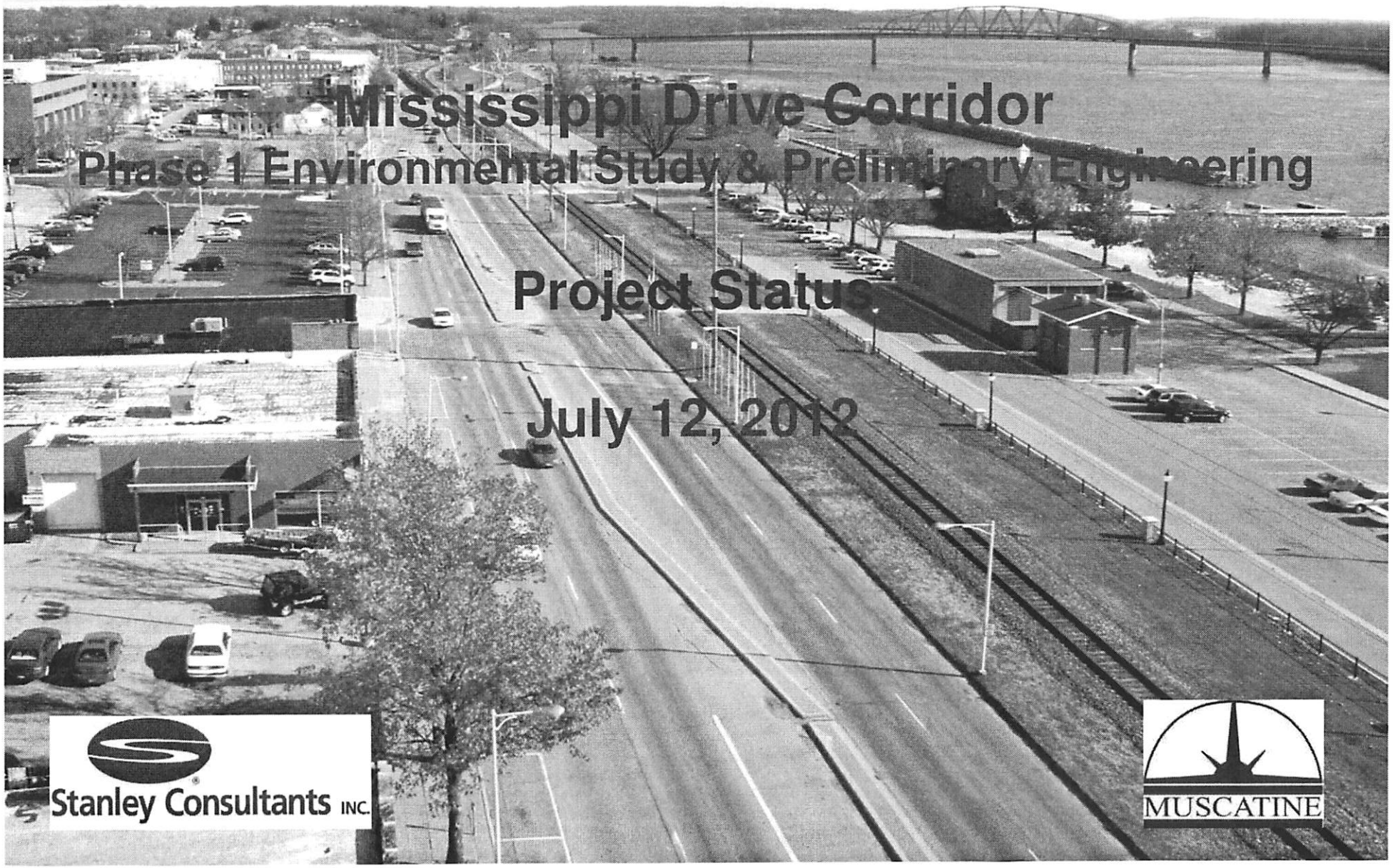


Mississippi Drive Corridor

Phase 1 Environmental Study & Preliminary Engineering

Project Status

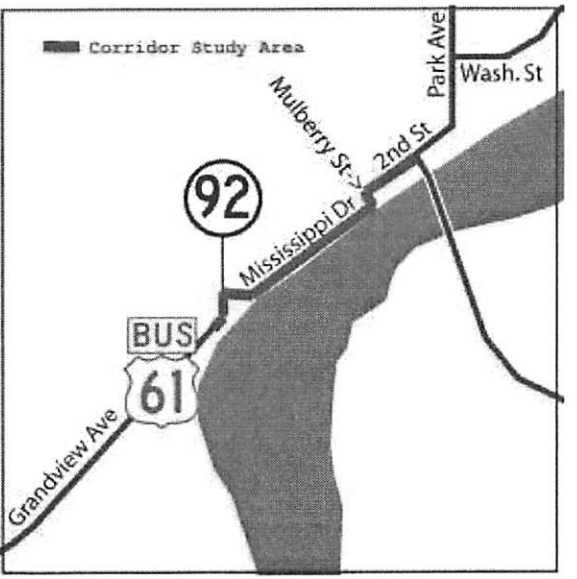
July 12, 2012

Stanley Consultants INC.

MUSCATINE

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Project Limits

- Formerly named "Front Street"
- Primary access route for downtown businesses
- Principal arterial – Segment of IA 92/(Business) US Route 61



Stanley Consultants INC.

MUSCATINE

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Project History

- 1980's – Hwy 61 By-Pass constructed
- 1984 to present - $20 million has been spent to preserve and enhance the Mississippi Drive Corridor area.
- 2006-2007 – Mississippi Drive Corridor Study completed
  - Conceptual improvements to pedestrian and vehicular traffic
  - Conceptual improvements to reduce flood impacts
  - Conceptual improvements to visual image

Stanley Consultants INC.

MUSCATINE

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering

Phase I Process

✓ To position the City for state and federal funding.

- **Environmental Assessment Process**
  - Initiate Early Coordination (Completed)
  - Conduct Alternative Analysis (Completed)
  - Hold Public Meetings (2 Meetings Completed)
  - Assess Project Impacts (Completed)
  - Prepare Environmental Assessment and 4(f) Statement
  - Hold Public Hearing
  - Prepare Final Environmental Document

- **Project Location Report** (Refer to Council Packets for list of reports)

- **Typical Length 18-24 Months (Currently 20 Months In)**

Stanley Consultants INC.

MUSCATINE

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Purpose and Need for Action

Purpose

- The purpose of the proposed Mississippi Drive (Iowa 92) improvements is to safely accommodate future traffic and pedestrians, including bicyclists along the corridor as well as between the riverfront and downtown, to correct roadway deficiencies to limit future flooding of Mississippi Drive and to provide the transportation infrastructure needed to support planned and future economic development.

Need

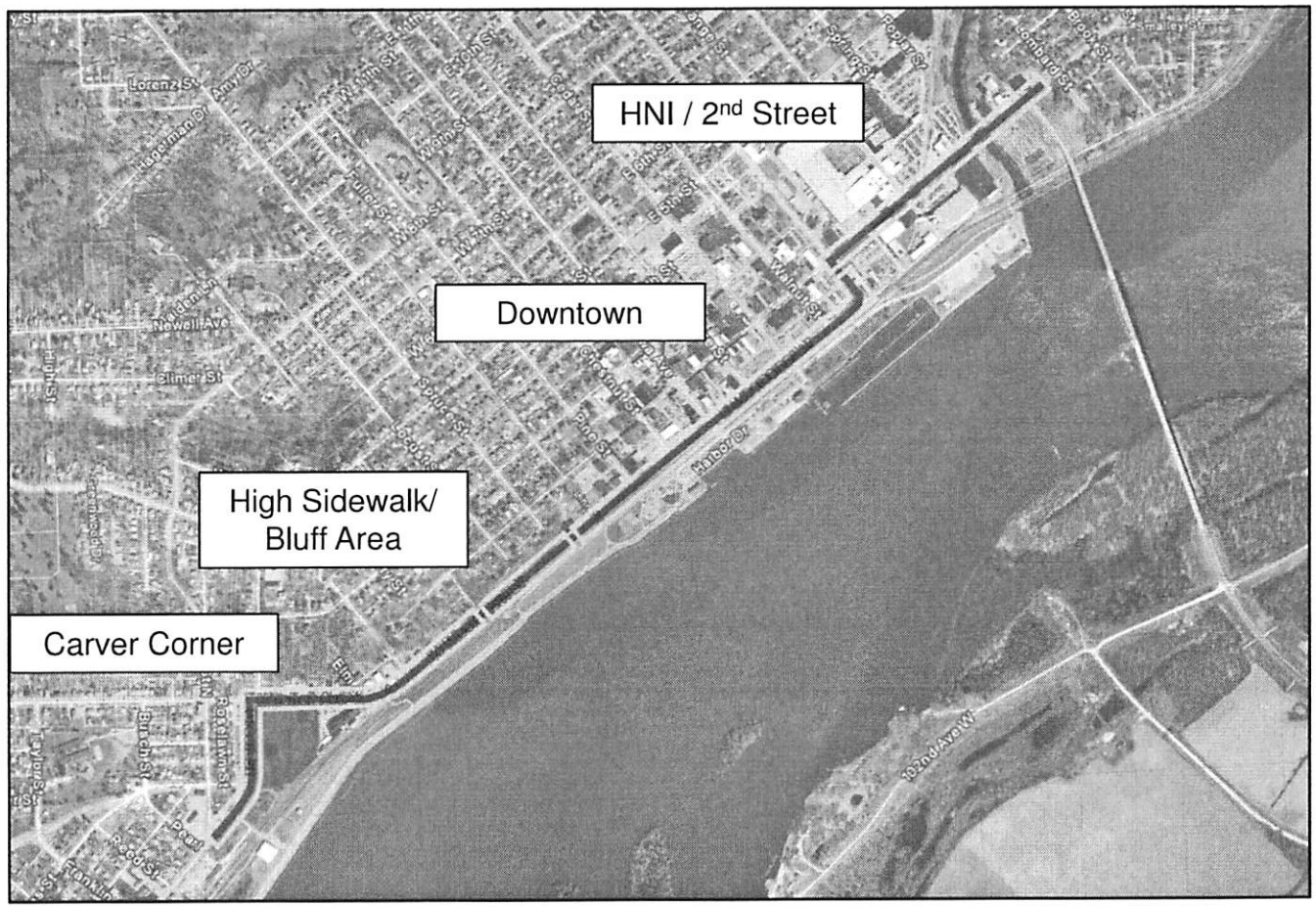
- This project is needed to provide better access to vehicles traveling thru the downtown, to provide safe access to pedestrians crossing Mississippi Drive, to reduce instances of closure of Mississippi Drive due to flooding and to foster economic development.

(Refer to Council Packets for complete Purpose and Need Statement)

Stanley Consultants INC.

MUSCATINE

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Project Areas

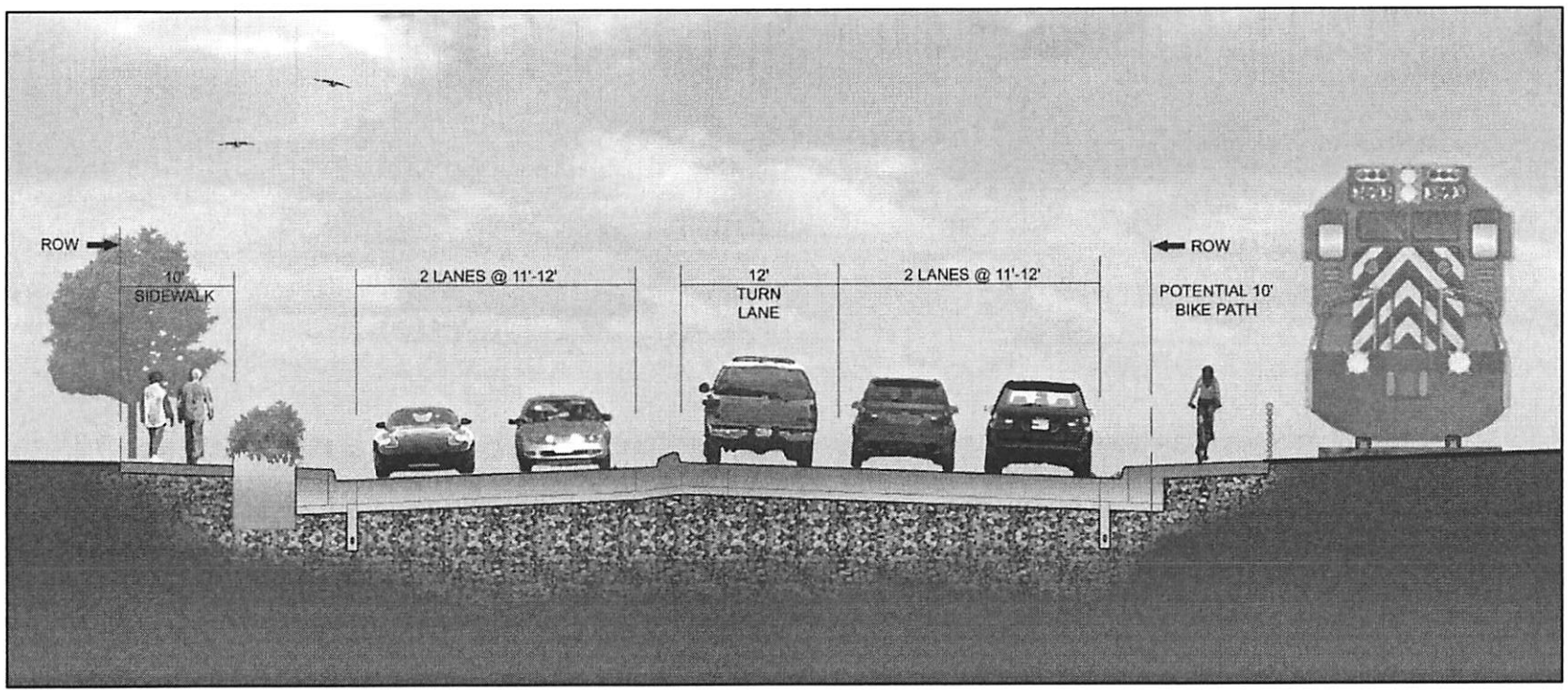


Stanley Consultants INC.

