I-40/CC Westbound On-Ramp and Right-Turn Lane

CENE-486C 30% Presentation 02/11/2020

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Project Review

- Client: Arizona Department of Transportation (ADOT)
- Location: I-40 and Country Club Drive Traffic Interchange (Flagstaff, AZ)
- Final Product: New right-turn lane and new on-ramp lane



Figure 1: Project Location (NTS)

Milestones

- Milestone 1: Process Survey Data
- Milestone 2: Input Existing Geometry
- Milestone 3: Create Construction Alignments
- Milestone 4: Create Existing Cross-Sections
- Milestone 5: Complete Existing Runoff Calculations

Processing Survey Data

- Contour Data was downloaded as a .shp file, and processed within Civil 3D
- Parcel information was exported from GIS into Civil 3D



Figure 2: Existing Contour Data (NTS)

Input Existing Geometry

- Project Aerial was georeferenced into Civil 3D
- Existing Geometry was drawn in using Aerial, within Civil 3D
- Various Layers and Line Types were used for Existing Geometry



Figure 3: Existing Geometry (NTS)

Create Alignments

- Country Club Drive CL Alignment
 - Stationing began at Intersection of US89
 - Placement Involved a split of ROW along Country Club Drive
- I-40 On-Ramp Edge Alignment
 - Stationing Began at Intersection of Country club Drive

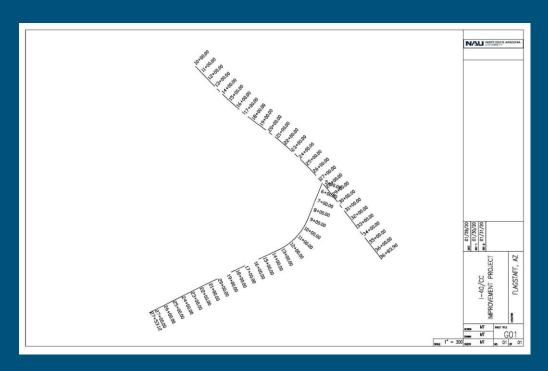


Figure 4: Alignment Geometry (NTS)

Existing Runoff Calculations

- Major Watershed was Delineated for Project Area
 - USGS Topo Maps
 - City Contour Data
- Peak Flows were Calculated Using National Stream Statistics (NSS)
 - Annual Precipitation (21 inches)
 - Watershed Area (2.02 square miles)
 - Region (Peak_Region_1_High_Elev_2014)
- Existing Infrastructure is able to Accommodate Existing Flows

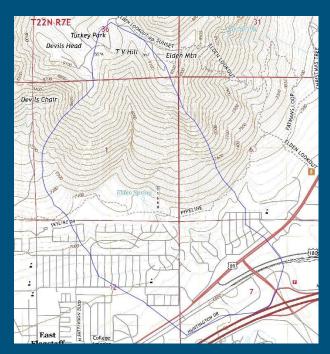


Figure 5: Project Watershed (NTS)

Existing Runoff Calculations Cont.

- Watershed was Delineated for Existing Catch Basin and 24" CMP
 - Rational Method
 - Bentley Flowmaster
- ADOT and COF Drainage Standards [2] [3]
- Existing Infrastructure is able to Accommodate Existing Flows [1]

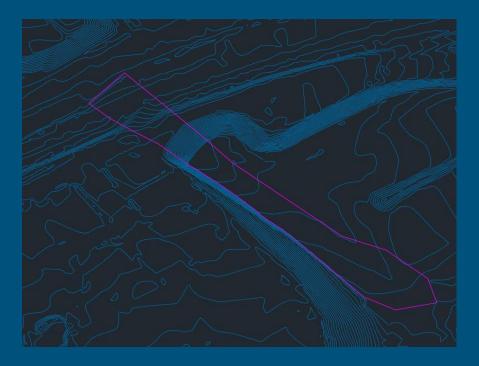


Figure 6: Inlet Watershed (NTS)

Existing Cross-Sections

- Obtained from As-Builts
 Provided by ADOT
- Drawn within Civil 3D
- Includes
 - Pavement Structure
 - Lane Widths and Usage
 - Curb and Gutter Detail Callouts
 - Cross-Slopes
 - Sidewalk Detail Callouts
 - Embankment Detail Callouts

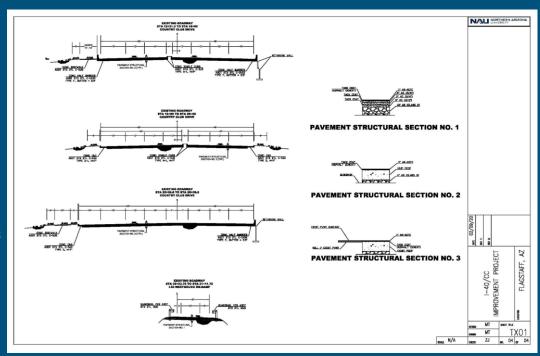


Figure 7: Typical Cross-Sections (NTS)

