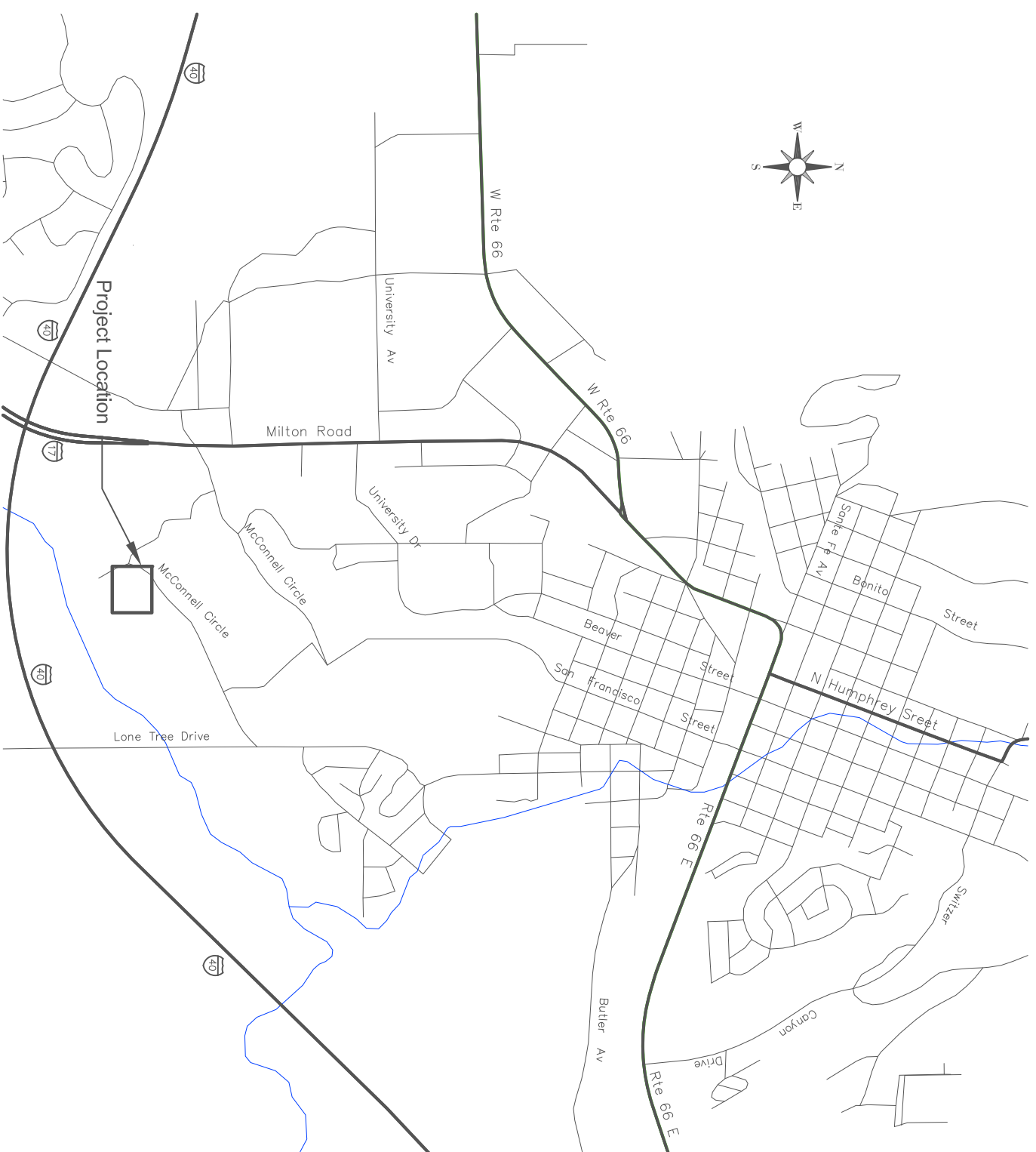
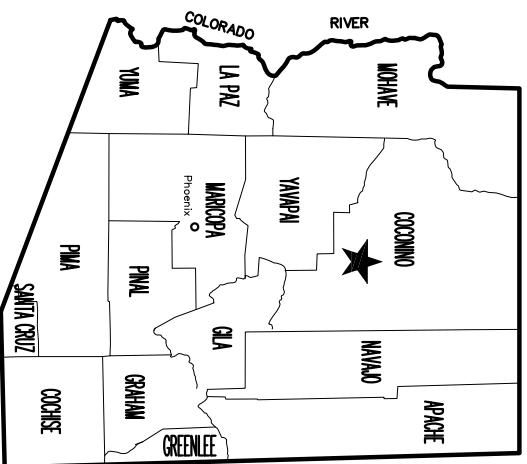


RECREATION SERVICES NAU OUTDOORS



**NORTHERN
ARIZONA
UNIVERSITY**



CHALLENGE COURSE CLIMBING WALL DESIGN

DESIGN	NAME	DATE	PROJECT
DESIGN	K. BECKERT		RECREATION SERVICES NAU OUTDOORS
DRAWN	S. SARTY		
CHECKED	A. HOPPER		
TEAM LEADER	A. HOPPER		CHALLENGE COURSE CLIMBING WALL DESIGN
SHARP ENGINEERING			Challenge Course Climbing Wall Design
Northern Arizona University Campus, Challenge Course			

Constructed by: _____

Construction Company: _____

Completion Date: _____

Red - Lines by: _____

Construction Administrator Name & Company: _____

Completion Date: _____

As - Built by: _____

As - Built Designer Name & Company: _____

Completion Date: _____

STAMP

CODE

- All design and construction shall conform to the Challenge Course and Canopy / Zip Line Tour Standards, Seventh Edition, along with all other applicable codes.