MUSCATINE

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Overall Corridor Alternatives

5-Lane Option



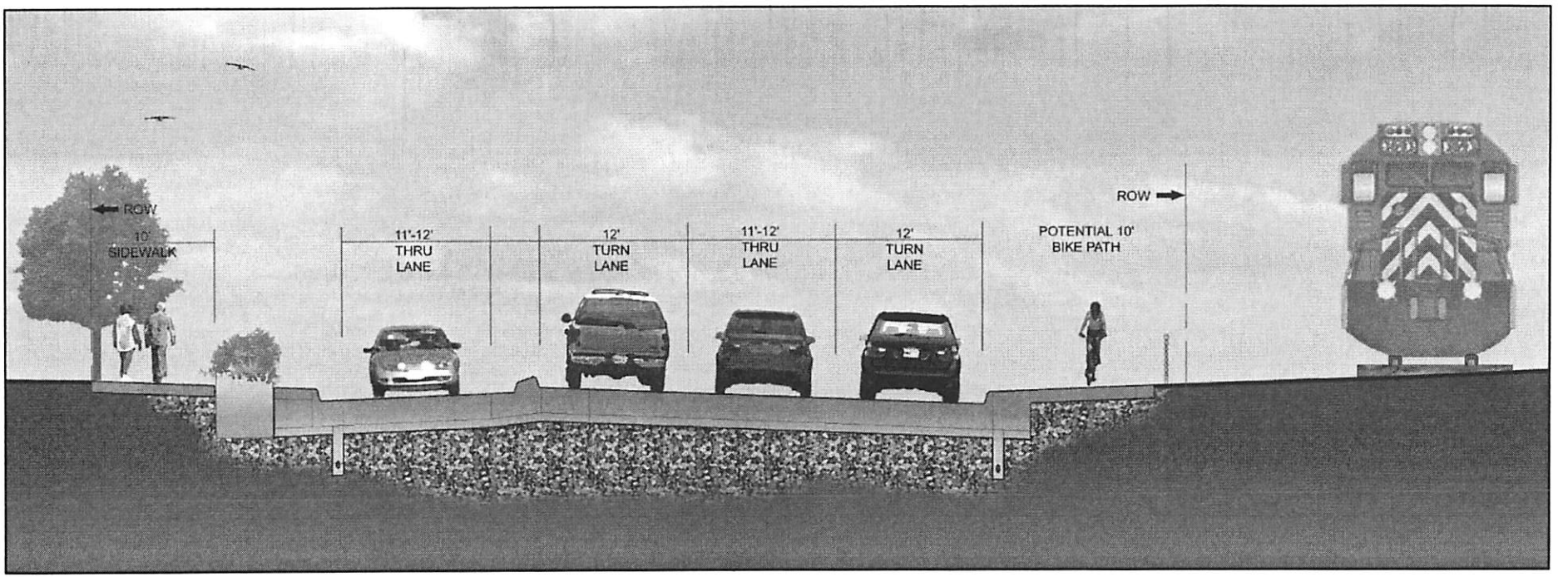
(Refer to Council Packets for detailed Evaluation of Alternatives)

Stanley Consultants INC.

MUSCATINE

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Overall Corridor Alternatives

3-Lane Option

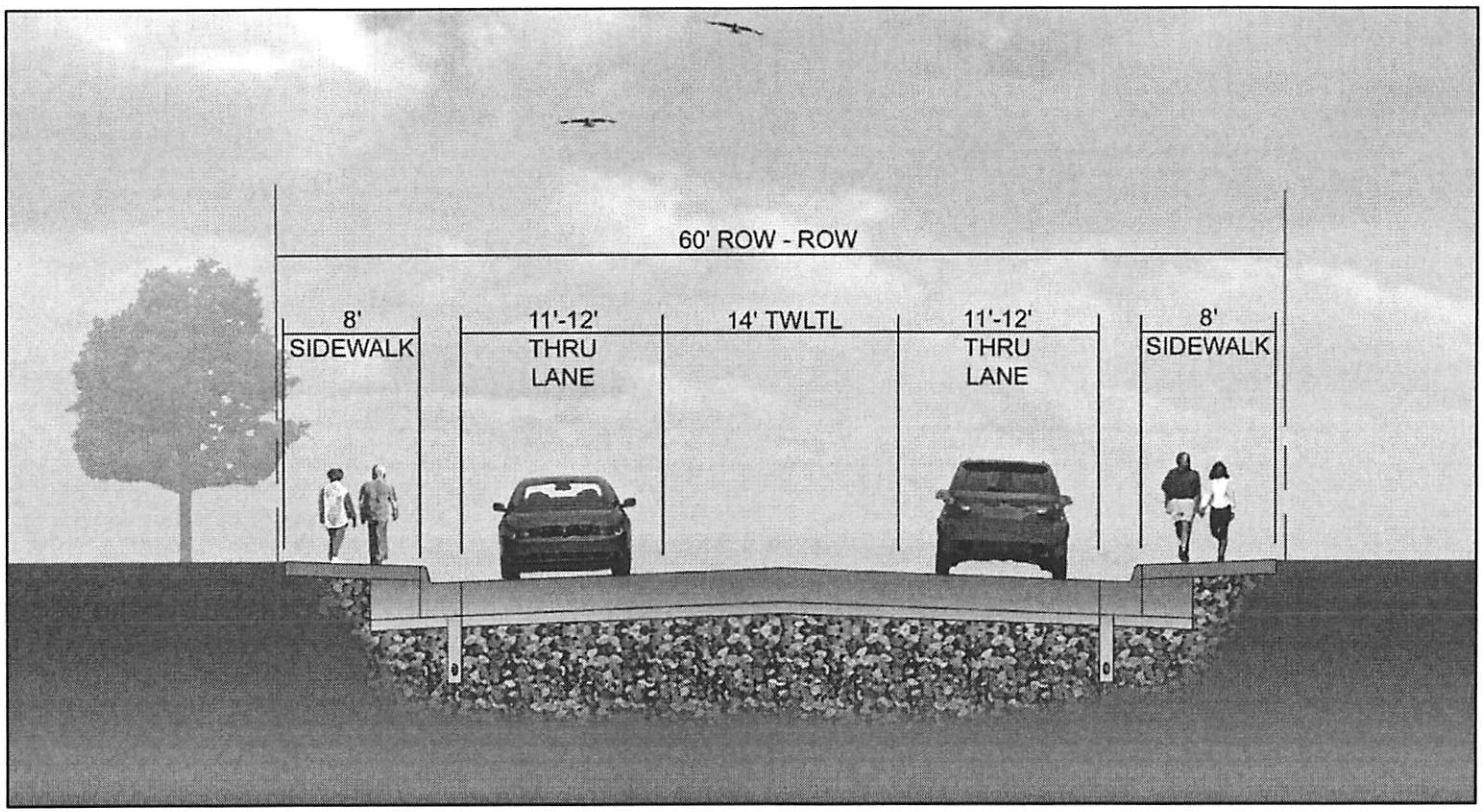


Stanley Consultants INC.

MUSCATINE

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Overall Corridor Alternatives

HNI/2nd Street and Carver Corner



Stanley Consultants INC.

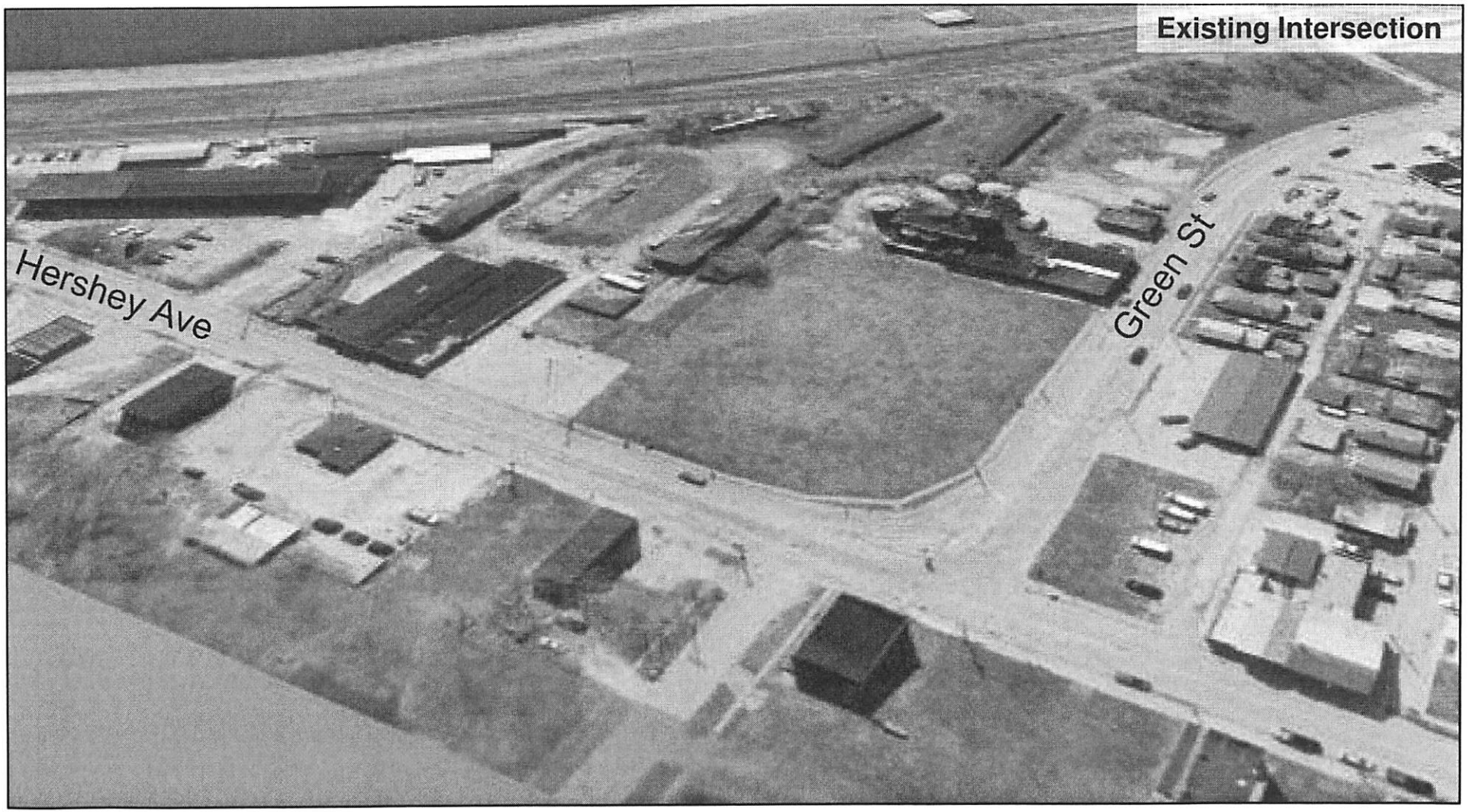
MUSCATINE

Mississippi Drive Corridor

Phase 1 Environmental Study & Preliminary Engineering

Carver Corner Area Options

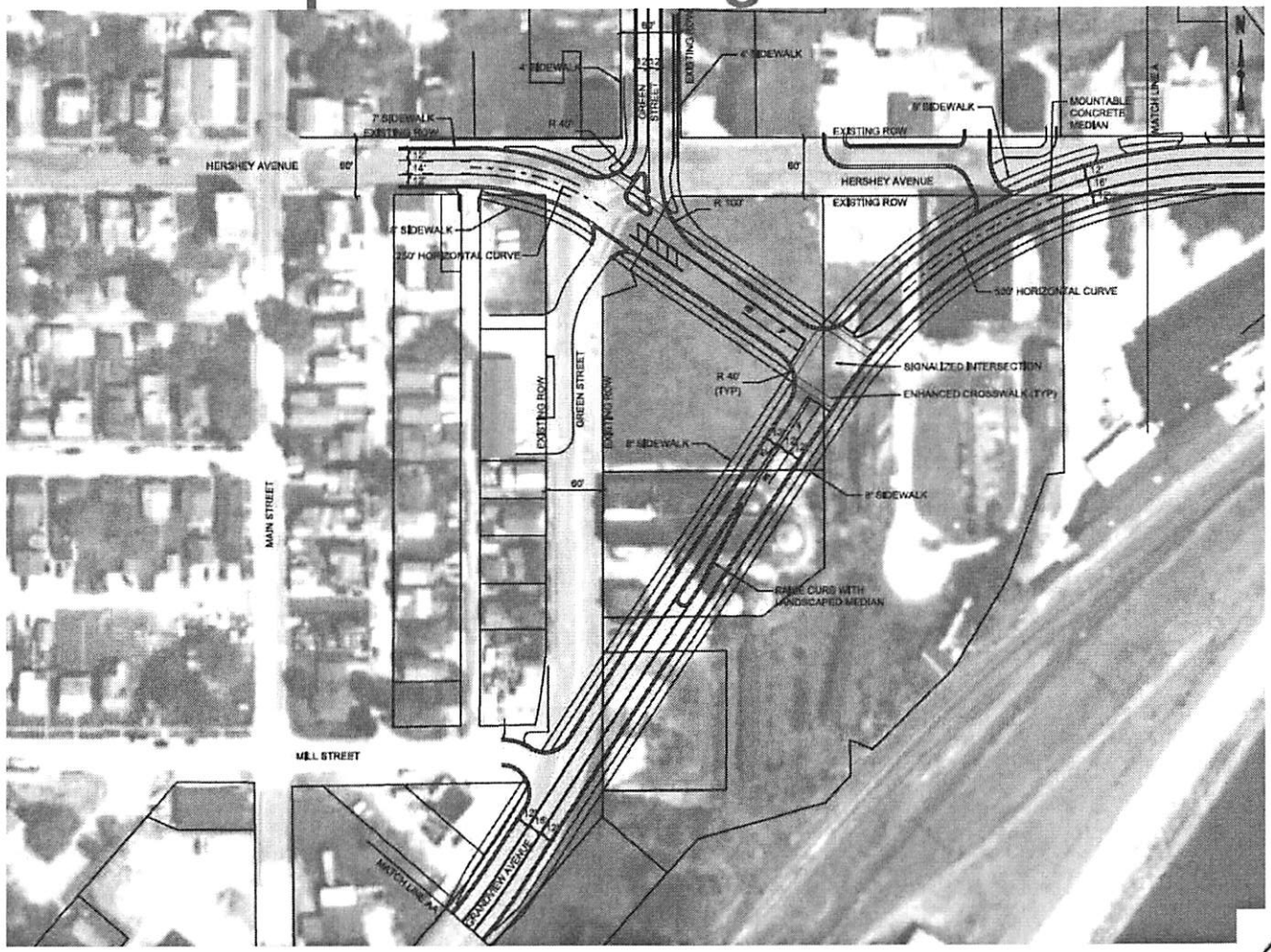
(Refer to Council Packets for Review of 5 Options Considered)



