



Bear Lake Trailhead Development

LOGO Engineering

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Barry Otwell, Owen Rohler and Cody Kapotak



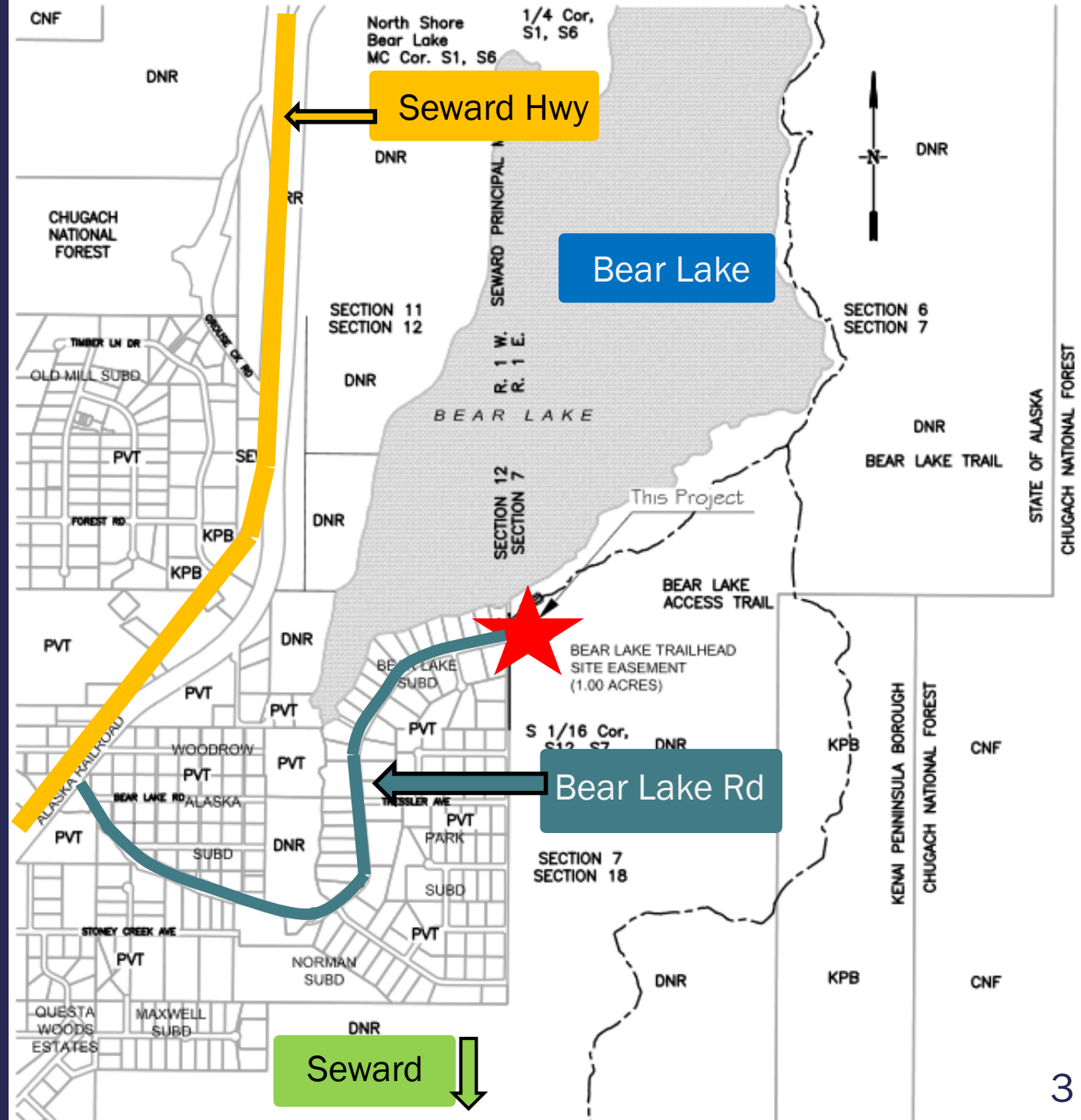


Bear Lake Trailhead Vicinity

- Located on Seward Ranger District (SRD)
- Kenai Peninsula Borough, north of Seward
- Historical background

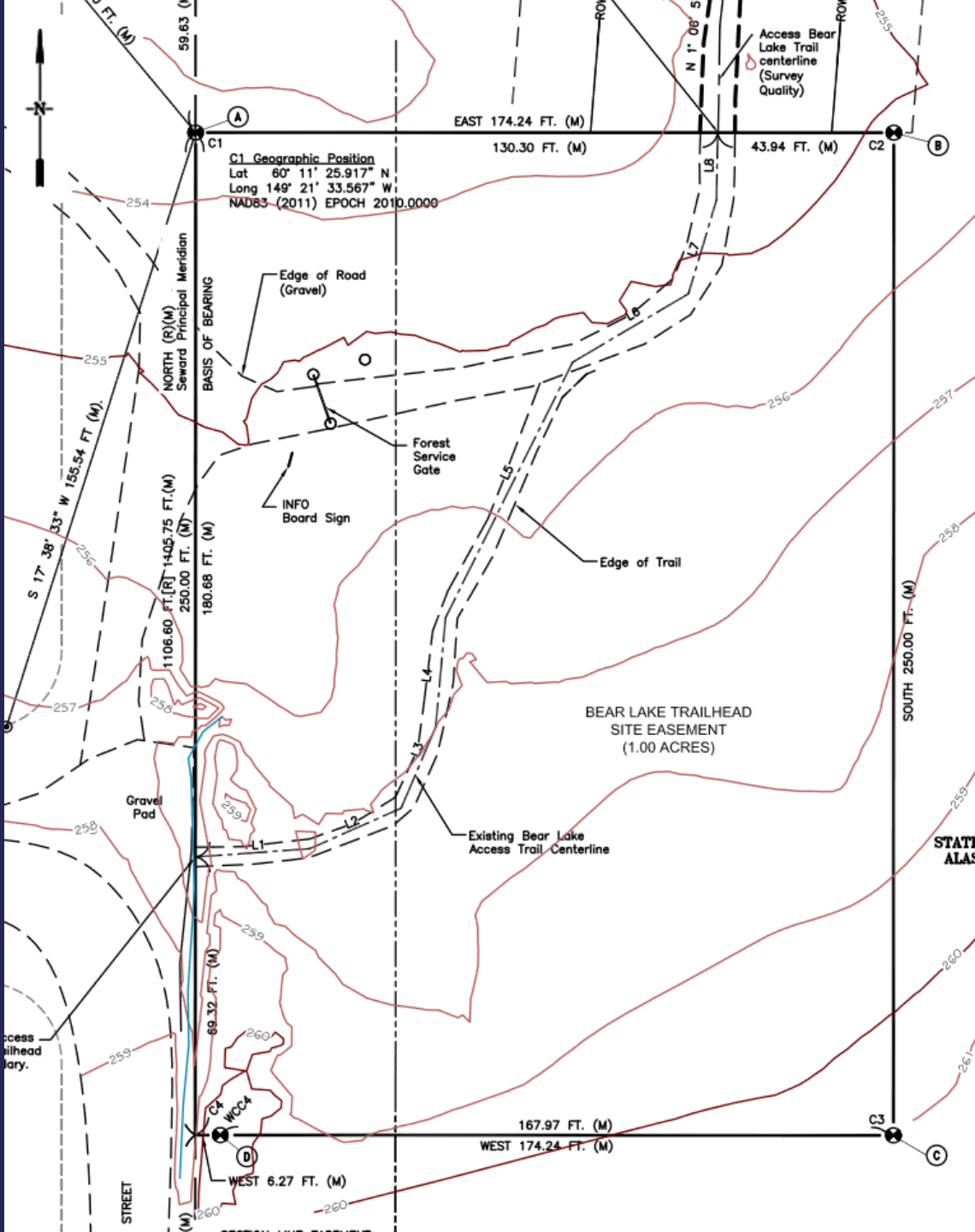
Bear Lake Trailhead Access

- Seward Highway
- Residential area
- Trail skirts side of Bear Lake



Site Description

- Site dimensions 175' x 250'
- Approximately 6' elevation difference
- Limited Survey
- Geotechnical info





W8761 19986

HOODRUM DRILLING & CONSTRUCTION

P.O. Box 917 Mile 6.5 Seward Hwy.
Seward, Alaska 99664 224-5602
Rick Jones, Driller

DRILLERS WELL LOG FOR: Truman Boling
DATE STARTED 1/20/87 DATE COMPLETED 1/21/87
LOCATION Meridian Park Subd B1k 2 Lot 6
MACHINE B.E. 22H

FT. PER DAY	
0 to 4 Silty soil & duff	to
4 to 17 Dirty sand & gravel, cobbles	to
17 to 28 Sand & silt, wet	to
28 to 30 Pea gravel "	to
30 to 39 Sand & silt "	to
39 to 41 Water gravel	to

DEPTH OF WELL 41' TOTAL CASING 43'
OPEN END CASING SCREENED PERFORATED OPEN HOLE
OTHER _____
PUMP SET AT by owner TYPE OF PUMP _____
PIPE: Sched 80 _____ Galvanized _____ Ft.

