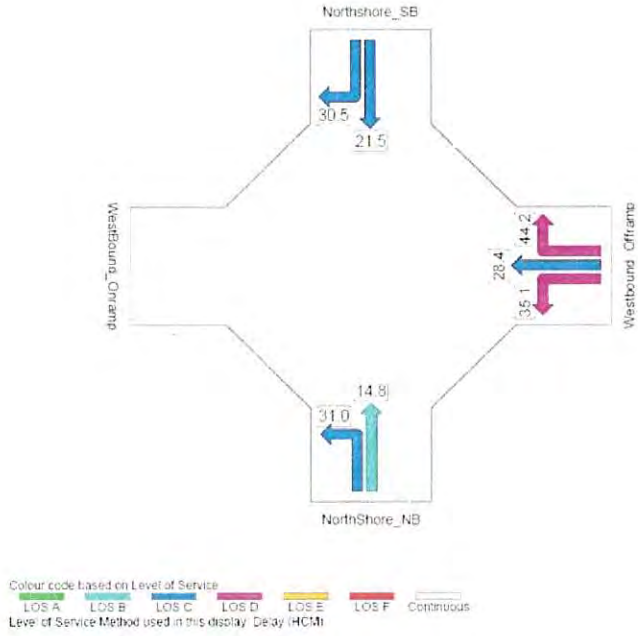
Eastbound Ramp (AM)



Eastbound Ramp (PM)



Westbound Ramp (AM)



Westbound Ramp (PM)

As expected, compared to existing conditions, delays are increased significantly at both off-ramps. These projected conditions will be compared with those of the SPUI concept. This comparison, along with estimated costs, will aid in determining the feasibility of reconstructing the interchange. Data from the Sidra analysis of projected conditions of the existing interchange can be found in Appendix D.

3.0 Single Urban Interchange Concept

3.1 Background

The Single Point Urban Interchange (SPUI) is a relatively new grade separated interchange concept being considered in urban areas where improved traffic flow is desired onto and off of freeway facilities. Often times there is little to no ROW available to make capacity improvements which is where the SPUI offers some significant benefit. According to AASHTO, the first SPUI's were constructed in the early 1970's.

In addition to the advantage of a narrower ROW footprint, SPUI's also offer several operational advantages over their diamond counterpart. All four turning movements accommodated by a diamond interchange are consolidated into a "single point" and controlled by one traffic signal with multiple phases. Opposing left turns pass to the left of each other, minimizing potential conflict. In addition, right turns are typically free flow, eliminating the need for a fourth signal phase.

One other point of note is the increased signal spacing realized with the SPUI. With the replacement of two ramp signals with one, spacing between SPUI interchange signalization and upstream and downstream signals is increased. With this increased spacing and the consolidated nature of movements through the SPUI, the overall efficiency of the interchange is greatly improved, thus significantly reducing delay.

There are however, several disadvantages associated with SPUI's. In situations where the SPUI exists as an overpass (as is the case with this study), the increased width of the bridge adds significant costs when compared to a traditional diamond interchange. Likewise, in situations where the SPUI exists as an underpass, due the symmetry of the geometry, overpasses spanning the SPUI are longer and therefore more expensive. There is also the additional cost associated with the longer geometry required for left turns through the intersection. Because of the relative size of a SPUI intersection, radii for left turn movements onto and off of the interstate must be compounded and lengthened as opposed to the more traditional radii found in diamond interchanges.

3.2 SPUI Geometric Layout

Airport Rd.

To accommodate an anticipated increase in through movement, an additional two lanes in the northbound direction and one additional lane in the southbound direction are recommended throughout the length of the interchange. As previously mentioned, all turning movements accommodated by the existing diamond interchange are consolidated into one signalized intersection to be located at the central crest curve of the Airport Rd. overpass. Due to the closer proximity of these movements, an additional left turn lane from Airport Rd. is recommended for both east and westbound I-12 on-ramp access points.

Several other design features were considered along Airport Rd. in the development of the SPUI concept. Sag and crest curve stopping sight distances, lane tapers, storage lengths and lane widths were among those considered. Design guidelines for an Urban Arterial-5 (UA-5) were used in developing the sag and crest curvature for stopping sight distance as well as minimum lane and shoulder widths. AASHTO standards were used to determine the minimum roadway gradient to maintain appropriate grade separation. All turning radii were developed using a WB-67 design vehicle. Projected turning counts were used to design storage lengths. These design elements are annotated in exhibits found in Appendix B.

I-12 Ramps

As previously mentioned, all movements accommodated by the diamond interchange are now consolidated into one signalized intersection. This allows for the design of on and off-ramps with less horizontal curvature that tie to Airport Rd. much closer to the I-12 alignment, thus further reducing the footprint of the interchange. Similar to conditions along Airport Rd., additional lanes have been added to on and off-ramps to account for the closer proximity of movements and the anticipated increase in traffic.

A second ramp configuration utilizing the existing on-ramps for right turn access to I-12 has also been considered. Although traditional SPUI configurations allow for right turn access to the freeway under free flow conditions, moving this decision back from the intersection can improve safety conditions by eliminating these movements from the SPUI.

The horizontal and vertical alignment of the on and off-ramps were designed in accordance with AASHTO standards. In addition, due to the relatively low usage of SPUI's, guidance was also obtained from the National Cooperative Highway Research Program Report No. 345 –

Single Point Urban Interchange Design and Operations Analysis for features such as the channelizing islands. Design elements for both ramp configurations are annotated in exhibits found in Appendix B.

It should be noted that with the SPUI configuration, drivers no longer have the option of reentering I-12 from off-ramps via through-lanes. However, because projected counts for this movement are minimal, this is not anticipated to be a problem.

3.3 Roadway Structural Support

For the embankment-supported portions of Airport Rd. north and south of I-12, a cast-in-place retaining wall system is recommended. Retaining wall systems minimize the footprint of an elevated roadway by retaining embankment slopes, which would otherwise require additional ROW. Retaining walls can also offer a more cost effective alternative to bridge structure.

The I-12 on and off-ramps shall also be retained using the same retaining wall system. This feature offers the greatest benefit with regard to ROW. The retaining wall system allows for placement of the ramps closer to the I-12 alignment, thus reducing the amount ROW required to maintain control of access. Land currently within the control of access will become available for reclamation and development, helping to offset the cost of constructing the SPUI.

The existing bridge supported section of Airport Rd. crossing over I-12 shall be widened as needed. The retaining wall supporting the inside of the on and off-ramps would tie to the bridge abutments to retain embankment behind the end bents.

It should be noted, a geotechnical investigation was not included as part of this study. Retaining wall support footings are a critical design and application element and can be either pile supported or spread type, depending on soil conditions and wall heights. For the purpose of detailing the typical sections, a spread footing was used in this study.

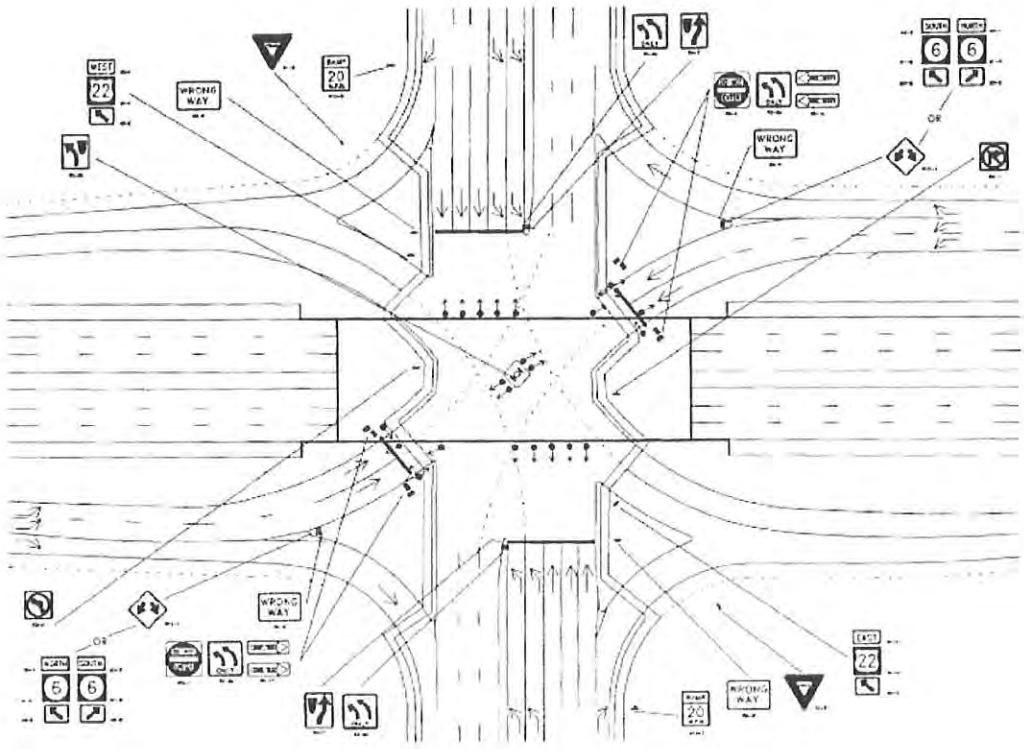
3.4 Traffic Control Plan

To safely accommodate the many movements occurring at a SPUI, careful attention must be paid to not only signalization but also signage and pavement markings.

Signage

Signage applications for the SPUI concept should be consistent with existing signage at the interchange. In addition, motorists may not expect split ramps prior to reaching the intersection, so exit ramp guidance information for I-12 access should be provided prior to reaching the SPUI's gore. The dual left turn lanes off of Airport Rd. should have highly visible lane use assignments provided; overhead signage is recommended.

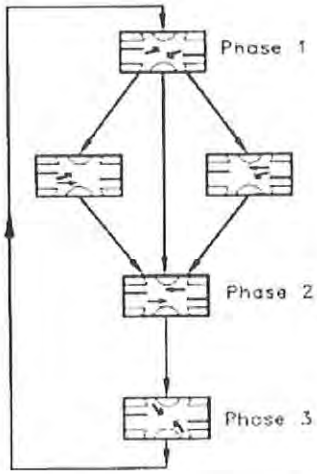
Below is an example of some typical signage that should be considered with this particular application.



Signalization

As previously stated, all movements at the SPUI can be controlled at one intersection with a three-phased signal plan. Protected left turns accessing I-12 can share the first phase with permitted left turns and through movements. The second phase can accommodate exclusive through movements followed by the third phase allowing for left turns off of both off-ramps. Right turns onto both on-ramps and off of both off-ramps is assumed to be free flow (yielded) and unsignalized. However, when allowing free flow right turns, special attention should be given to the pedestrian element. If there is considerable pedestrian traffic present, right

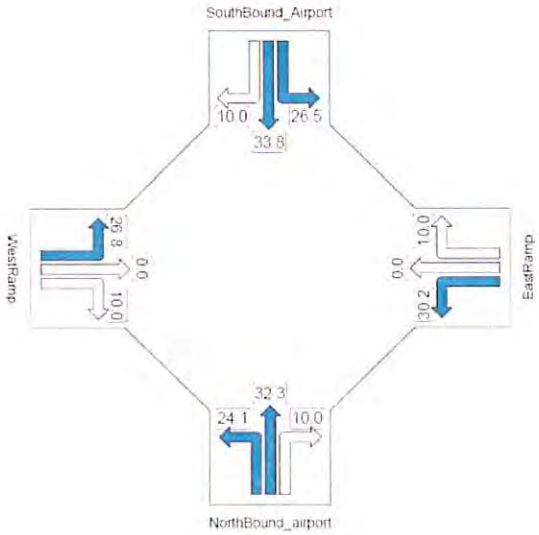
turns may have to be signalized for controlled passage. Below is a typical phase diagram for the signalization of all movements through the SPUI interchange.



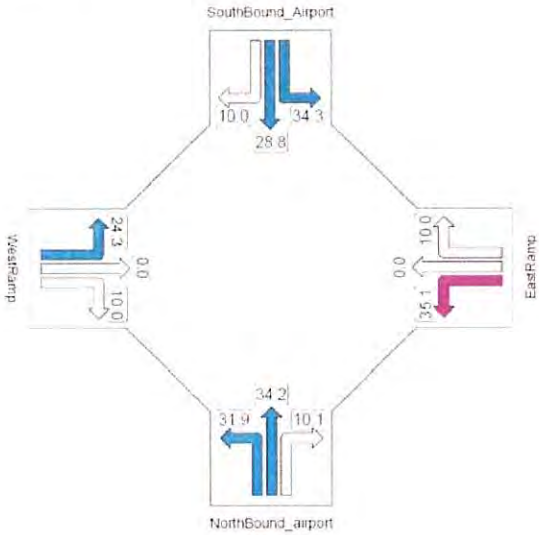
Special attention should also be paid to red clearance intervals, which should provide safe clearance between traffic movements traveling through the intersection and the next controlled movement. Because the turning paths through the SPUI are compounded and longer than normal intersections, the red clearances are likely to be longer; however, red clearances should be optimized to minimize any phase lost time.

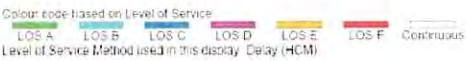
3.5 Projected Traffic Conditions

To facilitate a comparison of the SPUI concept's performance versus the existing diamond interchange's performance, projected traffic counts at east and westbound ramp intersections had to be consolidated to model SPUI operating maneuvers. Right turns onto and off of I-12 remained the same for the SPUI concept as they were for the diamond analysis. Left turns off of I-12 also remained the same. However, to model through movements from the north and southbound approaches, left turn movements from the upstream intersections could not be included. To obtain southbound through movements for the SPUI concept, projected left turns from the westbound off-ramp were subtracted from the southbound through movements at the eastbound ramp intersection. Likewise, for northbound through movements, projected left turns from the eastbound off-ramp were subtracted from the northbound through movements at the westbound ramp intersection. These projected through and turning movements were used to analyze projected traffic conditions with a SPUI concept implemented. Below are the average delay and LOS output diagrams for the SPUI intersection.



SPUI Concept (AM)





SPUI Concept (PM)

Results of the SPUI analysis indicate more favorable conditions when compared to that of the existing diamond interchange. This can be

attributed to the additional capacity of the SPUI concept analyzed, as well as the consolidated nature of the interchange's movements.

4.0 Impacts

4.1 Environmental

Because the SPUI concept can be constructed entirely within the existing control of access, there are no environmental impacts anticipated as a result of its construction.

4.2 ROW Acquisition

Similar to anticipated environmental impacts, because the SPUI concept can be constructed within the existing control of access, there will be no ROW acquisition required. In fact, land currently being used to maintain control of access can be reclaimed and developed, which would help offset the cost of constructing and permitting the SPUI interchange.

5.0 Engineer's Opinion of Probable Cost

5.1 Widening of Airport Rd. North and Southbound Approaches

To estimate the cost of north and southbound approaches along Airport Rd., the corridor will be broken into several components: the retaining wall system, removal of existing pavement, earthwork and new pavement.

Retaining Wall System

To estimate the cost of the retaining wall system, the estimated surface area of the retaining walls had to be found. Based on the proposed profile, a maximum wall height of 22ft was used. The estimated surface area of retaining wall by approach is as follows:

- South side approach – Eastern Edge = 8,800ft^2
- South side approach – Western Edge = 9,900ft^2
- North side approach – Eastern Edge = 9,900ft^2
- North side approach – Western Edge = 8,800ft^2

A unit cost of \$50/ft^2 was used, which includes placement of footers, reinforcement, bedding material, etc. The total estimated cost of the retaining wall system is \$1,870,000.