Mississippi Drive Corridor

Phase 1 Environmental Study & Preliminary Engineering

Option 1C - Signalized



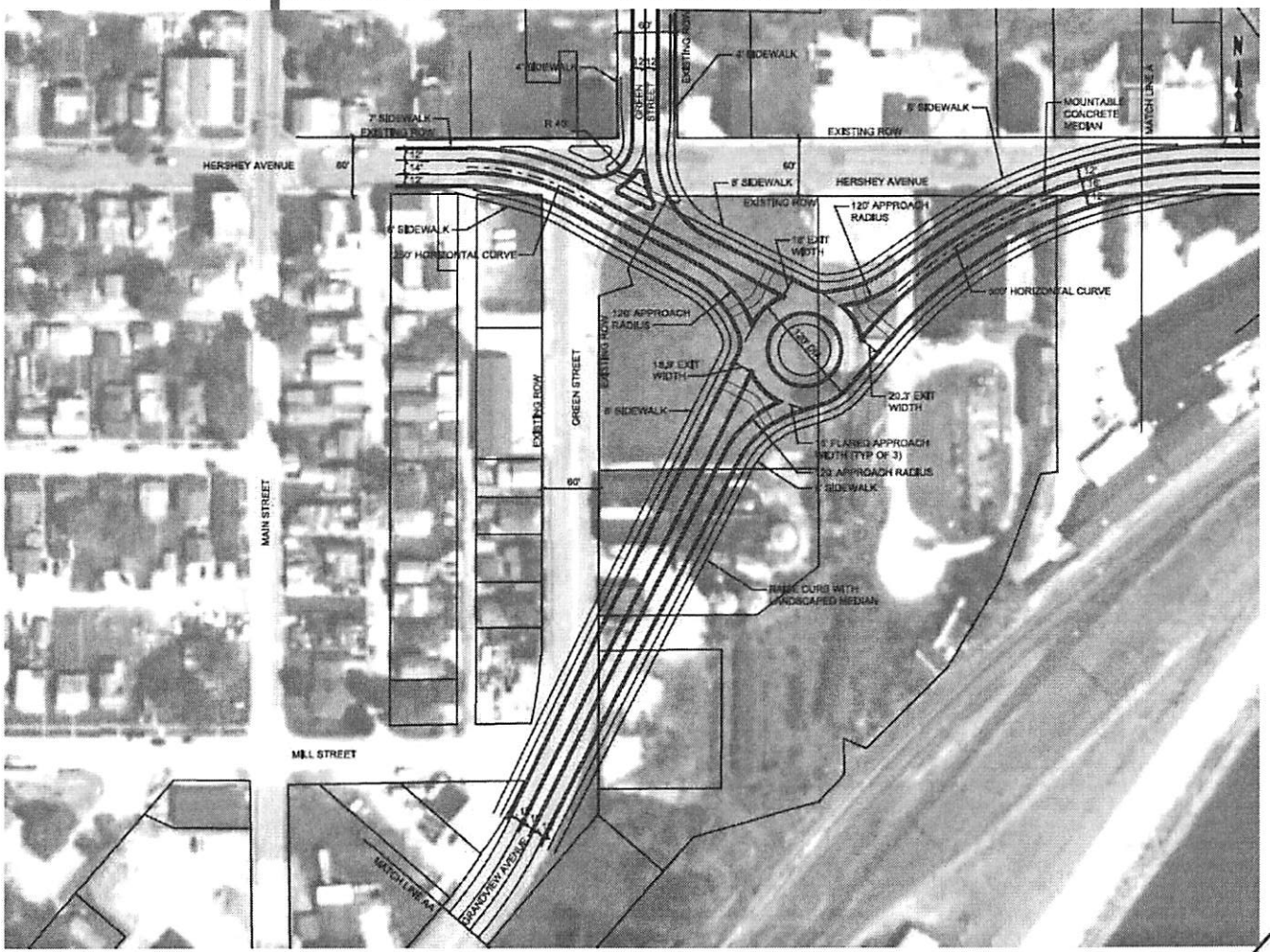
Stanley Consultants INC.

MUSCATINE

Mississippi Drive Corridor

Phase 1 Environmental Study & Preliminary Engineering

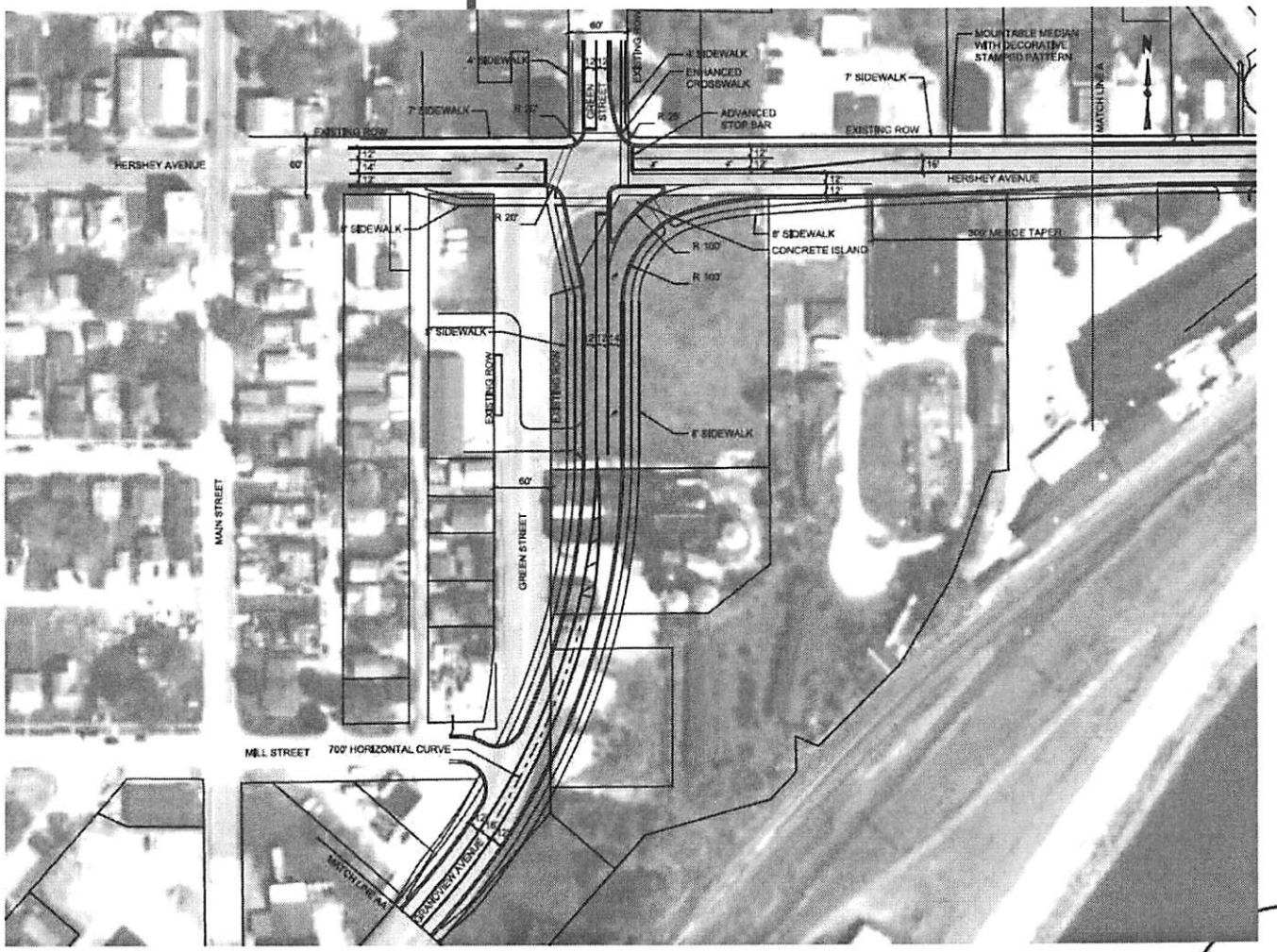
Option 1C - Roundabout



Stanley Consultants INC.

MUSCATINE

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Option 1D

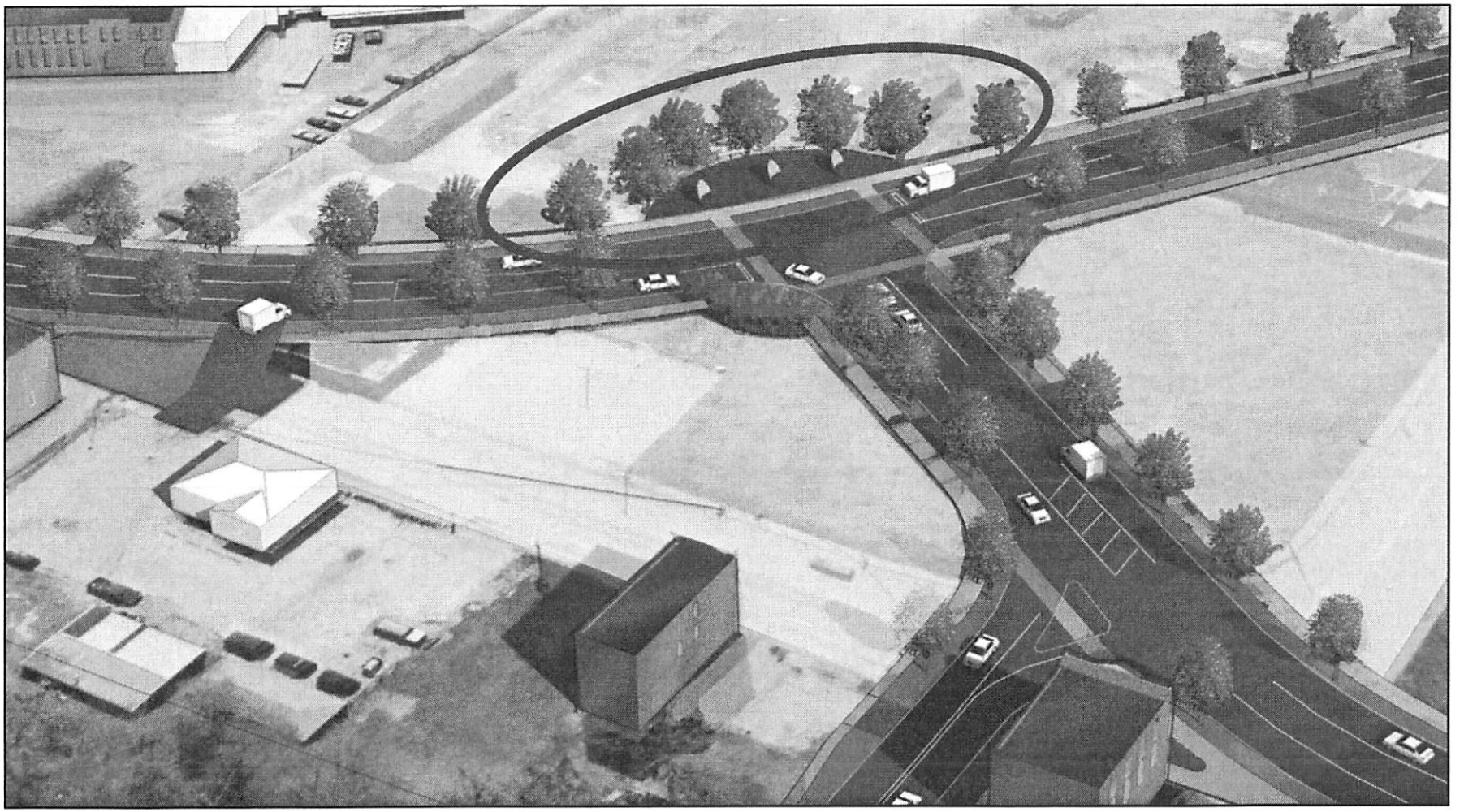


Stanley Consultants INC.

MUSCATINE

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Gateway Experience Focal Point

SOUTH EDGE



Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Gateway Experience Focal Point

WEST EDGE

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Gateway Experience Focal Point