HYDROSTATIC LEVEL 13'8" (Below) (Above)
YIELD. Bail 24 gpm Pump _____ Air _____
DRAWDOWN Less than 2' @ 24 gpm bail
RECOVERY _____

REMARKS _____

Richard R. Jones

LOCAL NO SBI-1-12DPAR-9
SITE ID 160116149 213401
SW02

Geotechnical

- Assumptions from ADNR well logs
- Assumed sand and gravel under surface organics
- FHWA requirements
- Evaluation recommended

Deliverables

Alternatives Analysis

- 3 designs
- Similar route
- Differing layouts

Preferred Alternative

- 35% design
- Drawings
- Expenses

Design Criteria and Considerations



TURNING
RADIUS



ADA/ABA
COMPLIANCE



CONSTRUCTION
MATERIALS



ADEQUATE
PARKING



PEDESTRIAN
CROSSINGS



DRAINAGE



AESTHETICS

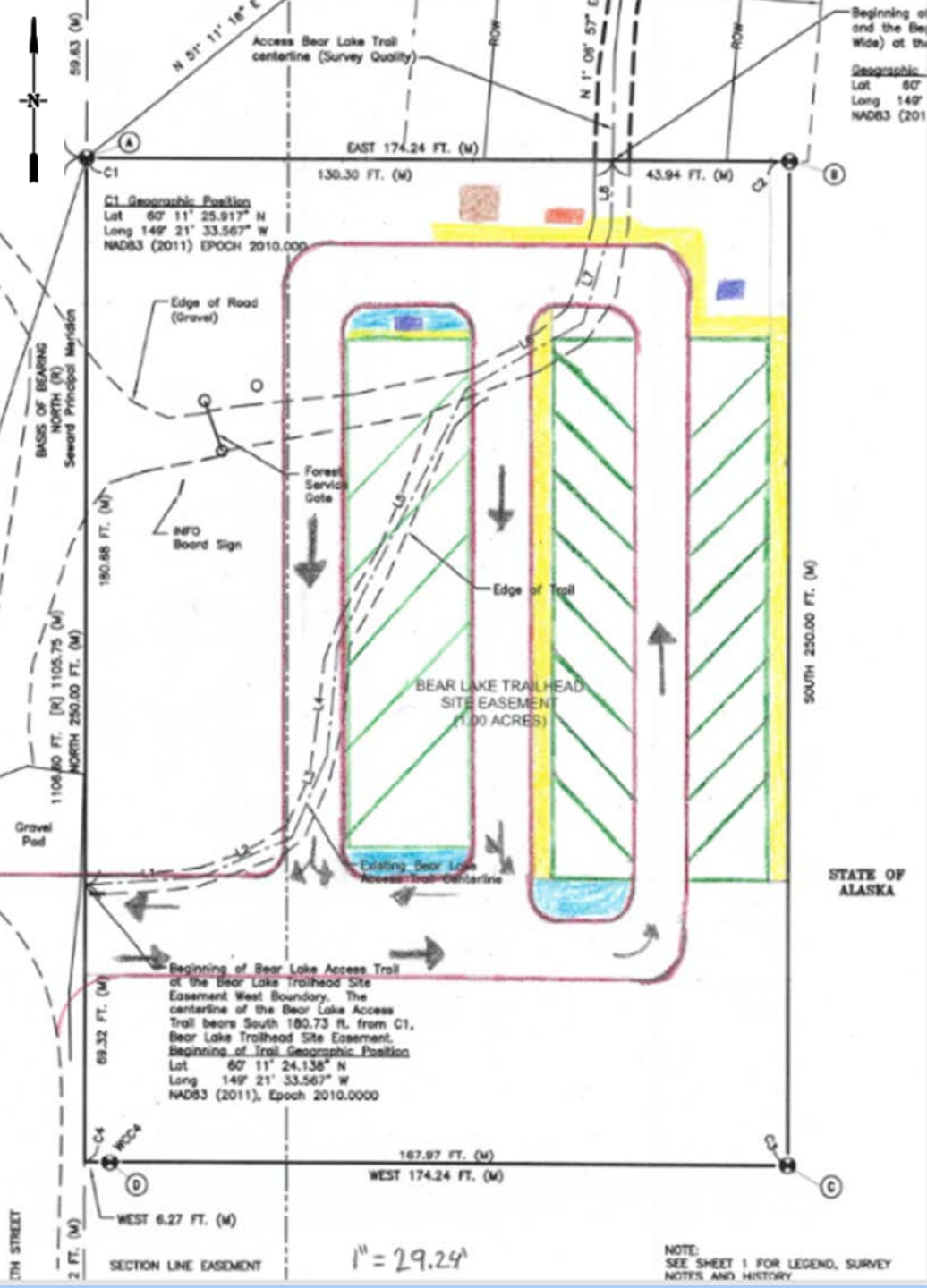


PRIVACY

Accessible Accommodations

- Americans with Disabilities Act (ADA)
- Architectural Barriers Act (ABA)
- Walking paths
- Outhouse Accessibility



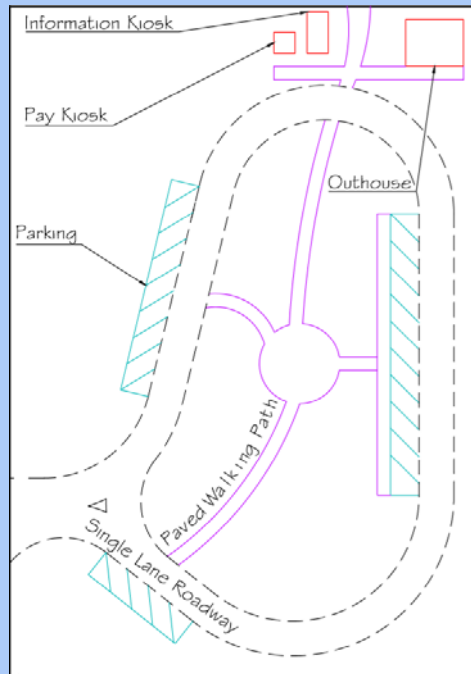


Initial Concept

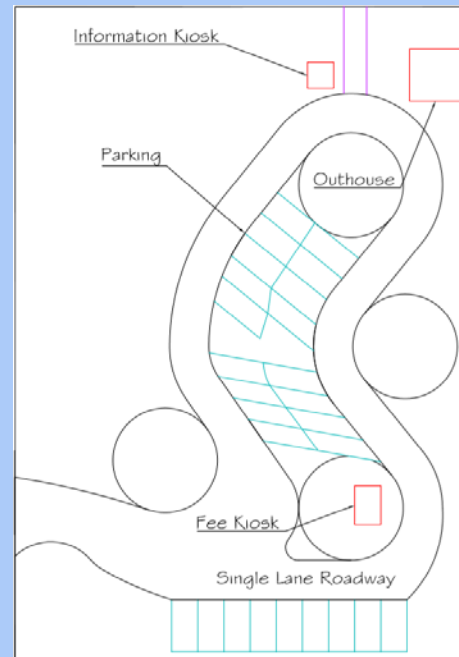
- Rectangular pad
- Lots of space
- Reduced design/construction time
- Not aesthetically interesting

