

NAU Compost Facility Analysis

Northern Arizona University-CENE 476 Project Proposal

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Background

Purpose: To create a comprehensive management plan for Northern Arizona University's (NAU) composting piles, including in house laboratory analysis required to determine if the compost meets EPA's quality standards to be sold.

Client: Adam Bringhurst

Location: NAU Facilities



Figure 1: Finished compost; Abdul Almechmadi

Site Location

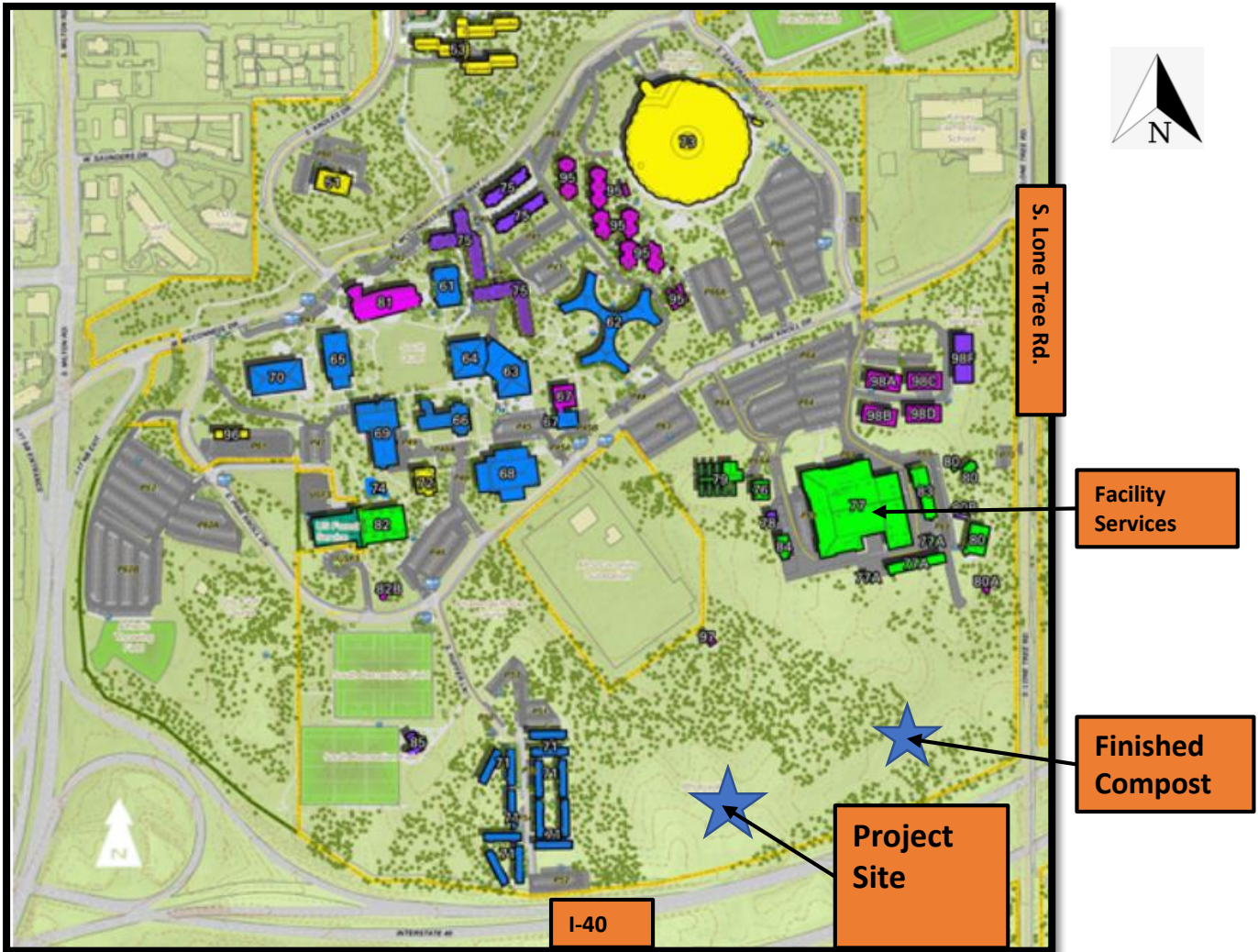


Figure 2: Project Site at Northern Arizona University; NAU Maps



Legend

- Project Site
- ▲ Finished Compost

Figure 3: Zoomed in Project Site; Google Maps

Scope of Service

Task 1.0 Research

1.1 Regulation Research

1.2 Operation Research

Task 2.0 Work Plan

2.1 Sampling and Analysis Plan

2.2 Health and Safety Plan



Figure 4: Compost Piles; Abdul Almeahmadi

Scope of Service

Task 3.0 Sampling

Task 4.0 Testing and Analysis

Testing Procedures will follow TMECC (Test Method Examination of Composting

- and Compost)
- Salmonella
- Heavy Metals (XRF)
- Temperature
- C:N Ratio
- pH
- Nitrite/Nitrate
- Phosphorus
- Potassium
- Ammonia
- Density
- Moisture Content