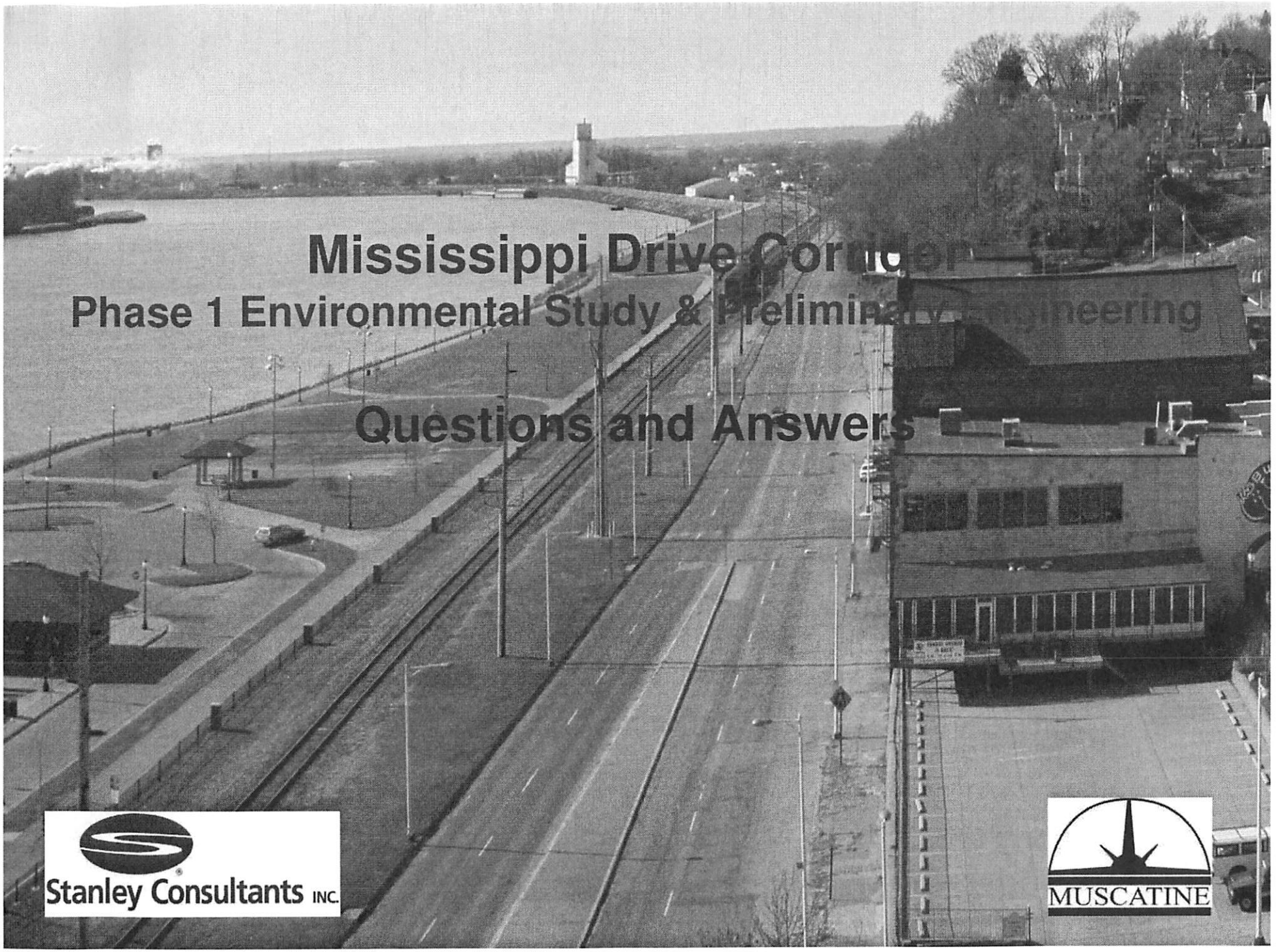
HILLSIDE

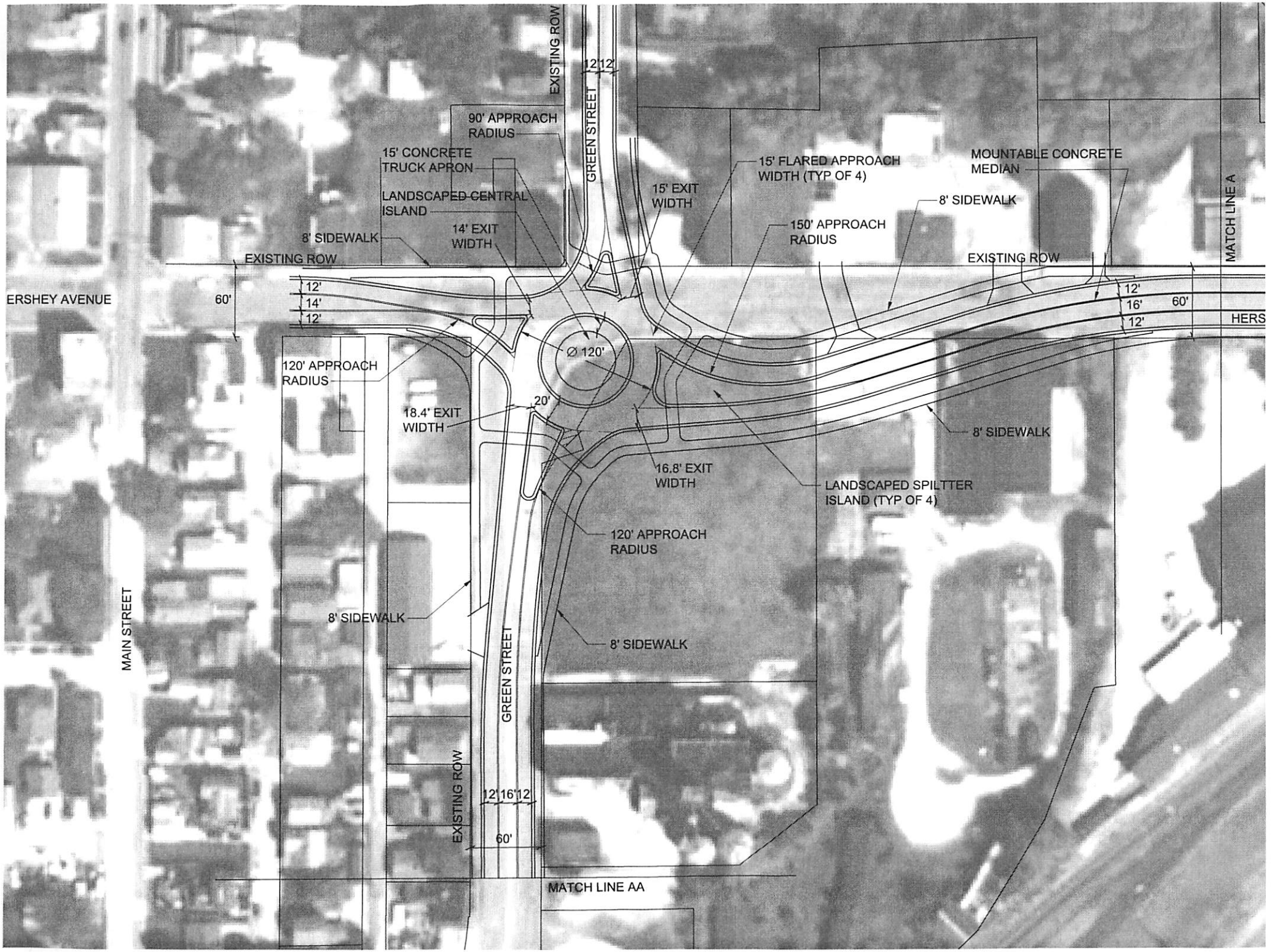
Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Future Project Tasks and Schedule

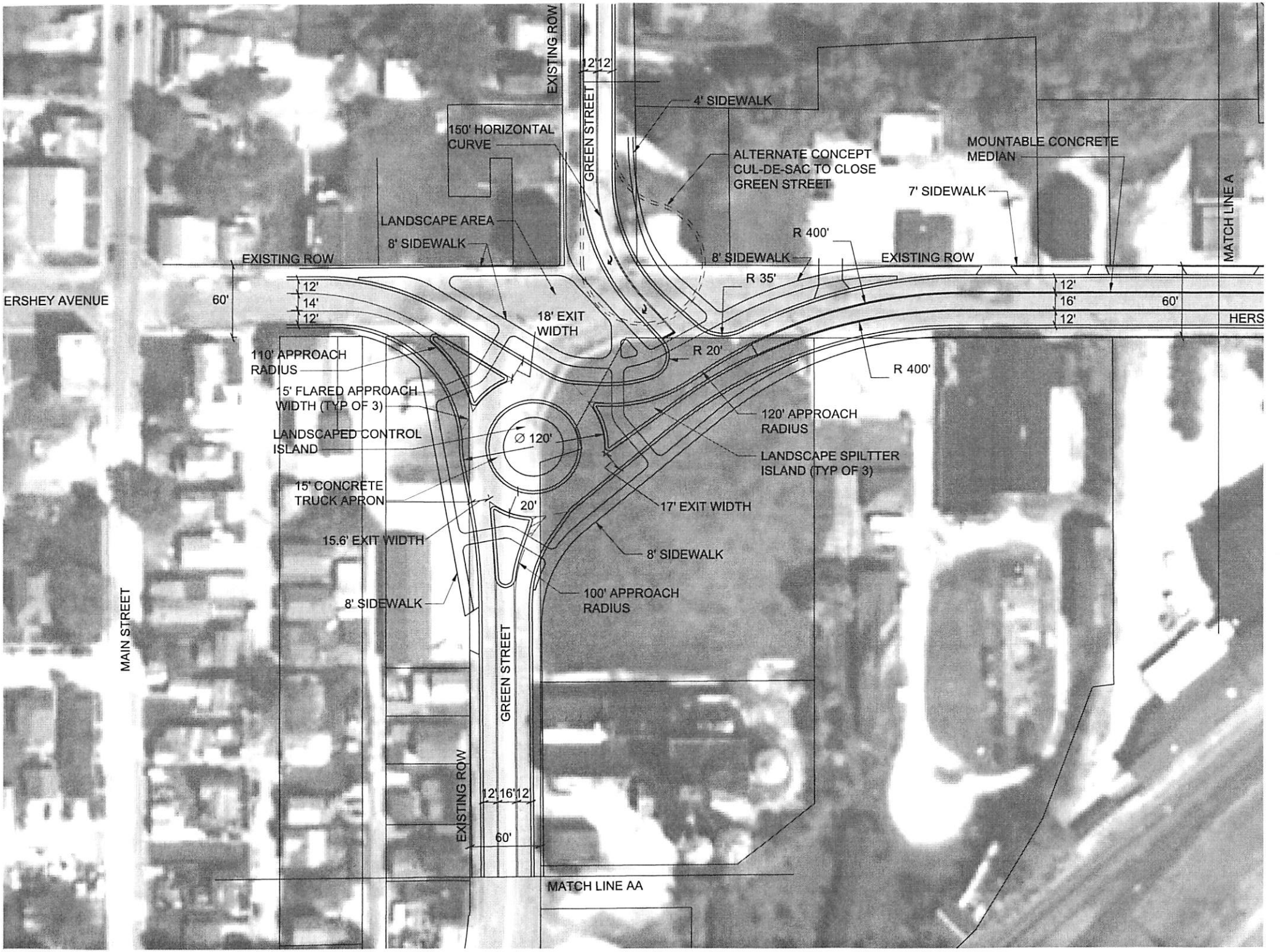
Tasks	Schedule
Preliminary EA and 4(f) Statement Documents Complete	Summer 2012
Receive Signed EA and 4(f) Statement from FHWA	September 2012
EA and 4(f) Statement Distributed to Agencies	Sept/Oct 2012
Public Hearing	**October 2012**
Complete Preliminary Project Report	November 2012
Draft Finding of No Significant Impact (FONSI)	November 2012
Regulatory Review	Dec 2012/Jan 2013
FONSI Signed by FHWA	February 2013
Final Project Report (All Project Work Complete	March 2013

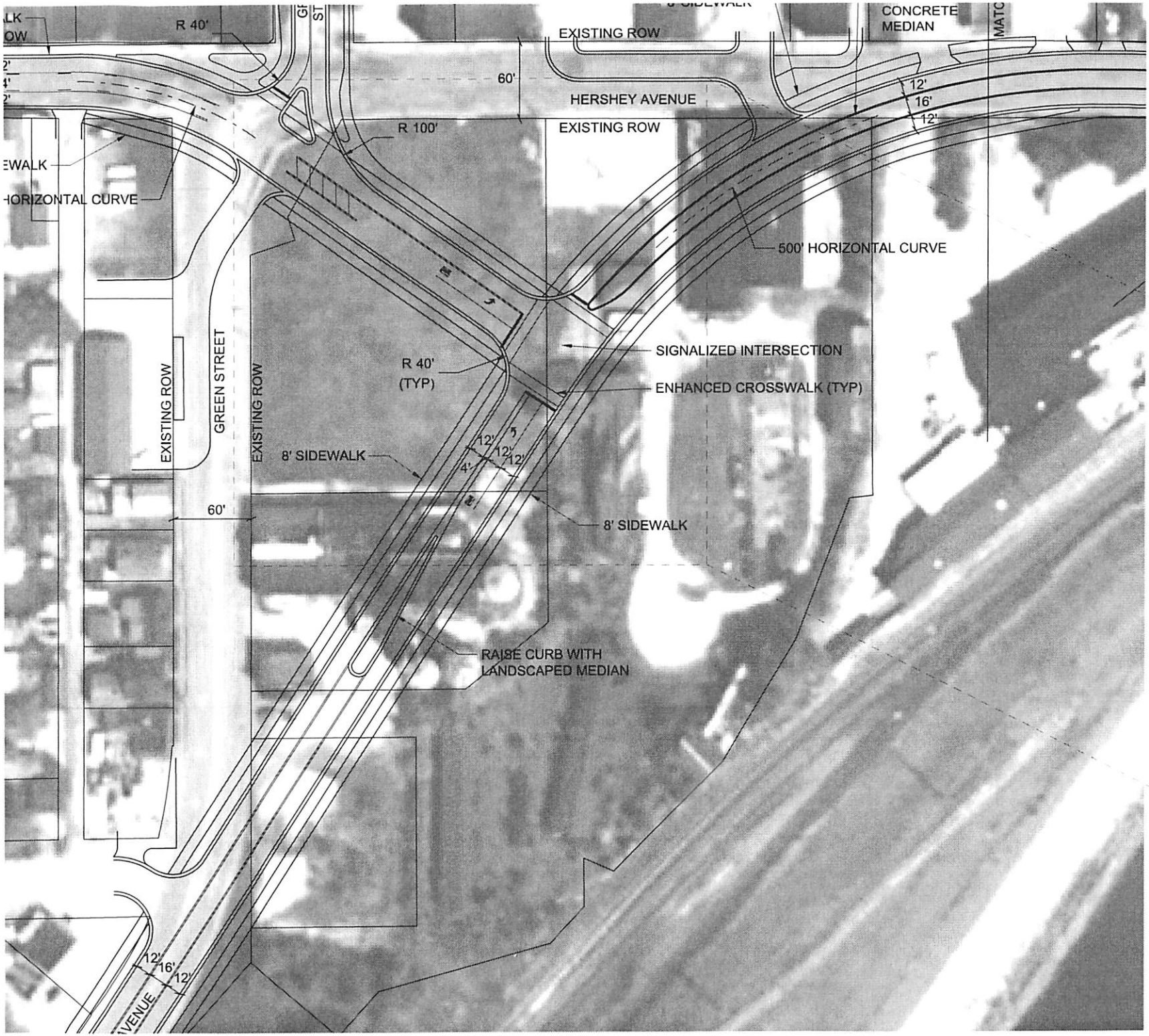
Stanley Consultants INC.