Design Alternatives

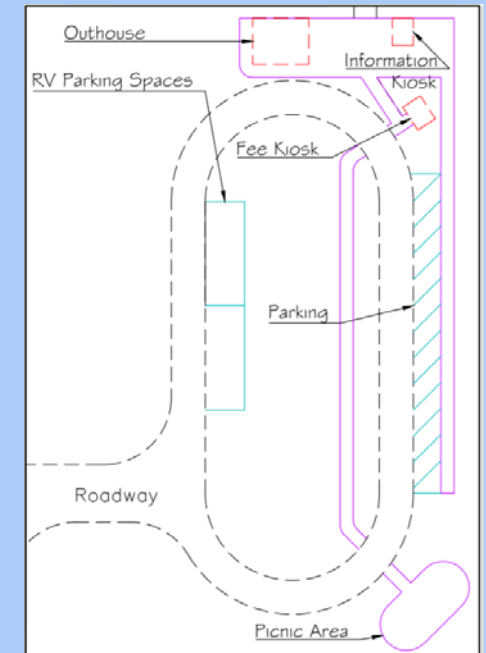
Alternative A

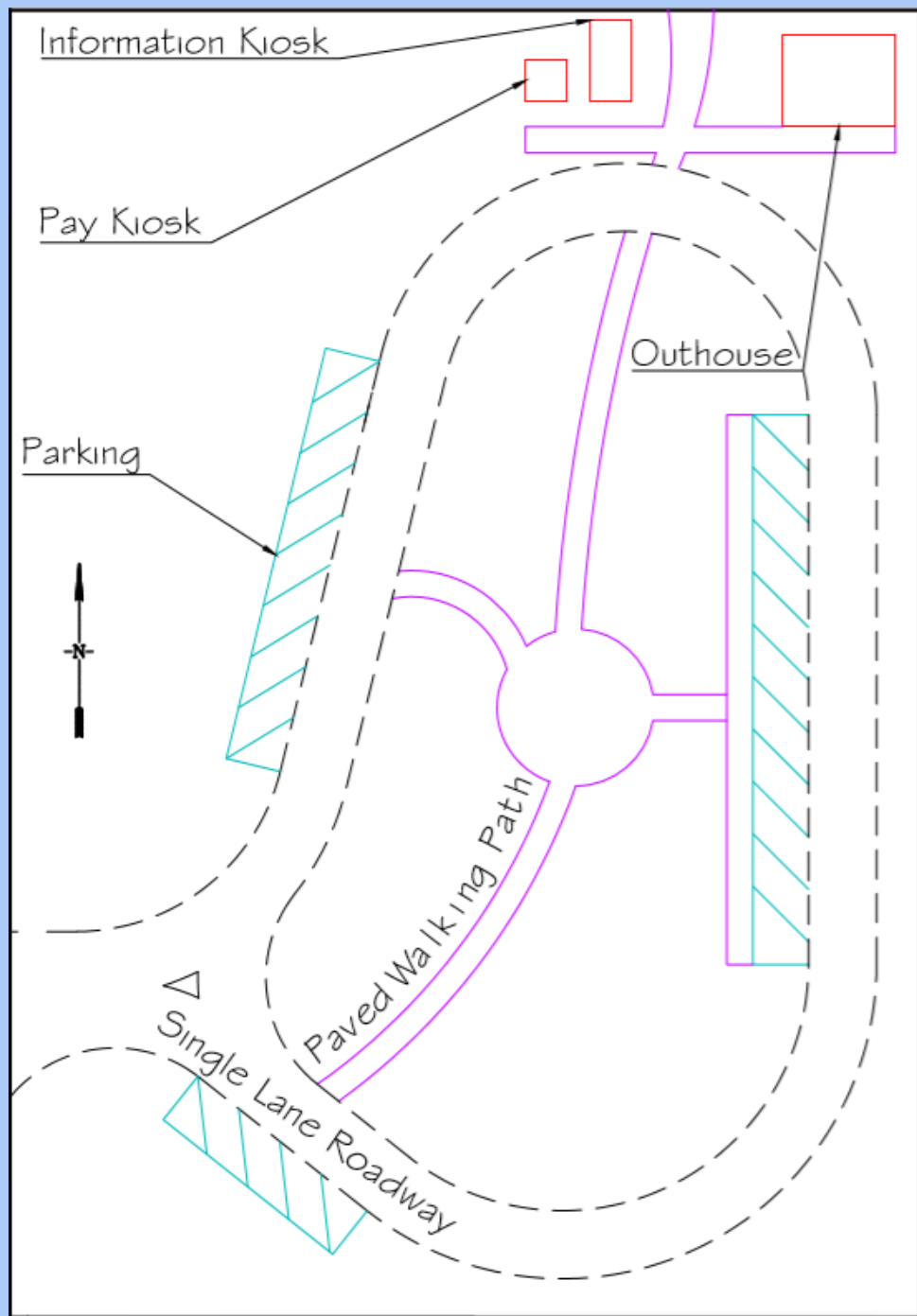


Alternative B



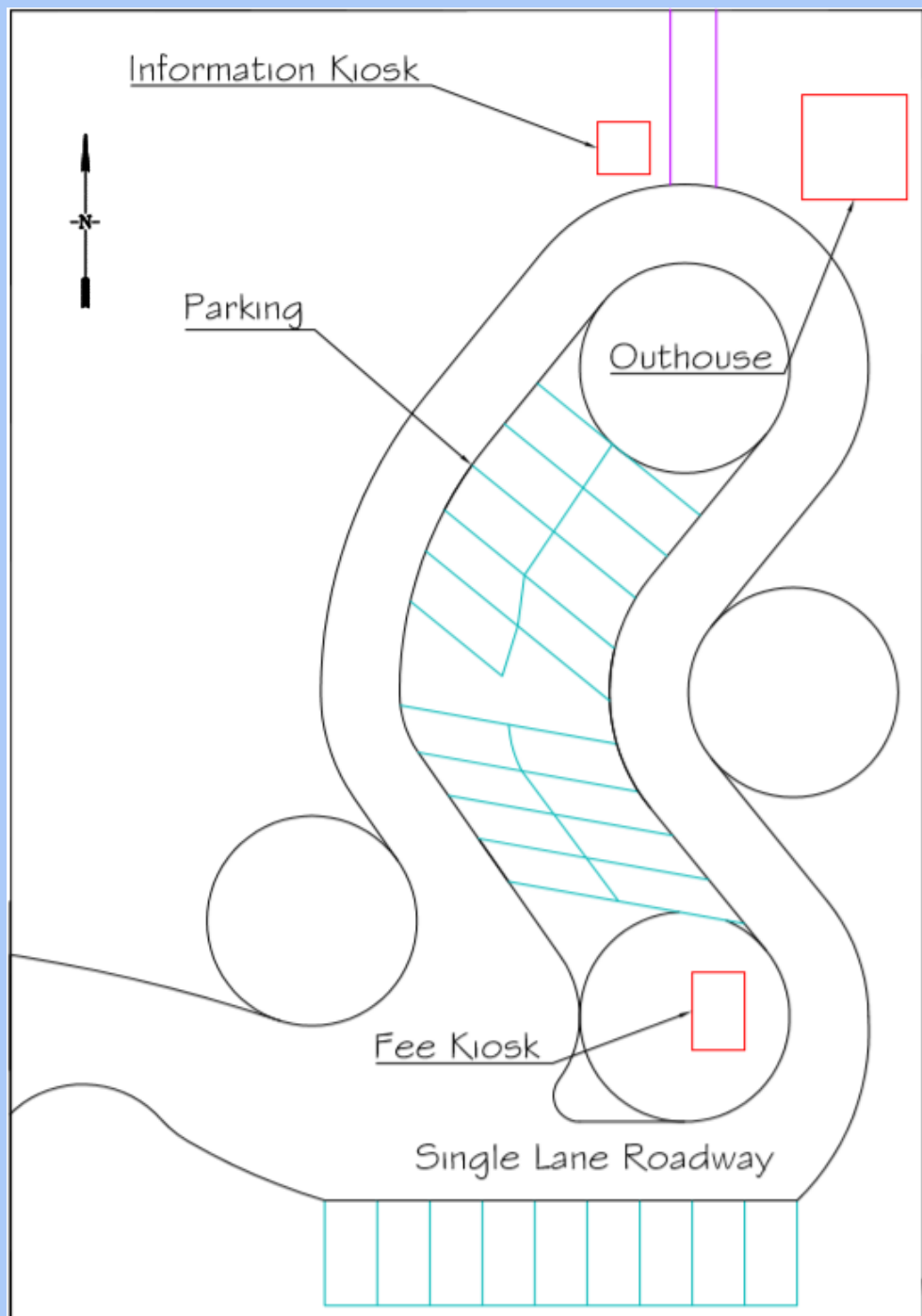
Alternative C





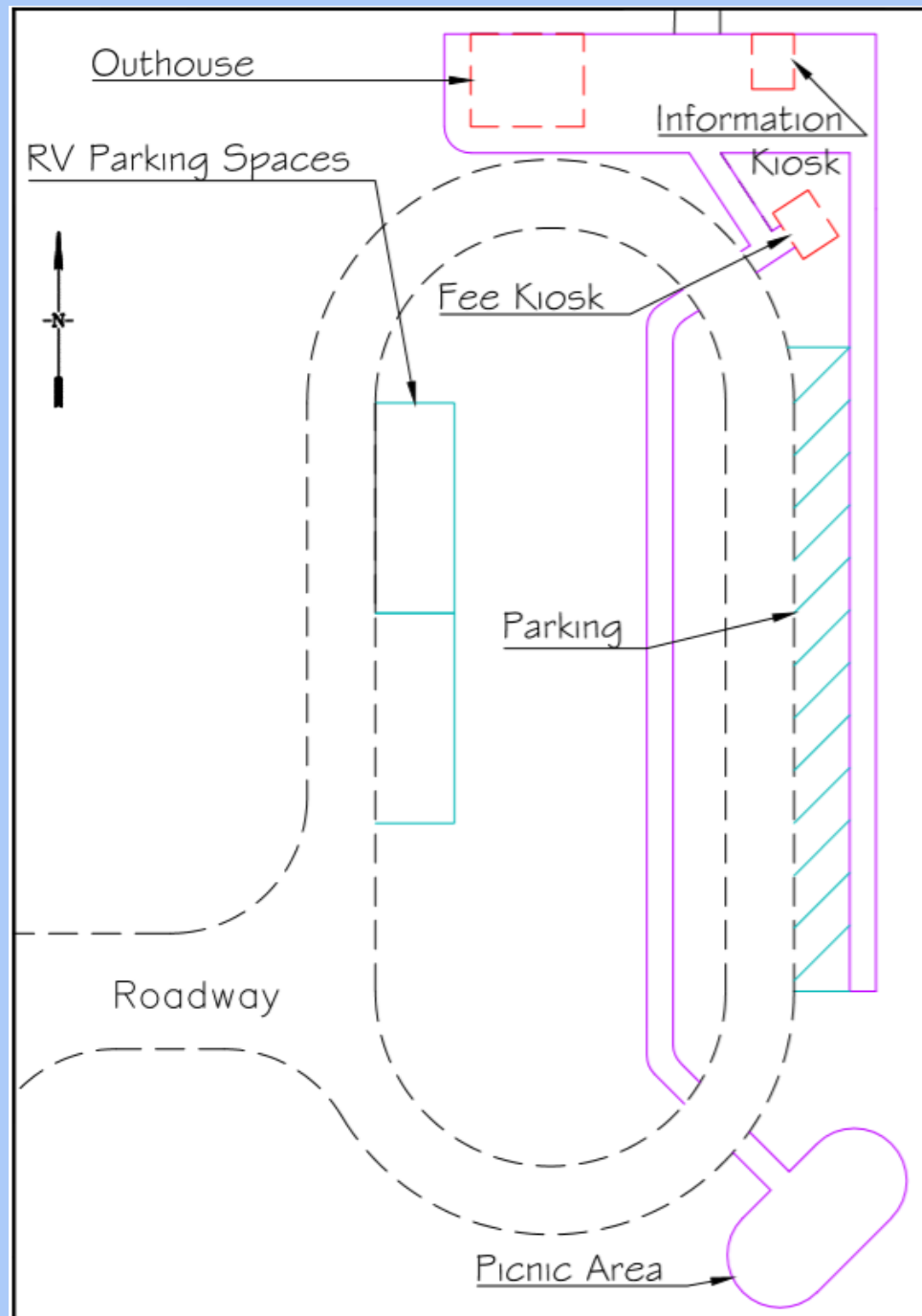
Design Alternative A

- 15 ft wide, one-way loop
- Pedestrian paths
- Stormwater ponding likely
- Prepared surface area approx. 12,918 sq. ft.



