PRCTI20221709

FOUNDATION ONLY PERMIT

Structural Calculations

PREPARED FOR:

Red Dot Corporation
Puyallup Corporate Center
East Main Avenue at Linden Lane

PROJECT:

Red Dot Corporation
Equipment Foundations
2220760.20

PREPARED BY:

Andrew McEachern, P.E., S.E.
Principal

DATE:

October 2022

City of Puyallup
Building
ACCEPTED
JMontgomery
01/05/2023
3:47:47 PM

THE APPROVED CONSTRUCTION PLANS, DOCUMENTS AND ALL ENGINEERING MUST BE POSTED ON THE JOB AT ALL INSPECTIONS IN A VISIBLE AND READILY ACCESSIBLE LOCATION.

FULL SIZED LEDGIBLE COLOR PLANS ARE REQUIRED TO BE PROVIDED BY THE PERMITEE ON SITE FOR INSPECTION

City of Puyallup
Development & Permitting Services
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Building	Planning
Engineering	Public Works
Fire	Traffic

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Structural Calculations

For

Red Dot Corporation Equipment Foundations

Project # 2220760.20

Project Principal Andrew D. McEachern, P.E., S.E.

Design Criteria

Design Codes and Standards

Codes and Standards: Structural design and construction shall be in accordance with the applicable sections of the following codes and standards as adopted and amended by the local building authority: International Building Code, 2018 Edition.

Structural Design Criteria:

Live Load Criteria:

Roof (Min Blanket Snow):	25 psf
Slab on Grade:	350 psf

Wind Load Criteria:

Basic Wind Speed:	97 mph
Risk Category:	II
Wind Exposure:	B
Topographic Factor:	1.0

Seismic Criteria:

Risk Category: II

Seismic Importance Factor: 1.0

S_s = 1.258 S_1 = 0.433

S_{ds} = 1.006 S_{d1} = N/A

Site Class: D

Seismic Design Category: D

Soil Criteria:

Based on Geotechnical Engineering Report by: Terra Associates Inc, dated September 2019.

Soil Bearing Capacity: 2,500 psf when sitting on 2 feet of structural fill on the previously preloaded side. Allow 33% increase for loads from wind or seismic origin.

Project Description

The scope of work for this project involves the structural design of foundations required to support new equipment. The equipment will be located within an existing building.

It is the intention of the structural design to satisfy the force levels of the IBC 2018.

