Water Environmental Federation Student Wastewater Design Competition

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Project Understanding

- Water Environment Federation(WEF) Student Design Competition at the Arizona Water Works Association conference in May
- Design or redesign of wastewater infrastructure at a wastewater treatment plant in Arizona
- Prompt will be released in January
- May include hydraulic analysis, unit design, and economic analysis

[1]

Potential Prompts and Background

- Potential Prompts
  - Wastewater Treatment Plant Units
    - Primary Treatment
    - Secondary Treatment
    - Tertiary Treatment
    - Sludge Treatment
  - Hydraulics
  - Collection Systems
  - Standards [2]

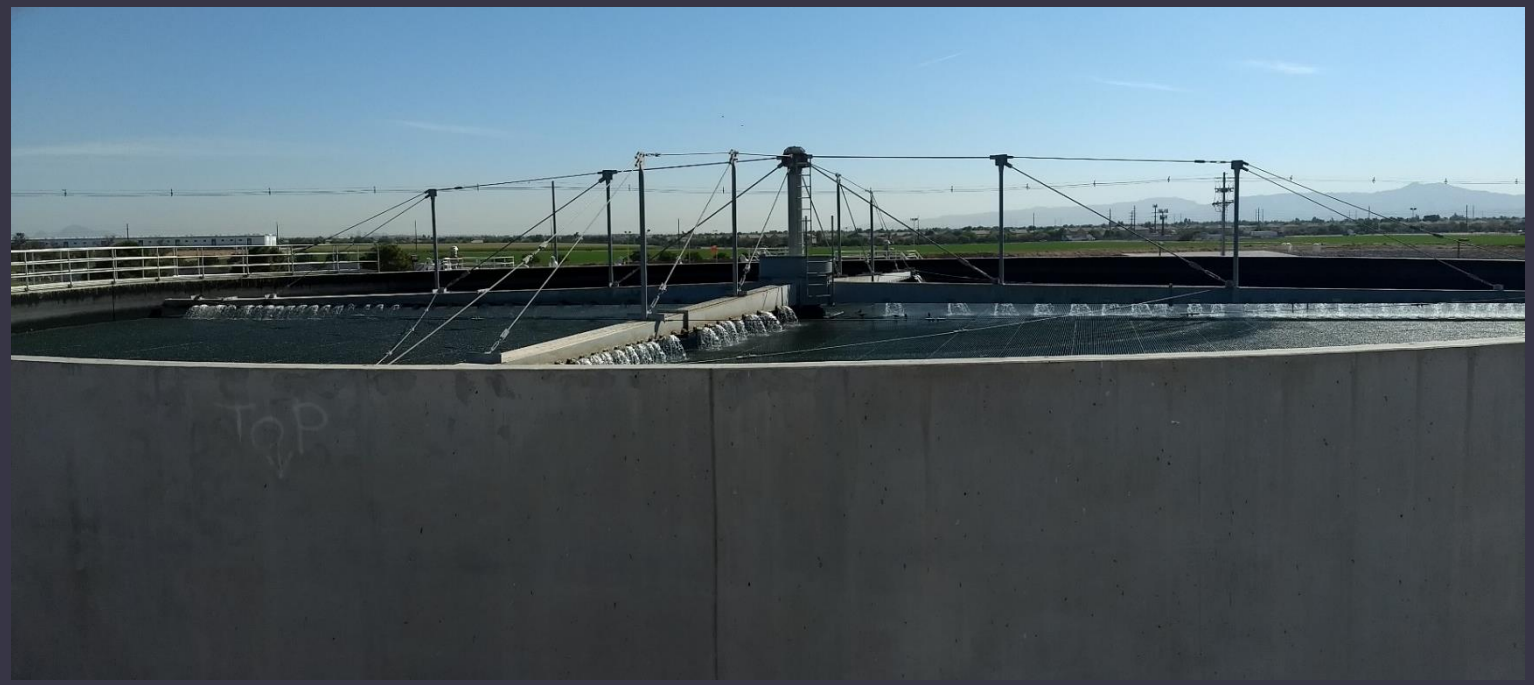


Figure 1: Tollesen WWTP Trickling Filter Photo by: Jed Ward

Project Scope

1.0 Project Definition
- Creating Existing and New Flow Diagram
- Identify Criteria and Constraints

2.0 Tour Treatment Plants

3.0 Analysis of Existing Treatment Plant
- Hydraulics
- Treatment Methods/Units
- Capacity
- Expansion Potential

Figure 2: Wild Cat Plant Tour Aeration Basin Photo: Max Ward

Project Scope

4.0 Design
- Technology Selection
- System Design

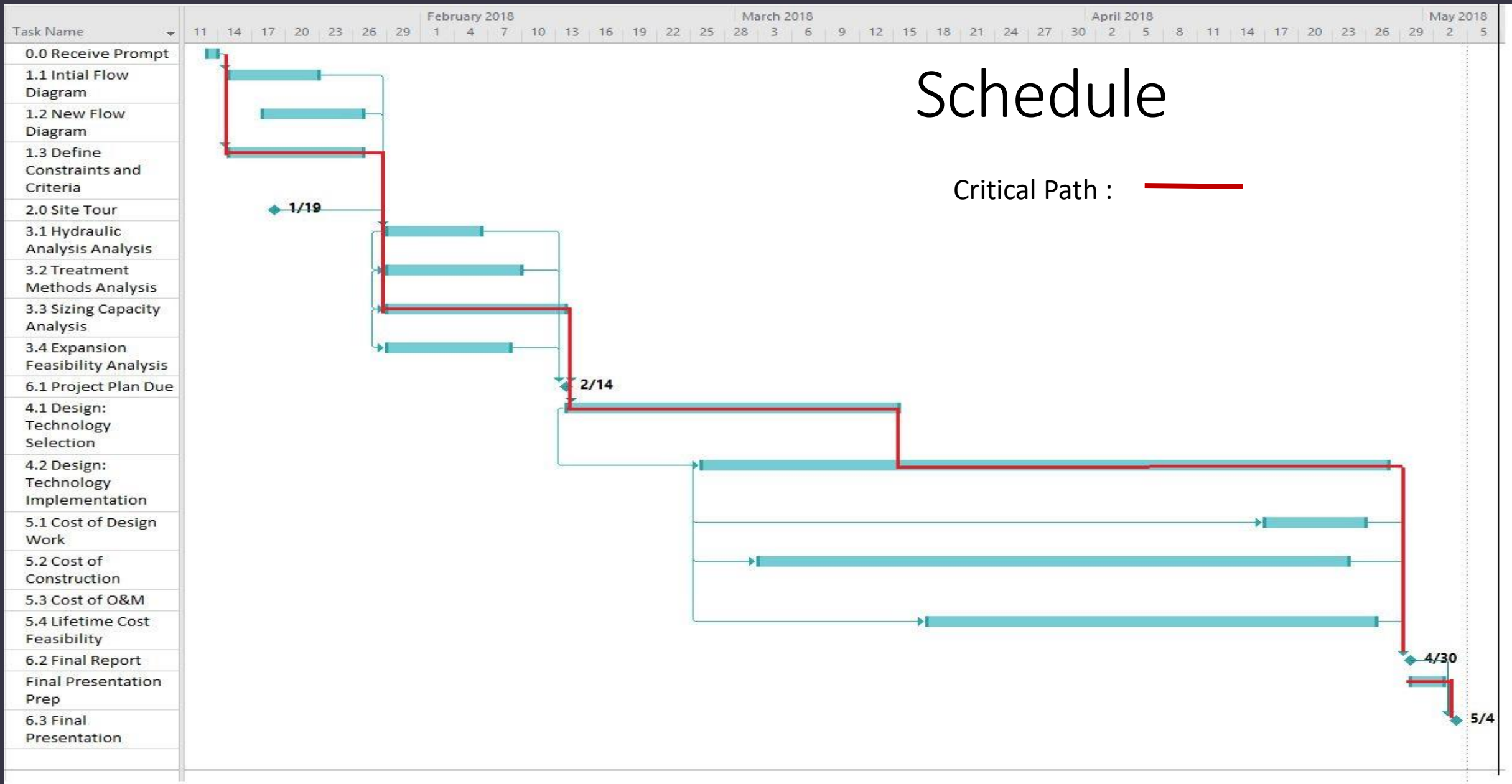
5.0 Economic Analysis
- Cost of Design Work
- Cost of Construction
- Cost of Maintenance
- Lifetime Cost Feasibility

6.0 Project Management