MUSCATINE

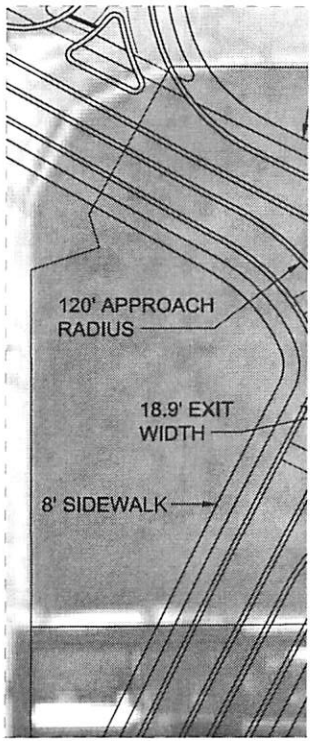

Mississippi Drive Corridor
Phase 1 Environmental Study & Preliminary Engineering
Questions and Answers
Stanley Consultants INC.
MUSCATINE

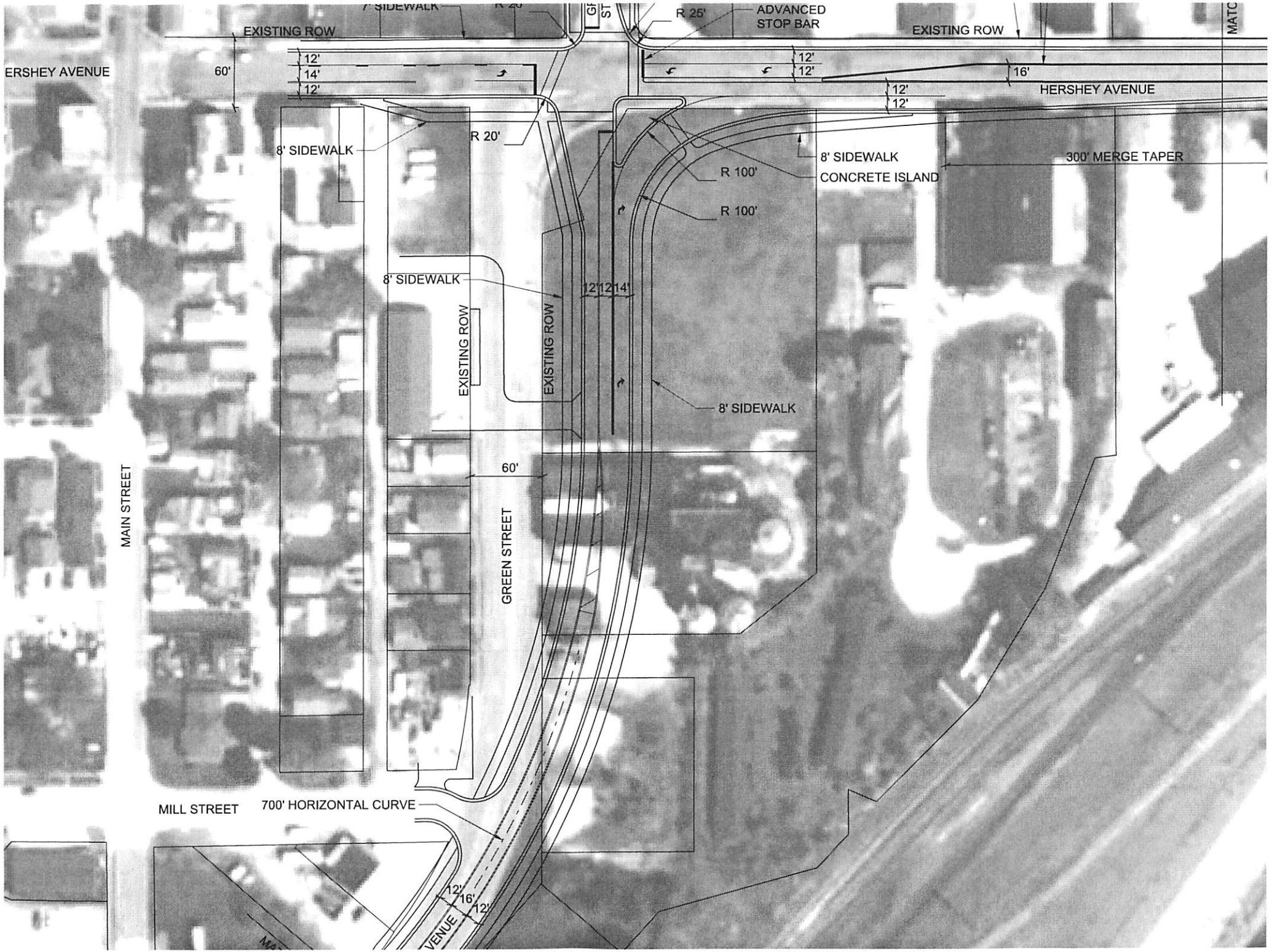

EXISTING ROW
12'12'
GREEN STREET
90' APPROACH RADIUS
15' CONCRETE TRUCK APRON
LANDSCAPED CENTRAL ISLAND
8' SIDEWALK
14' EXIT WIDTH
15' EXIT WIDTH
15' FLARED APPROACH WIDTH (TYP OF 4)
MOUNTABLE CONCRETE MEDIAN
8' SIDEWALK
150' APPROACH RADIUS
MATCH LINE A
EXISTING ROW
EXISTING ROW
ERSHEY AVENUE
60'
12'
14'
12'
12'
16'
12'
60'
HERS
Ø 120'
120' APPROACH RADIUS
18.4' EXIT WIDTH
20'
8' SIDEWALK
16.8' EXIT WIDTH
LANDSCAPED SPILTTER ISLAND (TYP OF 4)
120' APPROACH RADIUS
MAIN STREET
8' SIDEWALK
8' SIDEWALK
GREEN STREET
EXISTING ROW
12'16'12
60'
MATCH LINE AA

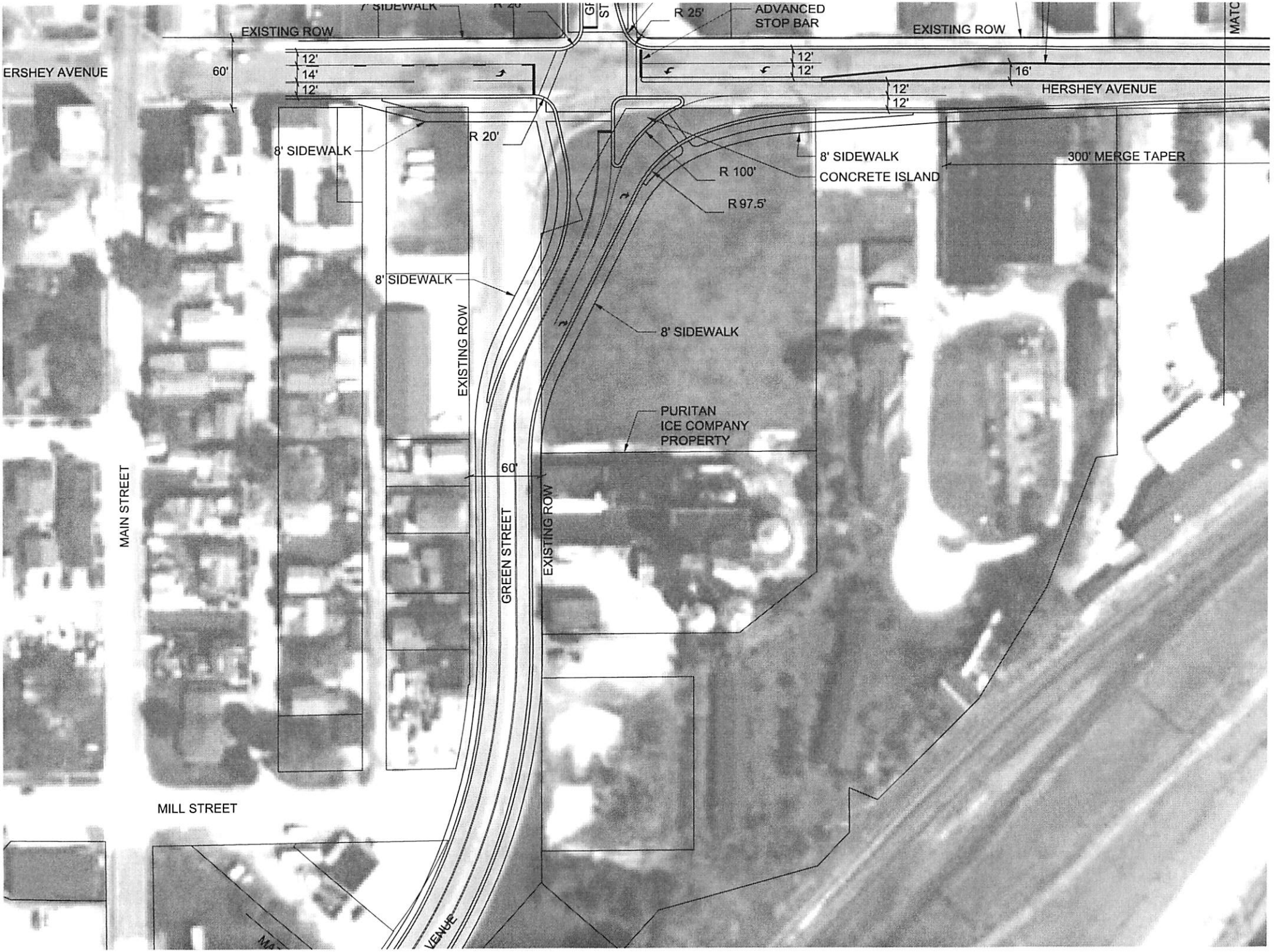

EXISTING ROW
12 12
GREEN STREET
4' SIDEWALK
150' HORIZONTAL CURVE
ALTERNATE CONCEPT CUL-DE-SAC TO CLOSE GREEN STREET
MOUNTABLE CONCRETE MEDIAN
7' SIDEWALK
MATCH LINE A
LANDSCAPE AREA
8' SIDEWALK
R 400'
EXISTING ROW
8' SIDEWALK
EXISTING ROW
ERSHEY AVENUE
60'
12'
14'
12'
R 35'
12'
16'
12'
60'
HERS
18' EXIT WIDTH
110' APPROACH RADIUS
R 20'
R 400'
15' FLARED APPROACH WIDTH (TYP OF 3)
120' APPROACH RADIUS
LANDSCAPED CONTROL ISLAND
Ø 120'
LANDSCAPE SPILTTER ISLAND (TYP OF 3)
15' CONCRETE TRUCK APRON
20'
17' EXIT WIDTH
15.6' EXIT WIDTH
8' SIDEWALK
100' APPROACH RADIUS
8' SIDEWALK
MAIN STREET
GREEN STREET
EXISTING ROW
12'16'12
60'
MATCH LINE AA



ALTERNATE INT
UTILIZING A M




EXISTING ROW
ERSHEY AVENUE
60'
12'
14'
12'
8' SIDEWALK
R 20'
R 25'
ADVANCED
STOP BAR
EXISTING ROW
12'
12'
16'
HERSHEY AVENUE
12'
12'
8' SIDEWALK
CONCRETE ISLAND
300' MERGE TAPER
R 100'
R 100'
8' SIDEWALK
12'12'14'
EXISTING ROW
EXISTING ROW
8' SIDEWALK
60'
MAIN STREET
GREEN STREET
MILL STREET
700' HORIZONTAL CURVE
12'
16'
12'


EXISTING ROW
ERSHEY AVENUE
60'
12'
14'
12'
8' SIDEWALK
R 20'
R 25'
ADVANCED
STOP BAR
EXISTING ROW
12'
12'
16'
HERSHEY AVENUE
12'
12'
8' SIDEWALK
CONCRETE ISLAND
300' MERGE TAPER
R 100'
R 97.5'
8' SIDEWALK
EXISTING ROW
8' SIDEWALK
PURITAN
ICE COMPANY
PROPERTY
60'
MAIN STREET
GREEN STREET
EXISTING ROW
MILL STREET

Section 5

Screening and Evaluation of Alternatives

In order to evaluate the alignment alternatives and the various roadway options, a screening process was completed. Tables 5-3, 5-4, and 5-5 present the advantages and disadvantages of each alternative and option noted in Section 4.

The various alternatives and options were presented to the City Staff, project team, and other stakeholders and consideration of the advantages and disadvantages of each were considered. A summary of the evaluation process and the reasons for recommending certain alternatives/options over others is discussed below.

Roadway Alignment Alternatives

Two roadway alignment improvement alternatives, along with a No-Build alternative, were considered for the Mississippi Drive Corridor project as follows:

- No-Build Alternative
- Alternative 1 – Three Lane Roadway
- Alternative 2 – Five Lane Roadway

The No-Build Alternative is evaluated in Table 5-3. Under this alternative, traffic will continue to use the existing 3 to 5 lane roadway through downtown. Due to safety concerns, flooding concerns, and the desire to create gateway features entering the downtown and riverfront areas, the No-Build Alternative is not recommended.

Alternative 1, called the Three Lane Roadway in Table 5-3, includes one driving lane in each direction along with accommodation for left and right turns throughout the corridor.

Alternative 2, called the Five Lane Roadway in Table 5-3, is the same as Alternative 1, except between Linn Street and Walnut Street, where it widens out to two driving lanes in each direction.

The evaluation process began with traffic analysis for the existing condition as well as the two build alternatives for the corridor. As noted in Section 1, the US-61 bypass was completed in the 1980s, which changed the character of the traffic using the Mississippi Drive corridor. The result has been relatively negligible traffic volume growth over the past 20 years. This trend is expected to continue into the future as well. Capacity calculation for the intersections throughout the corridor revealed that the current 3 to 5 lane corridor is over capacity for the traffic currently using it. Furthermore, with negligible traffic growth projections into the future, the current roadway system will continue to operate with excess capacity. The recommendation then, from a traffic capacity standpoint, was to narrow the roadway to three lanes, thus providing appropriate capacity for projected traffic.

A summary of the capacity analyses for the corridor under existing conditions and for projected 2040 traffic volumes are shown in Tables 5-1 and 5-2. The tables detail capacity analysis for the signalized intersections along the corridor, and thus provide a good summary of operations for the Mississippi Drive Corridor. Typically in urban areas, an intersection Level of Service of C or higher is considered acceptable (refer to Table 3-1 showing target level of service). For the Mississippi Drive Corridor, all signalized intersections currently operate at Level of Service B or better, and will continue to do so under 2040 projected traffic volumes, either under the 5 lane or 3 lane configurations. When comparing 3 lane and 5 lane configurations, the fact that the Level of Service does not change, is an indication that the 5 lanes are unnecessary for the corridor.