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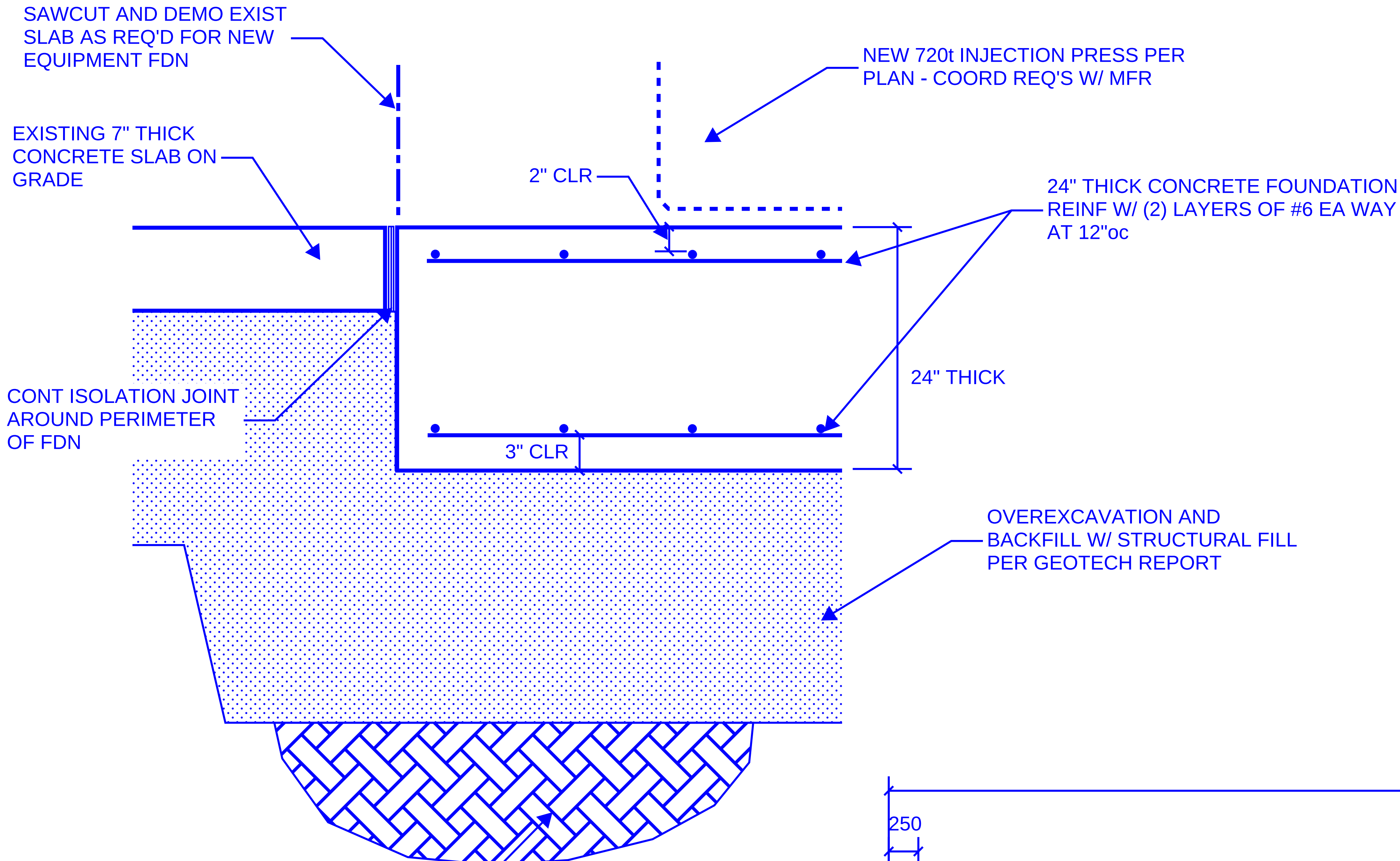
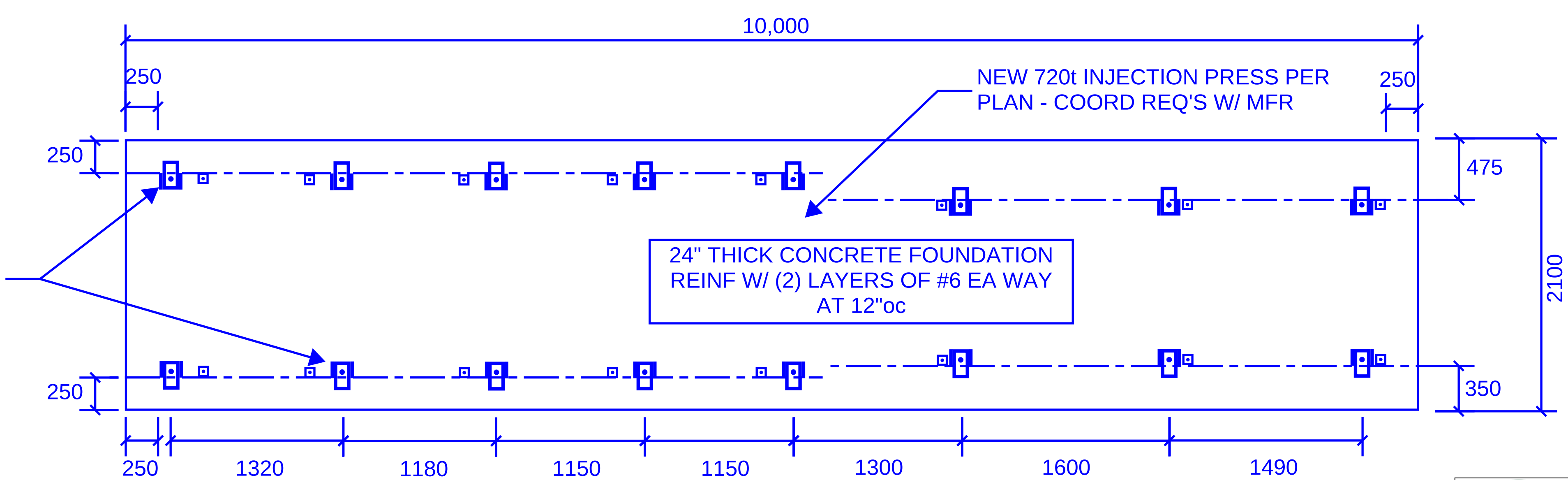