Figure 3: Wild Cat WWTP Secondary Clarifier Photo: Max Ward

Schedule

Critical Path :



Staffing

Table 1: Staffing (hours)					
Task	Project Manager	Senior Engineer	EIT	Drafter	Total
Define Project	7	4	4	6	21
Site Tour	11	11	11	11	44
WWTP Analysis	8	9	14	32	63
Design	25	80	90	90	305
Economic Analysis	8	10	14	16	48
Deliverables	25	40	50	50	145
Staff Total	84	154	183	205	626

Cost of Engineering Services

Table 2: Cost for Personnel				
Staff	**Project Manger**	**Senior Engineer**	**EIT**	**Drafter**
Rate	**$140**	**$105**	**$85**	**$75**
Hours	**84**	**154**	**183**	**205**
Total	**$17,640**	**$16,170**	**$15,555**	**$15,375**
Combined Total	**$64,740**			

Table 3: Additional Costs				
Other Expenses	**Travel (mi)**	**Night Stay**	**Travel Meals**	**Printing/Postage**
Unit	**400**	**2**	**24**	**3**
Rate	**$0.5**	**$250**	**$20**	**$20**
Total	**$200**	**$500**	**$480**	**$60**
Sum Total	**$1,240**			

Total Cost: $66,000

[3]

References

[1] WEF, "wef.org," 2 2017. [Online]. Available: https://wef.org/globalassets/assets-wef/2---membership/member-associations/students-and-young-professionals/design-competition-guidelines.pdf. [Accessed 23 9 2017].

[2] M. L. Davis, Water and Waste Water Engineering, New Dehli: McGraw HIll Education, 2016.

[3] Bureau of Labor Statistics, "www.bls.gov," 31 March 2017. [Online]. Available: https://www.bls.gov/oes/current/oes172081.htm. [Accessed 24 November 2017].