Montezuma Castle National Monument

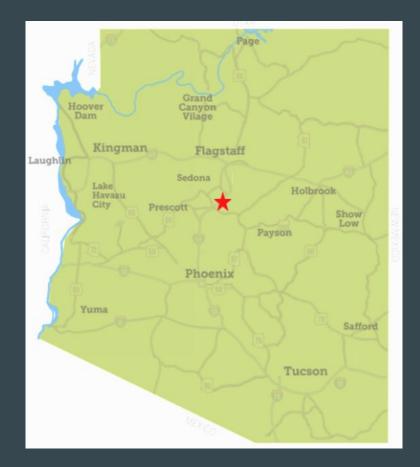
PARKING LOT REDESIGN



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1 DECEMBER 2017



Location of Montezuma Castle National Monument



Figure 2: Vicinity Map from I-17 [1]

Figure 1: Location of Site Within Arizona [1]

Site Description

- Parking Lot Characteristics:
 - 60 regular parking spaces
 - 4 ADA parking spaces
 - 4 bus/RV parking spaces
 - Large vegetation area in middle
 - Bordering sidewalks



Figure 3 & 4: Parking at Montezuma Castle [1]

Site Schematic - Existing



Figure 5: Site Schematic-Existing [1]

Project Background and Understanding

Site not currently optimal for visitor usage

- Pedestrian safety concerns
- Lack of parking spaces and usability
- Full parking lot turns visitors away

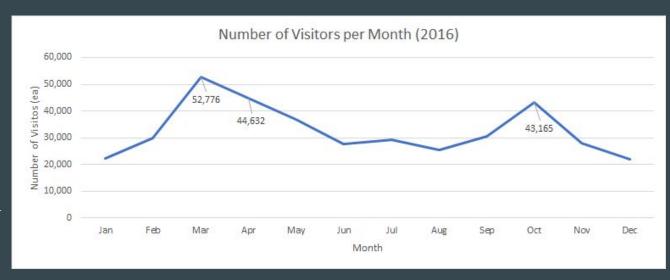


Figure 6: Number of Visitors of Montezuma Castle per Month [2]

Project Objectives

- Redesign the existing parking lot
 - Design a bus drop off zone
 - Design a usable and safely accessible picnic area
- Design a new bus/RV parking lot
- Promote site safety through use of sidewalks, crosswalks, control, and signage





Figure 7 & 8: Existing Parking Lot Pull Through

Photo by: Andrew McLaughlin

Cayla

Site Schematic - Proposed



Figure 9: Site Schematic-Proposed [1]

Scope of Work

1. Site Investigation

- a. Sitewalk
- b. Assess current conditions
- c. Field Survey

2. Hydrology and Hydraulics

- a. Map existing drainage basin
- b. Map proposed changes within basin

3. Site Plan

- a. Developing a parking lot, sidewalks, and picnic area, and drop off zones.
- b. Striping and Signage for existing and proposed parking lots
- c. Grading and Drainage



Figure 10: Looking West at the Existing Parking Lot *Photo by: Andrew McLaughlin*

Scope of Work

Traffic Analysis

- Evaluate: sight distances for intersections and conflict points, stopping distances, traffic movement
- Determine whether a controlled intersection is necessary.