Removal of Existing Pavement

In order to achieve the appropriate gradient, the existing pavement must be removed before the additional embankment material can be placed and compacted. The existing pavement is a 9" concrete with an estimated removal cost of $\$30/yd^2$. The estimated area of pavement to be removed from the north and southbound approaches is $16{,}305yd^2$. The total estimated cost of pavement removal is $489,166.

Earthwork

To estimate the cost of earthwork, the volume of additional embankment required to widen the roadway and increase the gradient was calculated. To find the area of widening, the area of pavement removed was subtracted from the area of pavement called for in the SPUI concept. The total area of new pavement required is $23{,}050yd^2$, thus the area of widening required is $6{,}745yd^2$. To calculate the amount of additional embankment required due to widening, the additional area is multiplied by the maximum height of the retaining wall, 22ft (7.3yd). This yields an additional volume of embankment of $49{,}463yd^3$. An additional $16{,}000yd^3$ should be added to this estimate to account for raising the roadbed an average of an additional 3ft to the required gradient. A unit price of $\$10/yd^3$ was used for embankment costs, which includes hauling, dozing, blading, scarifying, compaction, etc. The total estimated cost of additional embankment material is $654,633.

New Pavement

The final cost to complete the approaches is the pavement cost. For this estimate, the 9" concrete pavement was replaced. A unit cost of $\$50/yd^2$, which includes forming, rebar placement, subgrade preparation, etc. The total estimated pavement cost came to $1,152,500.

Total estimated cost of the north and southbound approaches, including the retaining wall system, removal of existing pavement, earthwork and new pavement is **$4,166,299**.

5.2 Widening of Bridged Section of Airport Rd. I-12 Overpass

The existing Airport Rd. bridge over I-12 will need to be widened to accommodate additional through lanes, as well as the four left turn movements through the SPUI. Due to the age of the existing structure and the amount of development and anticipated traffic in way of the interchange, a new wider bridge overpass is recommended. To estimate the cost of the new bridge, the required deck area of $32{,}000ft^2$ will be multiplied by a unit cost of $\$80/ft^2$ for a total estimated cost of $2,560,000.

The cost to remove the existing structure should also be considered. Removal cost was calculated by multiplying the existing bridge deck area of 13,000ft^2 by a unit cost of \$15/ft^2, for a total cost of \$195,000.

The total estimated cost of removing the existing Airport Rd. bridge over I-12 and replacing it with a new wider bridge capable of accommodating all turning movements through the SPUI is **\$2,755,000.**

5.3 Construction of New I-12 East and Westbound On and Off-Ramps

New I-12 east and westbound on and off-ramps will be reconstructed closer to the I-12 alignment using retaining wall systems. Total cost for the new ramps will be broken into several components: clearing and grubbing, retaining wall system, earthwork, pavement and removal of existing ramps.

Clearing and Grubbing

Prior to construction of the new ramps, trees within the footprint of their proposed location must be cleared. A 100ft wide clearance is recommended for the construction of the ramps. The length of each proposed ramp is as follows:

- Eastbound Off-Ramp – 1,200ft
- Eastbound On-Ramp –1,700ft
- Westbound Off Ramp – 1,600ft
- Westbound On-Ramp – 1,800ft

The total estimated area of clearing required is 630,000ft^2. A lump sum cost estimate of \$50,000 will be used for the clearing component of the ramp construction.

Retaining Wall System

To estimate the cost of the retaining wall system, the estimated surface area of the retaining walls along both sides of each ramp must be found. Using a maximum retaining wall height of 22ft. The estimated surface area of retaining wall by ramp is as follows:

- Eastbound Off-Ramp = 26,400ft^2
- Eastbound On-Ramp = 37,400ft^2
- Westbound Off-Ramp = 35,200ft^2
- Westbound On-Ramp = 39,600ft^2

Using a unit cost of \$50/ft^2, the total estimated cost of the retaining wall system for the new ramps is \$6,930,000.

Earthwork

To calculate the volume of embankment required for the new ramps, the surface area of each proposed ramp will be multiplied by ½ the maximum height of the profile, 11ft. The estimated surface areas along with the corresponding embankment volumes of the proposed ramps are as follows:

- Eastbound Off-Ramp = 51,150ft^2/20,838yd^3
- Eastbound On-Ramp = 66,800ft^2/27,214yd^3
- Westbound Off-Ramp = 59,300ft^2/24,159yd^3
- Westbound On-Ramp = 75,000ft^2/30,555yd^3

Using a unit cost of \$10/yd^3, the total estimated cost of embankment material is \$1,027,685.

Pavement

A 9" concrete pavement with a unit cost of \$50/yd^2 will be used to estimate the cost of paving the proposed ramps. Using a total surface area of 28,027yd^2 yields an estimated pavement cost of \$1,401,388.

Removal of Existing Ramps

Once the proposed ramps are completed, the existing on and off-ramps must be removed. For this cost estimate, an existing pavement of 9" is assumed, with an estimated cost of removal of \$30/yd^2. The estimated pavement area of ramps to be removed is 25,000yd^2. The total estimated cost of pavement removal is \$750,000.

Total estimated cost of new I-12 east and westbound on and off-ramps, including tree clearing, the retaining wall system, earthwork, pavement and the removal of existing ramps is **\$10,159,073**.

5.4 Signalization

The estimated cost of signalization is calculated by multiplying the number of signal heads by a unit price of \$10,000. This unit price includes all costs associated with constructing the signal system: foundation, poles, wiring, transformers, detectors and signals. An estimate of 12 signal heads is recommended to control all movements through the SPUI. The total estimated cost of for the SPUI concept is **\$120,000**.

5.5 Traffic Control

Signage, striping, maintenance of detours and traffic handling are reflected within traffic control costs. Traffic control costs are affected by several factors including, ROW available, bridge types, required construction phases, among others. For the purpose of this estimate, an estimate equaling 7% of the preceding four costs will be used for traffic control costs, for a total of **$1,201,576.**

5.6 Total Project Estimate

Widening of Airport Rd. North & Southbound Approaches	$4,166,299
Widening of Airport Rd. I-12 Overpass Bridge	$2,755,000
New I-12 Ramps	$10,157,073*
Signalization	$120,000
Traffic Control	$1,201,576
Subtotal	**$18,366,948**
Mobilization (5%)	$918,347
Total Est. Construction Cost	**$19,320,295.40**
Contingency (20%)	**$23,184,354.48**

* does not include an approximate $350,000 reduction in ramp removal cost for alternative on-ramp configuration discussed in Section 3.2

APPENDIX – B

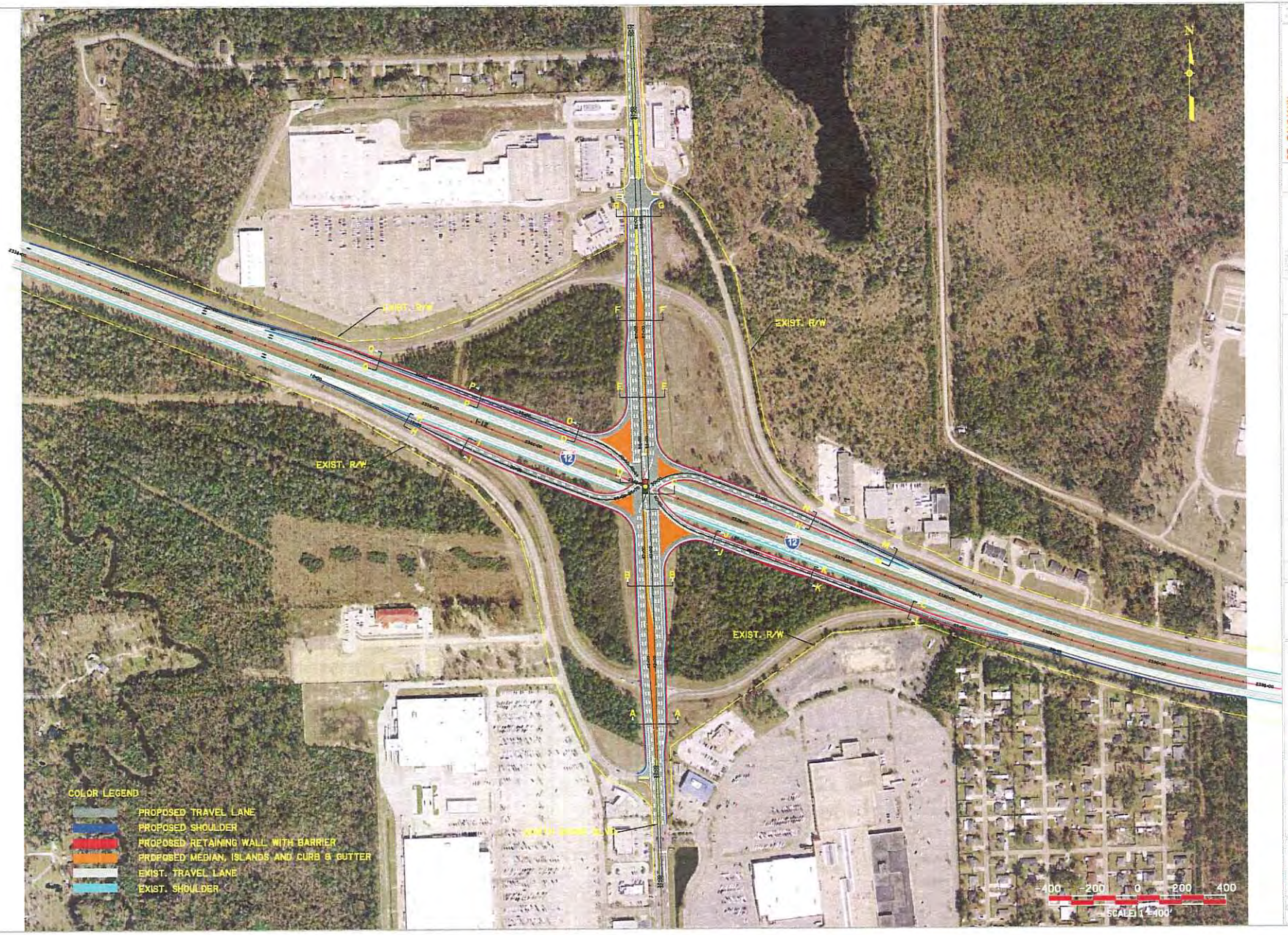
SPUI CONCEPT

(w/ both on-ramp configurations)

APPENDIX – B

SPUI CONCEPT

(w/ both on-ramp configurations)



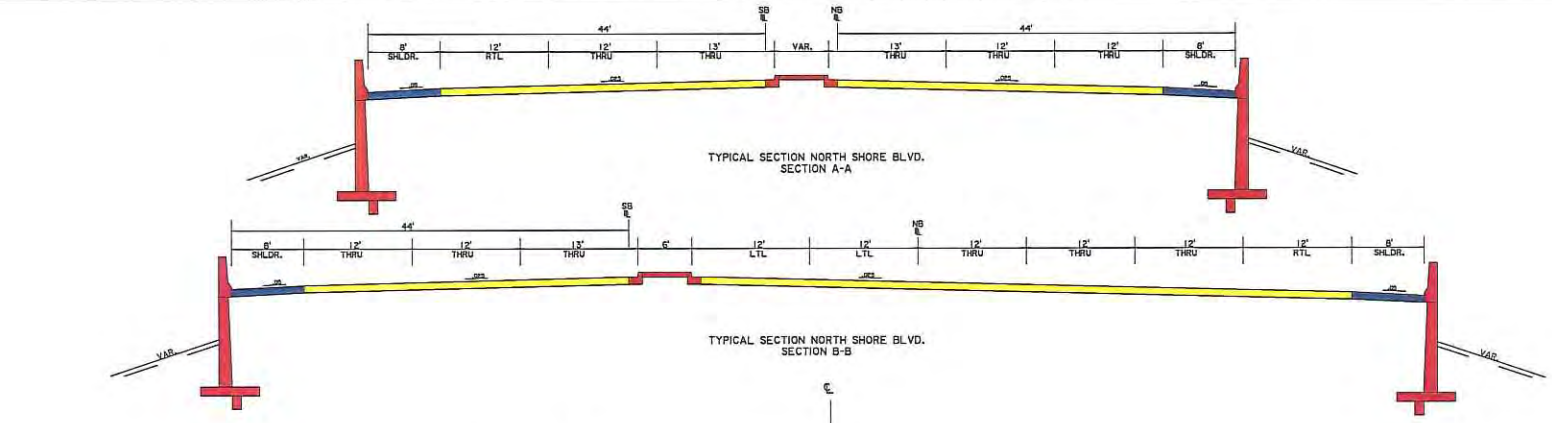
PROJECT LAYOUT

NORTH SHORE @ I-12

ST. TAMMANY

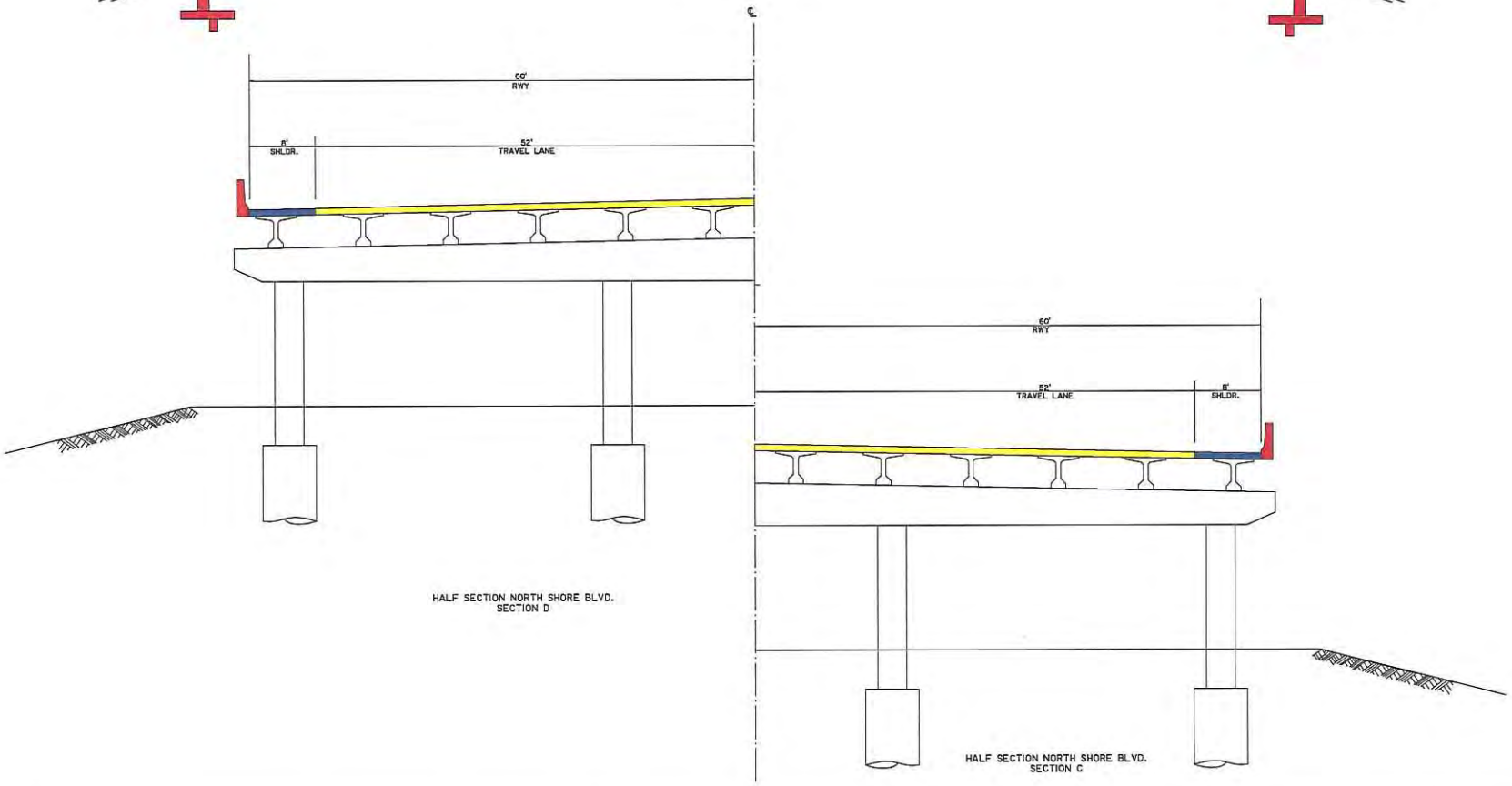
736-52-0062

BUCHART HORN INC.