DESIGN LOADS

- Deck Dead Load..... 7 psf
- Deck Snow Load..... 48 psf
- Deck Live Load..... 100 psf
- Wind Loads:
 - Wind Speed..... 90 mph
 - Exposure..... "B"
 - Design Wind Pressure..... 24.4 psf

FOUNDATIONS

- All foundations will be constructed with Pole Setting Foam, "Rainbow Technology" or an approved equal.
- The depth to resist lateral loads shall be determined using the design criteria established in the IBC 2012, Sections 1807.3.2.1 through 1807.3.2.3, or by other methods approved by the building official.

WOOD

- All wood is to be pressure treated.

POLES:

- The poles are to be Western Red Cedar with the following properties:

Reference Design Values for Poles Graded in Accordance with ASTM D 3200 (psi)					
Fb	Fv	Fc/perp.	Fc	E	Emin
1,350	95	255	750	940,000	500,000

SAWN LUMBER:

- The sawn lumber will be Douglas Fir-Larch No. 2 with the following properties:

Reference Design Values for Visually Graded Dimension Lumber (psi)						
Fb	Ft	Fv	Fc/perp.	Fc	E	Emin
900	575	180	625	1,350	1,600,000	580,000

DECKING:

- The decking will be Trex Deck 5/4" x 6". All attachment materials to meet Trex Deck specifications.

BELAY CABLE

BELAY / ELEMENT STRANDS:

- The galvanized aircraft cable shall be a minimum of 1/2 inch, with a tensile strength of 5,800 pounds.

WIRE ROPE SAG:

- The sag = 5 degrees
- The sag is required at a vertical load of 500 pounds. The contractor shall verify the sag is achieved using ACCT standard methodology, or other approved method.

STEEL

NUTS & BOLTS:

- All bolts will be a diameter of 3/4" and will be made of galvanized steel. The bolts shall be conforming to ASTM A307.

FORGED EYE BOLT:

- All forged eye bolts will be a diameter of 3/4" and will be hot dipped galvanized in accordance with ASTM A153.

SQUARE CURVED WASHER:

- All curved washers must be curved edge-to-edge and be galvanized in accordance with ASTM A153.

ROUND WASHERS:

- All round washers must be galvanized in accordance with ASTM A153.

SIMPSON TIES:

- All Simpson Ties are to follow manufactures specifications.

GENERAL CONSTRUCTION NOTES

- Neither the owner, the engineer, nor any public agency will enforce safety measures or regulations. The contractor shall design, construct and maintain all safety devices, including shoring, and shall be solely responsible for conforming to all local, state and federal laws and regulations.

- Prior to excavating for this contract, verify depth and location of all existing utilities. Location of utilities shown hereon has been determined by a search of available records. All existing utilities may or may not be shown on the plans.

- The contractor shall at their own cost and expense provide necessary permits, comply with local ordinances and regulations, and conform to all zoning, ordinances and covenants governing the project location. The contractor at their own cost and expense shall be responsible for the acquisition of any necessary easements for construction purposes.

- The contractor shall maintain and continually update a complete set of "as-built" plans on the project. The plans should be made available to the owner and/or engineer for review upon request as the work progresses. In addition to all changes and modifications to the work under this project, as-builts shall contain location and elevation of all existing utilities found during construction. A complete set of as-built plans shall be submitted to the owner, upon completion and prior to acceptance of the work.

- The contractor shall submit to the owner for approval all shop drawings, aggregate gradations, mix designs, etc., as appropriate, for all materials scheduled for use in this project. Copies of all submittals shall be made to the engineer of work as well as any requesting agency of jurisdiction. Prior to incorporating any of the submitted material into the work, approval of owner, engineer, as well as any agency of jurisdiction is required.

GENERAL CONSTRUCTION NOTES (CONTINUED...)