	T		R		*Approach*		L		T		R		*Approach*		L		T		R		*Approach*		L		T		R	
PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM	F
-	6.5	4.6	-	-	*6.5*	*4.6*	8.2	5.8	11	4.1	-	-	*11*	*4.5*	41	25	-	-	-	-	*41*	*25*	-	-	-	-	-	
-	A	A	-	-	*A*	*A*	A	A	B	A	-	-	*B*	*A*	D	C	-	-	-	-	*D*	*C*	-	-	-	-	-	
2.7	1.8	3.5	-	-	*1.8*	*3.5*	2	-	3	4.7	-	-	*3*	*4.7*	-	-	37	24	-	-	*37*	*24*	-	-	30	31	-	
A	A	A	-	-	*A*	*A*	A	-	A	A	-	-	*A*	*A*	-	-	D	C	-	-	*D*	*C*	-	-	C	C	-	
-	-	-	-	-	-	-	17	17	12	11	-	-	*14*	*14*	-	-	18	15	3.4	2.2	*6.2*	*3.9*	43	12	9	7.4	-	
-	-	-	-	-	-	-	B	B	B	B	-	-	*B*	*B*	-	-	B	B	A	A	*A*	*A*	D	B	A	A	-	
3.6	1.7	4.9	-	-	*1.6*	*4.7*	1.3	1.7	2.3	3.4	-	-	*2.2*	*3.3*	1	28	1.7	17	-	-	*1.6*	*18*	-	-	26	29	-	
A	A	A	-	-	*A*	*A*	A	A	A	A	-	-	*A*	*A*	A	C	A	B	-	-	*A*	*B*	-	-	C	C	-	
2.9	5.4	4.9	-	-	*5.2*	*4.7*	2.4	1.7	4.5	4.1	-	-	*4.2*	*4*	-	35	36	35	23	17	*29*	*30*	37	37	28	18	-	
A	A	A	-	-	*A*	*A*	A	A	A	A	-	-	*A*	*A*	-	C	D	C	C	B	*C*	*C*	D	D	C	B	-	
-	17	26	-	16	*17*	*25*	5.3	5.8	3.1	2.8	-	-	*5*	*5.2*	-	-	29	25	0.3	0.4	*1*	*0.9*	-	-	27	23	-	
-	B	C	-	B	*B*	*C*	A	A	A	A	-	-	*A*	*A*	-	-	C	C	A	A	*A*	*A*	-	-	C	C	-	

fic Volumes, Three Lane Configuration

Eastbound							Westbound								Northbound								Southbound					
	T		R		*Approach*		L		T		R		*Approach*		L		T		R		*Approach*		L		T		R	
PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM	F
-	7	3.4	-	-	*7*	*3.4*	8.2	5.2	11	3.7	-	-	*11*	*4.1*	41	28	-	-	-	-	*41*	*28*	-	-	-	-	-	
-	A	A	-	-	*A*	*A*	A	A	B	A	-	-	*B*	*A*	D	C	-	-	-	-	*D*	*C*	-	-	-	-	-	
2.2	1.8	2.8	-	-	*1.8*	*2.8*	2	-	3	4.3	-	-	*3*	*4.3*	-	-	37	37	-	-	*37*	*37*	-	-	30	35	-	
A	A	A	-	-	*A*	*A*	A	-	A	A	-	-	*A*	*A*	-	-	D	D	-	-	*D*	*D*	-	-	C	D	-	
-	-	-	-	-	-	-	17	21	12	15	-	-	*14*	*18*	-	-	17	17	2.9	2.6	*5.6*	*4.4*	43	11	9	7.1	-	
-	-	-	-	-	-	-	B	C	B	B	-	-	*B*	*B*	-	-	B	B	A	A	*A*	*A*	D	B	A	A	-	
2.6	2.3	5.1	0.2	3	*2*	*4.8*	1.3	1.6	3.3	3.5	-	-	*3.1*	*3.4*	36	31	22	18	-	-	*25*	*19*	-	-	26	36	-	
A	A	A	A	A	*A*	*A*	A	A	A	A	-	-	*A*	*A*	D	C	C	B	-	-	*C*	*B*	-	-	C	D	-	
2.5	6.5	5.1	2.8	4	*6*	*4.9*	2.4	2.3	5.1	5.6	-	-	*4.7*	*5.5*	-	41	35	40	23	19	*29*	*35*	37	43	28	21	-	
A	A	A	A	A	*A*	*A*	A	A	A	A	-	-	*A*	*A*	-	D	C	D	C	B	*C*	*C*	D	D	C	C	-	
-	17	18	-	12	*17*	*17*	5.1	5.6	3.2	2.8	-	-	*4.8*	*5*	-	-	29	29	0.3	0.4	*1*	*0.9*	-	-	27	26	-	
-	B	B	-	B	*B*	*B*	A	A	A	A	-	-	*A*	*A*	-	-	C	C	A	A	*A*	*A*	-	-	C	C	-	

	T		R		*Approach*		L		T		R		*Approach*		L		T		R		*Approach*		L		T		F
PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM
-	10	4.4	-	-	*10*	*4.4*	8.5	6.9	13	4.1	-	-	*13*	*4.8*	38	31	-	-	-	-	*38*	*31*	-	-	-	-	-
-	B	A	-	-	*B*	*A*	A	A	B	A	-	-	*B*	*A*	D	C	-	-	-	-	*D*	*C*	-	-	-	-	-
2.4	2.3	3.3	-	-	*2.4*	*3.3*	2.6	4.2	3.7	5.1	-	-	*3.6*	*5.1*	-	-	26	27	-	-	*26*	*27*	-	-	27	37	-
A	A	A	-	-	*A*	*A*	A	A	A	A	-	-	*A*	*A*	-	-	C	C	-	-	*C*	*C*	-	-	C	D	-
-	-	-	-	-	-	-	17	21	11	15	-	-	*14*	*18*	-	-	16	16	2.7	3.8	*5.2*	*5.2*	38	12	7.9	7.2	-
-	-	-	-	-	-	-	B	C	B	B	-	-	*B*	*B*	-	-	B	B	A	A	*A*	*A*	D	B	A	A	-
3.2	2.3	4.5	-	-	*2.1*	*4.4*	1.7	2.1	3.6	3.8	-	-	*3.4*	*3.7*	32	30	23	18	-	-	*26*	*19*	-	-	25	36	-
A	A	A	-	-	*A*	*A*	A	A	A	A	-	-	*A*	*A*	C	C	C	B	-	-	*C*	*B*	-	-	C	D	-
2.7	5.7	4.3	-	-	*5.5*	*4.1*	2.5	2.6	4.8	4.8	-	-	*4.5*	*4.7*	34	40	31	40	17	18	*29*	*34*	32	43	24	20	-
A	A	A	-	-	*A*	*A*	A	A	A	A	-	-	*A*	*A*	C	D	C	D	B	B	*C*	*C*	C	D	C	B	-
-	19	18	12	10	*19*	*17*	9.7	5.9	3.7	2	-	-	*8.7*	*5.2*	-	-	26	30	0.3	0.5	*1.7*	*1.6*	-	-	23	28	-
-	B	B	B	A	*B*	*B*	A	A	A	A	-	-	*A*	*A*	-	-	C	C	A	A	*A*	*A*	-	-	C	C	-

fic Volumes, Three Lane Configuration

Eastbound							Westbound								Northbound								Southbound				
	T		R		*Approach*		L		T		R		*Approach*		L		T		R		*Approach*		L		T		F
PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM	PM	*AM*	*PM*	AM	PM	AM	PM	AM
-	10	4.2	-	-	*10*	*4.2*	8.5	6.9	13	4.1	-	-	*13*	*4.8*	38	31	-	-	-	-	*38*	*31*	-	-	-	-	-
-	B	A	-	-	*B*	*A*	A	A	B	A	-	-	*B*	*A*	D	C	-	-	-	-	*D*	*C*	-	-	-	-	-
2.4	2.3	3.4	-	-	*2.4*	*3.4*	2.6	4.2	3.7	5.1	-	-	*3.6*	*5.1*	-	-	26	27	-	-	*26*	*27*	-	-	27	37	-
A	A	A	-	-	*A*	*A*	A	A	A	A	-	-	*A*	*A*	-	-	C	C	-	-	*C*	*C*	-	-	C	D	-
-	-	-	-	-	-	-	17	21	11	15	-	-	*14*	*18*	-	-	16	15	2.7	2.4	*5.2*	*3.8*	38	12	7.9	7.2	-
-	-	-	-	-	-	-	B	C	B	B	-	-	*B*	*B*	-	-	B	B	A	A	*A*	*A*	D	B	A	A	-
4.4	2.3	7.2	-	4	*2.1*	*6.7*	1.7	2.2	3.6	5	-	-	*3.4*	*4.9*	32	30	23	17	-	-	*26*	*18*	-	-	25	38	-
A	A	A	-	A	*A*	*A*	A	A	A	A	-	-	*A*	*A*	C	C	C	B	-	-	*C*	*B*	-	-	C	D	-
2.7	5.7	5.8	-	4	*5.5*	*5.5*	2.5	1.6	4.8	4.4	-	-	*4.5*	*4.4*	34	40	31	40	17	18	*29*	*34*	32	43	24	20	-
A	A	A	-	A	*A*	*A*	A	A	A	A	-	-	*A*	*A*	C	D	C	D	B	B	*C*	*C*	C	D	C	C	-
-	19	18	12	10	*19*	*17*	9.7	5.1	3.7	2	-	-	*8.7*	*4.5*	-	-	26	30	0.3	0.5	*1.7*	*1.6*	-	-	23	28	-
-	B	B	B	A	*B*	*B*	A	A	A	A	-	-	*A*	*A*	-	-	C	C	A	A	*A*	*A*	-	-	C	C	-

The three lane cross section in the downtown area provides other advantages as well. Eliminating two through lanes creates a narrower crossing at intersections for pedestrians, which enhances safety. In addition, the additional green space reduces the impervious area in the ROW, and provides additional space for enhancements to storm water management facilities, pedestrian facilities, and landscaping/streetscape features.

Under both build alternatives, access management criteria were applied to provide controlled loading and unloading zones and eliminate uncontrolled access areas along the Mississippi Drive corridor.

One advantage for the Five lane alternative is that two continuous driving lanes allow for easier passing of slower vehicles by faster moving vehicles. However, safety is negatively affected because traffic speeds tend to increase due to excess capacity through the downtown area.

As detailed herein, the overall advantages for the Three Lane Alternative outweighed those of the Five Lane Alternative; therefore the Five Lane Alternative was eliminated from further consideration.

Roadway Design Criteria Matrix Evaluation

As part of the evaluation process, a design criteria matrix was created comparing the No-Build and both Build Alternatives against various roadway design criteria. The criteria were developed to align with the project purpose and need criteria as well as general road design criteria. Following is a list of the criteria used in the matrix.

1. Improved Safety for Vehicles
2. Improved Safety for Pedestrians
3. Improved Safety for Bicycles
4. Reduced Flooding Potential
5. Provide Infrastructure for Future Development
6. Operations
7. Improve Aesthetics
8. Cost
9. Constructability
10. Improve Bicycle and Pedestrian Connection to the Riverfront
11. Create Gateway Opportunities

The first five criteria were considered primary to the project purpose and need. Criteria 6 - 9 were also considered primary but not part of the project purpose and need. Criteria 10 and 11 were considered secondary criteria.

The matrix was sent to various stakeholders and team members, who were asked to compare the No-Build Alternative, the Three Lane Alternative and the Five Lane Alternative for each of the

11 design criteria and rate them on a scale of 1 to 5, with 1 being the worst and 5 being the best. The results showed that in 10 of 11 categories the Three Lane Alternative ranked first of the three alternatives being considered. The only category that differed was cost, in which the No-Build Alternative ranked first.

Table 5-3 Evaluation of Roadway Alignment Alternatives

Advantages	Disadvantages
No-Build Alternative	
• Lowest Cost • No temporary disruption to local businesses	• Does not satisfy project purpose and need • Wider crossing widths for pedestrians. • Maintains existing character of the roadway. • Does not address flooding concerns between Iowa Avenue and Mulberry Avenue. • Does not address safety concerns at Carver Corner. • Does not address the desire to create gateway features coming into downtown from the north and south.
Alternative 1 – Three Lane Roadway	
• Satisfies project purpose and need • Lower cost than the five-lane option • Provides the best opportunity for streetscape, landscape, and storm water management improvements. • Lower impervious area. • Provides appropriate traffic capacity based on the operational analysis for the corridor. • Narrower crossing widths for pedestrians at intersections. • A designated loading zone provides designated areas for trucks and improves overall road safety.	• Higher cost than the do nothing alternative. • Limits passing opportunities for faster moving vehicles.

Alternative 2 – Five Lane Roadway	
•	• Does not satisfy project purpose and need for decreased width for pedestrians, or for safety concerns due to higher speeds.
• Higher capacity.	• Highest cost, when compared to either of the other two alternatives
• Two driving lanes make it easier for faster moving vehicles to pass slower vehicles.	• Limited potential for streetscape and storm water management improvements.
	• Higher impervious area.
	• Provides more traffic capacity than is necessary based on traffic analysis.
	• Wider crossing widths for pedestrians
	• Five lanes can't be accommodated on 2nd Street, in the bluff area, or in the Carver corner area due to site constraints such as buildings, utilities, and flood control structures.

Source: Stanley Consultants, Inc.

Carver Corner Intersection Geometric Options

Introduction

Carver corner is located in the southwest corner of Muscatine on the main arterial access to the City. The current intersection at the corner of Hershey Avenue and Green Street is an offset signalized intersection which has inherent operational and safety issues, requiring the City to consider changes. In addition, the City of Muscatine wants to create an entry statement (or gateway effect) for traffic entering the downtown area from the south and west, most of which is funneled through this intersection. However, due to the unusual existing geometry and limitations presented by nearby buildings, an innovative solution is required.

The 2007 corridor study considered options at Carver Corner that included a recommendation for a modern roundabout at this intersection. The current study, building on the previous recommendations, considered five options with a mixture of modern roundabout and traffic signal control. Appendix A shows graphical representations for the intersection options presented below.

Discussion

In Table 5-4, five intersection geometric options were evaluated. A variety of intersection control methods and orientations were considered in the Carver Corner area. Following is a summary of the evaluation process completed while considering these options.

The first intersection configuration considered, Option 1A, was a four-leg roundabout. This option addressed the offset between the north and south Green Street approaches as well as the safety and operational concerns that existed under the current intersection configuration. Capacity analysis showed that one lane approaches on all four legs could accommodate projected traffic volumes and design checks confirmed that the design vehicles could navigate the intersection without difficulty. The main disadvantage with Option 1A was the challenge presented by the steep approach slopes on the north leg of Green Street. Due to the

proximity of the existing building on the northwest corner of the intersection, raising the grade of the intersection to flatten the transition from the north would be difficult.

In order to address the concerns with grading on the north leg of Green Street, additional geometric configurations were considered. The second option, Option 1B, was a three-leg roundabout. The east and west legs of Hershey Avenue and the south leg of Green Street form the three legs of the intersection. The north leg of Green Street was realigned to intersect Hershey Avenue east of the roundabout, thus allowing a smoother transition from the steep slope to the north. Operationally, the roundabout functions well, accommodating the major traffic movements and necessary design vehicle turns. However, the tie in with the north leg of Green Street is very close to the roundabout, which is not an optimal condition. To address this issue, turning movements at the north Green Street approach would be limited to right-in and right-out turns. Since Green Street is a very low volume roadway (less than 10 vehicle turns in the peak hour) this option could work, however, there are better solutions which didn't limit vehicular movement so Option 1B was eliminated from further consideration.

In order to address the concerns with intersection spacing and proximity to buildings, a third option, Option 1C, was developed. Option 1C creates a sweeping curve between the south approach on Green Street and the east approach on Hershey Avenue. The west approach on Hershey Avenue then tees into the new roadway creating an intersection that is farther south and east from the existing configuration. The north leg of Green Street intersects Hershey Avenue west of the main intersection with sufficient spacing, allowing full movement capability for both intersections. One of the advantages for Option 1C is that the heaviest traffic movements through the intersection (previously westbound to southbound lefts and northbound to eastbound rights) are now through movements. Therefore traffic signal operations become simpler and more efficient. As an alternate, a three leg modern roundabout configuration also works well for Option 1C, as shown in the drawings in Appendix A. The main disadvantages with Option 1C include significant impacts to potential 4(f) resources and limited redevelopment potential for the remaining property once roadway improvements are completed. Whereas Options 1A and 1B leave one large developable property in the southeast quadrant of the intersection, Option 1C cuts that available property into several smaller pieces, leaving less desirable options for development.

A traditional crossing intersection configuration, Option 1D, was also considered in the study. Under this option, the south approach on Green Street was aligned with the north leg, making intersection operations simpler and traffic signal operation more efficient. The main advantage for this option is its similarity to the existing condition both in appearance and operation. Disadvantages include a significant impact to potential 4(f) resources, similar to Option 1C. Also, efficiency and safety concerns are not addressed, due to the fact that the major traffic movements still have to turn at the intersection.

