

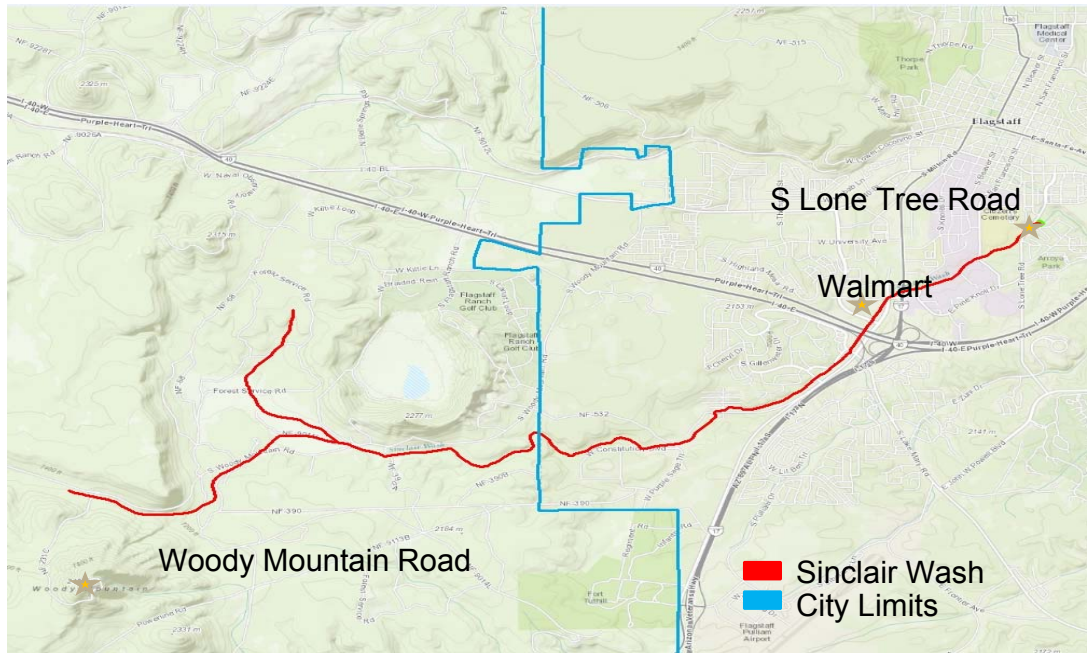


Agassiz Consulting Engineers

Sinclair Wash Riparian Habitat Enhancement Feasibility Study

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Project Site



From Sinclair Wash Capstone Spring 2015

- Location
 - Flagstaff, AZ
 - Woody Mountains to Rio De Flag
- Length
 - 7 miles
 - Focus will be on several reaches of the channel
- Public Use
 - Bike Trail
 - Walking Trail

Project Purpose

- Purpose of Sinclair Wash
 - Channel to collect stormwater runoff
 - Channel drains to Rio De Flag
- Previous Work Done
 - Inventory assessment
- Reasons for Redesign
 - Erosion
 - Flooding
 - Poorly designed infrastructure



Scope of Services



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- Task 1.0 Field Assessment
 - Site Walk
 - Stream Reach Determination
 - Infrastructure Assessment

Scope of Services

- Task 2.0 Stream Enhancement Design Alternatives
 - Acquire Topographic Data
 - Riparian Habitat Assessment
 - Geomorphic Assessment

West View of Sinclair Wash



From Sinclair Wash Capstone Spring 2015

Scope of Services

- Task 2.0 Continued
 - Hydrologic Assessment
 - Hydraulic Assessment
 - Bentley CulvertMaster
 - Bentley FlowMaster
 - HEC-RAS
 - Low Impact Development

West View of Sinclair Wash between San Francisco Street and Lone Tree



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Scope of Services

- Task 3.0 Project Management
 - Includes staffing, communication, budget, resource and schedule management.
 - Project Submittals
- Exclusions
 - Construction
 - Geotechnical Analysis
 - Property Acquisition
- Task 4.0 Broader Impact Analysis
 - Economic Impacts
 - Environmental Impacts
 - Community Impacts
 - Health Impacts



Stakeholders

- City of Flagstaff
- Northern Arizona University
- Coconino County
- USDA Forest Service
- Arizona Department of Transportation
- Arizona Game and Fish Department
- Flagstaff Community



Major Task Schedule

Major Task	Start Date	End Date	January	February	March	April
Geomorphic Assessment	1/19/16	1/26/16				
<i>Calculate Shear Stresses</i>	1/19/16	1/21/16				
<i>Analyze for Erosion</i>	1/22/16	1/26/16				
Hydraulic Analysis	1/26/16	2/22/16				
<i>Acquire GIS Data</i>	1/26/16	1/27/16				
<i>Develop Drawing in ArcMap</i>	1/27/16	1/29/16				
<i>Develop Drawing in AutoCAD</i>	1/29/16	2/2/16				
Use Appropriate Software	2/2/16	2/22/16				
<i>Model Design Alternative</i>	2/2/16	2/22/16				
Hydrologic Analysis	2/29/16	3/7/16				
<i>Assess Local Runoff of Proposed Design</i>	2/29/16	3/7/16				
Low Impact Development	3/22/16	4/22/16				
<i>Select Proposed Design</i>	3/22/16	4/22/16				

Staffing and Hour Breakdown

Breakdown of Hours:

Task	Project Manager Hours	Project Engineer Hours	Engineer-in-Training Hours	Labratory Technician Hours	Intern Hours
Field Assessment	4	11	23	17	40
Design Enhancement Alternatives	1	39	115	146	118
Project Management	83	96	106	58	77
Impact Analysis	6	6	5	0	4
TOTAL	94	152	249	221	239

Total for Project: 955 hours

Cost of Engineering Services

Personnel	Classification	Hours	Rate (\$/hr)	Cost
	Project Manager	94	160	\$15,040
	Project Engineer	152	80	\$12,160
	Engineer-in-Training	249	60	\$14,940
	Lab Technician	221	75	\$16,575
	Intern	239	20	\$4,780
	Total personnel			\$63,495
Travel	6 meetings×50 miles/meeting		\$0.40/mi	\$120
Surveying		16	\$150	\$2,400
TOTAL				\$66,015

Potential Challenges

- Technical Challenges
 - Surveying
 - Weather conditions
 - Runoff Calculations
 - Historical Data

Heavy floods in Sinclair Wash



From Sinclair Wash Capstone Group Spring 2015

Questions?



<http://civilwartalk.com/threads/call-for-trivia-questions.118549/>

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