Design Alternative B

- 15 ft wide, one-way, asymmetrical loop
- Developed circular pads
- No pedestrian pathways
- Prepared surface area approx. 20,453 sq. ft.

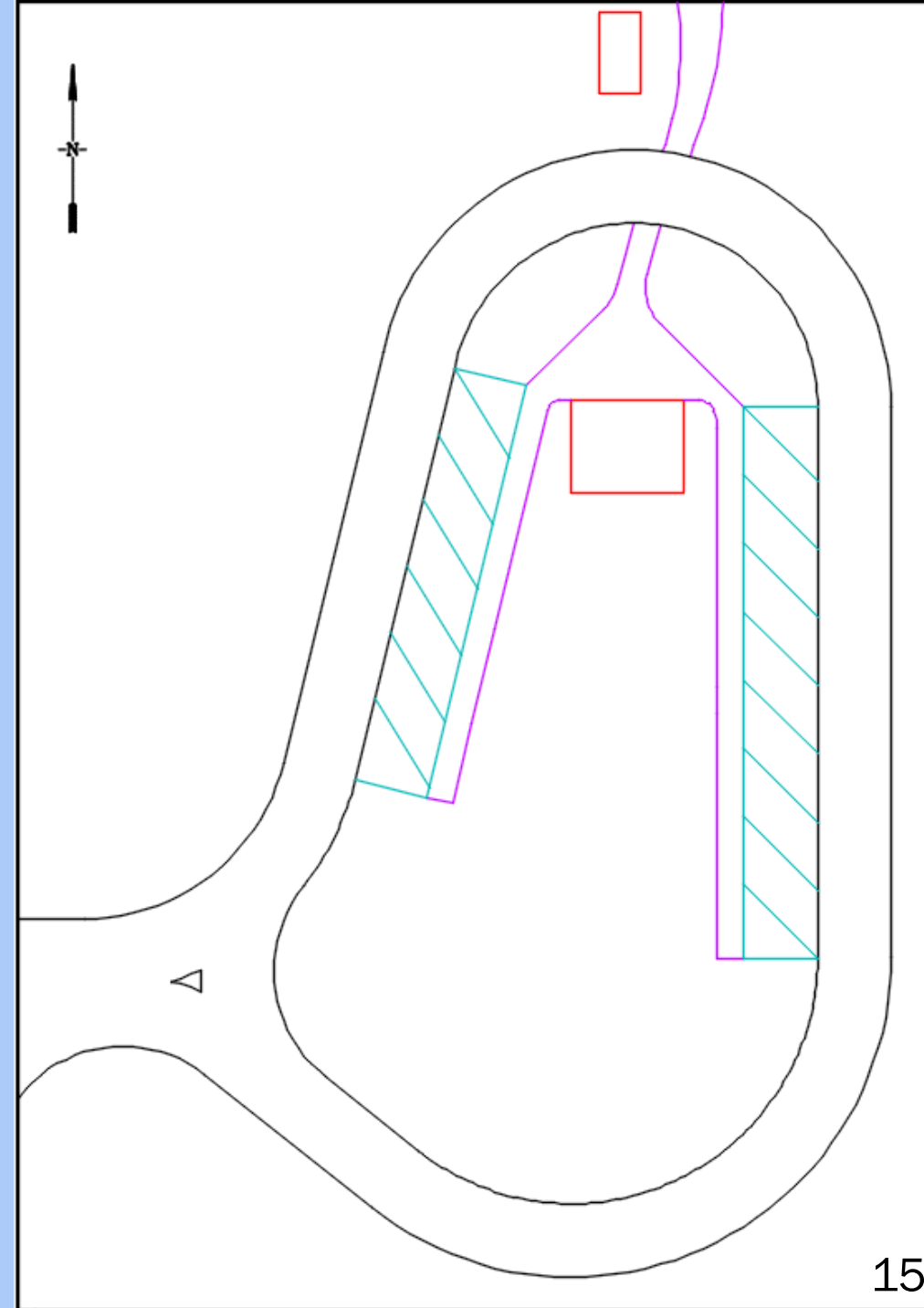


Design Alternative C

- 13 ft wide, symmetrical, one-way loop
- Outhouse and kiosks on paved pad
- Multiple walking paths
- Prepared surface area approx. 14,344 sq. ft.

