Fryeburg Hangar Project

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Introduction

- Eastern Slopes Regional Airport, Fryeburg, ME.
- Design a 100' x 100' hangar to house aircrafts with wingspan not exceeding 65' and tail height not exceeding 20'.
- Provide a site design for the location of the proposed hangar.

Site Investigation

Overview:

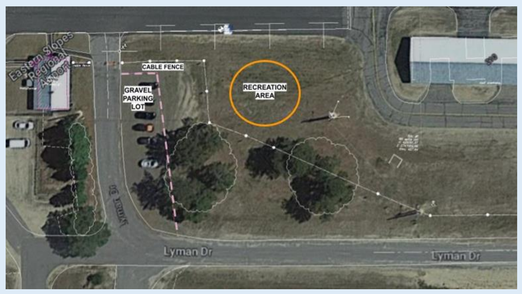
- SE edge of GA apron
- Occupied by parking lot & recreation area
- Uniform topography & minimal vegetation
- Has existing access road

Special Considerations:

- Inside ASOS restrictions
- Power lines & cable fence run through location

Site Design

Existing Site Conditions



Proposed Site Layout

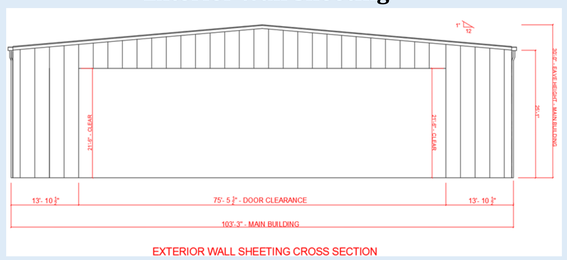
Hangar Design

Design Aircraft Characteristics

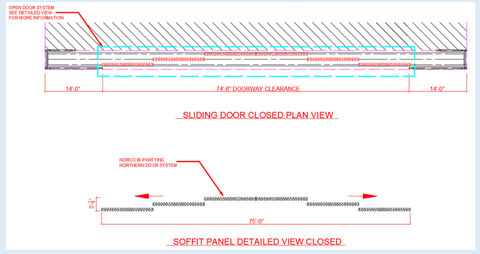
Aircraft	ADG	TDG	Wingspan (ft)	Tail Height (ft)
Cessna Citation X	II	1B	63.58	19.25

Existing Hangar Design

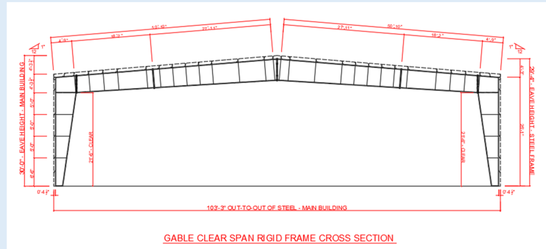
Exterior Wall Sheeting



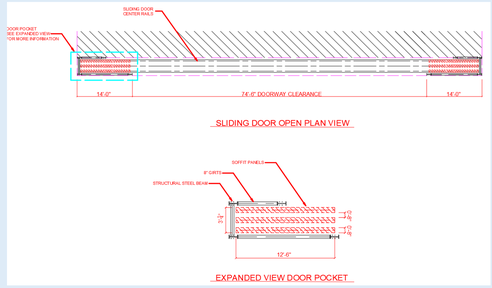
Closed Sliding Door



Gable Clear Span Frame

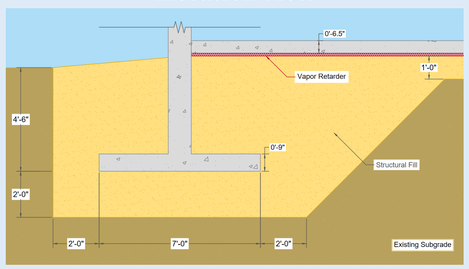


Open Sliding Door

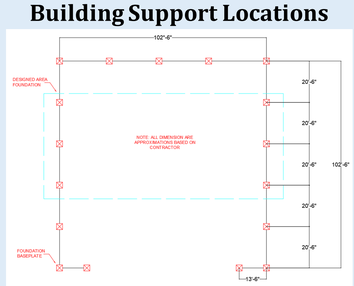


Foundation Design

Elevation View



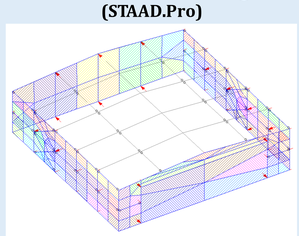
Building Support Locations



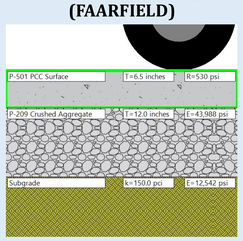
Foundation Design Overview:

- Foundation design is for typical mid-section of hangar
- Isolated spread footings below building supports
- Slab-on-grade rigid pavement for hangar interior
- Foundations underlain by imported structural fill material
- Exposure to freeze/thaw cycles anticipated

Wind Load Modeling (STAAD.Pro)



Ground Slab Design (FAARFIELD)



Mix Design Information	
Specified Compressive Strength at 28 Days	5,000 psi
Target Slump	1" - 3"
Target Air Content	5%
Exposure Category (ACI 318-19)	F3
Cementitios Materials	80% PC (I/II)
	20% Fly Ash

Coarse Aggregate Information	
Nominal Max. Agreggate Size	1"
Bulk Specific Gravity, SSD	2.65
Dry Rodded Unit Weight	100 lb/ft^3

Fine Aggregate Information	
Fineness Modulus	2.90
Bulk Specific Gravity, SSD	2.70

Concrete Mix Proportions (Per Cubic Yard)		
Material	SSD Weight (lb/yd^3)	Absolute Volume (ft^3)
Water	270	4.33
Cementitous Materials	711	3.61
Coarse Aggregate	1,960	11.85
Entrained Air	-	1.35
Fine Aggregate	986	5.85
Total	3,927	27.0

Erosion Control & Stormwater Management

Temporary Erosion Control Blankets

- Protection & Surface Stability
- Increase infiltration, decrease compaction
- Biodegradable material

Retention & Filtration Basin

- Filters pollutant and sediment
- Reduce & control flow rate.
- Controls direction of stormwater

Stormwater Swale & Ditches

- Natural & low maintenance
- Mitigate sediment & pollutants
- Increases stormwater infiltration

Engineer's Estimate

Item No.	Description of Item	Units	Unit Cost	No. of Units	Cost
	Building				
1	Hangar	SF	$278	10000	$2,780,000
	Foundation				
2	Cement	EA	$20.00	1680	$33,600
3	Water	GAL	$0.03	7193	$216
4	Coarse Aggregate	LBS	$0.13	435600	$56,628
5	Fine Aggregate	LBS	$0.10	219200	$21,920
	Site Work				
6	Over Excavation for Hangar	CY	$18.00	2800	$50,400
7	Subbase Course	CY	$45.00	1375	$61,875
8	Gravel Borrow for Hangar	CY	$40.00	2800	$112,000
9	Crushed Aggregate Base Course	CY	$70.00	45	$3,150
10	Airport Bituminous Pavement	TON	$500.00	60	$30,000
11	Seeding	SY	$2.00	700	$1,400
12	Topsoil (4" Deep)	SY	$10.00	700	$7,000
13	Mulching	SY	$2.00	700	$1,400
14	Structural Excavation and Fill	CY	$70.00	0	$0
15	Adjust Structure to Grade	EA	$2,500.00	1	$2,500
16	Erosion and Sedimentation Control	LS	$7,500.00	1	$7,500
17	Tree Removal	EA	$1,200.00	2	$2,400
18	Relocation of Utility Pole	EA	$100,000.00	1	$100,000
19	Pavement Markings	SF	$2.50	500	$1,250
	Compliances				
20	CSPP Compliance	LS	$7,500.00	1	$7,500
21	As-Built Survey	LS	$5,000.00	1	$5,000
22	Temporary Seeding and Mulching	SY	$3.00	700	$2,100
23	Contractor Quality Control Program	LF	$8.00	160	$1,280
24	Inlet Protection	EA	$300.00	1	$300
	Misc.				
25	Recreation Area Relocation	LS	$100.00	1	$100
26	Mobilization (10%)	%	10%	1	$328,952
27	Contingency (10%)	%	10%	1	$328,952
28	Height Restriction (5%)	%	5%	1	$164,475.9
29	Permitting (1%)	%	1%	1	$32,895.19
				TOTAL	**$4,144,794**
				ESTIMATE	**$4,200,000**

Acknowledgements

Sydney Seney PE – McFarland Johnson
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Fei Han Ph.D. – Dept. Of Civil and Environmental Eng.

References