A fifth intersection geometric option, Option 1E, was considered mainly to avoid impacts to potential 4(f) resources in the Carver Corner area. Option 1E is similar to Option 1D in that the south leg of Green Street is aligned with the north leg, creating a traditional signalized crossing intersection. The difference is that the south leg realignment begins north of the

TeStrake property, a 4(f) resource, and a tight S-curve is used to align the north and south legs of Green Street at Hershey Avenue. This tight S-curve configuration does not comply with sound road design principals which creates potential safety concerns, making this option less desirable. Due to this design deficiency, Option 1E was eliminated from further consideration.

Roadway Design Criteria Matrix Evaluation

As part of the evaluation process, a design criteria matrix was created comparing intersection options against various roadway design criteria. The criteria were developed to align with the project purpose and need criteria as well as general road design criteria. Following is a list of the criteria used in the matrix.

1. Improved Safety for Vehicles
2. Improved Safety for Pedestrians
3. Improved Safety for Bicycles
4. Reduced Flooding Potential
5. Provide Infrastructure for Future Development
6. Operations
7. Improve Aesthetics
8. Cost
9. Constructability
10. Improve Bicycle and Pedestrian Connection to the Riverfront
11. Create Gateway Opportunities

The first five criteria were considered primary to the project purpose and need. Criteria 6 - 9 were also considered primary but not part of the project purpose and need. Criteria 10 and 11 were considered secondary criteria.

The matrix was sent to various stakeholders and team members, who were asked to compare the five intersection options for each of the 11 design criteria and rate them on a scale of 1 to 5, with 1 being the worst and 5 being the best. The results showed that Option 1A ranked first overall in total points (167), followed closely by Options 1C (161) and 1D (159). Looking at the individual criteria, Option 1A scored highest in 6 of 11 categories, followed by Option 1D scoring highest in 3 of 11 categories. Interestingly, Option 1C, having the second highest total points did not score highest in any one category but was second in 7 of 11 categories.

Recommendation for Carver Corner Area

Based on the discussion above, Option 1B and 1E were eliminated from consideration, leaving Options 1A, 1C, and 1D for further evaluation.

Option 1A, the four leg roundabout was rated highly in the criteria matrix evaluation chiefly in the areas of safety, operations and aesthetics. However, the issue of constructability may not be able to be overcome, making this option less desirable.

Given that Option 1C, the sweeping curve, can also be constructed with a roundabout, most of the desirable traits from Option 1A could then be applied to Option 1C. The downside of this option is the major impact on the TeStrake property and the less desirable options for redevelopment of the property surrounding the intersection. However, from an engineering standpoint, Option 1C with a modern roundabout at the main intersection is the most desirable of the remaining options.

Option 1D, the conventional signalized intersection, is the option that is most similar to the existing condition and was favored by some of the local residents. It also preserves a larger portion of the available redevelopment property, which is an advantage over Option 1C. However, it has a similar impact on the TeStrake property as Option 1C, and does not address the operational deficiencies as well as the other options under consideration.

A definitive recommendation in the Carver Corner area is difficult to determine, given the differing decision criteria of engineering advantages, land development potential, and public opinion. A case could be made for Option 1C (with a traffic signal), Option 1C (with a roundabout), or Option 1D, all of which meet the project purpose and need and are viable engineering solutions. In light of this situation, it is prudent to carry all three remaining options into the next stage of the NEPA process for further evaluation of the competing priorities in the Carver Corner area. Further input is needed from the public, the City of Muscatine and the Iowa DOT before a final determination can be made at this location.

Table 5-4 Evaluation of Carver Corner Intersection Geometric Options

Advantages	Disadvantages
Option 1A – Four Leg Roundabout	
• Provides opportunity for attractive entry/gateway feature at the south end of the corridor. • Addresses safety and operational deficiencies. • Provides opportunity for one large parcel for redevelopment. • Satisfies project purpose and need. • Provides separation from traffic lanes in the front yards of residents along Green Street.	• Difficult to accommodate the approach grades on the north leg of Green Street. • Local drivers are unfamiliar with modern roundabout operation. • Up-front construction cost is slightly higher than other improvement options. • Section 4(f) impacts can't be avoided.
Option 1B – Three Leg Roundabout	
• Section 4(f) Statement impacts can be avoided at TeStrake property. • Provides opportunity for attractive	• North leg of Green Street is offset, creating two closely spaced intersections. • Vehicular turning movements to/from the

entry/gateway feature at the south end of the corridor • Provides opportunity for one large parcel for redevelopment. • Satisfies project purpose and need.	north leg of Green Street are restricted. • Local drivers are unfamiliar with modern roundabout operation.
Option 1C – Sweeping Curve Roadway (Signalized or Roundabout)	
• Best facilitates the main traffic movements through the intersection. • Provides opportunity for attractive entry/gateway feature at the south end of the corridor • Simplifies traffic operations and provides better separation between intersections. • Provides opportunity for several small redevelopment parcels. • Satisfies project purpose and need.	• Significant impacts to Section 4(f) resources. • The opportunity for one large parcel for redevelopment is eliminated.
Option 1D – Conventional Intersection (Signalized)	
• Similar to the existing condition, so operations will not change significantly. • Provides opportunity for attractive entry/gateway feature at the south end of the corridor • Several local residents favored this option because they were more familiar with it. • Provides opportunity for one large parcel for redevelopment. • Satisfies project purpose and need. • Provides separation from traffic lanes in the front yards of residents along Green Street.	• South leg realignment causes significant impacts to Section 4(f) resources. • Less safe than roundabout options. •
Option 1E – Conventional Intersection, No 4(f) Impacts at TeStrake Property (Signalized)	
• Section 4(f) Statement impacts can be avoided at TeStrake property. • Provides opportunity for one large parcel for redevelopment.	• Geometry on the south approach includes very tight S-curve close to the intersection. • Does not satisfy project purpose and need for safety improvements. • Less safe than roundabout options. •

Source: Stanley Consultants, Inc.

Bluff Area Geometric Options

In table 5-5, three geometric options were evaluated in the bluff area along Mississippi Drive between Broadway Street and Linn Street. This area of the corridor is unique due to the narrow constructible space between the bluff, flood control structure, utility poles, and the railroad. Three potential cross sections were considered, as shown in Figure 4-1.

Option 2A has several advantages, in that it maintains the standard 40-foot roadway width consistent with the rest of the corridor, including two 12-foot driving lanes and a 16-foot mountable center median. Continuous pedestrian facilities are maintained on the bluff side as well. The main disadvantage with this option is the amount of space necessary, which creates the need to relocate several high voltage power poles and also requires the construction of a retaining wall on the river side of the roadway along with hazard shielding for up to 10-feet of vertical drop immediately adjacent to the driving lane. In addition to the expense of roadside hazard shielding, the view of the riverfront is impeded for motorists traveling along Mississippi Drive.

Option 2B maintains the standard 40-foot cross section as in Option 2A, but the walkway on the bluff side is eliminated. This change eliminates the need to relocate the line of power poles and construct a retaining wall, but does not eliminate the need to provide roadside hazard shielding on the river side of the roadway. The other main disadvantage for Option 2B is that the continuity of pedestrian access is not maintained throughout the corridor. As this is an element in the purpose and need statement, Option 2B does not satisfy the project purpose and need statement and is therefore eliminated from further consideration.

Option 2C provides a continuous pedestrian facility and one lane in each direction, but the center median is narrowed or eliminated in the bluff area. The main disadvantage for this condition is a decrease in safety, in that with no center median, opposing traffic lanes are closer causing and increased risk for head-on collisions. Also, available space for snow removal and disabled vehicles is diminished with the narrower cross section. The advantages include significant cost savings, since the power poles don't need to be relocated and the retaining wall is not necessary. Also, the increased separation of the 10-foot drop off from the driving lane eliminates the need for roadside hazard screening.

Due to the ease of construction, maintaining continuous pedestrian access, cost savings, and cleaner, more open views of the riverfront, Option 2C was the recommended option for the geometry in the bluff area.

Table 5-5 Evaluation of Bluff Area Geometric Options

Advantages	Disadvantages
Option 2A – Two Lane with mountable median and walkway on bluff side	
• Maintains continuous pedestrian walkway throughout the corridor. • Maintains continuity of three lane cross section throughout the corridor. • Satisfies project purpose and need. • Provides refuge for disabled vehicles. • Provides more space for snow storage.	• Requires utility pole relocation • Higher cost due to structural requirements and pole relocation on the river side. • Requires retaining wall and roadside hazard shielding from steep slope on the river side.
Option 2B – Two Lane with mountable median, no walkway on bluff side	
• Utility poles do not require relocation • Retaining wall is not required on the river side. • Provides refuge for disabled vehicles. • Provides more space for snow storage.	• No walkway in the bluff area; continuity of pedestrian access is not maintained, which does not satisfy the project purpose and need. • Requires roadside hazard shielding from steep slope on the river side.
Option 2C – Two Lane with narrow/no median and walkway on bluff side	
• Utility poles do not require relocation • Maintains continuous pedestrian walkway throughout the corridor. • Satisfies project purpose and need.	• Potential for head-on collisions is higher with no median. • Less space for disabled vehicles. • Less space for snow storage.

Source: Stanley Consultants, Inc.

Option 2 Note – A variation of Option 2A was briefly considered that moved the road cross section closer to the bluff. However, this requires a structural wall (sheet piling or similar) that increases the cost to an unacceptable level. Discussions with the City revealed that the bluff face could become unstable if disturbed, so any option that cuts into the cliff face should be avoided if possible. Therefore this option was not considered further.

Summary of Evaluation Results

Based on the above screening and evaluation of alternatives and options, and after discussion with the City of Muscatine, the general recommendations for the Mississippi Drive corridor are summarized as follows:

- Alternative 1 – Three Lane Roadway.
- Option 1C (signalized), 1C (modern roundabout), 1D – Further evaluation is needed.
- Option 2C – Two Lane Roadway with narrow/no median and walkway on bluff side.

These alternatives and options will be presented in the Environmental Assessment and at the upcoming Public Hearing to receive further public comment.

PURPOSE AND NEED FOR ACTION

Purpose

The purpose of the proposed Mississippi Drive (Iowa 92) improvements is to safely accommodate future traffic and pedestrians, including bicyclists along the corridor as well as between the riverfront and downtown, to correct roadway deficiencies to limit future flooding of Mississippi Drive and to provide the transportation infrastructure needed to support planned and future economic development.

Need

This project is needed to provide better access to vehicles traveling thru the downtown, to provide safe access to pedestrians crossing Mississippi Drive, to reduce instances of closure of Mississippi Drive due to flooding and to foster economic development.

Traffic

Traffic on Mississippi Drive has been declining on average since 1998 according to Iowa DOT traffic counts (see historic traffic trends below in Table ___). The major factor in this decline was the opening of the US 61 bypass which eliminated the need for much of the traffic to travel thru the central business district of Muscatine. In February and March 2011, traffic data was collected at 11 intersections along the corridor. Based on these traffic counts, Average Daily Traffic (ADT) ranges from 8,500 to 10,000 vehicles per day (vpd). The existing traffic counts along with the width of the corridor which is mostly four lanes wide (approximately 40-64 feet) creates excess capacity, a tendency for traffic to exceed the speed limit and a challenge for pedestrians crossing the roadway safely.

Table ___
Historic Traffic Counts

Location (Mississippi Drive Intersects)	Year			
	1998	2002	2006	2010
Main Street	10100	9900	9700	7272
Hershey Avenue & Green Street	12000	11800	12000	8767
Iowa Street	11000	10100	9900	7662
Cedar Street	9700	9800	9000	7296
Mulberry Avenue	12300	12800	9100	9494
Oak Street	12600	12300	12600	9903

Traffic projections were conducted for the design year of 2040 based on a 0.5% growth per year. Population of Muscatine has been steady over the last four decades and is projected to increase by 1.64% according to Muscatine's Comprehensive Plan. As a result forecasted traffic volumes thru the design year 2040 show minimal growth. Table __ below shows current and future Average Daily Traffic (ADT) for the corridor.

Table ___
Existing and Projected Average Daily Traffic

Location	Existing (2011)	Projected Traffic (2040)
2nd Street (Mulberry Avenue to Norbert Beckey Bridge)	10,000	11,600
Mississippi Drive (Elm to Mulberry Avenue)	8,500	10,000
Hershey Avenue (Green Avenue to Mississippi Drive)	9,000	10,500

Safety and Pedestrian Access

Pedestrian safety is a frequent issue of concern among the public and stakeholders in Muscatine. The concern is due to the wide roadway (as much as 64 feet) that must be crossed which can be challenging for elderly and persons with young children, the lack of pedestrian refuges and protected crosswalks, as well as the lack of convenient access for bicyclists reaching the recreational trail along the river from downtown. Extensive free parking exists along the riverfront as well as many outdoor recreational opportunities creating a need to access the riverfront. An active railroad parallels Mississippi Drive through the Central Business District separating the roadway and the riverfront. The track is fenced from the corridor for safety purposes but has openings at Cedar Street and Iowa Avenue for both vehicles and pedestrians and additional openings at Sycamore and Chestnut Streets for pedestrians only. On weekdays, the riverfront is used extensively for parking by persons who work or shop in the downtown. Special events on the riverfront attract many visitors to downtown several times each year. Parking lots are used for event setup and not available for parking. This creates large numbers of people crossing Mississippi Drive to reach the venue and the potential for pedestrian crashes.

A crash analysis was conducted for the Mississippi Drive corridor as part of this project. Data was examined from the Iowa DOT-Office of Traffic and Safety for the five-year period from 2005 – 2009. A total of 73 crashes were reported in that timeframe with 53 crashes occurring at intersections and 20 crashes occurring on road segments between intersections. The table below shows the most common types of accidents and number of each along the Mississippi Drive corridor. No reported pedestrian accidents occurred in this timeframe however, one bicycle/car crash occurred in 2006 at the intersection of Cedar and Mississippi Drive.

Table ____
Common Types of Accidents on Mississippi Drive Corridor

Type of Accident	Number
Failure to Yield at Intersections/Driveways	15
Losing Control/Running off Road	12
Rear End Crashes	10
Speeding/Driving Too Fast for Conditions	7

Flooding

Mississippi Drive runs parallel to the Mississippi River with less than 300 feet between them. Frequent flooding between Mulberry Avenue and Iowa Street causes Mississippi Drive to be closed, detouring traffic onto local streets in the downtown area and limiting access to businesses located on Mississippi Drive. The most recent occurrence was spring 2010; Mississippi Drive was closed for approximately 2 weeks in April.