TYPICAL SECTION NORTH SHORE BLVD.
SECTION A-A

TYPICAL SECTION NORTH SHORE BLVD.
SECTION B-B



HALF SECTION NORTH SHORE BLVD.
SECTION D

HALF SECTION NORTH SHORE BLVD.
SECTION C

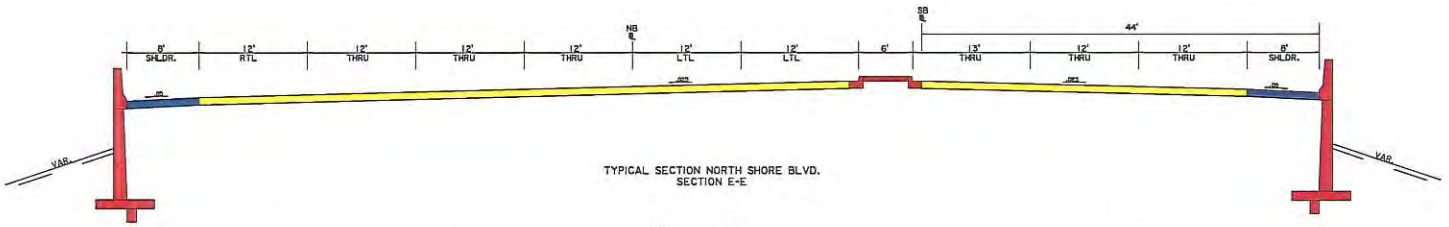
ST. TAMMANY

736-52-0062

TYPICAL SECTION

NORTH SHORE @ I-12
NORTH SHORE BLVD.

BUCHART HORN INC



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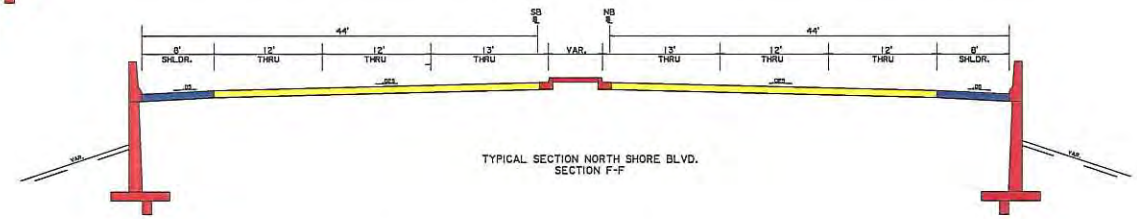
SECTION E-E



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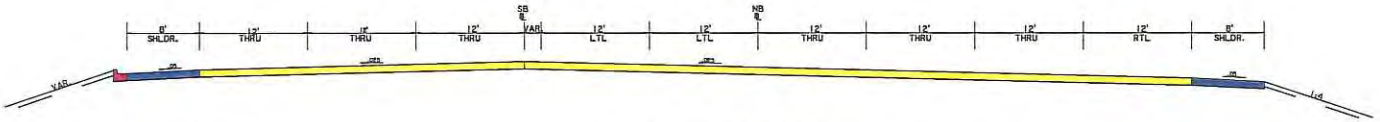
SECTION F-F



TYPICAL SECTION NORTH SHORE BLVD.
SECTION G-G

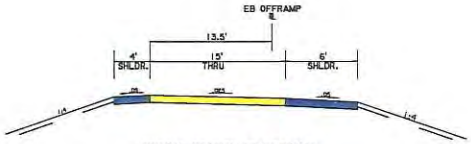
ST. TAMMANY

736-52-0062

TYPICAL SECTION

NORTH SHORE @ I-12
NORTH SHORE BLVD.

BUCHART HORN INC



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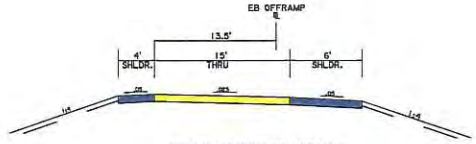
SECTION H-H



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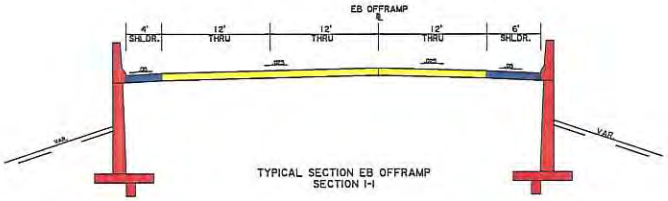
SECTION M-M



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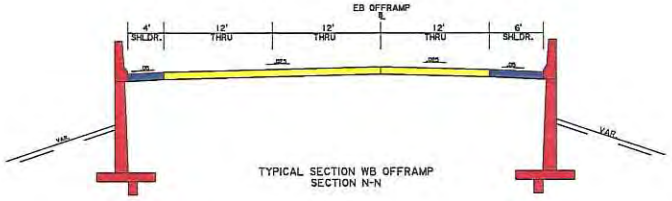
SECTION I-I



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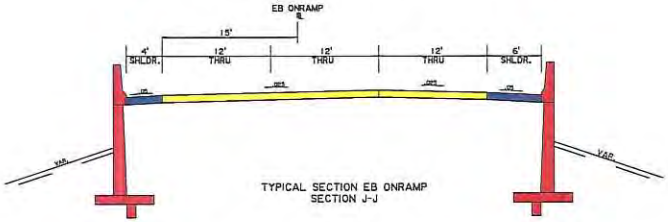
SECTION N-N



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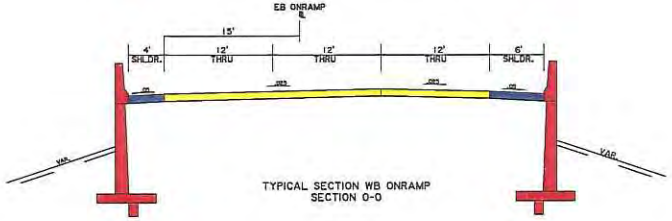
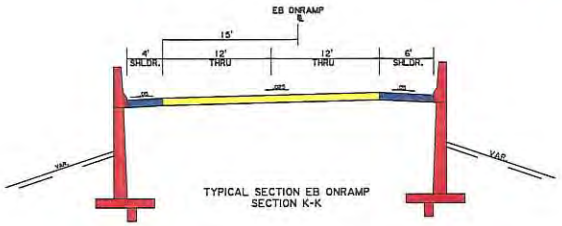
SECTION J-J



TYPICAL SECTION WB ONRAMP
SECTION O-O



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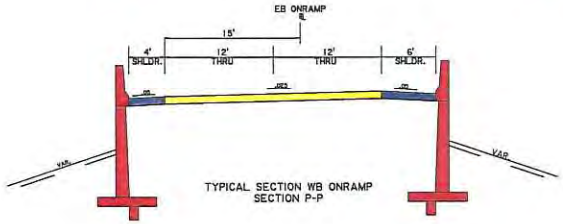
SECTION K-K



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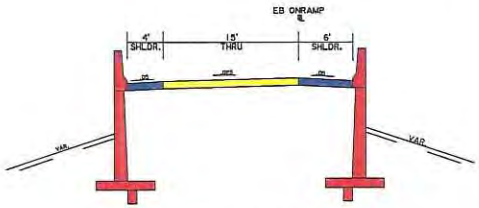
SECTION P-P



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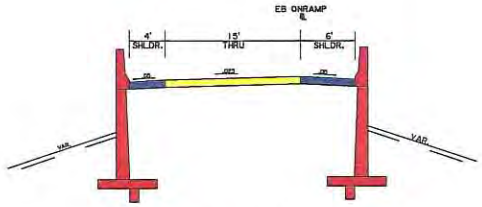
SECTION L-L



TYPICAL SECTION WB ONRAMP
SECTION Q-Q

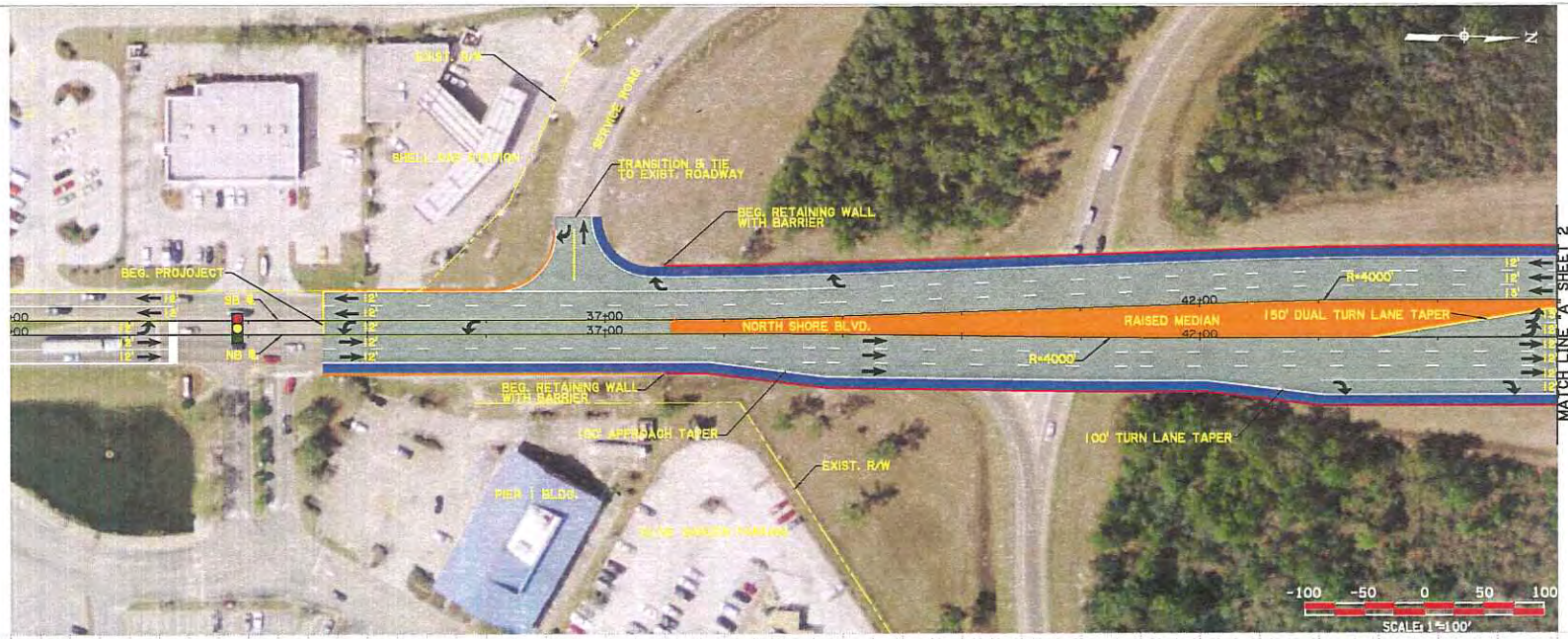
ST. TAMMANY

736-52-0062

TYPICAL SECTION

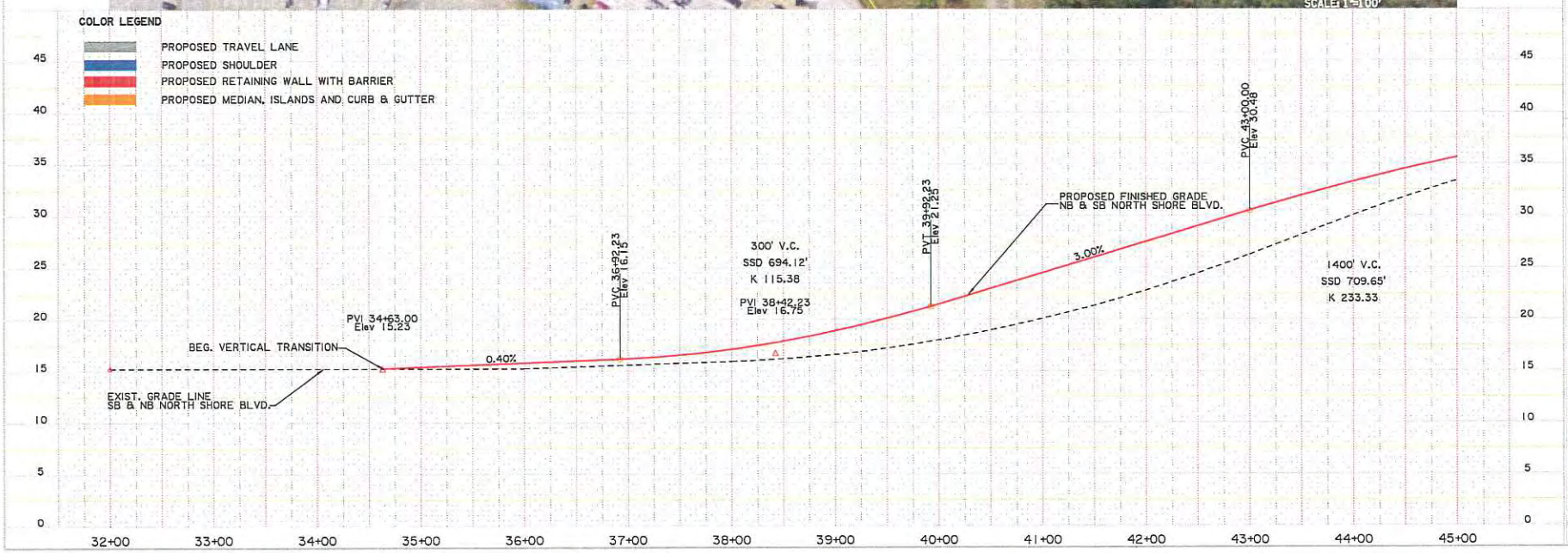
NORTH SHORE @ I-12
RAMP SECTION

BUCHART HORN INC



COLOR LEGEND

- PROPOSED TRAVEL LANE
- PROPOSED SHOULDER
- PROPOSED RETAINING WALL WITH BARRIER
- PROPOSED MEDIAN, ISLANDS AND CURB & GUTTER