Task 5.0 Operation Analysis

Task 6.0 Economic Analysis



Figure 5: Compost Piles; Abdul Almechmedi

Scope of Service

Task 7.0 Impacts

- Environmental
- Economic
- Social



Figure 6: Raw Compost; Abdul Almeahmadi

Task 8.0 Project Management

8.1 Meetings

8.2 Team Management

8.3 Deliverables

8.3.1 Milestone

8.3.1.1 30%

Milestone

8.3.1.2 60%

Milestone

8.3.1.3 90%

Milestone

8.3.1.4 Final

8.3.2 Presentations

8.3.3 Meeting memo binder

8.3.4 Website

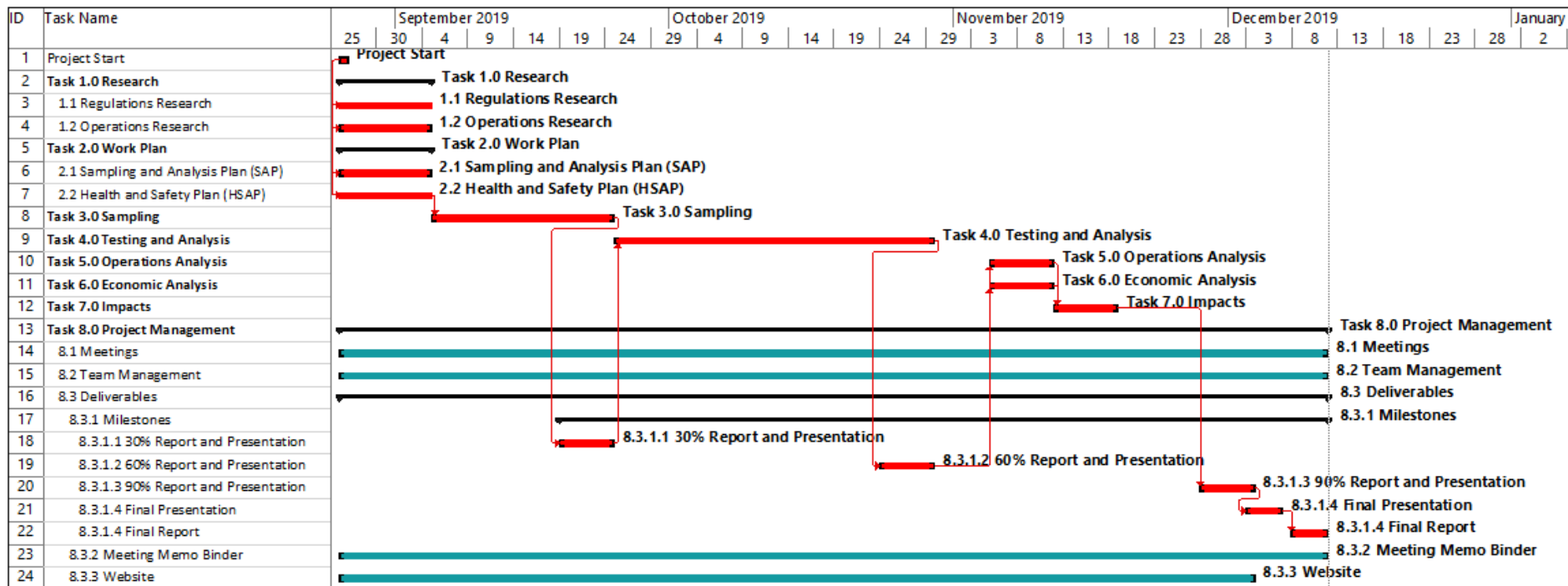
Exclusions

- Permits (Aquifer Protection Permit)
- Notifying ADEQ

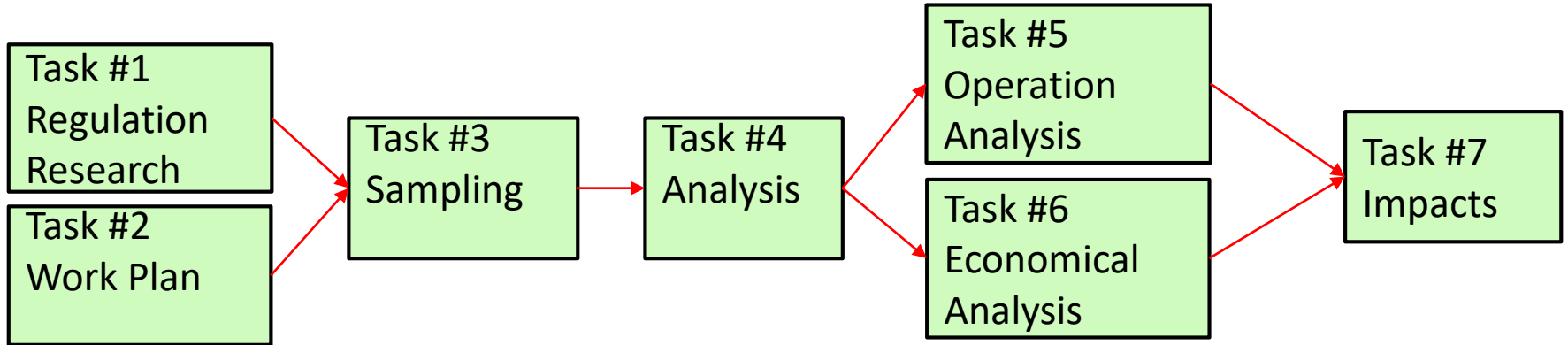


Figure 7: Mixing the Windrow Compost; Google Maps

Gantt Chart



Critical Path



Staffing Plan

Task	Staff (Hours)			
	Senior Engineer	Engineer	Lab Technician	Total
Task 1.1 Operations Research	2	4	8	14
Task 2.1 Sampling and Analysis Plan (SAP)	3	7	3	13
Task 2.2 Health and Safety Plan (HSAP)	2	4	8	14
Task 3.1 Testing Parameters	3	22	22	47
Task 3.2 Testing Methods	3	22	22	47
Task 4.0 Analysis	45	65	118	228
Task 5.0: Impacts	3	15	12	30
Task 6.0: Operation Analysis	14	15	4	33
Task 7.0: Economic Analysis	22	35	0	57
Task 8.1: Meetings	3	3	3	9