Impact Reports

- Hydrology and Hydraulic
- Traffic Impact

Construction Documentation

- Full set of drawings for review
- Bid schedule for contractor pricing



Figure 11: Looking East at the Existing Parking Lot Photo by: Andrew McLaughlin

Task Name	Downston			January				February					March			April					
rask Name	Duration	Dec 31	Jan 7	Jan 14	Jan 2	1 Jar	128	Feb 4	Feb 11	Feb 18	Feb	25	Mar 4	Mar 11	Mar 18	Mar 25	Apr 1	Apr 8	Apr 15	Apr 22	A
Site Investigation	8d			8	The second second																
1.1 Field Visit and Assessment	3d																				
1.2 Field Survey	3d																				
1.3 Process Survey Data	7d			_	Description of the last of the																
Traffic Analysis	4d																				
4.1 Existing Traffic Analysis	2d																				
4.2 Proposed Traffic Analysis	3d																				
Hydrology	45d								No.					8							
2.1 Research Previous Studies	1d																				
2.2 Existing Drainage Basin Mapping	14d						8	8													
2.3 Exisitng Stormwater Flow	14d																				
2.4 Proposed Drainage Basin	26d																				
2.5 Proposed Stormwater Flow	26d																				
Site Plan	56d							8						8							
3.1 Review As - Builts	1d																				
3.2 Analyze Existing Conditions	2d																				
3.3 Estimate Parking Lot Location and Size	7d																				
3.5 Bus Turning Radii	2d																				
3.6 Sidewalk Placement	3d																				
3.7 Proposed Stormwater	6d															I I					
3.8 Site Signage	5d																				
3.10 Proposed Picnic Area	6d																				
Impacts	44d																	Trail			
5.1 Hydrology	5d																				
5.2 Physical	44d																	I T			
Construction Plans	66d				Į.									8							
6.1 Cover	14d																				
6.2 Codes or Applicable Codes	30d																				
6.3 Existing & Proposed Site Plan	24d																				
6.4 Demo Sheet	14d																				
6.5 Grading and Drainage Sheet Including	14d																	-			
6.7 Necessary Details	7d																				
6.8 SWPPP/Safety/Risk Plan	9d																			7	
50% Construction Drawings	0													+						10	
100% Construction Drawings	0																				

Staff and Billing Rates

All rates include compensations, benefits, and overhead.

- **Project Engineer: \$120/Hr**
 - Provides oversight, technical expertise, and design review
- Staff Engineer: \$100/Hr
 - Responsible for project management and coordination along with more technical design
- Surveyor: \$90/Hr
 - Provides survey services and raw data to the designer
- **Engineer in Training: \$80/Hr**
 - Responsible for the majority of the design work
- Admin: \$65/Hr
 - Assembles deliverables and provides edits to report as required
- Technician: \$60/Hr
 - Completes drafting and plan preparation of design
- Intern: \$50/Hr
 - Completes minor design work and on-site tasks

Cost of Engineering Services

Staff (Hours)

Task	Project Engineer	Staff Engineer	Survey	EIT	Admin	Tech	Intern	Total Task	
Site Investigation	4	4	35	30	2	2	4	81	
Traffic Analysis	4	2	0	23	2	0	2	33	
Hydrology	8	15	5	49	2	6	15	100	
Site Plan	8	12	0	22	2	10	12	66	
Impacts	8	7	0	20	2	5	7	49	
Construction Plans	20	34	0	64	5	40	34	197	
Deliverables	5	2	2	106	25	5	2	147	
Project Coordination	5	5	5	132	51	5	5	208	
Hours Total	62	81	47	446	91	73	81	881	
Billing Rate	\$120	\$100	\$90	\$80	\$65	\$60	\$50		
Position Total	\$7,440	\$8,100	\$4,230	\$35,680	\$5,915	\$4,380	\$4,050		
Reimbursables	Rate (\$/Mi)	Expected	Total						
Mileage*	0.65	212	\$137.80		PROJECT TOTAL \$69,93				
Plan Production		er sheet as requi	red for						

^{*}Assumed two site visits. Additional costs associated with travel included in hourly rate schedule shown above

References

[1]"Montezuma Castle National Monument", Montezuma Castle National Monument, 2017. [Online]. Available: https://www.google.com/maps/place/Montezuma+Castle+National+Monument/@34.6115755,-111.8371741,17z/data=!3m1!4b1!4m5!3m4!1s0x872daabdb1196721:0x8605dcdaba237348!8m2!3d34.6115755!4d-111.8349854. [Accessed: 28- Nov- 2017].

[2] "Park Statistics - Montezuma Castle National Monument (U.S. National Park Service)", Nps.gov, 2017. [Online]. Available: https://www.nps.gov/moca/learn/management/statistics.htm. [Accessed: 28- Nov- 2017].