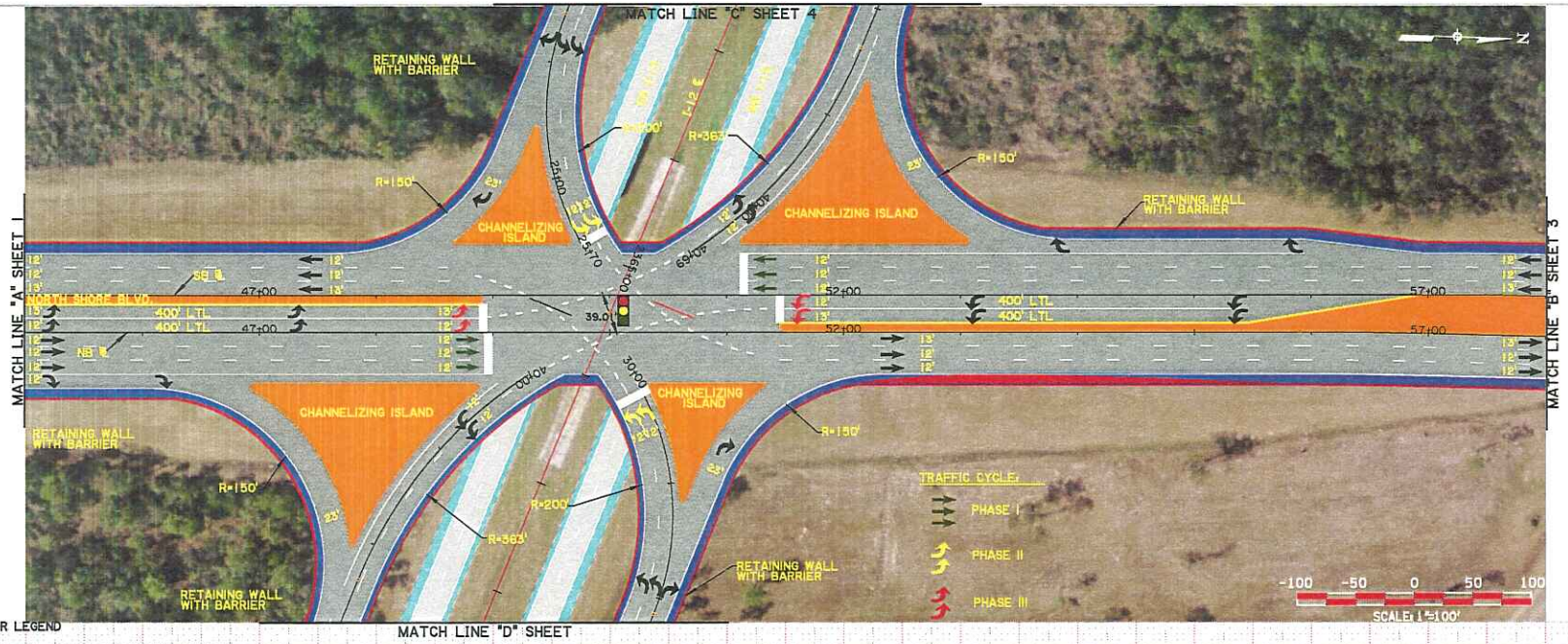
ST. TAMMANY

736-52-0062

PLAN & PROFILE

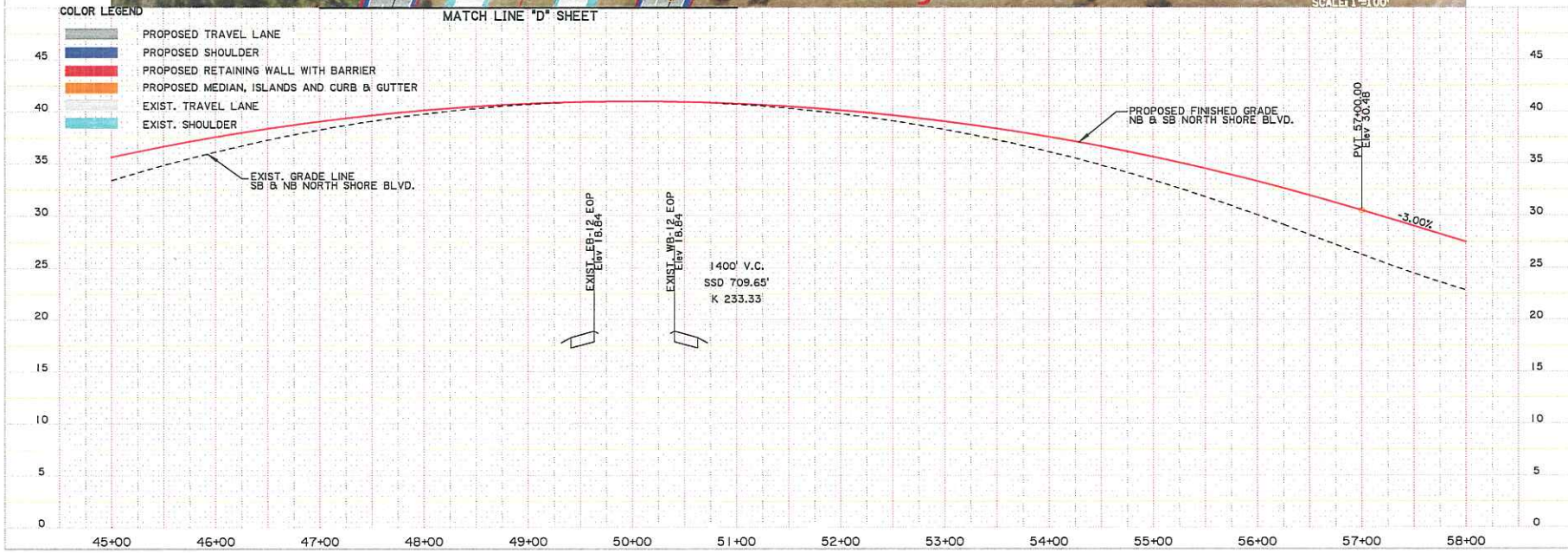
NORTH SHORE @ I-12
NORTH SHORE BLVD.

BUCHART HORN, INC.



COLOR LEGEND

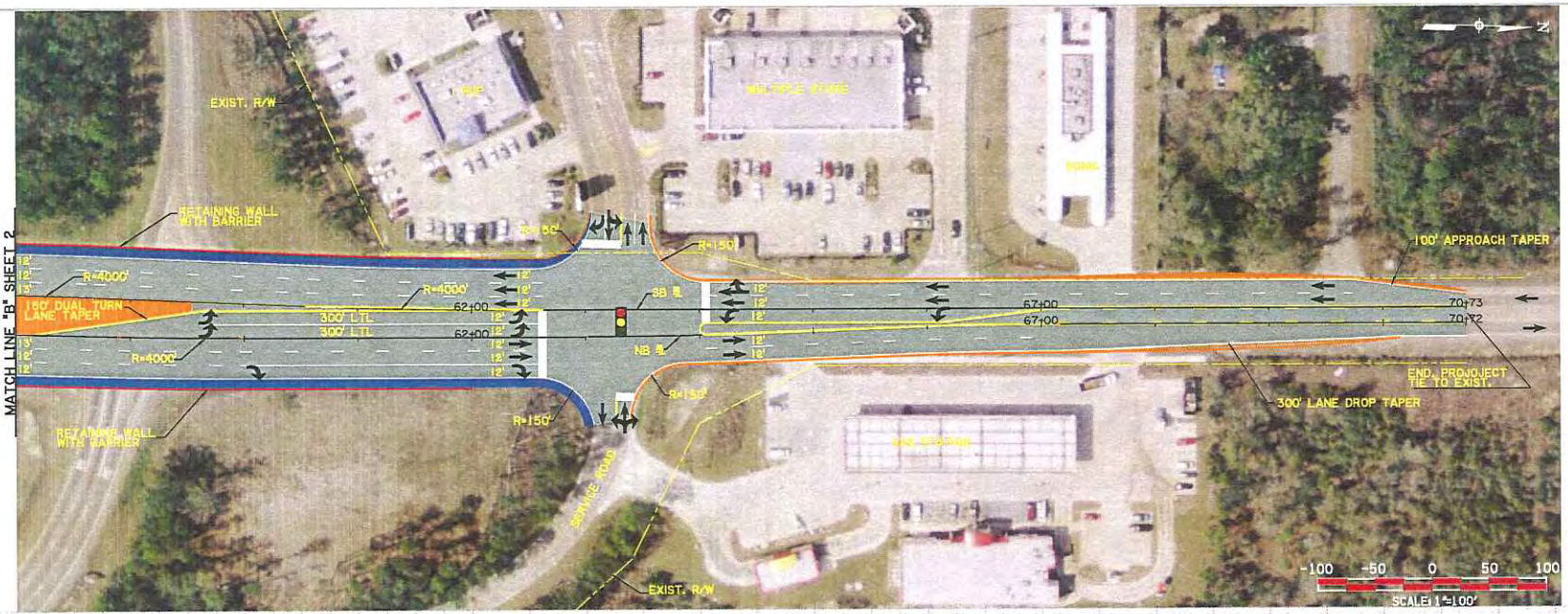
- PROPOSED TRAVEL LANE
- PROPOSED SHOULDER
- PROPOSED RETAINING WALL WITH BARRIER
- PROPOSED MEDIAN, ISLANDS AND CURB & GUTTER
- EXIST. TRAVEL LANE
- EXIST. SHOULDER

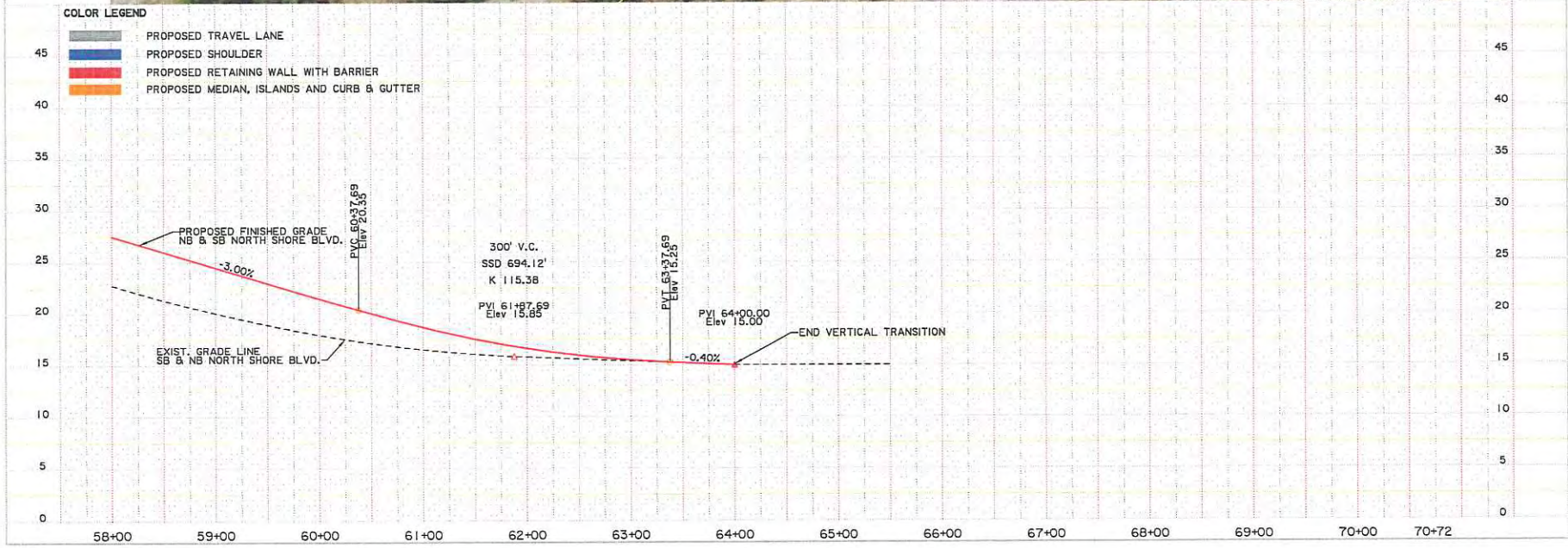


PLAN & PROFILE
NORTH SHORE @ I-12
NORTH SHORE BLVD.

ST. TAMMANY
736-52-0062

BUCHART HORN, INC.





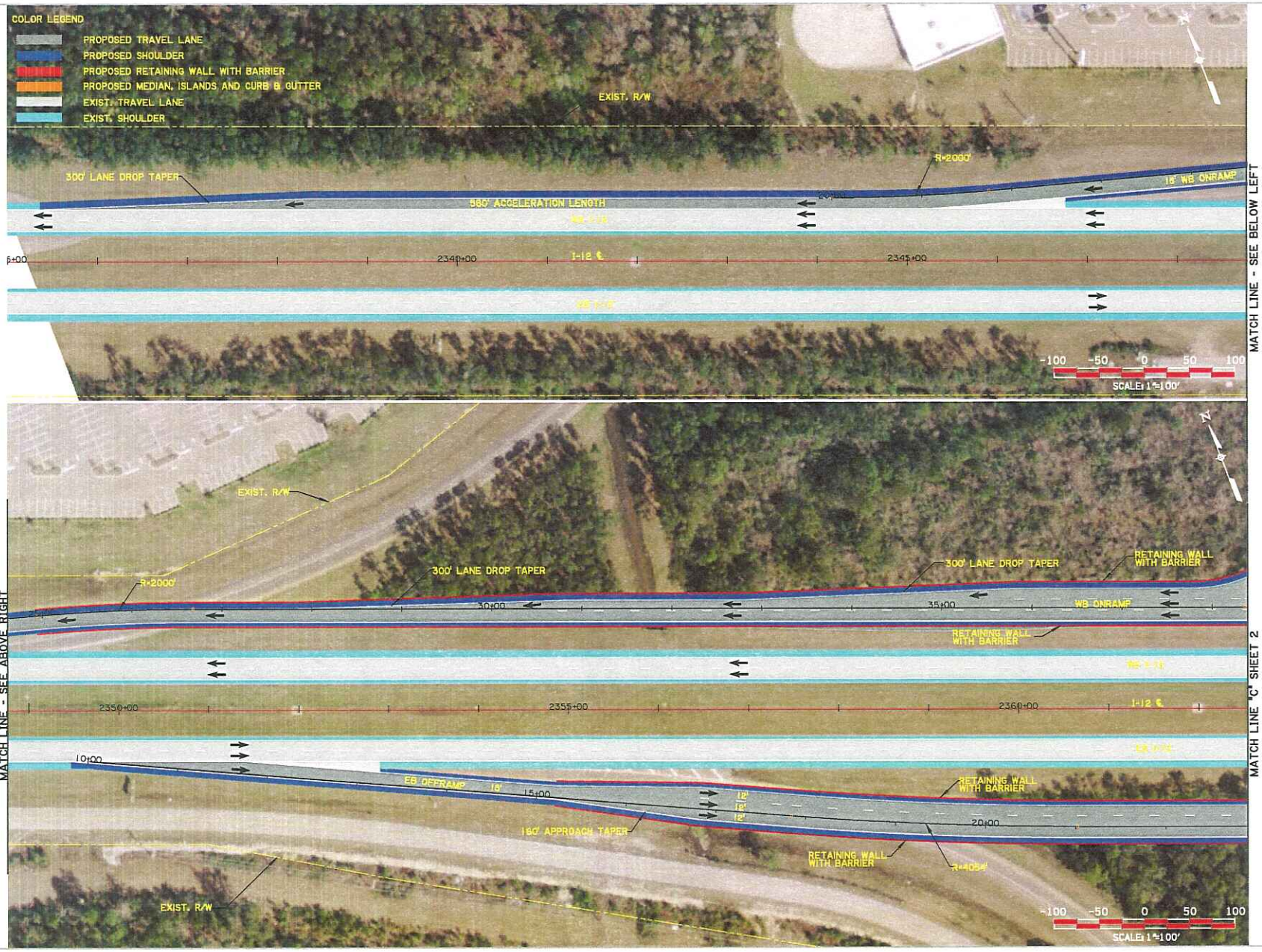
ST. TAMMANY

736-52-0062

PLAN & PROFILE

NORTH SHORE @ I-12
NORTH SHORE BLVD.

BUCHART HORN INC.