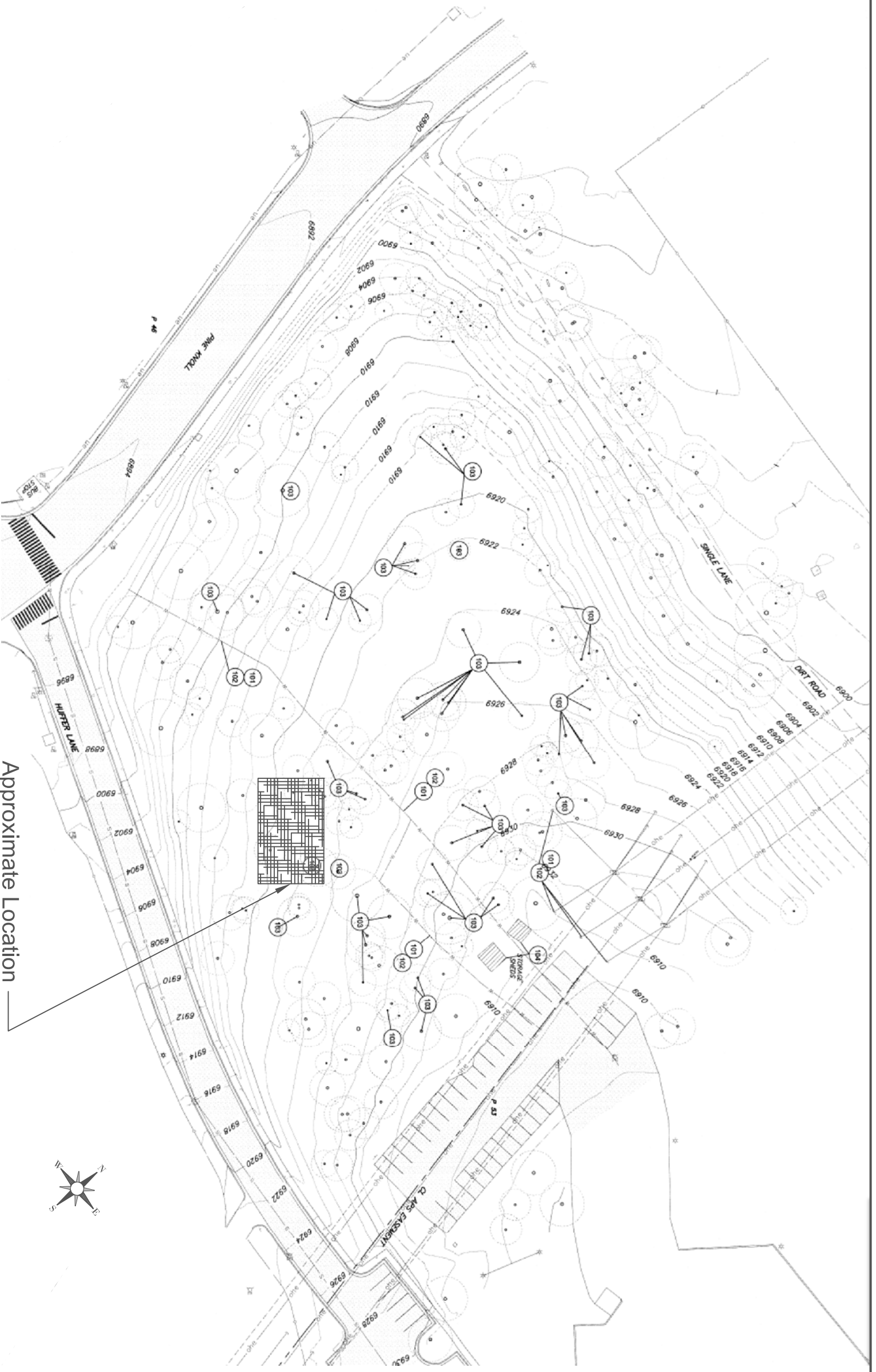
- A staging area for the contractors equipment, materials, temporary sanitary facilities, etc. equipment shall be parked within the designed area during non-working hours. Stored materials shall also be stockpiled in the same area. Equipment and materials are not to be parked or stored at the various work sites. Upon completion of the project, the staging area shall be regraded, cleared or otherwise re-stored to the original or better condition.

- The contractor shall supply all water and spray equipment as required to maintain project dust control to the satisfaction of NAU and MAG Section 225.

- All grading/work areas regraded or otherwise disturbed during construction of this project shall be finished graded as per MAG Section 424 and to the satisfaction of the owner/engineer.

- Where any discrepancies occur between plans, details, general structural notes and specifications, the greater requirements shall govern.

DESIGN	NAME	DATE	RECREATION SERVICES	STAMP
DRAWN	K. BECKERT		NAU OUTDOORS	
CHECKED	S. SARTY		NOTE SHEET	
TEAM LEADER	A. HOPPER			
SHARP ENGINEERING			PROJECT	
Northern Arizona University Campus, Challenge Course			Challenge Course Climbing Wall Design	2 OF 7