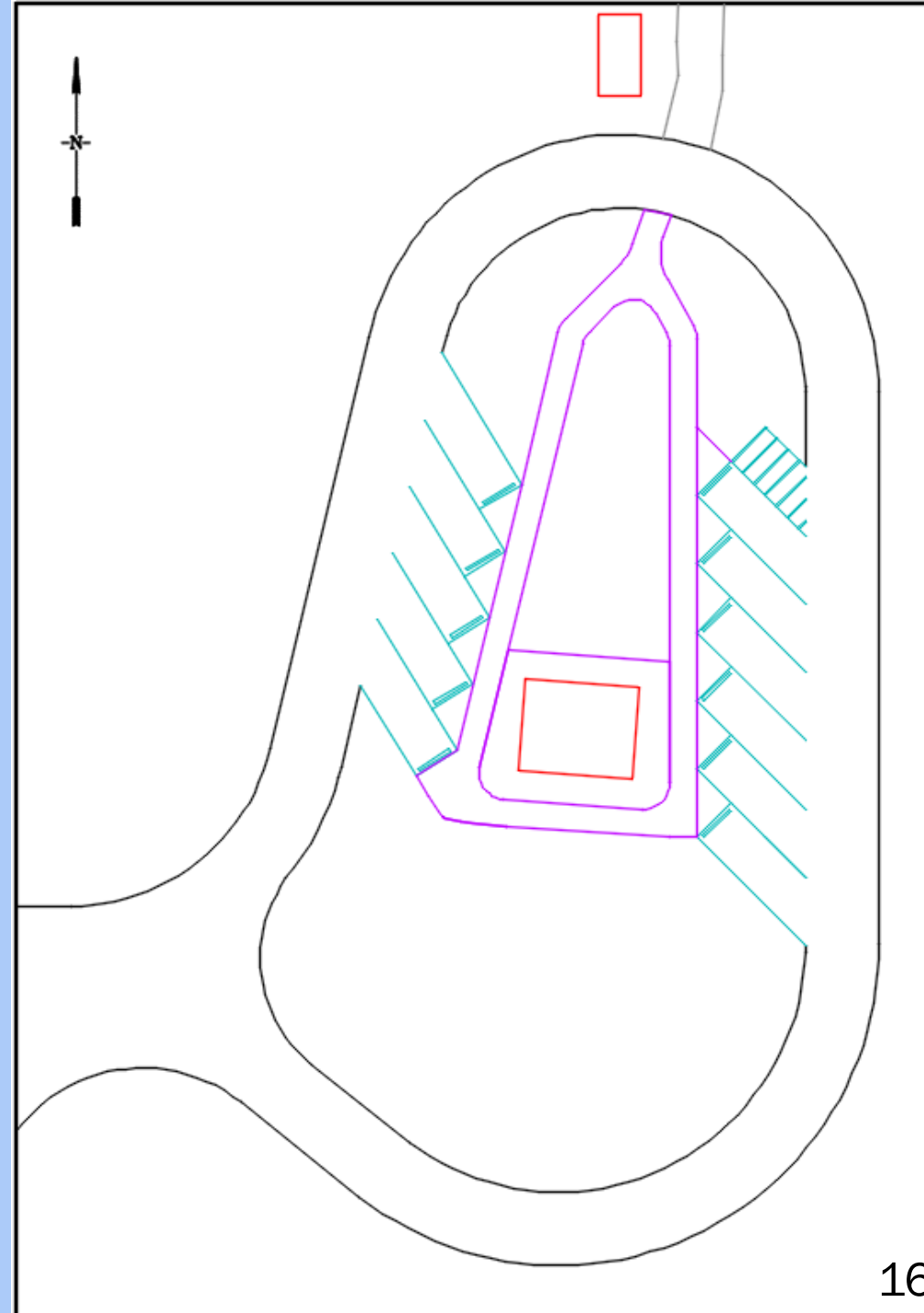
Preferred Design Alternative A

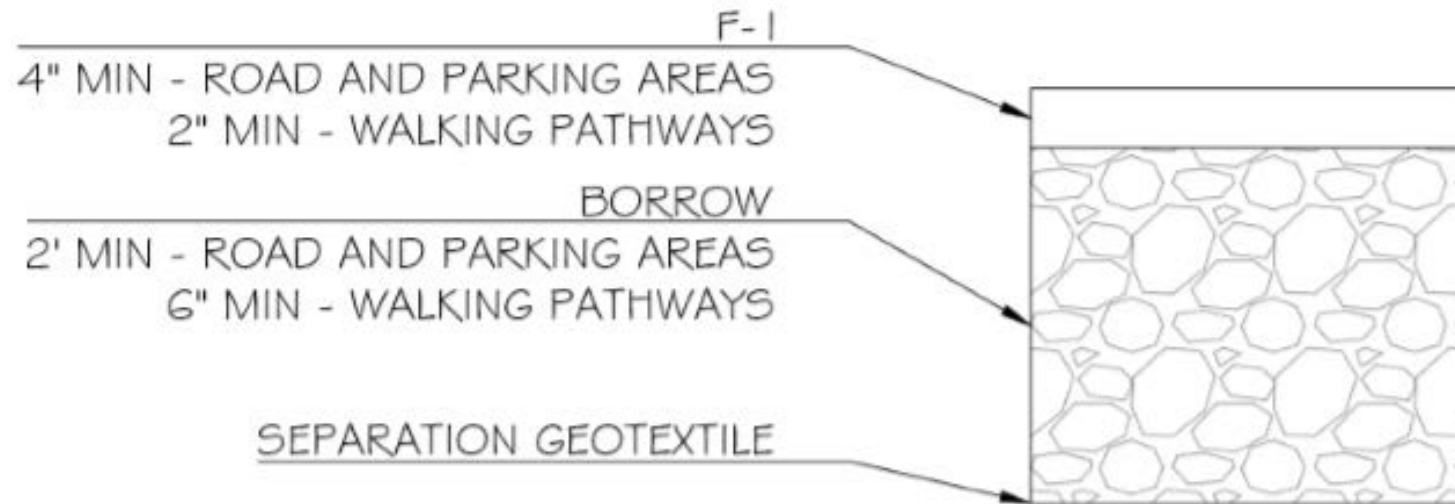
- 11 parking spaces
- Outhouse
- Information kiosk
- Road access
- Trail connection



Preferred Design Update

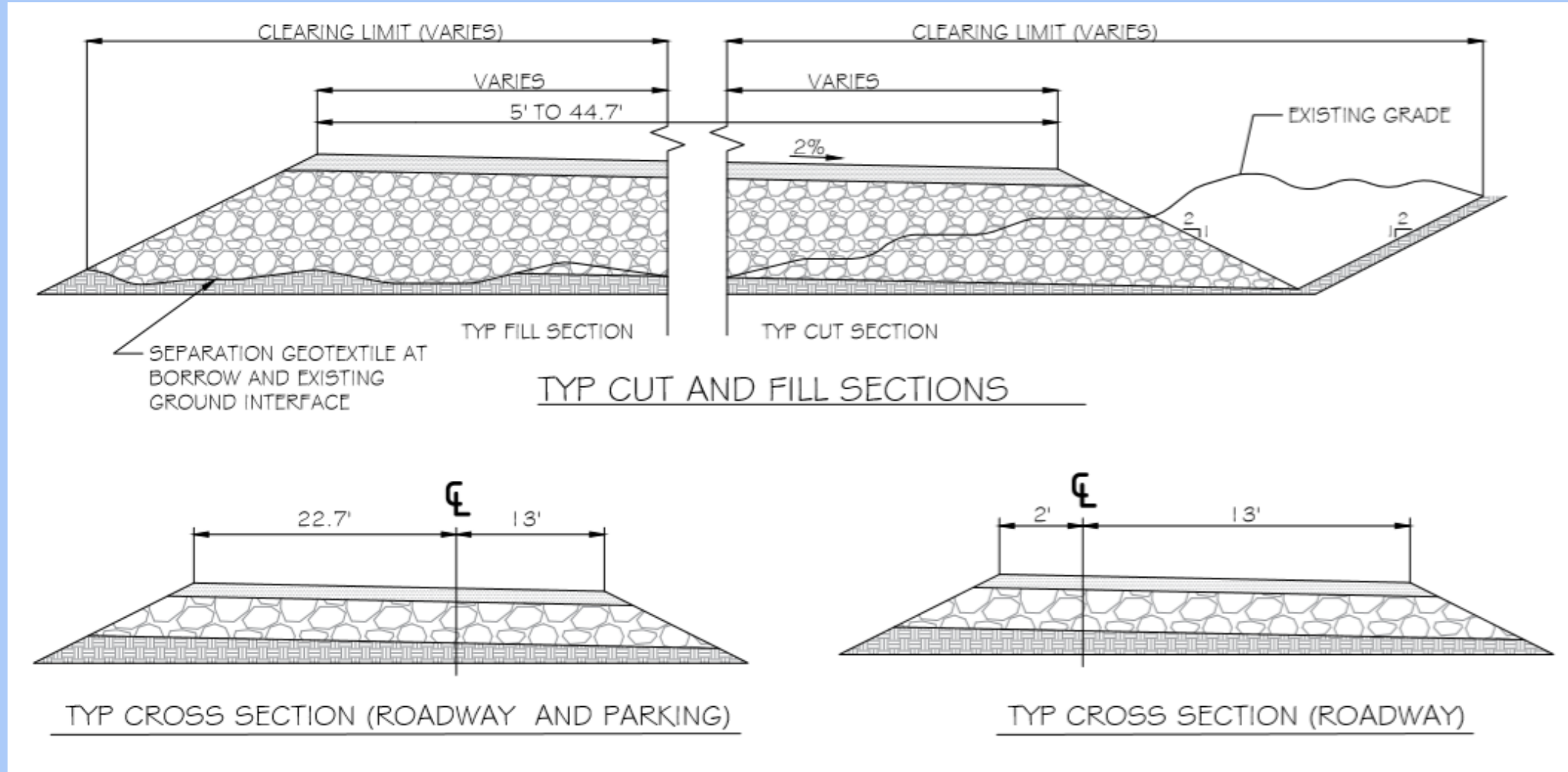
- Extend parking spaces
- Adjust placement of outhouse
- Adjust walking path
- Prepared surface area of 12,948 sq. ft.





