Road Evaluation and Redesign for the City of Manchester

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Site Map

The location of our site is the intersection of 210th Street and Early Stagecoach Road which is just west of the City of Manchester. The Right–of–Way for Road A is 70 feet wide with the centerline of the road sitting 225 feet away from the west property line of 1543 210th Street.

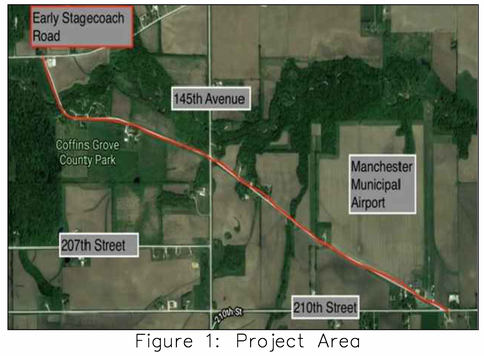

Figure 1: Project Area

Figure 2: Project Right of Way

Intersections

The intersections were designed to handle the use of larger trucks. The design vehicle WB–67 was used for the intersections were the turning radius is 41 feet. Figure 4 show the intersection at 210th Street and Road A. Figure 5 shows the intersection at Early Stagecoach Road and Road A.

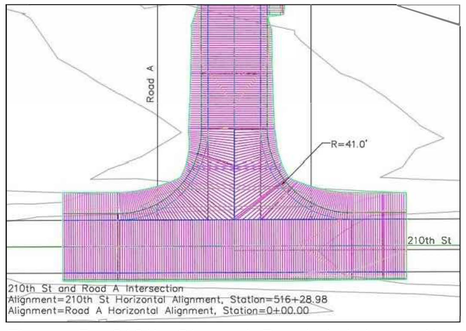

Figure 3: 210th St. and Road A Intersection

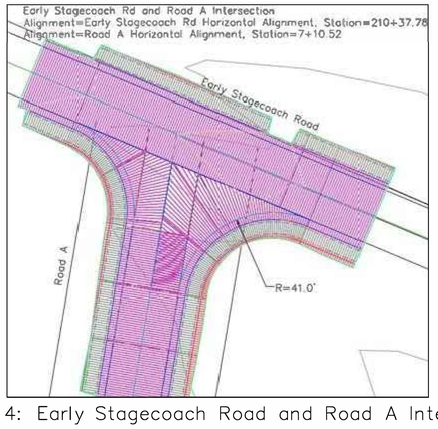

Figure 4: Early Stagecoach Road and Road A Intersection

Design Objectives

The goal for this project was to reroute Early Stagecoach Road while still providing access to the airport and adjacent farmland. The design of the new roadway was to be done in accordance with IowaDOT, Iowa SUDAS, AASHTO, ADA Regulations, and Delaware County regulations.

Cross Section

The lanes of the road are 12 feet in width for a total width of 24 feet. The pavement has a depth of 3 inches with asphalt, a base of 6 inches, and a subbase of 1 foot. The typical foreslope and backslope is 4:1 with a maximum of 2:1 wth a 5 foot ditch width. Figure 2 below shows the cross section for Road A.

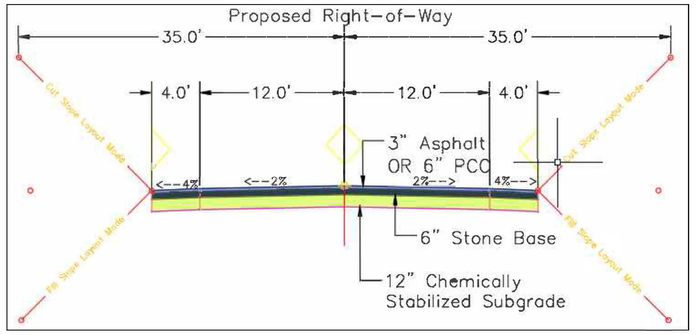

Figure 5: Cross Section of Road A

Culverts

Two culverts will be installed along Road A. One will be located near the southern intersection, with the other at STA 5+84. Using the Rational Method, a max flow for the whole area was determined to be 6.1 cfs. The pipes will be corrugated steel with a 12 inch diameter, 2–2/3 inch pitch, and $\frac{1}{2}$ inch rise.