Approximate Location
of Climbing Wall

Owner to specify exact location at time of construction

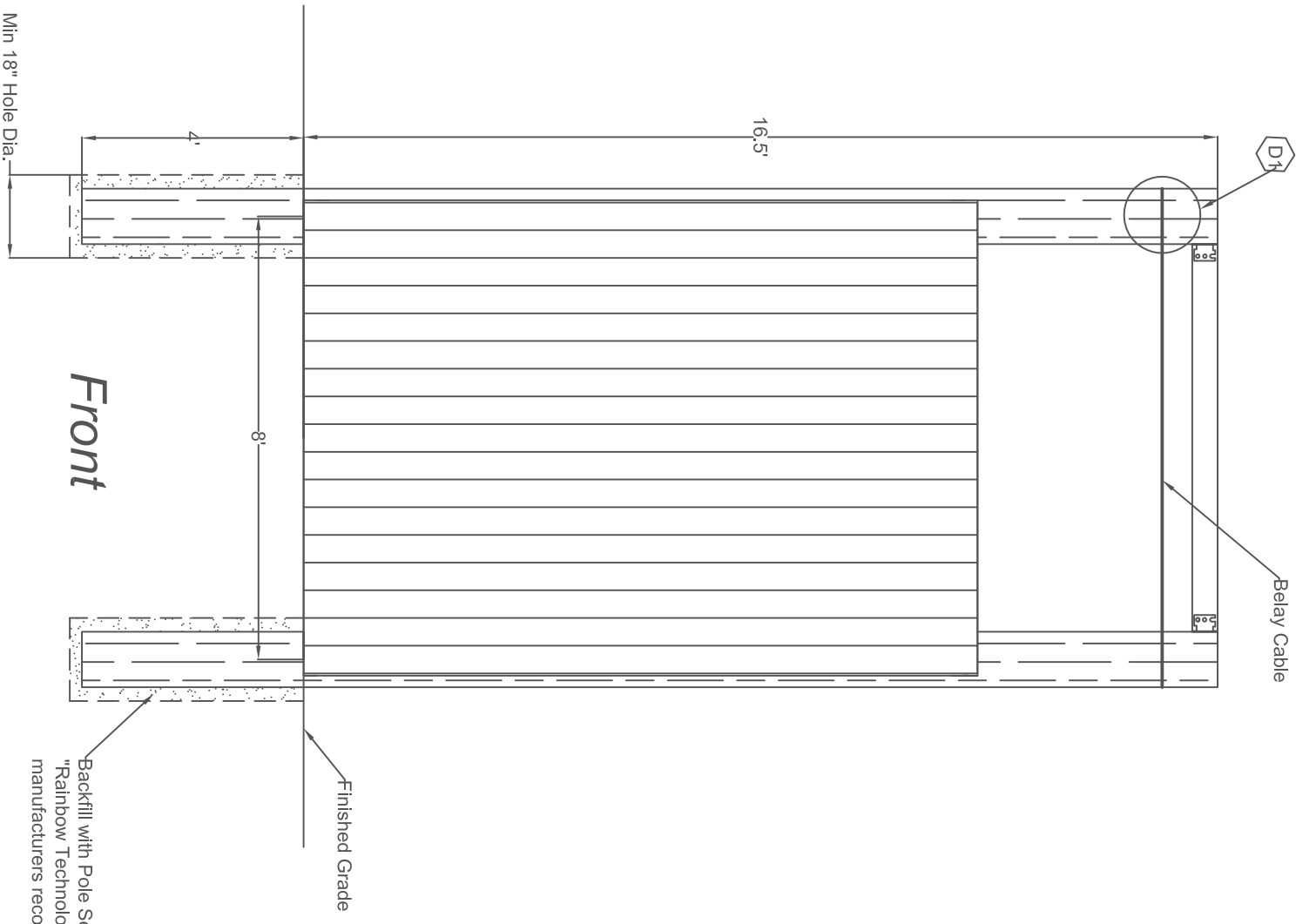


DESIGN	NAME	DATE
DRAWN	S. SARTY	
CHECKED	A. HOPPER	
TEAM LEADER	A. HOPPER	

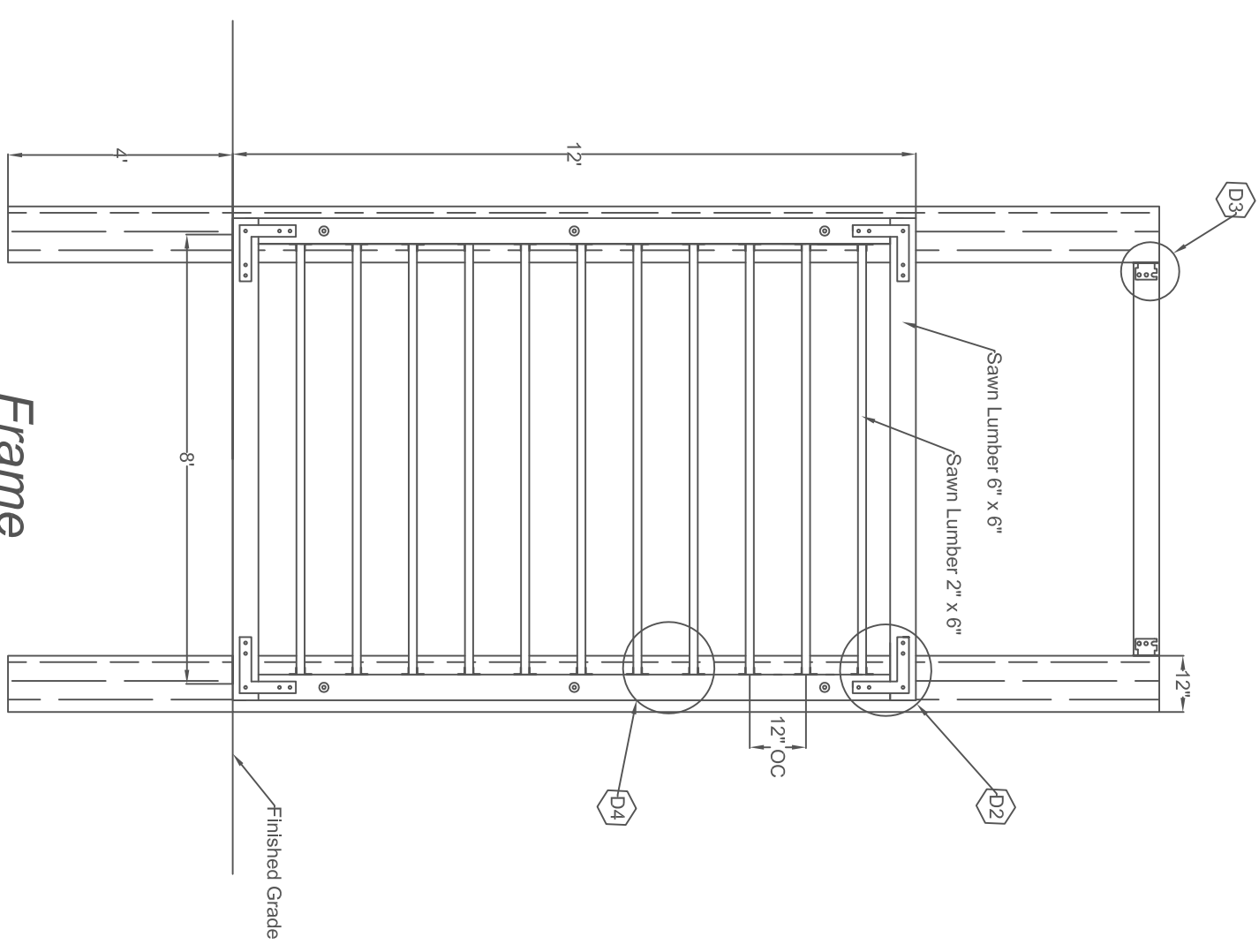
PROJECT
STARRP ENGINEERING
Challenge Course Climbing Wall Design