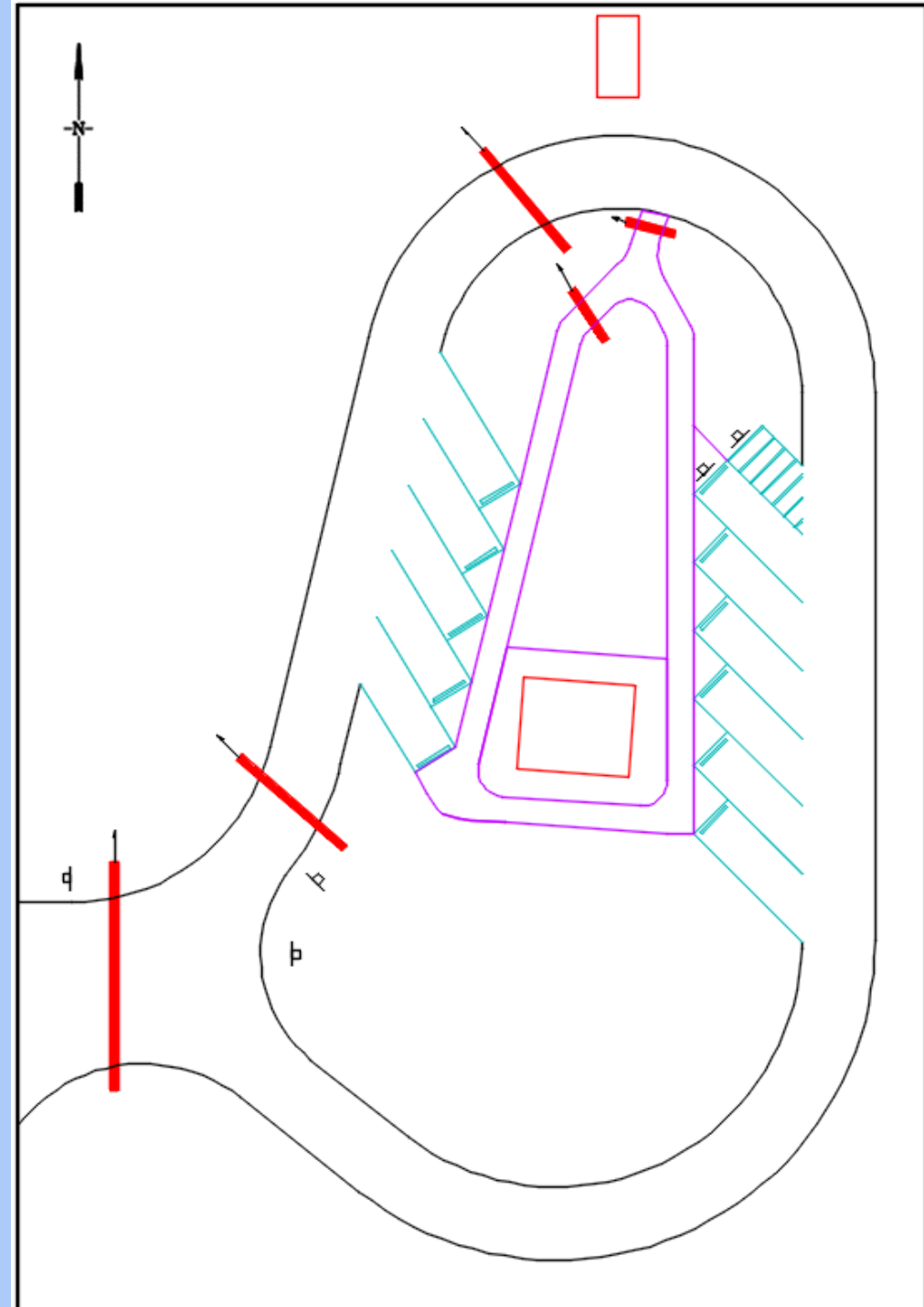
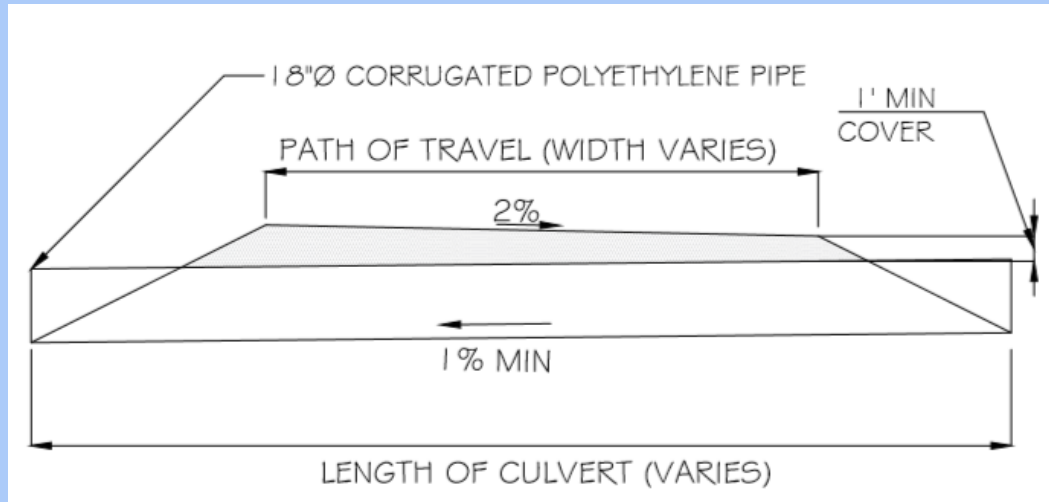
Structural Section

Cross Sections



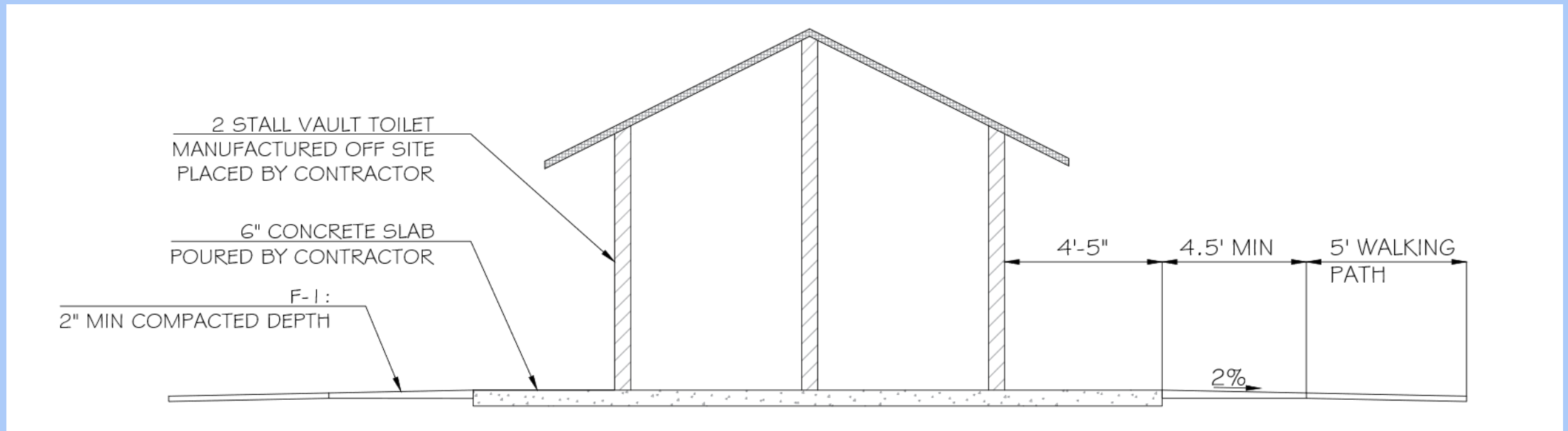
Drainage

- 5 culverts will be installed to facilitate drainage
- Culvert ditches have side slopes of 2:1