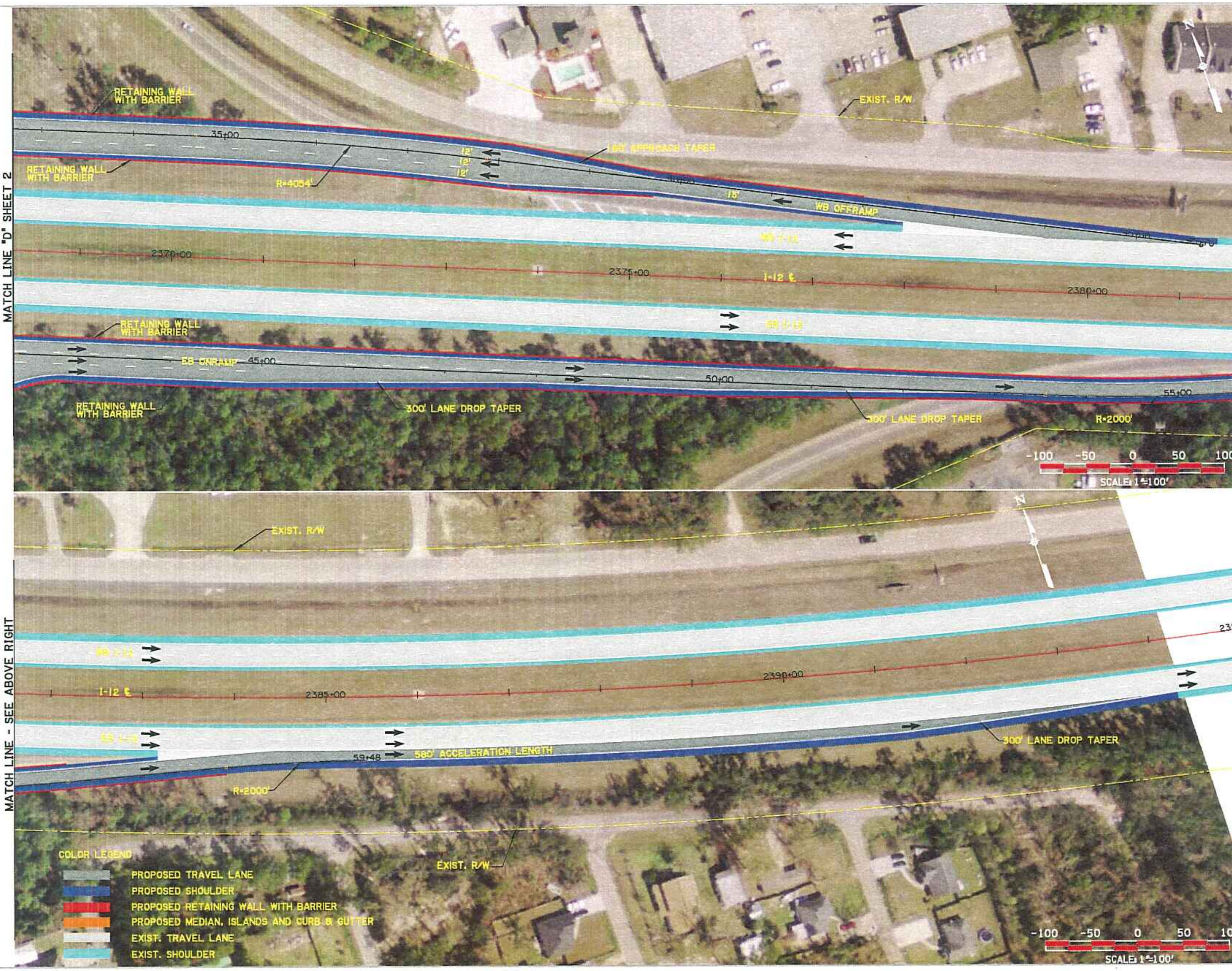
ST. TAMMANY

736-52-0062

PLAN SHEET

NORTH SHORE @ I-12
WEST RAMPS

BUCHART HORN INC.



SHEET NUMBER 9

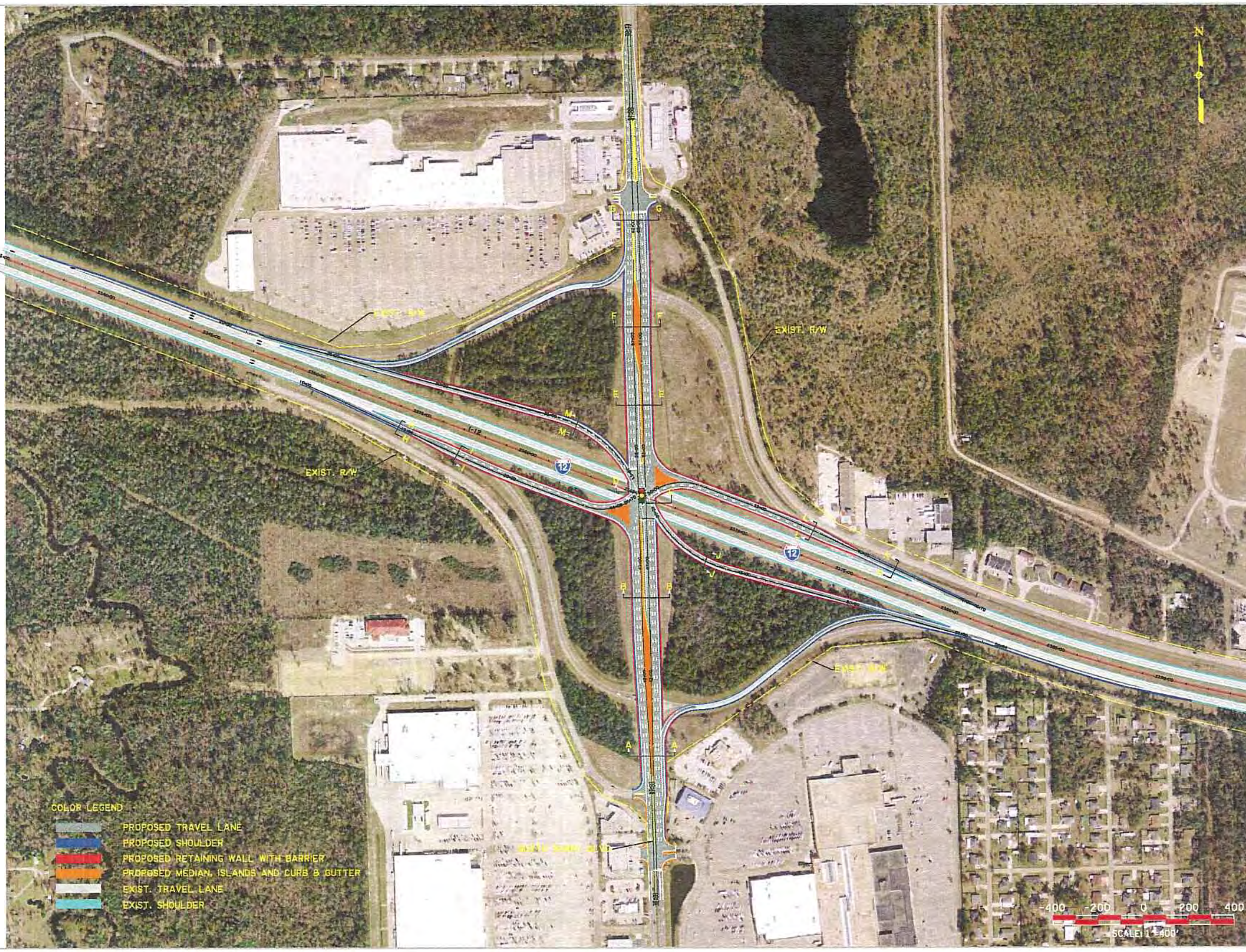
ST. TAMMANY

736-52-0062

PLAN SHEET

NORTH SHORE @ I-12
EAST RAMPS

BUCHART HORN, INC.



PROJECT LAYOUT

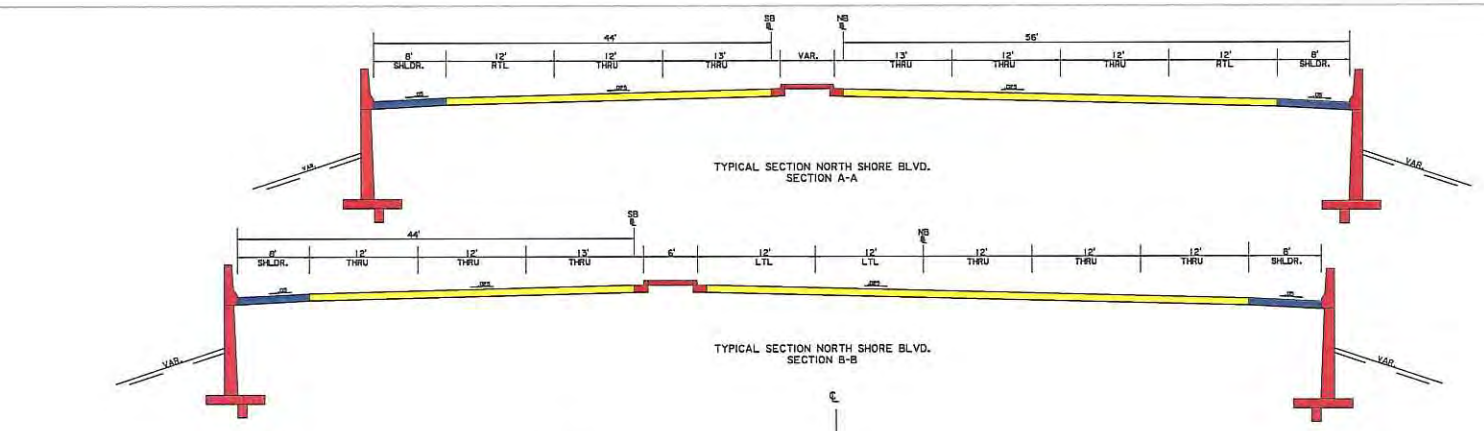
NORTH SHORE @ I-12

ST. TAMMANY

736-52-0062

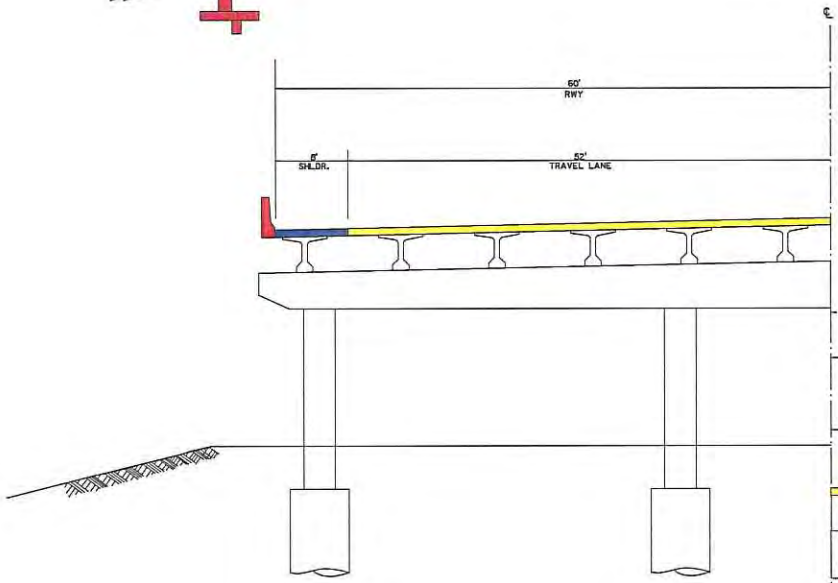
SHEET NUMBER 1

BUCHART HORN, INC.

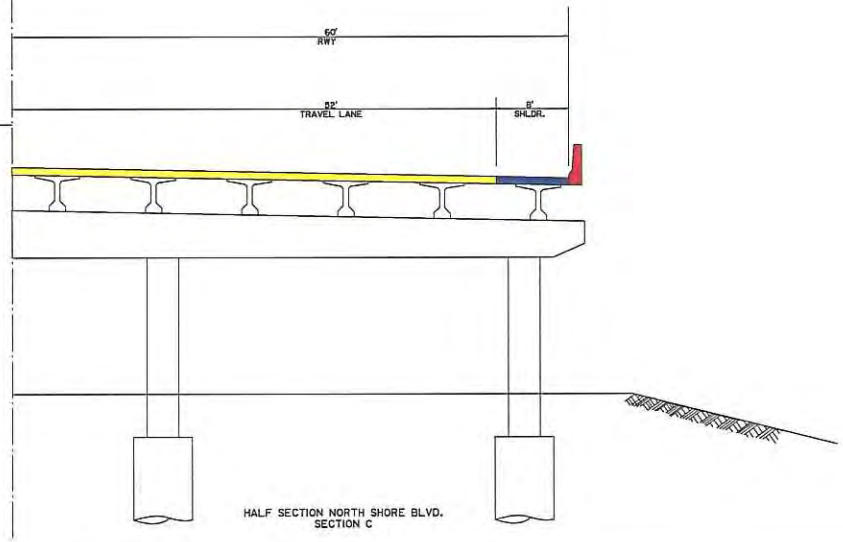


TYPICAL SECTION NORTH SHORE BLVD.
SECTION A-A

TYPICAL SECTION NORTH SHORE BLVD.
SECTION B-B



HALF SECTION NORTH SHORE BLVD.
SECTION D



HALF SECTION NORTH SHORE BLVD.
SECTION C

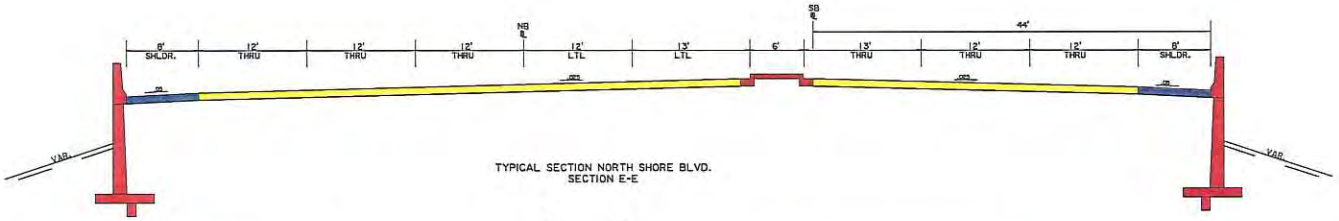
ST. TAMMANY

736-52-0062

TYPICAL SECTION

NORTH SHORE @ I-12
NORTH SHORE BLVD.

BUCHART HORN, INC.