STAMP

3 OF 7



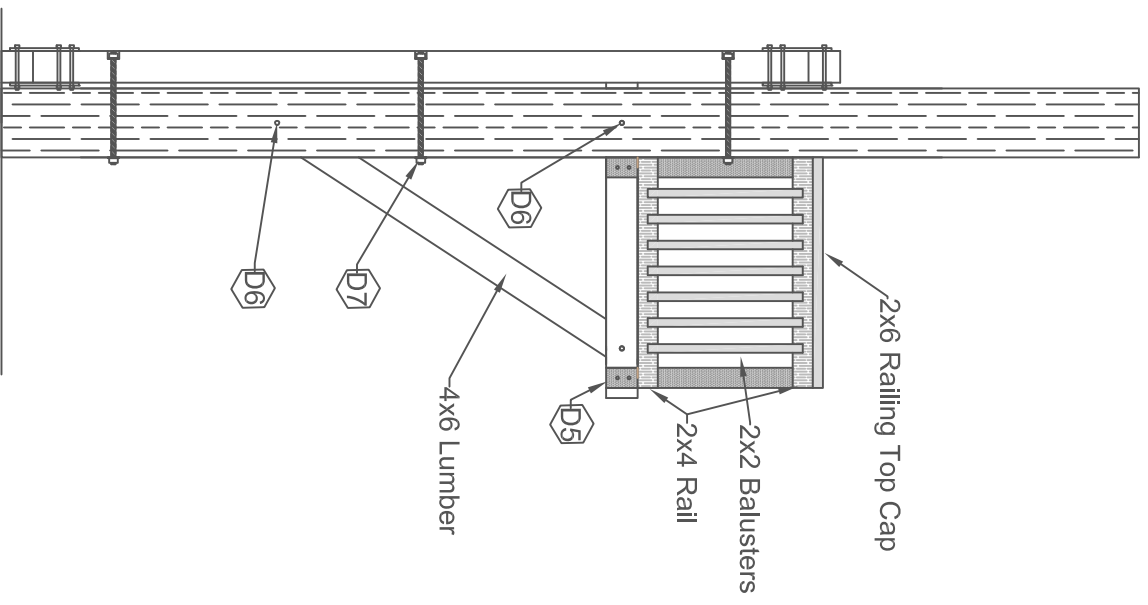
Front



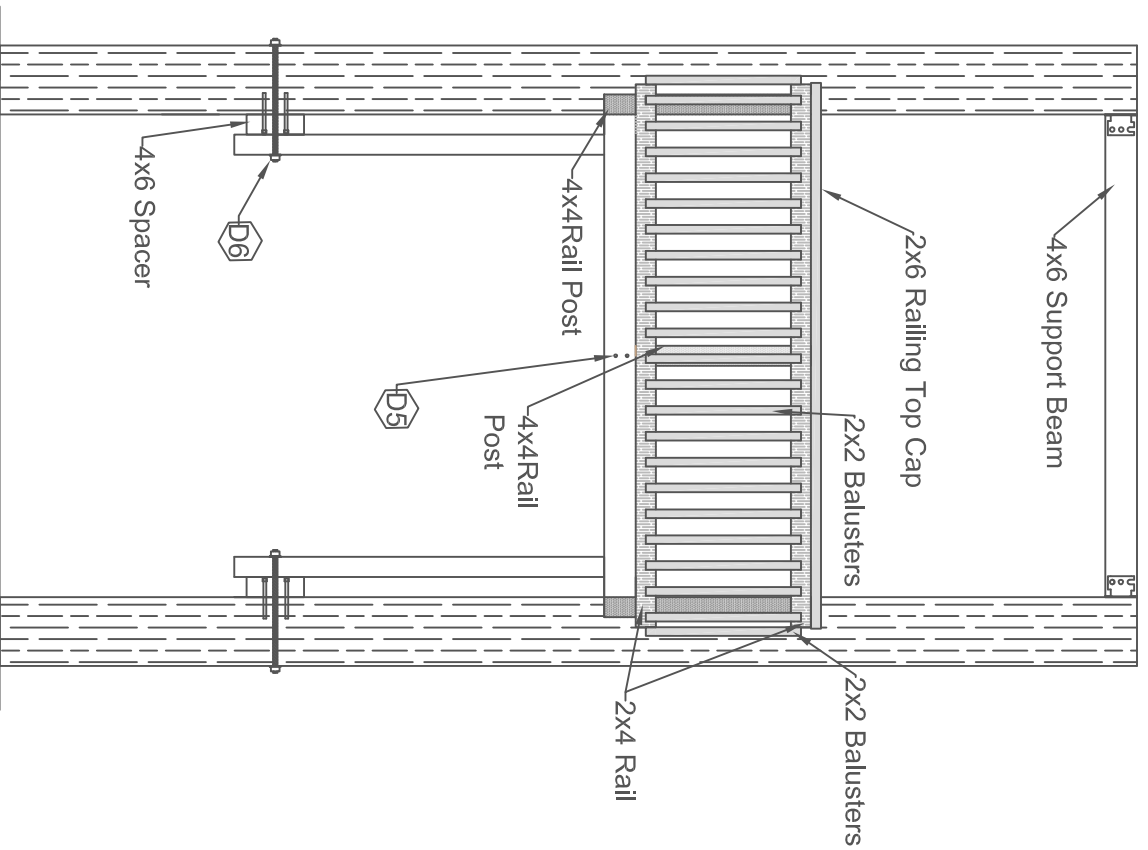
Frame

DESIGN	NAME	DATE	PROJECT
DESIGN	K. BECKERT		RECREATION SERVICES NAU OUTDOORS WALL PLAN 1
DRAWN	K. HOPPER		
CHECKED	S. SARTY		
TEAM LEADER	A. HOPPER		
SHARP ENGINEERING PROJECT: Challenge Course Climbing Wall Design LOCATION: Northern Arizona University Campus, Challenge Course			

