Oak Creek Water Crossing

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About the Project

- Low water crossing through Oak Creek
- Service the Rancho Mission/Shangri-La Subdivision
- Floods are problematic in the area
 - Flood of 1993
- Only egress and ingress to subdivision



Needs of the Client

Protect the current crossing
 Scouring
 Stream rerouting
 Design a new crossing



A view of the downstream apron and bank erosion

Stakeholders

- Beth Ann
 Dzierson Client/Head of
 HOA
- Shangri-La residents



The road heading down towards the water crossing

Existing Conditions

- ▶ 40 feet long and 14 ½ feet wide
- ► Four 48″ concrete culverts
- Weight limit of 30 tons



Existing Conditions



The natural beach that formed from deposits can be seen on the left



The crossing as seen from the other side

Foreseen Challenges (Regulations and Required Permits)

- ADOT
- ADEQ
- National Forest Service
- Game and Fish
- Army Corps of Engineers
- Coconino County



Foreseen Challenges (Design)

- Access to homes
- Environment
- Debris buildup
- Service Life
- Flooding
 - ► Impacts



The narrowness of the crossing can pose a challenge for home access during construction

Foreseen Challenges (Design)



The small culverts could cause buildup of debris to occur during flooding

Scope (Research)

Army Corps
ADEQ
ADOT
EPA
Forest Service

AZ Game and Fish

- SAFETY



The crossing's surrounding area

Scope (Modeling)

HEC-HMS
HEC-RAS
USGS
Land Survey



http://waterdata.usgs.gov/usa/nwis/uv?09504420

Scope (Impacts)

Political
 Sensitivity
 Social
 Economy





Oak Creek is vital to many aspects of the local community

Scope (Analysis)

- What is our data and modeling telling us?
- Use AutoCAD 3D, Culvert Master, HydraFlow, Bentley WaterGEMS
- What is best for our clients?



Scope (Design)

- Review Client's expectations of design
- Evaluate alternatives
- Make a calculated decision on design attributes



Scope (Exclusions)

- Geotechnical Evaluation
- Traffic Control



The narrowness of the crossing can be easily seen

Schedule

	•	Task					3 Oct 27, '13	Nov 10, '13	Nov 24, 13	Dec 8, '13	Dec 22, '13	Jan 5, '14	Jan 19, '14	Feb 2, '14	Feb 16, "	14 Mar a	2, 14	Mar 16, 14	Mar 30,	'14 Apr 1
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1		*	WEBSITE	26 days	Fri 10/18/13	Fri 11/22/13														
2		% ?																		
3			Research	25 days	Mon 11/11/1	Fri 12/13/13														
4		*	ARMY CORPS	25 days	Mon 11/11/13	Fri 12/13/13														
5		*	AZ DEQ	25 days	Mon 11/11/13	Fri 12/13/13														
6		*	ADOT	25 days	Mon 11/11/13	Fri 12/13/13														
7		*	EPA	25 days	Mon 11/11/13	Fri 12/13/13														
8		*	FOREST SERVICE	25 days	Mon 11/11/13	Fri 12/13/13														
9		*	GAME & FISH	25 days	Mon 11/11/13	Fri 12/13/13														
10		*	SAFETY	25 days	Mon 11/11/13	Fri 12/13/13					_									
11		*	ResearchComplete	0 days	Fri 12/13/13	Fri 12/13/13				12/1	3									
12		X ?																		
13			MODELING	70 days	Sat 11/16/13	Fri 2/21/14														
14		*	USGS DATA	16 days	Sat 11/16/13	Fri 12/6/13														
15		*	LAND SURVEY	21 days	Sat 11/16/13	Fri 12/13/13														
16		*	HEC-HMS	20 days	Mon 1/27/14	Fri 2/21/14														
17		*	HEC-RAS	20 days	Mon 1/27/14	Fri 2/21/14														
18		*	Modeling Complete	0 days	Fri 2/21/14	Fri 2/21/14									♦ 2/	21				
19		*?																		
20			▲ IMPACT	5 days	Mon 2/3/14	Fri 2/7/14														
21		*	POLITICAL	5 days	Mon 2/3/14	Fri 2/7/14														
22		×	SOCIAL	5 days	Mon 2/3/14	Fri 2/7/14														
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27		×.	HYDRAFLOW EXPRESS	20 days	Mon 2/10/14	Fri 3/ //14														
28		*	BENTLY W. GEMS	20 days	Mon 2/10/14	Fri 3/7/14														444
29		*	AUTOCAD 3D	11 days	Fri 3/ // 14	FR 3/21/14														
21		×	CULVERT MASTER	11 days	Fri 3/ //14	FR 3/21/14												2/21		
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