GENERAL NOTES:

- FIELD VERIFY ALL DIMENSIONS SHOWN W/ EQUIPMENT MFR
- MIN CONCRETE STRENGTH (f'c) 4,000 psi
- VERIFY ANCHORAGE REQUIREMENTS W/ EQUIPMENT MFR
- VERIFY SUBGRADE REQUIREMENTS AND SURFACE PREPARATION WITH GEOTECH AND EQUIPMENT MFR.
- PROVIDE GEOPIERS OR EQUIVALENT BELOW FDN PER GEOTECH IF NECESSARY TO MEET SLAB DEFLECTION REQUIREMENTS.



FOUNDATION PLAN

AHBL
2215 North 30th Street
Suite 300
Tacoma, WA 98403
253.383.2422 TEL
253.383.2572 FAX

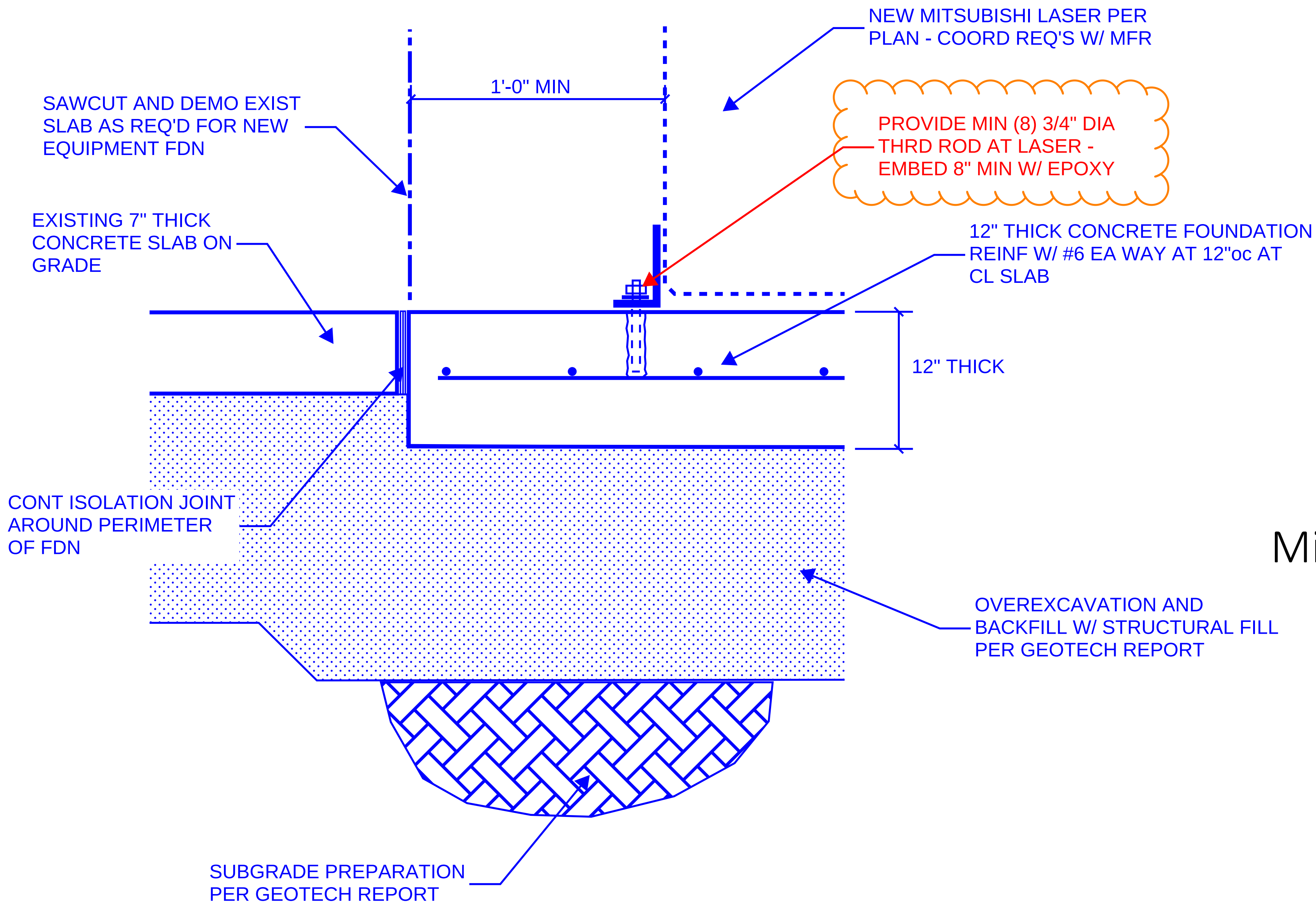
RED DOT CORPORATION EQUIPMENT FOUNDATIONS

720t INJECTION PRESS

DRAWN BY: ADM | DATE: 10/04/2022 | JOB NO.: 2220760.20

SSK-01

PRCTI20221709



GENERAL NOTES:

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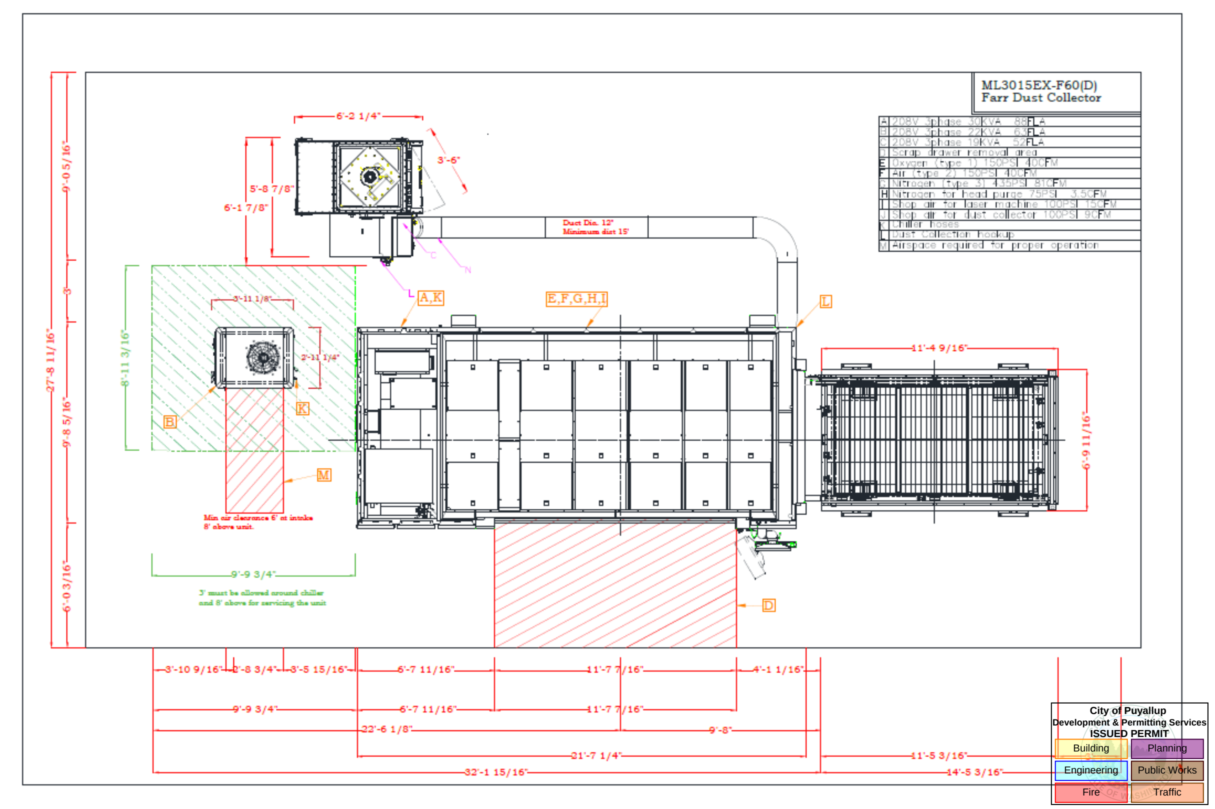
Mitsubishi Laser