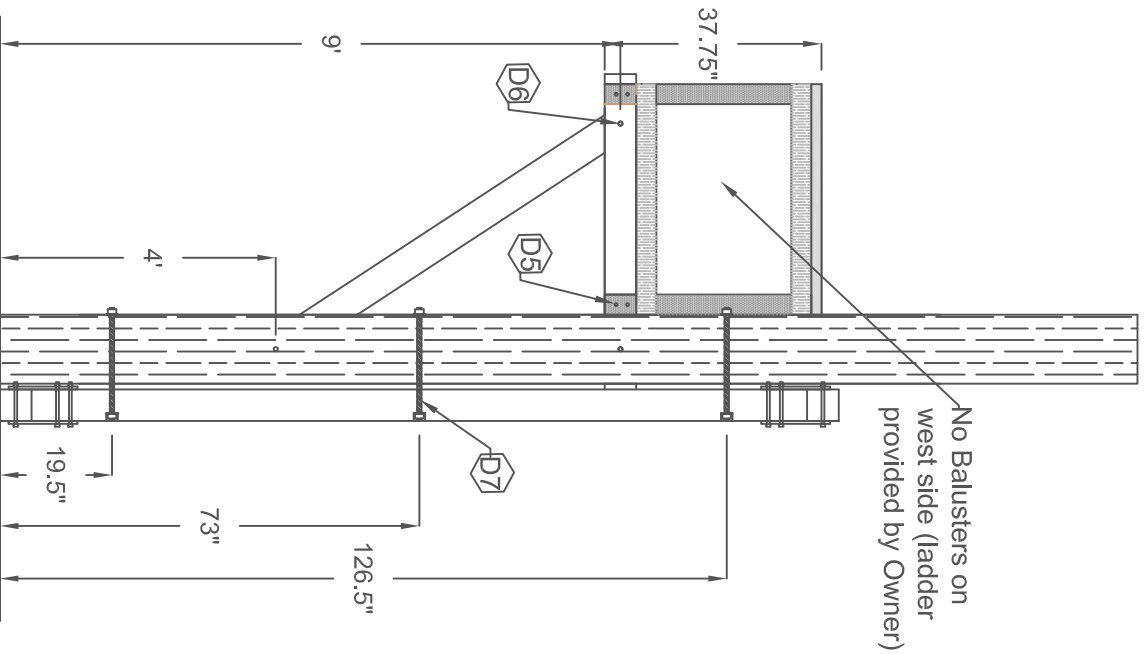
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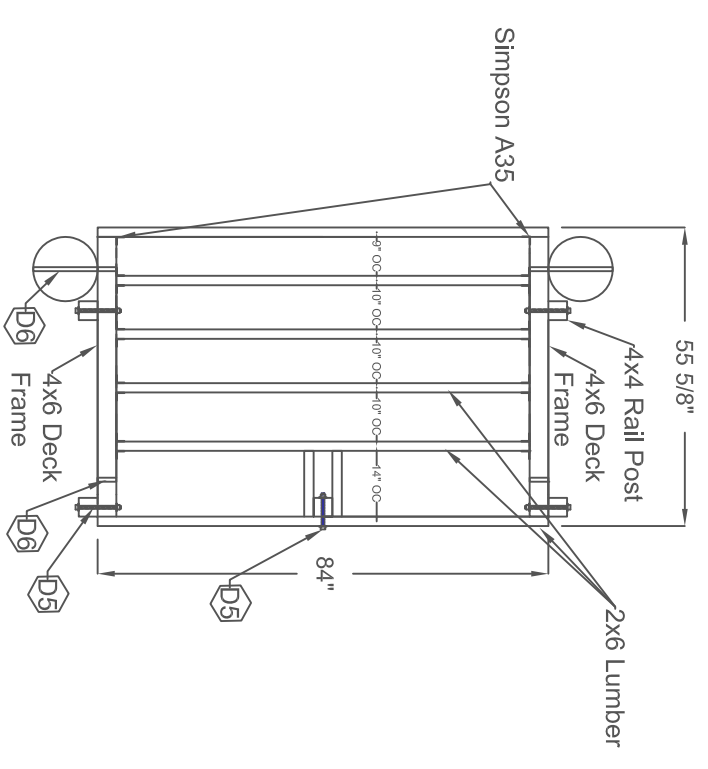
East Elevation