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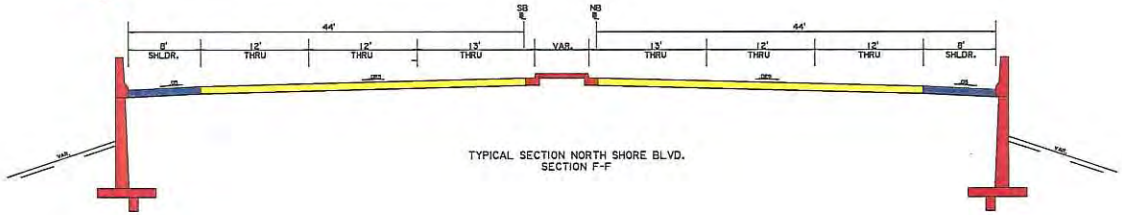
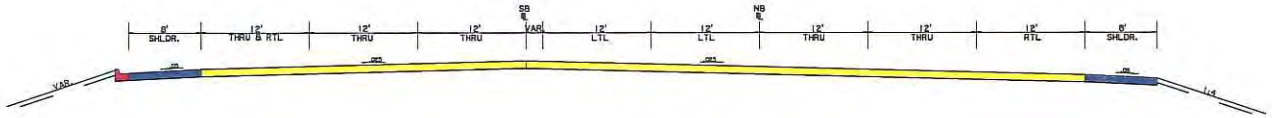
SECTION E-E



TYPICAL SECTION NORTH SHORE BLVD.
SECTION F-F



TYPICAL SECTION NORTH SHORE BLVD.
SECTION G-G

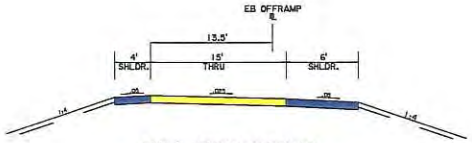
ST. TAMMANY

736-52-0082

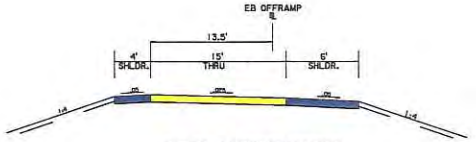
TYPICAL SECTION

NORTH SHORE @ I-12
NORTH SHORE BLVD.

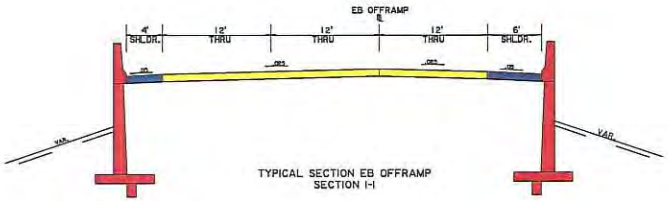
BUCHART HORN, INC.



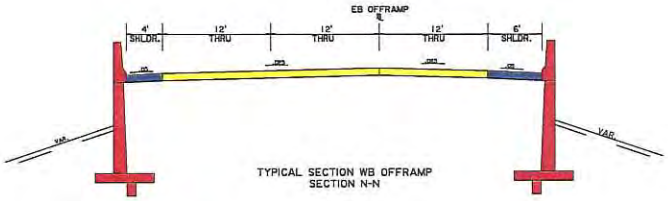
TYPICAL SECTION EB OFFRAMP
SECTION H-H



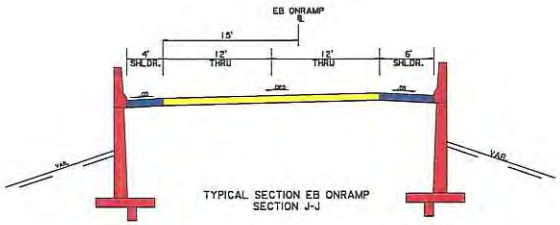
TYPICAL SECTION WB OFFRAMP
SECTION M-M



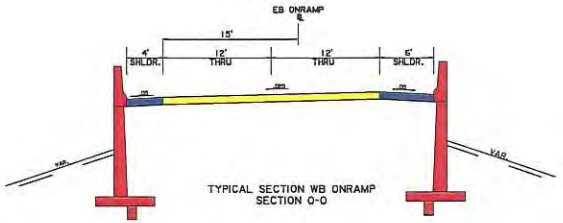
TYPICAL SECTION EB OFFRAMP
SECTION I-I



TYPICAL SECTION WB OFFRAMP
SECTION N-N



TYPICAL SECTION EB ONRAMP
SECTION J-J



TYPICAL SECTION WB ONRAMP
SECTION O-O

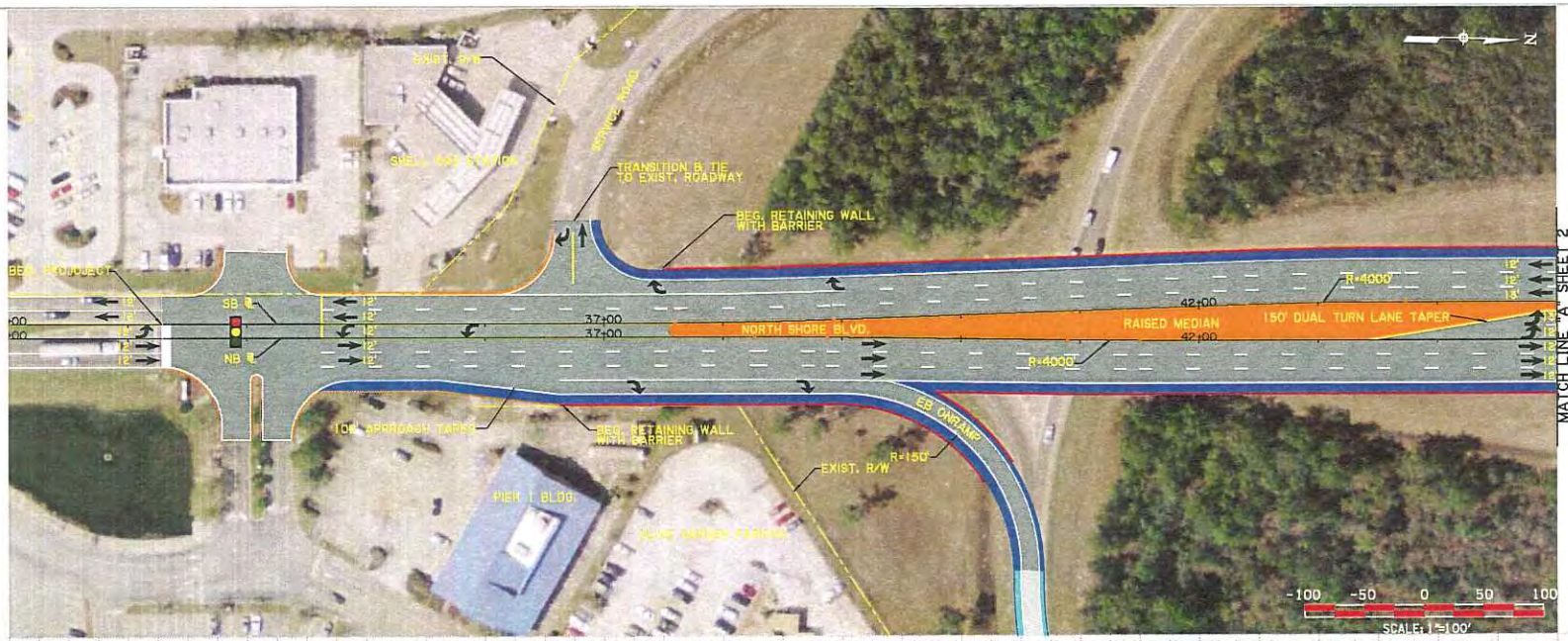
ST. TAMMANY

736-52-0062

TYPICAL SECTION

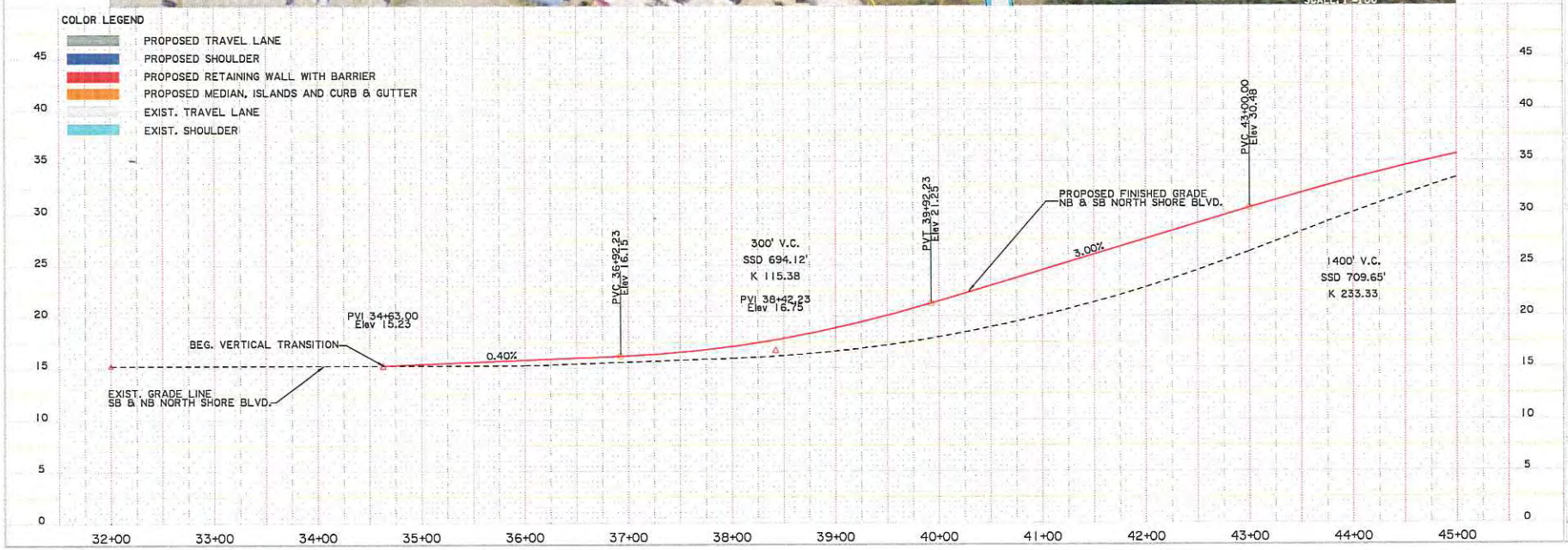
NORTH SHORE @ I-12
RAMP SECTION

BUCHART HORN INC.



COLOR LEGEND

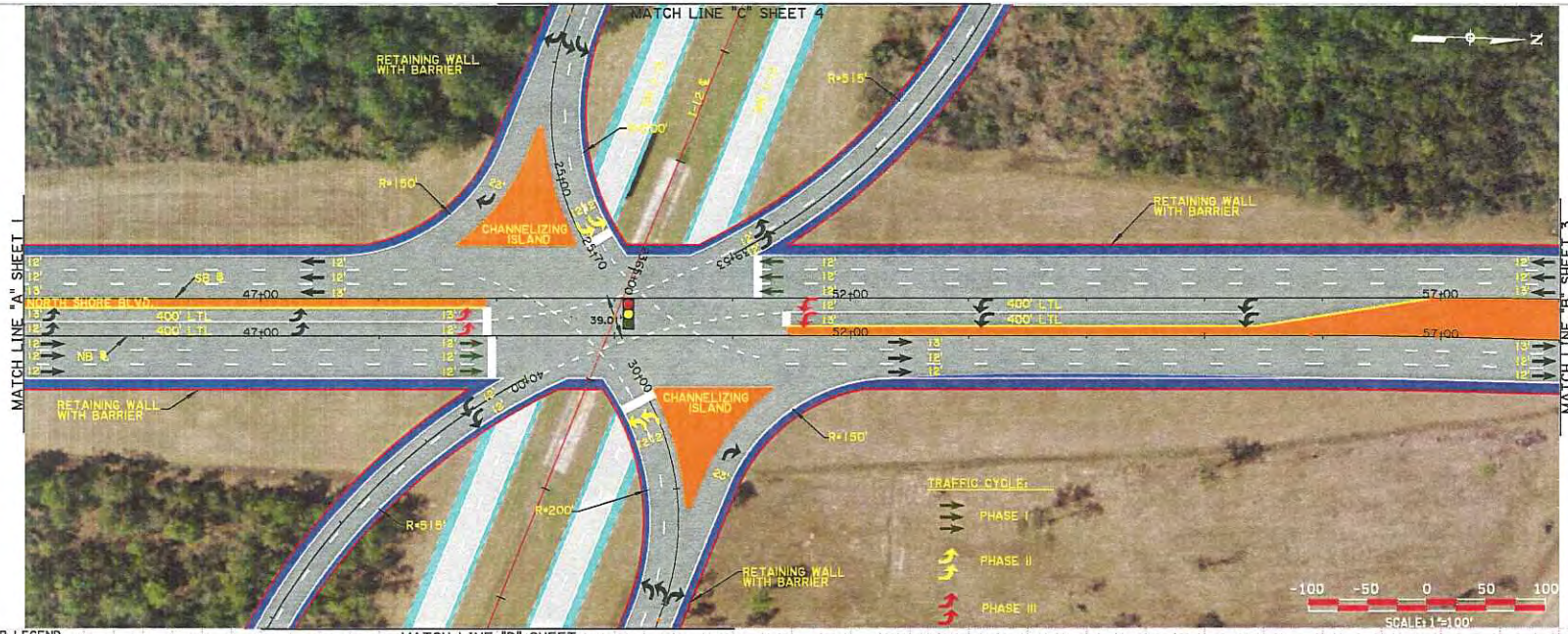
- PROPOSED TRAVEL LANE
- PROPOSED SHOULDER
- PROPOSED RETAINING WALL WITH BARRIER
- PROPOSED MEDIAN, ISLANDS AND CURB & GUTTER
- EXIST. TRAVEL LANE
- EXIST. SHOULDER



PLAN & PROFILE
NORTH SHORE @ I-12
NORTH SHORE BLVD.

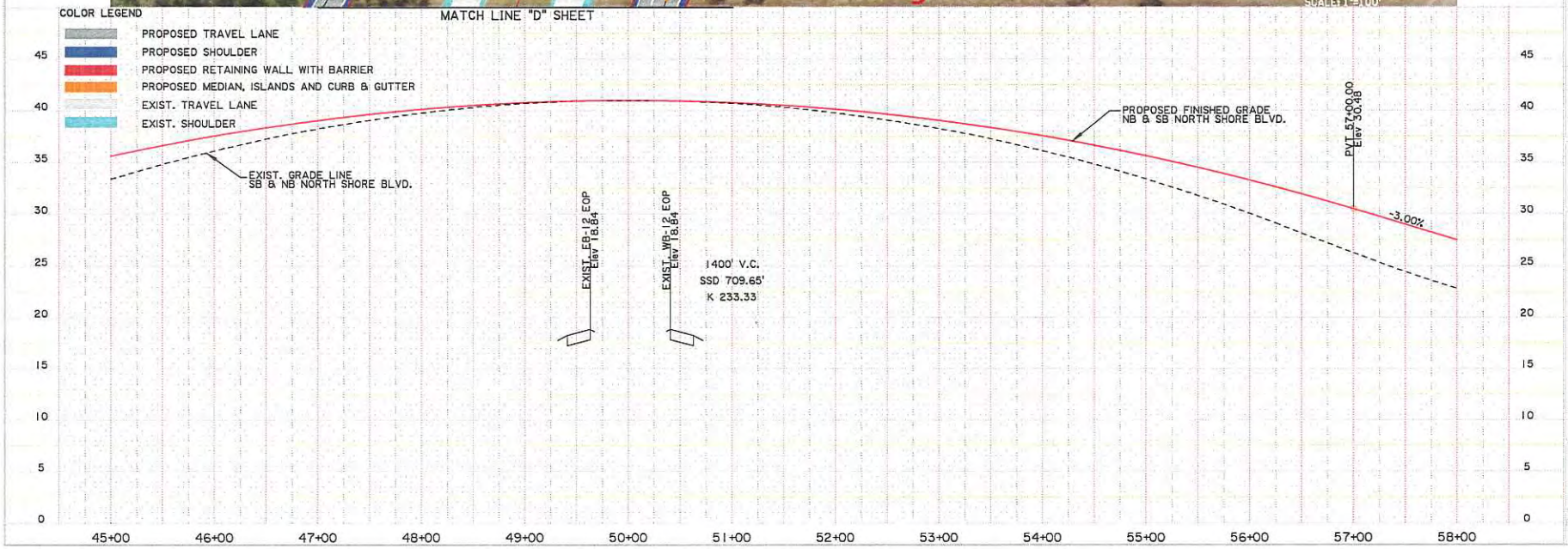
ST. TAMMANY
736-52-0062

BUCHART HORN, INC.