Before final approval, a Final letter of acceptance and approval is required from the W.A.B. Special Inspector for Re-bar, Concrete, Welding and epoxy of Anchors and Bolting. Per Table 1705.3 of the 2018 IBC.

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Development & Permitting Services
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Engineering	Public Works
Fire	Traffic

AHBL
2215 North 30th Street
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253.383.2422 TEL
253.383.2572 FAX

RED DOT CORPORATION EQUIPMENT FOUNDATIONS

MITSUBISHI LASER

DRAWN BY: ADM | DATE: 10/04/2022 | JOB NO.: 2220760.20

SSK-02

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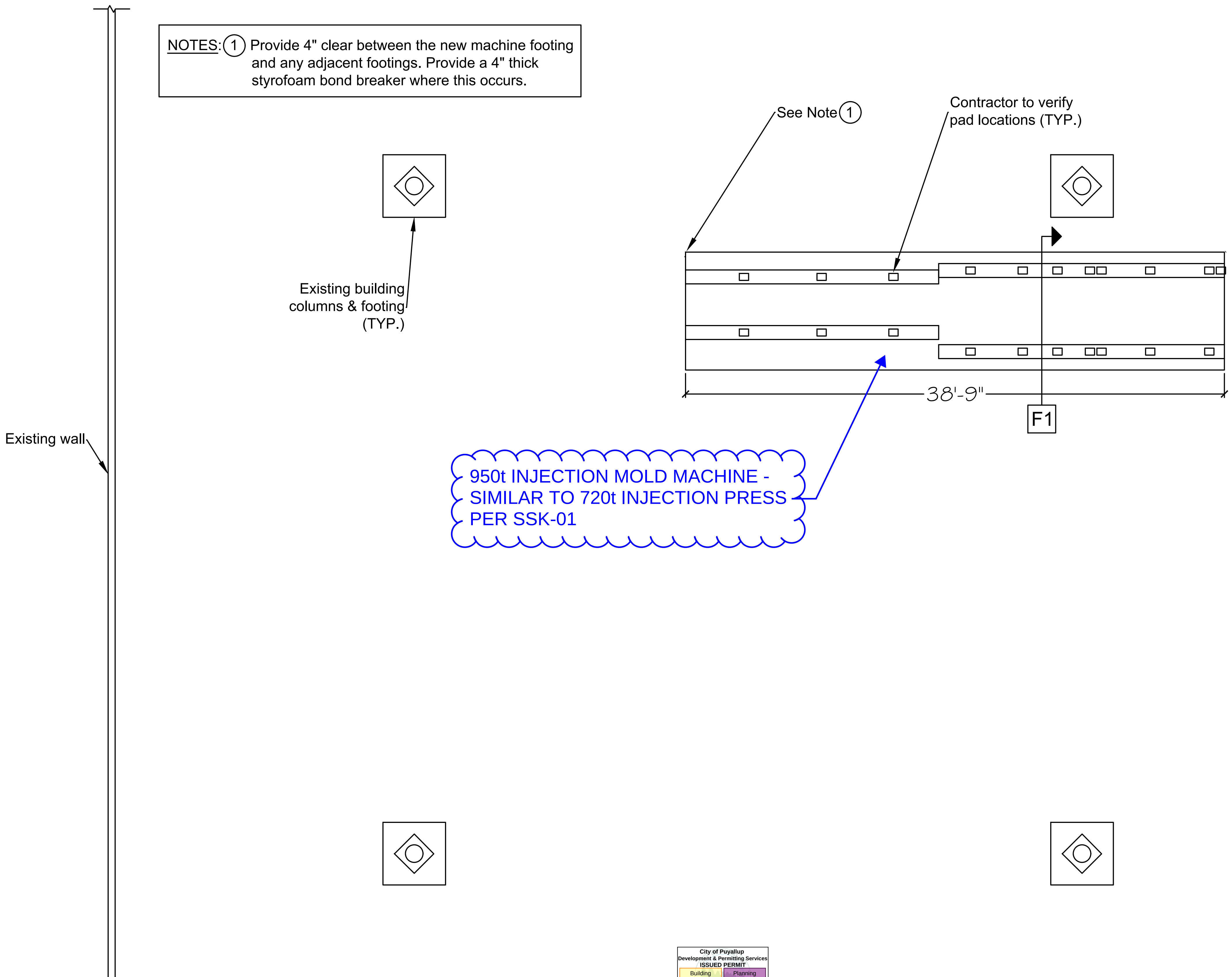