South Elevation



West Elevation



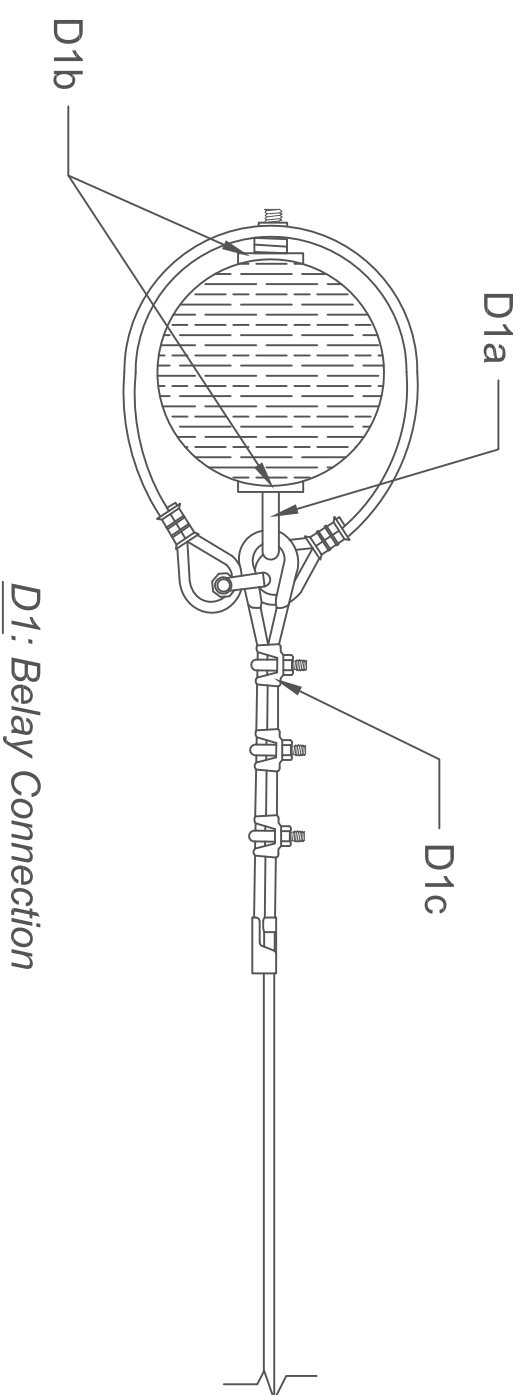
Top View

DESIGN	NAME	DATE
DESIGN	K. BECKERT	
DRAWN	K. HOPPER	
CHECKED	S. SARTY	
TEAM LEADER	A. HOPPER	

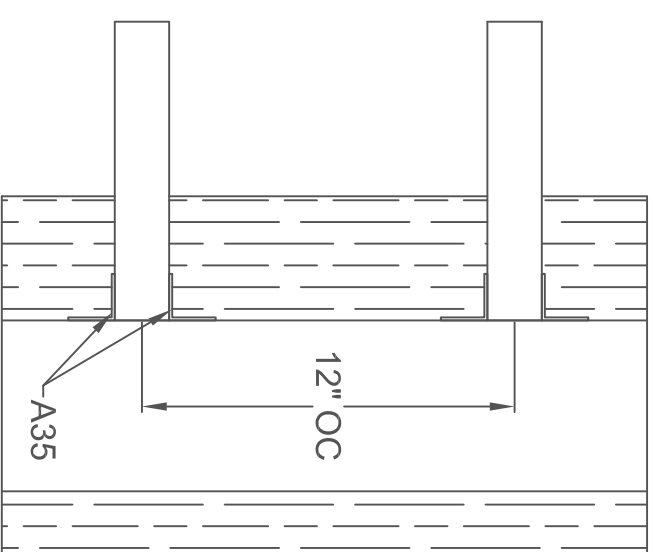
SHARP ENGINEERING Northern Arizona University Campus, Challenge Course	RECREATION SERVICES NAU OUTDOORS WALL PLAN 2	PROJECT Challenge Course Climbing Wall Design
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STAMP

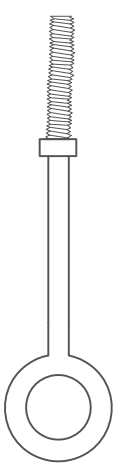
5 OF 7



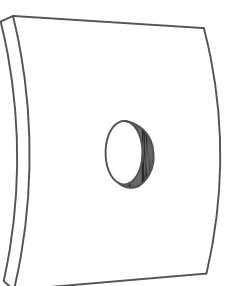
D1: Relay Connection



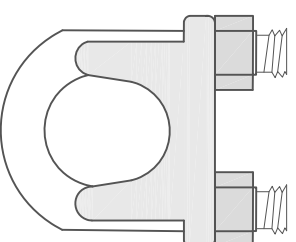
D4: Simpson A35



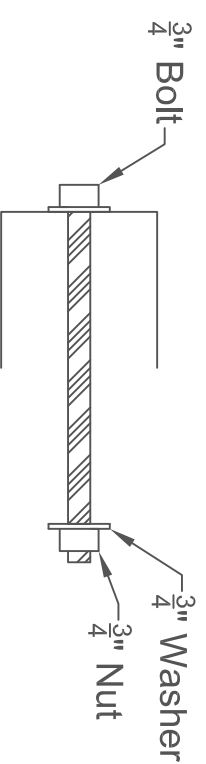
D1a: Forged Eyebolt



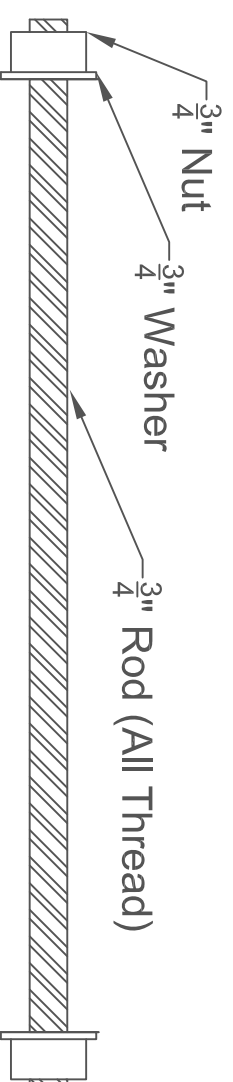
D1b: Rounded Metal Plate



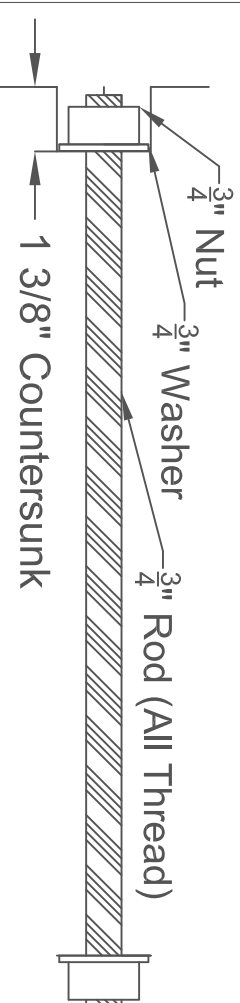
D1c: Wire Rope Clip (forged)