D Tasl	Name	Duration	Start	Finish	Predecessors	10 13	16 19 22	25 28	Februar 31 3 6	y 2020	15 18	21 24 27	March 20	20	19 22	A A	pril 2020	9 12 19	18 21 24	4 27 3
1						10,131	10 10 100		1311310					110112110	10,166,1	.5 20 51	3 0	7 116 11	110121123	11.00
2 Ta	sk 1: Existing Studies	19 days	Mon 1/13/20	Thu 2/6/20					\neg											
3	1.1: Site Visit	1 day	Mon 1/13/20	Mon 1/13/20)	-														
4	1.2: Process Survey Data from GIS	3 days	Tue 1/14/20	Thu 1/16/20		-	-													
5	1.3: Studying/Analyzing Existing Drainage Studies/As-Built In:	fc2 days	Wed 1/15/20	Thu 1/16/20	3	-														
6	1.4: Runoff Calculations	4 days	Fri 1/17/20	Wed 1/22/20	0 4		_													
7	1.5: Analyze Existing Geotechnical Information	2 days	Wed 1/15/20	Thu 1/16/20		-														
8	1.6: Enter Existing Geometry into Civil3D	6 days	Wed 1/22/20	Wed 1/29/20	5SS		-													
9	1.7: Create Existing Cross-Sections	4 days	Thu 1/30/20	Tue 2/4/20	5SS			-												
10	1.8: Create Roadway Alignments/Base Files	3 days	Tue 2/4/20	Thu 2/6/20	8				-											
11 Ta	sk 2: Design	63 days	Mon 2/3/20	Tue 5/5/20					-	_										_
12	2.1: Create Proposed Cross-Sections	4 days	Thu 2/13/20	Tue 2/18/20							-									
13	2.2: Initial Design	27 days	Wed 2/19/20	Wed 4/1/20							-					1				
14	2.2.1: Intersection Design	27 days	Wed 2/19/20	Wed 4/1/20	12						*					-				
15	2.2.1: On-Ramp Design	27 days	Wed 2/19/20	Wed 4/1/20	12						*					- 5				
16	2.4: Final Design Geometry/Cross-Sections	12 days	Thu 4/2/20	Fri 4/17/20	13,14											1			-	
17	2.5: Final Drainage Design	12 days	Mon 4/20/20	Tue 5/5/20	16														1	
18	2.6: Stormwater Pollution Prevention Control Plan	4 days	Mon 4/20/20	Thu 4/23/20	17SS														-	
19	2.7: Construction Plan Set	51 days	Mon 2/3/20	Fri 4/17/20																
20	2.8 Synchro Analysis and Traffic Analysis Recommendation	2 days	Thu 4/2/20	Fri 4/3/20	14															
21 Ta	sk 3: Deliverables	56 days	Fri 2/14/20	Thu 5/7/20						1	3									_
22	3.1: 30% Submittal	1 day	Fri 2/14/20	Fri 2/14/20	9SS,10SS			L		-				1						
23	3.2: 60% Submittal	1 day	Tue 3/10/20	Tue 3/10/20	22									10						
24	3.3: 90% Submittal	1 day	Wed 5/6/20	Wed 5/6/20	23,27,28,29,17															
25	3.4: Final Design Report	1 day	Thu 5/7/20	Thu 5/7/20	24															
26 Ta	sk 4: Impacts	2 days	Fri 4/3/20	Mon 4/6/20																
27	4.1: Social Impacts Assessment	2 days	Fri 4/3/20	Mon 4/6/20																_
28	4.2: Economic Impacts Assessment	2 days	Fri 4/3/20	Mon 4/6/20																_
29	4.3: Environmental Impacts Assessment	2 days	Fri 4/3/20	Mon 4/6/20																_
30 Ta	sk 5 Project Management	70.5 days	Mon 12/16/1	!Thu 4/23/20															\neg	
31	5.1: Grading Instructor Meetings	56.5 days	Fri 1/17/20	Fri 4/10/20			1		1	- 1	1	1		1		1	1	1		
39	5.2: Client Meetings	61.5 days	Thu 1/23/20	Thu 4/23/20			1					1							1	
14	5.3: Technical Advisor Meetings	61.5 days	Thu 1/23/20	Thu 4/23/20								E							- 1	
49	5.4: Team Meetings	67 days	Mon 1/13/20	Mon 4/20/20)															
65	5.5: Schedule Management	67.5 days	Mon 12/16/1	Mon 4/20/20)			1	1			1		1		1	1	1		
85	5.6: Cost/Resource Management	68 days	Mon 12/16/1	!Mon 4/20/20)		-			100										

References

- [1] Primatech (2020). Interstate 40 East Flagstaff Traffic Interchange at SR 89 and US 66. [online] Arizona Department of Transportation, pp.7, 8, 16, 18. Available at: http://file://C:/Users/mlt289/AppData/Local/Downloads/SR89%20and%20US66%20TI.pdf [Accessed 9 Feb. 2020].
- [2] City of Flagstaff Engineering Division (2009). CITY OF FLAGSTAFF STORMWATER MANAGEMENT DESIGN MANUAL. Flagstaff: City of Flagstaff, pp.3-1, 3-3, 3-4.
- [3] Arizona Department of Transportation (2020). *Roadway Design Guidelines*. Arizona Department of Transportation, pp.600-6, Appendix C.

Questions?