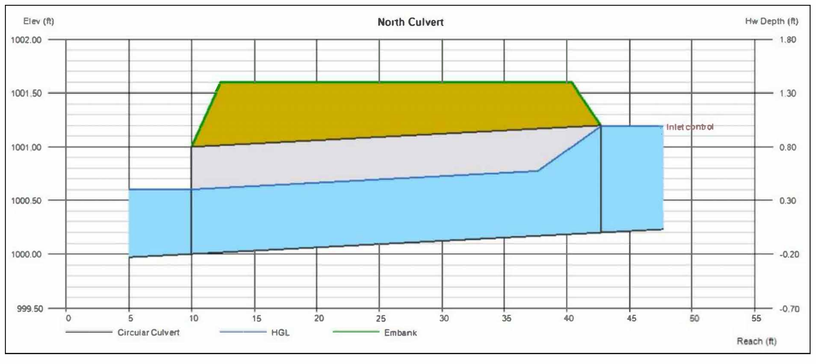

Figure 6: Culvert on north side of Road A

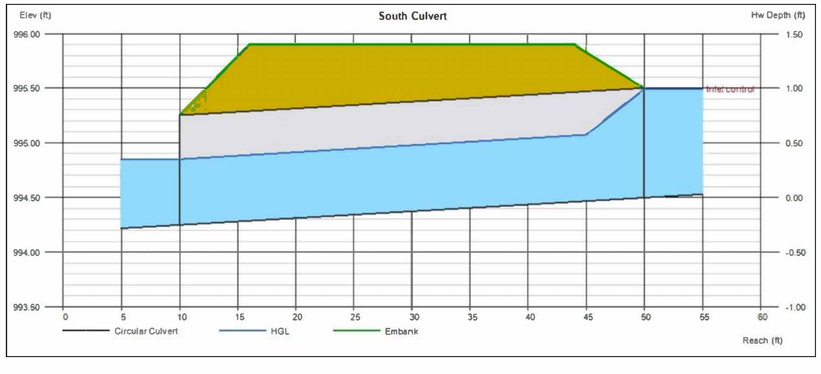

Figure 7: Culvert on south side of Road A

Plan and Profile

Road A is about 700 feet in length from 210th Street to Early Stagecoach Road with a total elevation change of approximately 9 feet.

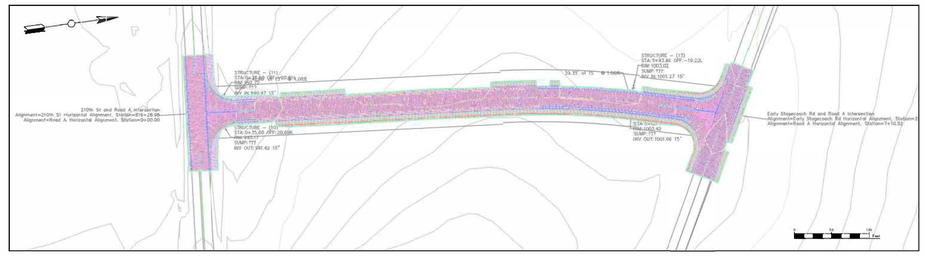

Figure 8: Plan of Road A

Final Project Costs

The costs included into the final cost estimate are clearing and grubbing, cut/fill, soil compaction, granular subbase, top soil, hydraulic seeding, pavement marking, signs, traffic control, road removal, culverts, erosion and sediment control, and the type of pavement. The total project cost for PCC is $305,000 and the total project cost for asphalt is $155,000. A conservative estimated duration would be one construction season.

Project:	Early Stagecoach Road–Road Evaluation and Redesign				
Item	**Unit**	**Dollars**	**Quantity**	**Cost**	**Rounded Cost**
Clearing and Grubbing	Acre	$ 5,140.85	0.4	$ 2,012.49	$ 2,000
Excavation - Class 10 Roadway and Borrow					
Cut/Fill	CY	$ 5.46	686.4	$ 3,747.74	$ 3,750
Soil Compaction	CY	$ 1.73	631.6	$ 1,092.62	$ 1,100
Granular subbase	Ton	$ 26.36	1151.0	$ 30,341.48	$ 30,300
Pavement					
6" pcc	SY	$ 84.05	1894.72	$ 159,251.22	$ 159,500
3" asphalt	SY	$ 12.15	1894.7	$ 23,020.85	$ 23,000
Subbase/Subgrade					
Granular Subbase 12"	SY	$ 7.23	1894.7	$ 13,698.83	$ 13,700
Soil Compaction-Subgrade	STA	$ 932.26	14.2	$ 13,247.79	$ 13,200
Traffic Control	LS	$ 16,727.00		$ 16,727.00	$ 16,700
Road Removal	ST	$ 437.43	5.0	$ 2,187.15	$ 2,175
Top soil	Cy	$ 5.87	631.6	$ 3,707.34	$ 3,700
Hydraulic Seeding	Acre	$ 1,553.22	0.4	$ 608.04	$ 610
Pavement Marking	STA	$ 14.68	14.2	$ 208.61	$ 210
Signage	SF	$ 25.00	42.0	$ 1,050.00	$ 1,050
Signage (posts)	Unit	$ 100.00	6.0	$ 600.00	$ 600
Erosion/Sediment Devices	LF	$ 3.21	1421.0	$ 4,561.54	$ 4,562
Culverts	LF	$21.00	113	$2,373.00	$ 2,375
Option 2 PCC				$ 255,414.84	$ 255,500
Option 1 Asphalt				$ 119,184.47	$ 119,000
PCC					
Contigency Costs -- 10%	0.1			$ 25,541.48	$ 25,500
Admin & Engneering	LS			$ 23,836.89	$ 23,800
Asphalt					
Contigency Costs -- 10%	0.1			$ 11,918.45	$ 11,900
Admin & Engneering	0.2			$ 23,836.89	$ 23,800
Total Project Cost - PCC				$ 304,793.22	$ 305,000
Total Project Cost - Asphalt				$ 154,939.81	$ 155,000

Figure 9: Construction Costs

References

Below are the design standards and specifications used for the design of Road A

Iowa Department of Transportation – (IA DOT)
- Chapter 1C–1: Selecting Design Criteria
- Chapter 1F–1: Plan Sheets
- Chapter 3A–1 Typical Roadway Sections
- Chapter 6D–1 Sight Distance
- Chapter 7G–2 Traffic Engineering Studies

Iowa Statewide Urban Design and Specifications (SUDAS)
- Chapter 5D: Asphalt Pavement Mixture Selection
- Chapter 5E: PCC Pavement Mixture Selection
- Chapter 5F: Pavement Thickness Design
- Chapter 12B–2: Shared Use Path Design

Asphalt Paving Design Guide – Iowa Asphalt Pavement Association
- Chapter 3: Design Considerations
- Chapter 4: Thickness Design