COLOR LEGEND

- PROPOSED TRAVEL LANE
- PROPOSED SHOULDER
- PROPOSED RETAINING WALL WITH BARRIER
- PROPOSED MEDIAN, ISLANDS AND CURB & GUTTER
- EXIST. TRAVEL LANE
- EXIST. SHOULDER



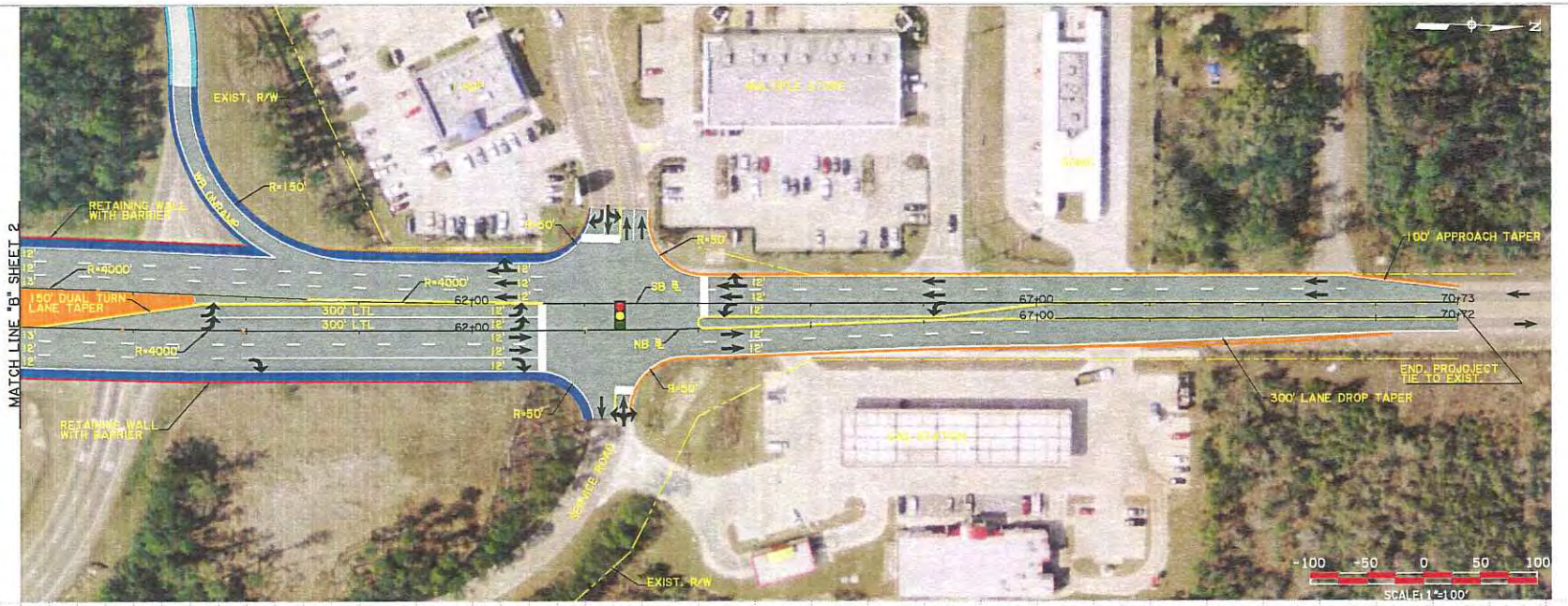
ST. TAMMANY

736-52-0062

PLAN & PROFILE

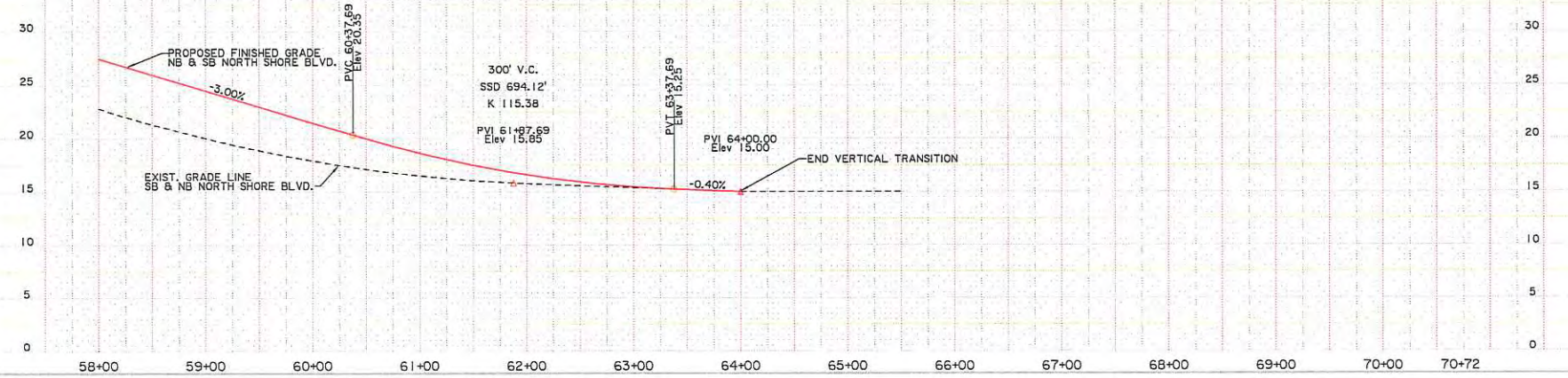
NORTH SHORE @ I-12
NORTH SHORE BLVD.

BUCHART HORN, INC.



COLOR LEGEND

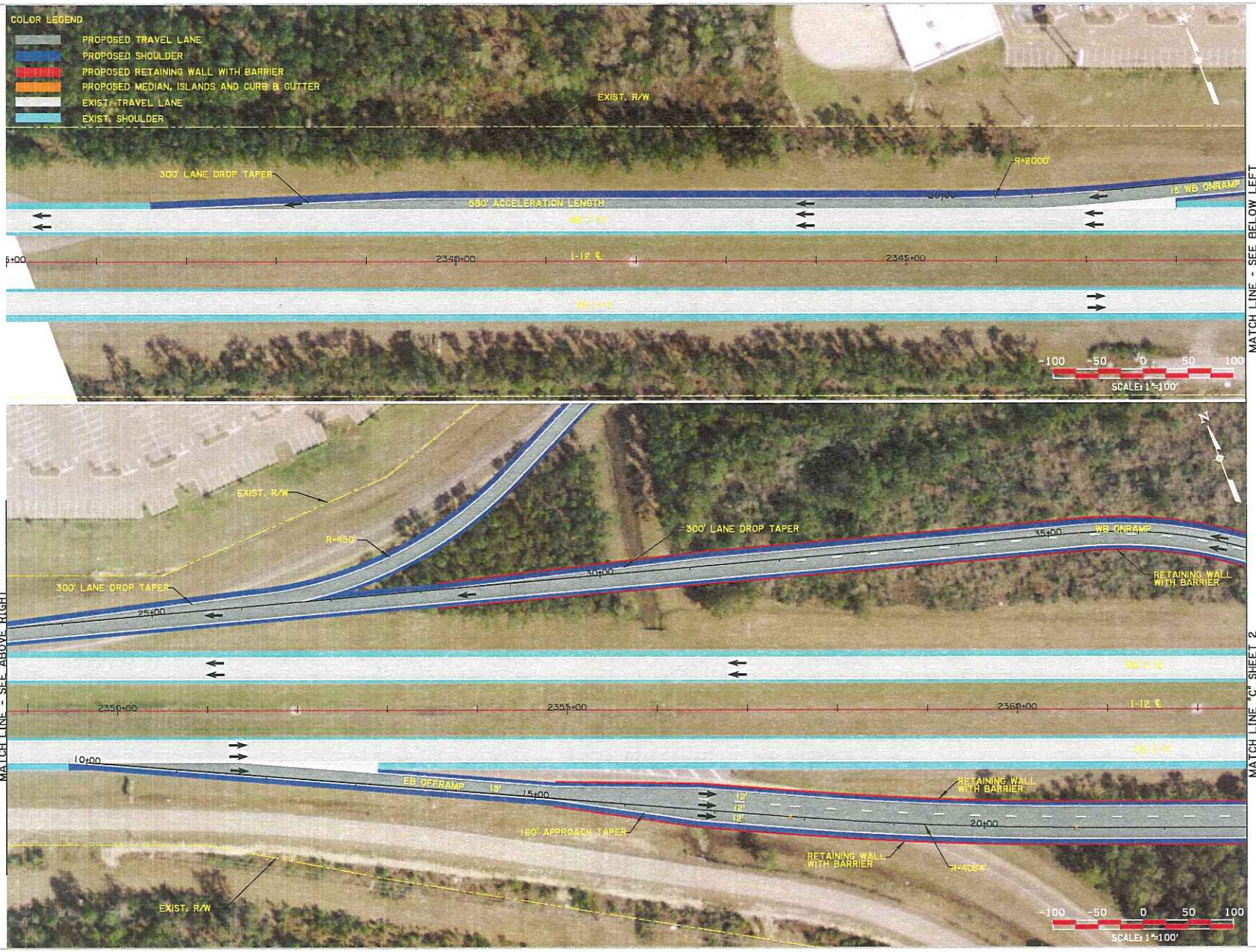
- PROPOSED TRAVEL LANE
- PROPOSED SHOULDER
- PROPOSED RETAINING WALL WITH BARRIER
- PROPOSED MEDIAN, ISLANDS AND CURB & GUTTER



PLAN & PROFILE
NORTH SHORE @ I-12
NORTH SHORE BLVD.

ST. TAMMANY
736-52-0062

BUCHART HORN, INC.



PLAN SHEET

NORTH SHORE @ I-12
WEST RAMPS

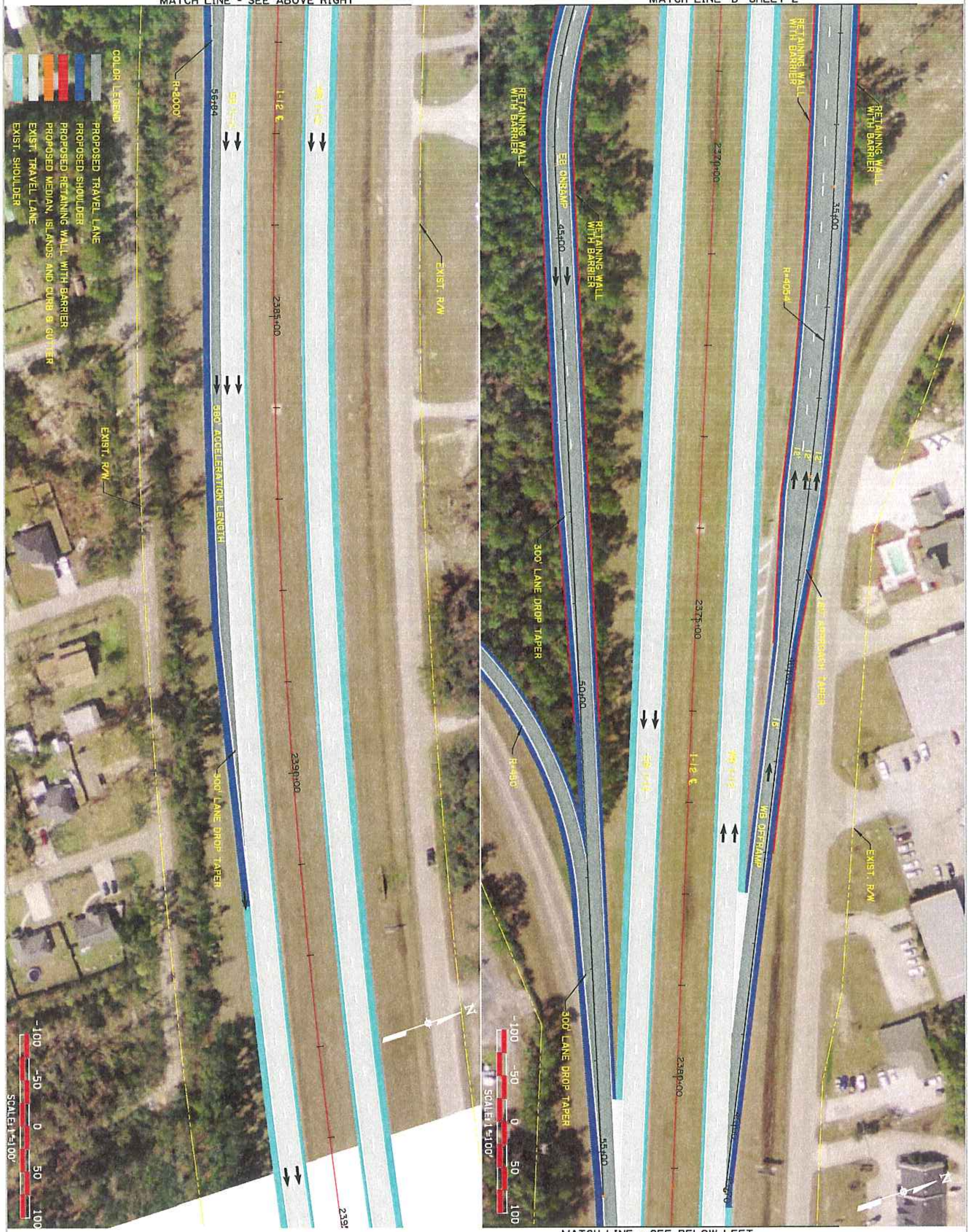
ST. TAMMANY

736-52-0062

BUCHART HORN, INC.

MATCH LINE - SEE ABOVE RIGHT

MATCH LINE "D" SHEET 2



MATCH LINE - SEE BELOW LEFT

BUCHART HORN, INC.	PLAN SHEET NORTH SHORE @ I-12 EAST RAMPS	PARISH: ST. TAMMANY STATE PROJECT: 736-52-0062 SHEET NO. 9

CHECKLIST FOR STAGE 0
Preliminary Scope and Budget Worksheet

District 62 Parish St. Tammany Route Interstate 12

Control Section 454-04 Project Length (miles) 0.61 (estimate)

Begin Project (CS Log Mile) 27.640 End Project (CS Mile)

Project Category (Safety, Capacity, etc.) Capacity Date Prepared 12/01/07

A. Purpose and Need for the Project: Address existing congestion, build capacity to address future development demands, improve level-of-service, enhance connectivity to the interstate highway network, reduce delay and improve traffic operations

B. Project Concept:

Description of Existing Facility (functional class, ADT, number of lanes, etc) Rural diamond Interchange of I-12 at Northshore Boulevard/Airport Road, 2 lanes NB, 1 lane SB, single turn lanes, 26,100 ADT on Northshore Boulevard south of I-12 (as of 10/2007).

Major Design Features. Criteria of the proposed facility (attach aerial photo w/ concept if applicable) Recently improved westbound off ramp and Airport Road/Grantham College Road intersection on north side of interchange. Median on overpass and on Northshore Boulevard. Two traffic signals in interchange (at ramps), additional signals north and south of interchange. Signals south of I-12 ramp in City of Slidell and not examined as part of this study. Signal at Grantham College Road included in study. See attached report for more details.

Design Exceptions To be addressed as needed in advanced design

Technical Analyses (traffic analysis, safety analysis, etc) Attached report contains results of a technical analysis of existing and future traffic conditions based upon changes in land use and growth of traffic. In addition, report documents advisory committee, public information meeting and agency coordination processes.