Outhouse

- 2 stall vault toilet
- Premanufactured



Budget

	Budgeted Cost	Invoiced Cost
Preliminary Investigation	\$ 25,200	\$ 16,360
Alternatives Analysis	\$ 25,200	\$ 24,115
35% Design	\$ 33,600	\$ 39,840
Final Design Documents	\$ 33,600	\$ 35,775
Total	\$ 117,600	\$ 116,090

ENGINEERS ESTIMATE OF PROJECT COSTS

Section Estimates	Cost
Preliminary Tasks	\$ 60,484
Materials	\$ 53,567
Structures (outhouse)	\$ 104,505
Other Items	\$ 28,833
Controls and Contingency	\$ 32,903
Total	\$ 277,817

Environmental Impacts: General

- USFS is initiating proposal
- No Stormwater Pollution Prevention Plan
- Disturbed area less than one acre



Photo Courtesy of US Forest Service

Environmental Impacts:

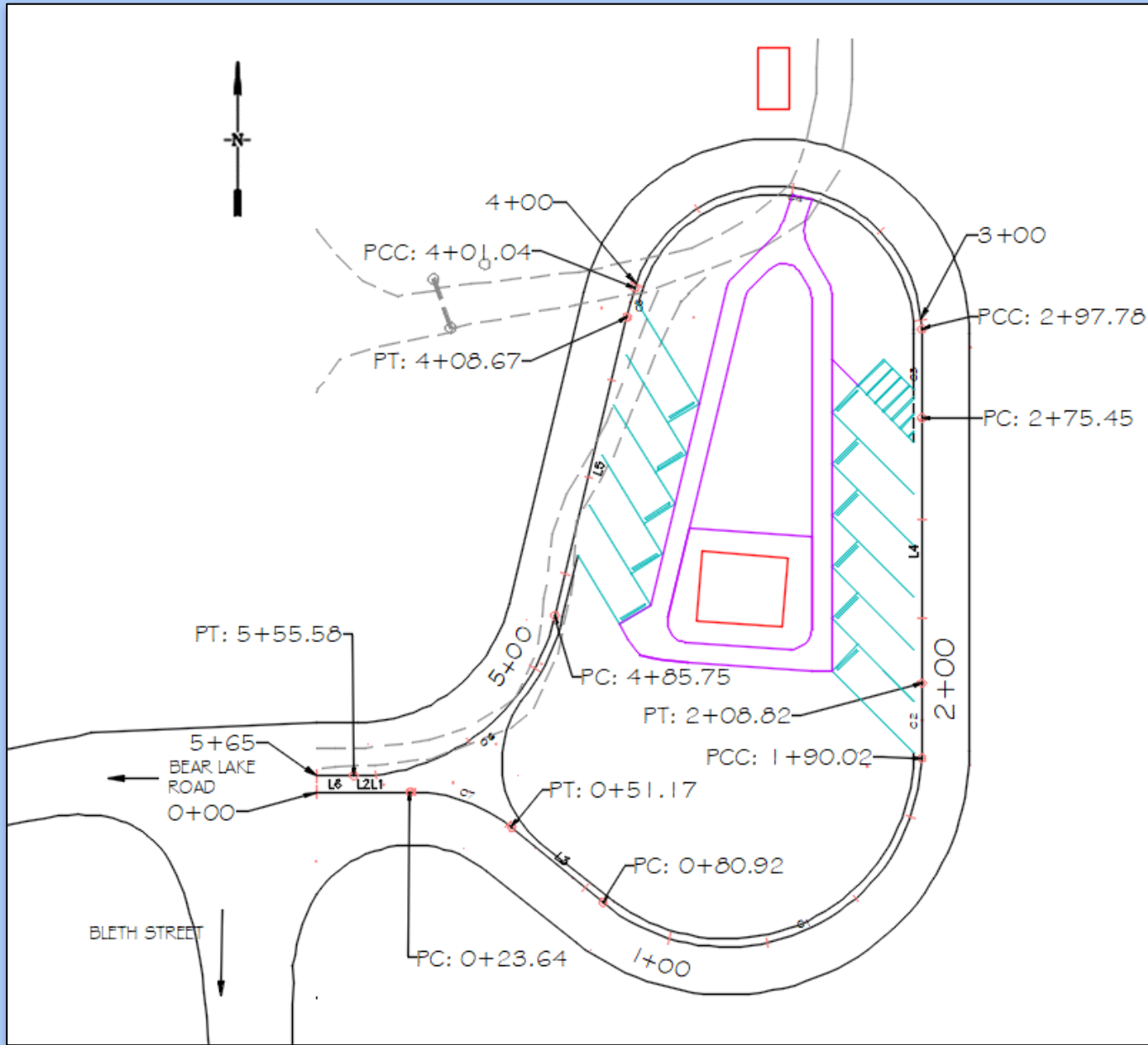
National Environmental Policy Act Considerations