The first intersection to flood is at Walnut. Floodwaters begin flooding this intersection from a storm inlet located at a low point in the south curb. This inlet has a direct discharge pipe to the river and water begins flooding the street when the river elevation reaches 548.7 or during a 7-year flood event. The second intersection to flood is at Sycamore Street. The south gutter line at this intersection is at elevation 552.3, an 18-year flood event. The intersections at Mulberry Avenue, Cedar Street, and Iowa Avenue begin flooding when they experience a flood greater than 25-year frequency (552.47). Intersections west of Iowa Avenue are considerably higher and flood much less frequently.

Note: All elevations discussed above are NAVD 1988 datum.

Planned Development and Land Use Plans

The city of Muscatine Comprehensive Plan lists economic development and downtown revitalization under goals and objectives. One of the key elements includes revitalizing the riverfront area and downtown business district. Future land use suggested in the Comprehensive Plan includes specialty retail boutiques, antique shops, restaurants/cafés, tea/coffee shops as well as recreation and entertainment venues like theaters, community center and arcade/game room. The intent is to improve community cohesion in the downtown area for all community uses.

In keeping with goals of the Comprehensive Plan and future land use the City has already purchased and has been actively beautifying the land along the riverfront between the river and road/active railroad track corridor. Beautification projects already completed include a paved recreational trail, visual and recreational focus points, green areas, statuary reflecting the history of the city, and resting areas for pedestrians.

The Bi-State Regional Committee determined that the proposed project is consistent with long-range transportation goals for the area (see letter dated 12/9/2010 in Appendix __). In addition, the project is anticipated to further the *Comprehensive Economic Development Strategy* for the Bi-State Region General Economic Development Goal G – Continue to make the best use of existing infrastructure. The Mississippi Drive Corridor Project to reconstruct the business route in Muscatine is consistent with long-term plans and is an important element of revitalization within the Bi-State region.

2. Studies and Analysis

A number of studies and investigations were completed as part of the NEPA process for the Mississippi Drive Corridor Project. Following are descriptions for the various documents produced, along with completion dates, the name of the consultant who did the work, and the network location for the report or memorandum. All documents detailed below have been made part of the project record and are available for review, upon request.

2.1. Infrastructure Analysis

2.1.1. Existing Conditions (Traffic)

Status – Completed (2011-07-15)
Completed By – Stanley Consultants, Inc.
Network Location – \23103\06-Studies\04-Studies\Traffic\ - various files

Existing traffic counts, traffic signal timing plans, and geometric data were collected along the mainline corridor and intersecting side streets. An analysis of intersection capacity under existing conditions was completed at 11 intersections to show the baseline existing conditions for the corridor. A summary of this data and analysis is included in the Traffic Analysis/ Geometric Alternatives Report.

2.1.2. Traffic Analysis (Capacity, Warrants, Geometric Alternatives)

Status – Completed (2011-07-15)
Completed By – Stanley Consultants, Inc.
Network Location – \23103\06-Studies\04-Studies\Traffic\ - various files

Traffic projections were developed for the year 2040 using a yearly growth rate of 0.5 percent to accommodate potential growth in the area. Then, traffic analyses were conducted using Synchro/Sim Traffic software in order to evaluate the entire corridor as a single system. Traffic signal warrant analyses were conducted at all intersections along the corridor as well. Traffic data and capacity analyses results are included in the Traffic Analysis/Geometric Alternatives Report.

Two base improvement alternatives were considered along the corridor, including a 3-lane and 5-lane alternative in the downtown section of the corridor. In addition, several improvement options were considered at the Hershey Avenue/Green Street intersection near the southern end of the corridor. These options are discussed in detail as part of the Alternatives Analysis Report. Capacity analyses were completed for all alternatives and intersection options along the corridor.

2.1.3. Crash Analysis

Status – Completed (2011-07-01)
Completed By – Stanley Consultants, Inc.
Network Location –
\23103\06-Studies\04-Studies\CrashStudy\20110707_MissDr_CrashAnalysis_Final.pdf

A crash analysis was conducted for the Mississippi Drive corridor as part of this project. Data was examined from the Iowa DOT-Office of Traffic and Safety for the five-year period from 2005 – 2009. A total of 73 crashes were reported in that timeframe with 53 crashes occurring at intersections and 20 crashes occurring on road segments between intersections.

2.1.4. Drainage Analysis

Status – Completed (2012-05-24)
Completed By – Stanley Consultants, Inc.
Network Location –
\23103\06-Studies\04-Studies\
ProjectDrainageReport\Final\ProjectDrainageReport_Final_May2012.pdf

The drainage analysis was completed to determine the base line conditions along the Mississippi Drive corridor, for use in related analyses and investigations for the Environmental Assessment. Data produced as part of this analysis was used to formulate conceptual improvements necessary to address flooding concerns, maintain and upgrade the existing storm sewer system, and make recommendations for future storm water management techniques along the corridor. When the project moves into the final design stage, further analysis will be necessary to size proposed storm water systems and ensure that the improvements will function as intended.

2.1.5. Flood Protection Analysis

Status – Completed (2012-05-22)
Completed By – Stanley Consultants, Inc.
Network Location –
\23103\06-Studies\04-Studies\Environmental Resources\Flooding Analysis\20120522_FinalReport\

A flood protection analysis was completed to document the extent of existing flooding along the corridor and investigate options for mitigation of flooding. Several options were presented and discussed with stakeholders and City officials, then proposed improvements were recommended.

2.1.6. Sustainable Storm Water Management

Status – Completed (2012-02-20 and 2012-03-01)
Completed By – LT Leon Associates, Inc. and RDG Planning & Design
Network Locations –
\23103\06-Studies\04-Studies\SustainableSWStudy\FinalReport_LTLeon\
SSMS_FINAL_2-20-2012.pdf
\23103\06-Studies\04-Studies\SustainableSWStudy\RDG_SWConcepts\
RDG_SWReport_3-1-2012.pdf

Modern drainage facilities are looking more and more at sustainable methods for storm water management and surface runoff treatment prior to outletting into rivers, lakes, and other susceptible natural resources. Part of the analysis for the Mississippi Drive corridor project was to evaluate the potential for use of sustainable practices for storm water management. The two reports completed by LT Leon and RDG give a summary of the methods that may be feasible for the Muscatine area.

2.1.7. Utility Impacts Analysis

Status – Completed (2012-05-17)
Completed By – Stanley Consultants, Inc.
Network Location – \23103\06-Studies\04-Studies\Utility Analysis\

An analysis of the existing utilities along the Mississippi Drive corridor was completed to document existing conditions and investigate necessary and feasible improvements for various public and private utilities as part of the proposed improvements. Utilities investigated included sewer, water, gas, telephone, fiber optic, and electric lines within the existing corridor.

2.1.8. Geotechnical Analysis

Status – Completed (2011-01-14)
Completed By – Terracon Consultants, Inc.
Network Location – \23103\06-Studies\04-Studies\Geotechnical\07105080 REPORT.pdf

Thirteen (13) borings extending to depths of approximately 10 to 10 ½ feet below existing grades were performed to evaluate subgrade soil conditions for design of the new corridor pavement. Ten (10) retaining wall borings extending to depths of approximately 13 to 28 feet below existing grades were also performed for the project. Four (4) borings from a previous project were also utilized for the project. The purposes of the report are to describe the subsurface conditions encountered at the boring locations, present the test data, and provide geotechnical engineering recommendations regarding earthwork including fill materials, placement and compaction, subgrade preparation, drainage and an estimated support value (d) for rigid pavement

design, lateral earth pressures, allowable bearing pressures, and drainage for reinforced concrete cantilever retaining walls for the proposed project.

2.1.9. Evaluation of Maintenance of Traffic During Construction

Status – Completed (2011-11-29)
Completed By – Stanley Consultants, Inc.
Network Location –
\23103\06-Studies\04-Studies\MaintainingTrafficAnalysis\
20111129_MOT_Analysis_Memo_Combined.pdf

An evaluation was completed along the Mississippi Drive corridor of available detour routes and necessary accommodation for residents and businesses during construction activities. Staged construction was considered and feasible routes were developed, both for local traffic and regional through traffic.

2.1.10. Corridor Alignment and Geometric Alternatives Analysis

Status – Completed (2012-02-28)
Completed By – Stanley Consultants, Inc.
Network Location –
\23103\06-Studies\04-Studies\AlternativesAnalysis\Final_Report\20120228Report.pdf
\23103\06-Studies\04-Studies\AlternativesAnalysis\Final_Report\20120228_AppendixA_Figures.pdf

An analysis of the available and feasible alignment and geometric alternatives was completed for the Mississippi Drive Corridor Project. Two mainline improvement alternatives, along with the no-build alternative, were evaluated. A number of geometric alternatives in the Carver Corner area and the bluff area, between Broadway Street and Linn Street, were also evaluated. The purpose of the analysis was to determine preferred improvement alternatives for the project and provide evaluation of advantages and disadvantages for each alternative for use in arguments as part of the Environmental Assessment documentation.

2.2. Environmental Impact Analysis

2.2.1. Land Use Analysis

Status – Completed (2012-03-01)
Completed By – RDG Planning & Design
Network Location –
\23103\06-Studies\04-Studies\Land Use Analysis\RDG_Muscatine_CarverReport_3-1-12-R.pdf

Although most of the Mississippi Drive corridor has been fully developed for many years, the Carver Corner area has several parcels that are either undeveloped or in need of redevelopment. This report explores options for potential redevelopment under several roadway geometric options.

2.2.2. Noise Analysis

Status – Completed (2012-04)
Completed By – AECOM Technical Services
Network Location – \23103\06-Studies\04-Studies\Noise Analysis\Noise Memo.pdf

An analysis was completed along the Mississippi Drive corridor to document the existing noise levels and analyze the change due to proposed improvements, if any. Results indicated that future noise levels will not change enough to warrant any mitigation, due to the proposed roadway improvements.

2.2.3. Qualitative Mobile Source Air Toxics Analysis Determination

Status – Completed (2012-02-27)
Completed By – Stanley Consultants, Inc.
Network Location –
\23103\06-Studies\04-Studies\Environmental Resources\Final_Mississippi_Corridor_MSAT_Memo.docx

An analysis of mobile source air toxics (MSAT) was performed for the Mississippi Drive Corridor in Muscatine, Iowa.

2.2.4. Phase 1 Archaeological Analysis

Status – Completed (2012-02-01)
Completed By – The Louis Berger Group, Inc.
Network Location –
\23103\06-Studies\04-Studies\CulturalRescources\RevisedMississippiDriveReport.pdf

The Louis Berger Group, Inc. completed Phase I intensive archaeological survey investigations for the proposed Mississippi Drive Corridor Project. Archaeological field investigations, which included pedestrian survey and shovel testing, were performed between August 28 and September 1, 2011. The purpose of the subsurface testing was to determine, where possible, whether intact archaeological deposits remained that were associated with prehistoric occupation of the high terrace on which the proposed project is situated as well as with the early settlement and development of Muscatine.

2.2.5. Environmental Resources (T&E, Parklands, Wetlands)

Status – Completed (2011-06-01)
Completed By – Stanley Consultants, Inc.
Network Location –
\23103\06-Studies\04-Studies\Environmental Resources\20110601_ParksRec_Wetland_T&E.docx

A evaluation of several environmental resources along the corridor as required for inclusion in the EA.

2.2.6. Socio-Economic Evaluation

Status – Completed (2012-04-25)
Completed By – Stanley Consultants, Inc.
Network Location –
\23103\06-Studies\04-Studies\Environmental Resources\20120425_Memo_socioeconomic_Final.docx

An evaluation of the direct and indirect impacts of the proposed improvement project on socioeconomic resources within the City of Muscatine. In particular, the study looks at the potential for disproportionate impacts on lower income and/or minority populations near the corridor. Also evaluated, is the consistency with local and regional land use plans and the potential economic impacts due to the proposed improvements.

2.2.7. Contaminated/Regulated Material Sites Inventory

Status – Completed (2011-03-07)
Completed By – Stanley Consultants, Inc.
Network Location –
\23103\06-Studies\04-Studies\Environmental Resources\ContReg_Material_Sites\Mississippi_Dr_Corridor_Env_Review.docx

An inventory of documented contaminated materials sites within the project area of potential effect was completed to determine what, if any, potential impacts are present for proposed improvements along the Mississippi Drive Corridor Project.

2.2.8. Environmental Justice Evaluation

Status – Completed (2011-07-13)
Completed By – Stanley Consultants, Inc.
Network Location –
\23103\06-Studies\04-Studies\Environmental Resources\20110718_Memo_EnvironmentalJustice.docx

An assessment of potential impacts to low income and minority populations was conducted for the Mississippi Drive Corridor Project.

MEMO
Des Moines, IA

TO: File **DATE:** April 6, 2012

FROM: Jeffrey Hillegonds, P.E.
Stanley Consultants, Inc.

SUBJECT: City of Muscatine - Mississippi Drive Project
Geometric Evaluation for Carver Corner Option 1E

As part of the Alternatives Analysis for the Carver Corner area of the Mississippi Drive corridor, and evaluation of the plan geometric layout was completed for the design of Option 1E, the realigned crossing intersection, avoiding 4(f) resources at the TeaStrake property. The layout consists of two small radius curves starting just north of the 4(f) property to realign the south leg of the Hershey Avenue/Green Street intersection with the existing north leg.

Following are our findings:

1. The first curve radius north of the TeaStrake property measures 200-feet. The current posted speed limit on this roadway is 35 mph. The minimum Iowa DOT criteria for horizontal curve radii on reduced-speed urban facilities is 533-feet for the recommended 40-mph design speed (e_{max} = 4%). Even if a minimal design speed of 30-mph is used (not recommended), the minimum horizontal curve radius is 250-feet. Therefore, the first curve north of the TeaStrake property does not meet Iowa DOT design criteria for this type of facility. (Reference – *Iowa DOT Design Manual,* Chapter 1C-1.)

2. The second curve radius, just south of the Hershey Avenue/Green Street intersection, measures 181-feet. As noted in Item 1, this curve also fails to meet Iowa DOT design criteria for this type of facility. (Reference – *Iowa DOT Design Manual,* Chapter 1C-1.)

3. The location of the curve in Item 2 is close to the intersection, which is not recommended practice.

   > "An intersection should not be situated just beyond a short-crest vertical curve or a sharp horizontal curve." (Reference - Chapter 5.2.5 – Intersection Design, page 5-9 in *AASHTO, A Policy on Geometric Design of Highways and Streets, 2011, 6th Edition.)*

4. The design vehicle for this facility is a WB-67. With the small radius curves, trucks cannot negotiate through this area and stay in the proper lane at all times. This is a safety an operational deficiency since the road is a designated truck route. (Reference - Chapter 2 – Design Controls and Criteria, page 2-24 in *AASHTO, A Policy on Geometric Design of Highways and Streets, 2011, 6th Edition)*