Task 8.2: Team Management	10	10	10	30
Task 8.3.1: Milestones	7	15	4	26
Task 8.3.2: Presentations	3	6	2	11
Task 8.3.3: Meeting Memo Binder	0	8	8	16
Task 8.3.4 Website	3	10	0	13
Staff Total	123	241	224	588

Cost of Engineering Service

Cost Estimate of Engineering Services				
1.0 Personnel				
Classification	Hours	Rate, \$/hr	Cost \$	
SENG	123	200	24600	
ENG	241	74	17834	
LAB	224	63	14112	
Total Personnel		N/A	56546	
2.0 Supplies				
Item	Cost per unit \$	Unit	Quantity	Cost \$
NAU Lab Rental	100	120	1	12000
E.coli Broth Glass Ampules, pk/20	56	1	20	56
m-ColiBlue24 Broth, Plastic Ampules, PK/50	130	1	50	130
Total Organic Carbon (TOC) Reagent Set, HR	489	1	1	489
Nitrogen-Ammonia Standard Solution, 50 mg/L as NH ₃ -N, pk/20 - 2 mL PourRite™ Ampules	54	1	20	54
NitriVer® 3 Nitrite Reagent Powder Pillows, 10 mL, pk/100	43	1	100	43
Nitrate TNTplus Vial Test, LR (0.2-13.5 mg/L NO ₃ -N)	47	1	1	47
Phosphorus (Reactive and Total) TNTplus Vial Test, LR (0.15 to 4.50 mg/L PO ₄)	59	1	1	59
Potassium Reagent Set	210	1	1	210
Salmonella EPA Test Broth pk/15	108	1	15	108
Total Supplies	N/A			13196
Total				69742

References

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