Alternatives to the Project Concept A total of four build and one no-build concept were considered.

Future ITS/ Traffic Considerations DOTD, St. Tammany Parish and City of Slidell need to coordinate additional progression analysis and review of Northshore Blvd/Airport Rd from US 190 to Slidell Airport.

Construction Traffic Management/Property Access Considerations All construction would be completed within apparent right-of-way of interchange (pending confirmation by survey). Some coordination required between Parish, City and LADOTD on access management issues in vicinity of the Service Road intersections. Traffic flow would be maintained under construction of improvement.

C Potential Environmental Impacts (Complete the Stage 0 Environmental Checklist

Checklist completed as per the Stage 0 Guidelines. In addition, the project team conducted initial agency Outreach. No potential environmental impacts by project noted. No sensitive sites identified within interchange.

D. Cost Estimate

Engineering Design	$1,542,500
Environmental Mitigation	-n/a-
R/W Acquisition	$64,800
C of A (if applicable)	-n/a-
Utility Relocations (Drainage)	$500,000
Construction (include Construction Traffic management)	$9,718,100
TOTAL PROJECT COST	$11,825,400

E. Expected Funding Source(s) (Highway Priority Program, CMAQ, Urban Systems, Fed/State earmarks, etc. Surface Transportation Program, Surface Transportation Program > 200K, with matching funds from the State of Louisiana and some Parish Funds

ATTACH ANY ADDITIONAL DOCUMENTATION **Prepared by:** Burk-Kleinpeter, Inc. and Tamplan, llc through the RPC

Disposition (circle one): (1) Advance to Stage 1 (2) Hold for Reconsideration (3) Shelve

District 62 Parish St. Tammany Route Interstate 12
Begin Project (CS Log Mile) 27.640 End Project (CS Mile)

Adjacent Land Use: Commercial within three quadrants of interchange (NW, SE, SW), Undeveloped/Vacant within 1 quadrant of interchange (NE) at time of initial survey

Any property owned by a Native American Tribe?
(Y or N) or Unknown. If so, which Tribe? No

Any property enrolled in the Wetlands Reserve Program?
(Y or N) or Unknown. If so, give location. No

Community Elements: Is the project impacting or adjacent to any?

Element	(Y or N)	Location
Cemeteries	N	
Churches	N	
Schools	N	
Public Facilities	N	
Community Water well/supply	N	

Section 4F Issues: Is the project impacting or adjacent to any?

Issue	(Y or N)	Location
Public Recreation Areas	N	
Public Parks	N	
Wildlife Refuges	N	
Historic Sites	N	

Is the project impacting, or adjacent to a property listed on the National Register of Historic Places?
(Y or N) No

Is the project within a historic district or a National Landmark District?
No

Do you know of any threatened or endangered species in the area?
(Y or N) If so, what species? No

Does the project impact a stream protected by the Louisiana Scenic Rivers Act?
(Y or N) If yes, name the stream. No

Are there any Significant Trees as defined by EDSM I.1.1.21 within the proposed ROW?
(Y or N) If yes, name the stream. No

What year was the existing bridge built? N/A

Are any waterways impacted by the project considered navigable?
(Y or N) If unknown, state unknown, list the waterways N/A

Hazardous Materials: Have you checked the following DEQ and EPA Databases for potential problems?

Item	Checked Database? (Y or N)	Potential Problems? (Y or N and location)
Leaking Underground Storage Tanks	Y	N
CERCLIS	Y	N
ERNS	Y	N
ECHOS	Y	N

Underground Storage Tanks (UST). Are there any gas stations or other facilities that may have UST on or adjacent to the project? (Y or N) If so, give name and location

Name	Address	UST ID #
Shell Express #7	183 Northshore Boulevard	52017704

Are there any chemical plants, refineries or landfills adjacent to the project?
(Y or N) N

Are there any large manufacturing facilities adjacent to the project?
(Y or N) N

Are there any dry cleaners adjacent to the project?
(Y or N) N

Oil/Gas Wells. Have you checked the DNR Database for registered oil and gas wells?
Checked Database? (Y or N) Y Wells present? (Y or N) N

Type Location

Are there any possible residential or commercial relocations/displacements?
(Y or N) How many? N

Do you know of any sensitive community issues related to the project?
(Y or N) If so, explain. N

Is the project area population minority or low income?
(Y or N) N

What type of detours. closures could be used on the job?
Unknown at this time

Did you notice anything of concern during your site/windshield survey of the area?
No

Ellen W. Soll, AICP, Burk-Kleinpeter, Inc
Point of Contact

504.486.5901 x 143
Phone Number

December 1, 2007
Date

SOURCES:

WETLAND RESERVE PROGRAM: United States Department of Agriculture (USDA), Natural Resources Conservation Service (NCRS). http://www.nrcs.usda.gov/programs/wrp/pdfs/louisiana05.pdf

WILDLIFE REFUGES: Louisiana Department of Wildlife and Fisheries, map of Wildlife Management Areas. http://www.wlf.state.la.us/apps/netgear/clientFiles/lawlf/files/WMA%20Location%20Map.jpg.pdf

NATIONAL REGISTER SITES: National Park Service, National Register Information Service (NRIS). http://www.nr.nps.gov/

THREATENED AND ENDANGERED SPECIES: Louisiana Department of Wildlife and Fisheries, Louisiana Natural Heritage Program, Threatened and Endangered Species. http://www.wlf.state.la.us /apps/netgear/index.asp?cn=lawlf&pid=693.

SCENIC RIVERS: Louisiana Department of Wildlife and Fisheries, Scenic Rivers Program. http://www.wlf.state.la.us/apps/netgear/index.asp?cn=lawlf&pid=1239)

SIGNIFICANT TREES: Live Oak Society: LA DOTD's significant trees policy. http://www.louisianagardenclubs.org/pages/liveoakfiles/treepolicy.htm

LEAKING UNDERGROUND STORAGE TANKS: LA DEQ Portal. http://www.deq.louisiana.gov/portal/tabid/2214/Default.aspx

CERCLIS: United States Environmental Protection Agency (US EPA), Superfund (CERCLIS) Query. http://www.epa.gov/enviro/html/cerclis/cerclis_query.html

ERNS: National Response Center, Environmental Response Notification System. Online. Available: http://www.nrc.uscg.mil/download.html

ECHOS: United States Environmental Protection Agency (US EPA), Enforcement and Compliance History Online (ECHO). http://www.epa.gov/echo/

USTS: Louisiana Department of Environmental Quality, Underground Storage Tanks Database. http://www.deq.louisiana.gov/portal/tabid/136/Default.aspx

OIL and GAS WELLS: Department of Natural Resources (DNR), SONRIS Integrated Applications. http://sonris-www.dnr.state.la.us/www_root/sonris_portal_1.htm.

EXECUTIVE SUMMARY

This project involves improvement to an existing rural diamond interchange on Interstate 12 (I-12) at Northshore Boulevard and Airport Road, in St. Tammany Parish, LA. The project area encompasses the interchange area, starting on the north at the I-12 Service Road/Target Shopping Center intersection and ending at the I-12 Service Road intersection on the south. The boundaries for the project to the east and west are the ramp termini with the I-12 corridor.

No improvements or activity on the I-12 corridor are proposed or included within this Stage 0 study. The purpose of this study is to develop potential interchange and roadway improvements to alleviate traffic congestion at the I-12 at Northshore Boulevard/Airport Road exit ramps.

The alternative that has been selected as the most feasible and practical through the Stage 0 process provides the following improvements, as summarized on Figure ES-1:

- Construction of a new six-lane bridge over I-12 between the existing ramps, which includes:
  - Dual left turn lanes for northbound and southbound traffic to the I-12;
  - Additional lane capacity (2 lanes in each direction) for north/southbound traffic;
- Construction of a dedicated right turning lane from southbound Airport Road and northbound Northshore Boulevard to the I-12 entry ramps;
- Construction of new dual right turn lane for the eastbound I-12 exit ramp to southbound Northshore Boulevard;
- Construction of a two-lane section on the existing entry ramps to facilitate dual lefts and dual right turning movements from the Northshore Boulevard and Airport Road corridors;
- Minor widening of Grantham College Road to provide for a dedicated left-turn and shared through/right lanes for westbound traffic.
- Updates to all traffic signals within the interchange to maintain coordination and corridor progression.

The initial order of magnitude cost estimate for these improvements, shown in Table ES-1, is $11,825,400. This is based on use of LADOTD unit costs of construction and existing corridor as-built information. This total includes all costs for design, minimal right-of-way acquisition and construction.

Review of the various environmental elements of the interchange area, as determined using the LADOTD Stage 0 evaluation form, identified no specific concerns with regard to the natural environment. In addition, there do not appear to be any impacts to the manmade environment since there is no development within the interchange right-of-way except the existing overpass and ramp structures. All improvements, as proposed, will transition back into the existing corridor definition for Airport Road and Northshore Boulevard outside of the interchange area.

A comprehensive review of traffic operations and conditions within the interchange found that improvements outlined provide a positive change to level-of-service as well as enhance available roadway capacity.[1]

Table ES-1
Preliminary Order of Magnitude Cost Estimate (2007)
I-12 at Northshore Boulevard and Airport Road Interchange Improvement

Cost Category	Estimated Cost
Mobilization, Demolition, Site Preparation	$738,000
Roadway Components	$6,923,600
Drainage and Utility Relocation	$500,000
Right-of-Way	$64,800
Contingencies	$2,056,600
Engineering, Construction Administration, Testing, Survey	$1,542,500
Total Estimated Project Cost	$11,825,400

Notes:
1. Based upon unit cost information provided by similar work completed through LADOTD.
2. Costs are based upon an initial order of magnitude and should be used for planning purposes only.

Compiled by Burk-Kleinpeter, Inc. and Tamplan, llc., 2007.

[1] To determine corridor-wide benefits, a similar review will need to take place from US 190 to the Slidell Airport on the Northshore Boulevard and Airport Road corridors. This was beyond the scope of this study. Note, general design issues including lane, median and shoulder widths, will be addressed in more advanced design. All other specific design issues, including but not limited to those mentioned above and that pertain to LADOTD standards, shall be addressed in more advanced stages of design.

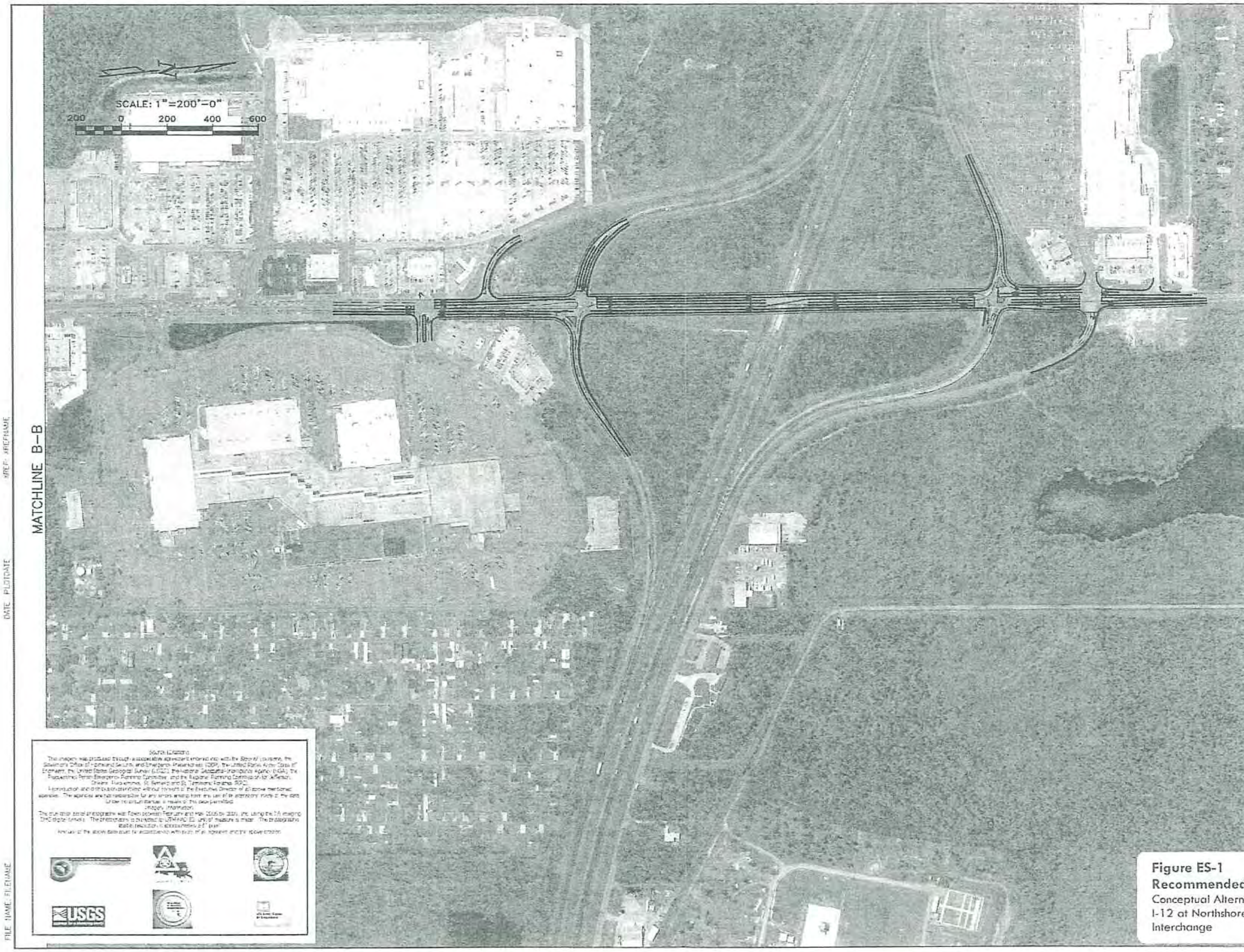


Figure ES-1
Recommended Improvement
Conceptual Alternative #1 – Reconstruction I-12 at Northshore Boulevard/Airport Road Interchange

INTERSTATE–12/NORTHSHORE BLVD. /AIRPORT ROAD.
STAGE 0 FEASIBILITY STUDY
AND ENVIRONMENTAL INVENTORY
ALTERNATIVE ONE

ST. TAMMANY PARISH
I-12 – 0139
10337
SHEET NUMBER 3

APPENDIX D

PROJECT SITE PICTURES

APPENDIX D – PROJECT SITE PICTURES

LA 1088 Looking southbound toward I-12
(Construction of LA 1088 Interchange in Progress)

LA 36 Looking Eastbound (near Alt P crossing)

LA 1088 Looking northbound from I-12

LA 435 Looking Eastbound (near Alt P crossing)

LA 36 Looking Eastbound (near Alt P crossing)

LA 435 looking eastbound (near Alt B/O crossing)

LA 435 Looking eastbound near Talisheek

LA 41 looking northbound at LA 40
(northern project terminus for Alt P, Q and J)

Peg Keller Road looking southbound

LA 41 looking northbound at LA 21 Intersection

LA 435 looking southbound at Old RR Alignment

LA 21 looking westbound at LA 40 Intersection

LA 21 looking eastbound at LA 40 Intersection

LA 434 looking southbound at I-12

LA 21 looking southbound near Bush

LA 434 looking northbound near Ezell Rd

Airport Road looking northbound near Grantham College Dr.

Old Railroad Corridor looking northbound from LA36 overpass

LA 36 looking westbound at RR Overpass

LA 1083(Allen Rd) looking northbound near Sanders Road

LA 41 looking northbound near LA 36 intersection

Bob Levy Rd looking northbound