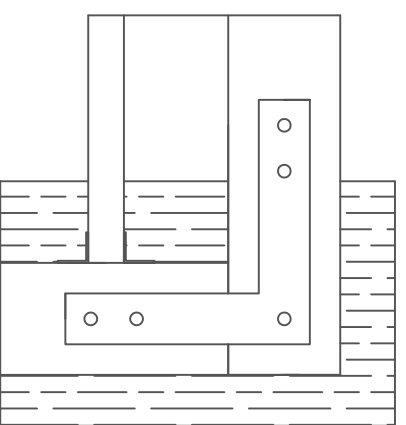
D5: 4x4 Rail Post Connection



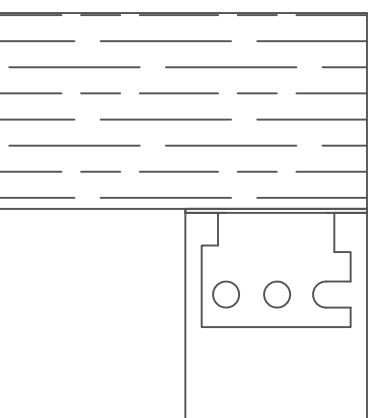
D6: General Connection Type



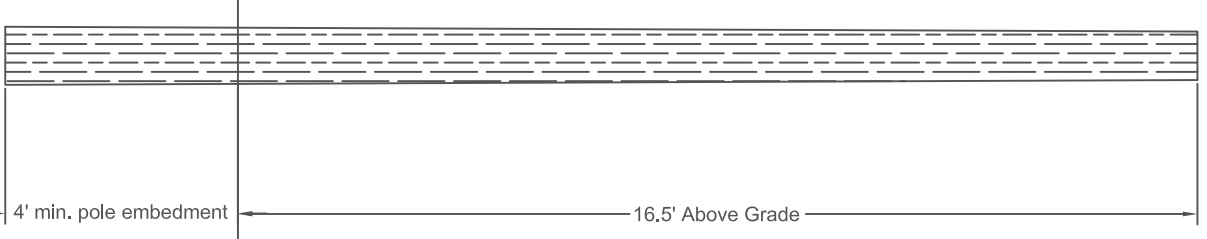
D7: Front Deck Connection



D2: Simpson 1212HL



D3: Simpson CJT3



D8: Pole

DESIGN	K. BECKERT	DATE	
DRAWN	S. SARTY		
CHECKED	A. HOPPER		
TEAM LEADER	A. HOPPER		

PROJECT	Challenge Course Climbing Wall Design
LOCATION	Northern Arizona University Campus, Challenge Course

RECREATION SERVICES	
NAU OUTDOORS	
DETAIL SHEET	

STAMP

6 OF 7

Estimated Materials Cost

Material	Quantity	Type	Unit Cost	Total with Tax 9.446%
Red Cedar Poles	41	LF	\$12.50	\$560.91
6" x 6" Lumber	40	LF	\$3.38	\$147.97
4" x 6" Lumber	34	LF	\$2.50	\$93.03
4" x 4" Lumber	16	LF	\$1.81	\$31.70
2" x 6" Lumber	150	LF	\$1.29	\$211.78
2" x 4" Lumber	33	LF	\$0.85	\$30.70
2" x 2" Lumber	80	LF	\$0.61	\$53.41
5/4" x 6" Trex	270	LF	\$2.81	\$830.37
3/4" All Thread	18	LF	\$3.46	\$68.16
3/4" x 8" Bolt	10	EA	\$1.10	\$12.04
3/4" Washers	34	EA	\$0.52	\$19.35
3/4" Nuts	34	EA	\$2.02	\$75.17
5/8" x 6" Bolt	16	EA	\$0.81	\$14.18
5/8" Washer	32	EA	\$0.41	\$14.36
5/8" Nut	16	EA	\$0.75	\$13.13
Simpson 1212HL	8	EA	\$13.98	\$122.40
Simpson CJT3	2	EA	\$23.00	\$50.35
Simpson A35	72	EA	\$0.56	\$44.13
Rounded Metal Plate	2	EA	\$15.00	\$32.83
Forged Eyebolt	2	EA	\$35.20	\$77.05
Wire Rope Clip	6	EA	\$15.25	\$100.14
Rainbow Tech. Foam	1	EA	\$250.00	\$273.62
Trex Deck Screws	10	LB	\$7.99	\$87.45
1.5" Deck Screws	5	LB	\$4.78	\$26.16
3" Deck Screws	5	LB	\$4.78	\$26.16
Belay Cable	20	LF	\$2.05	\$44.87
Total Estimated Materials Cost				\$3,061.41

Estimated Structure Crew

Description	Quantity	Hours	Rate	Total
Foreman	1	16	\$40.56	\$648.96
Laborer	3	16	\$25.60	\$1,228.80
Total Estimated Structure Crew Cost				\$1,877.76

Estimated Drilling Subcontractor

Description	Quantity	Unit Cost	Total
16" x 5' Hole	2	\$750.00	\$1,500.00

Total Project Estimated Cost

Material Cost	\$3,061.41
Labor Cost	\$1,877.76
Subcontractor Cost	\$1,500.00
Total Climbing Wall Cost	\$6,439.17

DESIGN	K. BECKERT	DATE		RECREATION SERVICES
DRAWN	S. SMARTY			NAU OUTDOORS
CHECKED	A. HOPPER			QUANTITIES SHEET
TEAM LEADER	A. HOPPER			
SHARP ENGINEERING				PROJECT: Challenge Course Climbing Wall Design
LOCATION: Northern Arizona University Campus, Challenge Course				STAMP 7 OF 7