Environmental Assessment

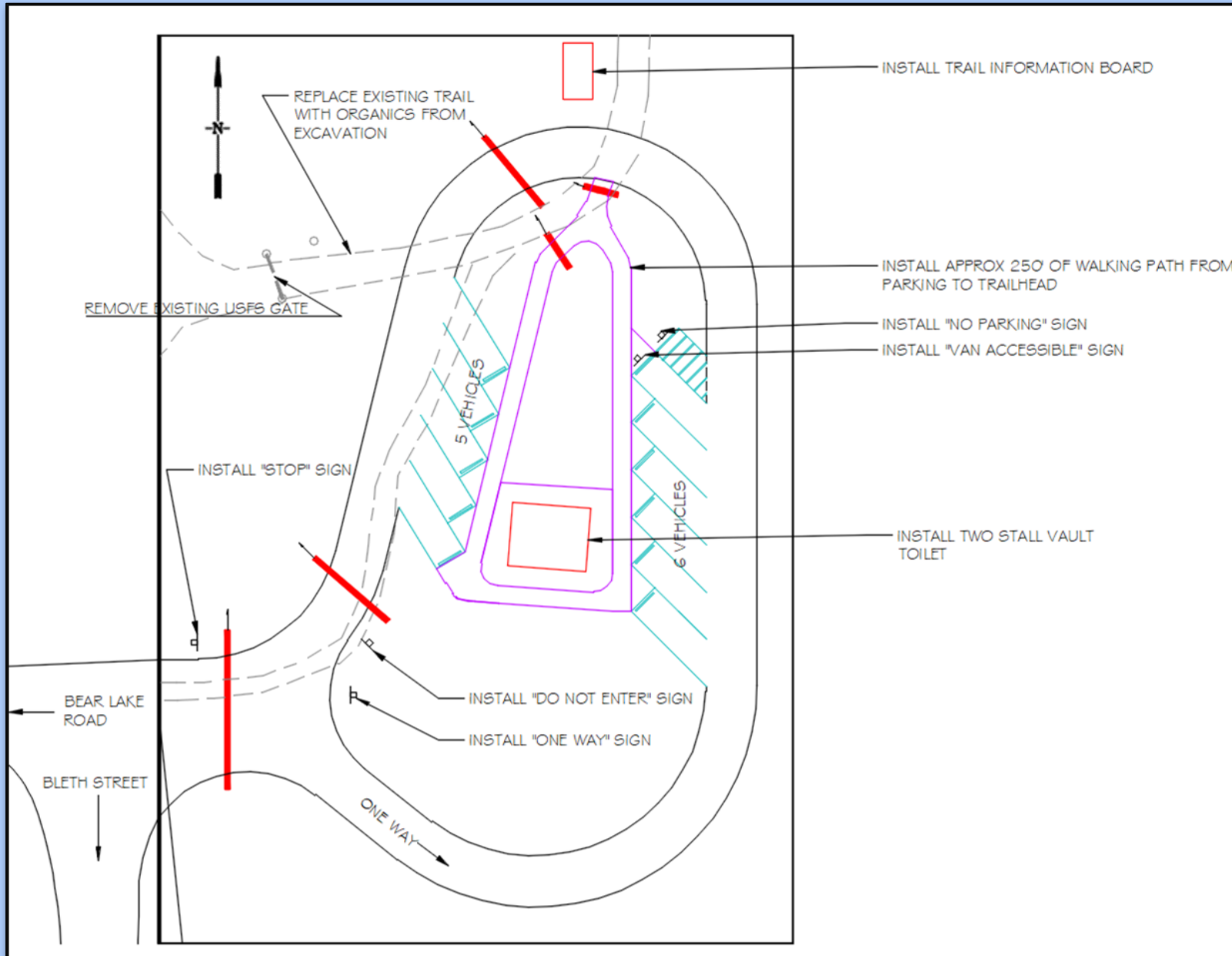
Finding of No Significant Impact

Environmental Impact Statement

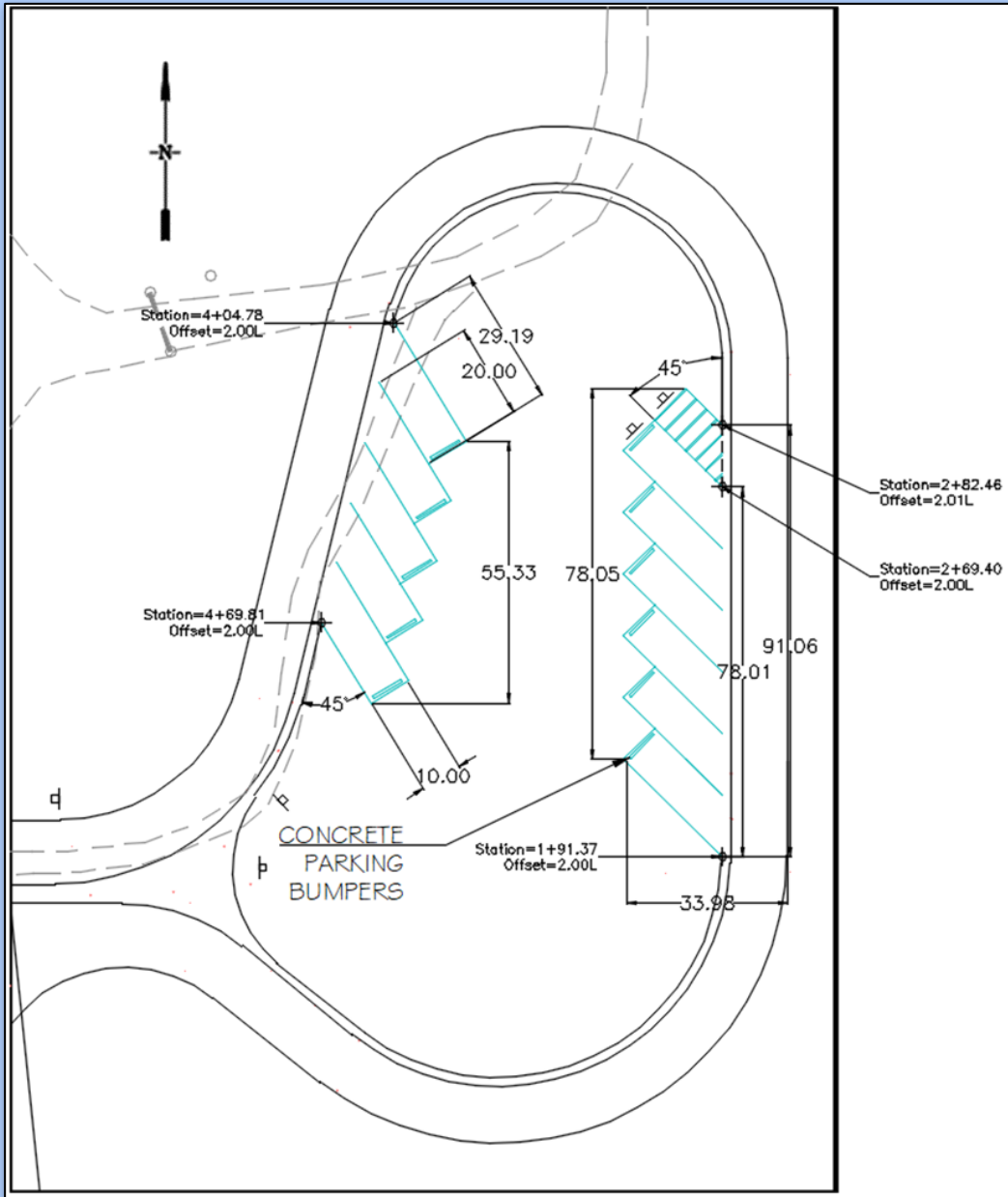
Only Categorical Exclusion needed



Plans: Alignment Layout

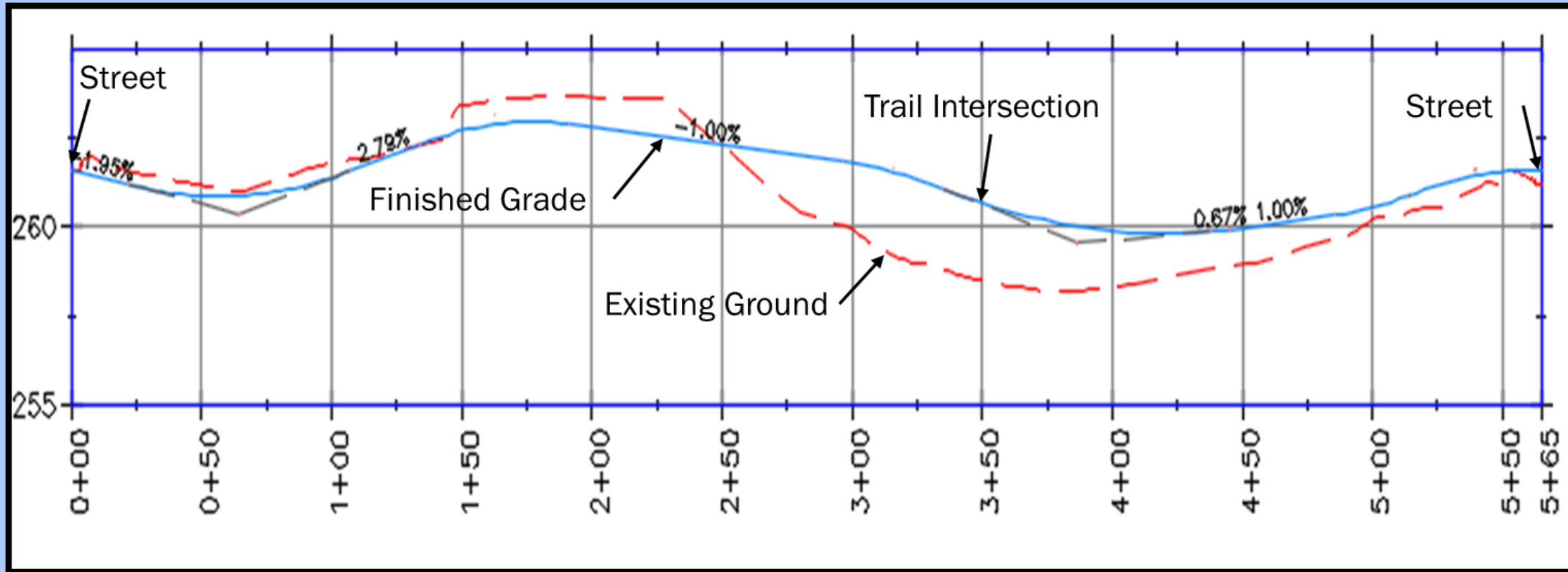


Plans: Site Plan



Plans: Parking Plan

Profile



Recommendations

Before Design Completion

- More survey data
- Geotechnical information
- Check for eagle's nests

After Construction Completion

- Site usage

Conclusions

Primary objectives:

- Offstreet parking
- Better overall experience
- Aesthetically pleasing
- Compliment natural surroundings

Best design for USFS:

- Preferred Alternative A
- One-way loop
- Ten passenger parking, one ADA
- Outhouse
- Information kiosk



Questions

Special thanks to our clients,
professional mentor, and faculty
mentor:

USFS: Josh Latham, Jason
Johnston PE, Griffith Berg

Kinney Engineering: Chuck
Casper PE

UAA: Dr. Vinod Vasudevan PE