City of Puyallup
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Partial Plan - New Machine Footing
1/8" = 1'-0"

RED DOT CORPORATION
745 Andover Park East
Tukwila WA 98188

Revisions:

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic

Date:
04/10/19

Sheet:
S1

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Structural Notes:

Applicable Codes and Standards:

2015 International Building Code (IBC) and other applicable local building codes.
ASCE/SEI 7-10 - "Minimum Design Loads for Buildings and Other Structures"
2015 NDS for wood structures.
American Concrete Institute - ACI 315, ACI 318, ACI 301, ACI 307.

Structural design shall be in accordance with the latest edition of above codes and standards. Contractor shall comply with the latest edition of all applicable codes and standards.

Design Loads:

Seismic loading per IBC Sections 1603 and 1613, Site Class D.
The basic structural type is a bearing wall system with light framed walls with shear panels. Rw = 6.5 (wood structural panels), soil type D.
Seismic importance factor 1.0, Seismic Use Group I
Design and Analysis by Simplified Design Procedure
Peak Ground Accelerations (PGA) based on OSHPD, by lat/long.
PGA 1 sec = .421   PGA .2 sec = 1.217
Seismic base shear = 0.185 * Dead Load

Foundations:

Soil parameters (assumed): Vertical allowable soil pressure: 1,000 psf

ALLOWABLE SOIL PRESSURE OF PROJECT SITE EXCEEDS ALLOWABLE SOIL PRESSURE INDICATED - ORIGINAL DESIGN OK PER AHBL

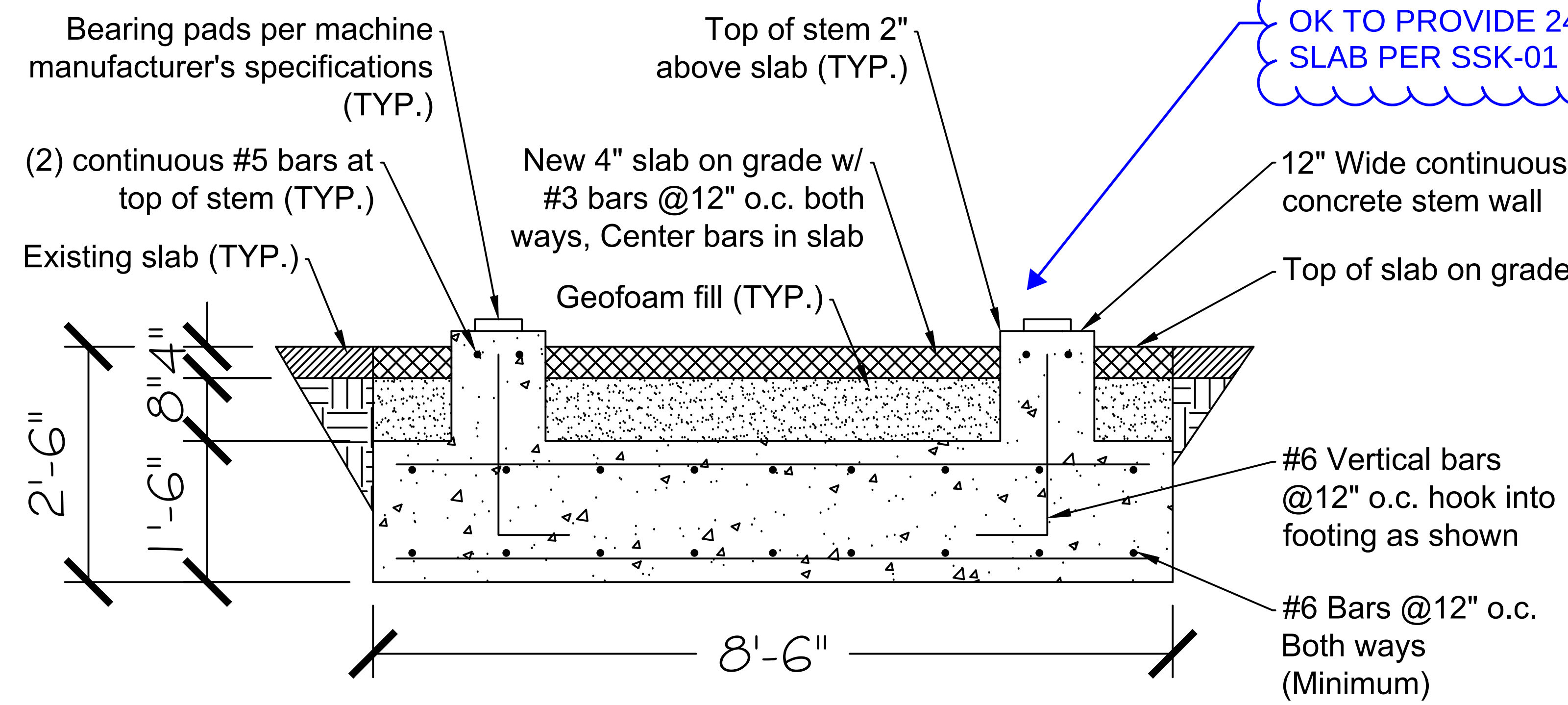
All soil conditions are to be field verified during construction by the Geotechnical Engineer. If needed, structural fill shall be placed in 12-inch maximum horizontal lifts (loose thickness) and compacted to 90 percent of maximum dry density in accordance with ASTM D-1557. Imported structural fill shall be granular material containing no more than 5 percent fines, passing no. 200 sieve. Structural fill in place shall be tested by a licensed soil engineer or approved by the building inspector.

Cast in Place Concrete:

Concrete shall attain a minimum compressive strength of 3,000 psi at 28 days (5-½ sack mix). An alternate mix provided by the concrete supplier and pre-approved by the building department is acceptable. Reinforcing steel shall conform to ASTM A-615, Grade 60 (Fy=60,000 psi) for all bars.

Concrete protection for reinforcement shall be:

Concrete exposed to earth or weather	2" (#6 & larger)
Concrete cast against earth	3"



AT CONTRACTOR'S OPTION - OK TO PROVIDE 24" THICK MAT SLAB PER SSK-01

F1

Footing Detail
1/2" = 1'

RED DOT CORPORATION
745 Andover Park East
Tukwila WA 98188

Revisions:

Date:
04/10/19

Sheet:
S2

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1. STRUCTURAL NOTES

1.1. ANY DISCREPANCY FOUND AMONG THE DRAWINGS, SPECIFICATIONS, THESE NOTES, AND THE SITE CONDITIONS SHALL BE REPORTED TO THE ARCHITECT AND THE STRUCTURAL ENGINEER, WHO SHALL CORRECT SUCH DISCREPANCY IN WRITING. ANY WORK DONE BY THE CONTRACTOR AFTER DISCOVERY OF SUCH DISCREPANCY SHALL BE DONE AT THE CONTRACTOR'S RISK. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE DIMENSIONS AMONG ALL DRAWINGS PRIOR TO PROCEEDING WITH ANY WORK OR FABRICATION. THE CONTRACTOR IS RESPONSIBLE FOR ALL ERECTION BRACING, FORMWORK AND TEMPORARY CONSTRUCTION SHORING.

1.1.1. THE CONTRACTOR SHALL NOT SCALE THE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR LOCATIONS OF ELEMENTS NOTED ABOVE.

1.1.2. ELECTRONIC COPIES OF THE STRUCTURAL DRAWINGS (PDF'S, CAD DRAWINGS OR BIM MODELS) MAY BE PROVIDED TO THE CONTRACTOR FOR THEIR USE. THESE FILES MAY BE PROVIDED AT THE REQUEST OF THE CONTRACTOR FOR THEIR CONVENIENCE ONLY. THE CONTRACTOR AGREES THAT THESE FILES SHALL NOT SUPERSEDE INFORMATION SHOWN ON THE ORIGINAL BID/ CONSTRUCTION DOCUMENTS. THE CONTRACTOR AGREES TO HOLD THE STRUCTURAL ENGINEER HARMLESS FOR ANY ERRORS OR DISCREPANCIES CONTAINED WITHIN THESE ELECTRONIC FILES.

1.2. CODES

1.2.1. ALL METHODS, MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE 2015 INTERNATIONAL BUILDING CODE (IBC) AS AMENDED AND ADOPTED BY THE LOCAL BUILDING AUTHORITY.

1.2.2. ALL REFERENCES TO OTHER CODES, STANDARDS AND SPECIFICATIONS, (ACI, ASTM, ETC.), SHALL BE FOR THE EDITION CURRENTLY REFERENCED BY IBC AS AMENDED AND ADOPTED BY THE LOCAL BUILDING AUTHORITY.

1.3. DESIGN CRITERIA

1.3.1. UNIFORM LOADS:

LOCATION	LIVE LOAD	DEAD LOAD
ROOF	25 PSF (SNOW*)	ACTUAL
SLAB ON GRADE (STRUCTURAL)	7" SLAB = 350PSF	ACTUAL

* THIS IS NOT A GROUND SNOW LOAD

1.3.2. CONCENTRATED LOADS: ALL MANUFACTURERS OF PRE-ENGINEERED COMPONENTS OR SYSTEMS SHALL LOCATE, COORDINATE, VERIFY WEIGHTS, ETC., OF MECHANICAL UNITS OR OTHER CONCENTRATED LOADS AND DESIGN THEIR SYSTEM FOR THESE LOADS.

1.3.3. WIND LOADS (PER IBC SECTION 1609 AND ASCE 7 CHAPTERS 26 THRU 30):

ULTIMATE DESIGN WIND SPEED (V_{ult}):	110 MPH
RISK CATEGORY	II
WIND EXPOSURE:	B
APPLICABLE INTERNAL PRESSURE COEFFICIENT:	+/-0.18
TOPOGRAPHIC FACTOR (K_{zt})	1.0 (FLAT)

COMPONENTS AND CLADDING: ULTIMATE DESIGN WIND PRESSURES TO BE USED FOR THE DESIGN OF EXTERIOR COMPONENT AND CLADDING MATERIALS IS AS FOLLOWS:

ZONE:1	+/- 23 PSF (10 SQ FT)
ZONE:2	+/- 39 PSF (10 SQ FT)
ZONE:3	+/- 59 PSF (10 SQ FT)
ZONE:4	+/- 23 PSF (10 SQ FT)
ZONE:5	+/- 28 PSF (10 SQ FT)

1.3.4. SEISMIC LOADS (PER IBC SECTION 1613 AND ASCE 7 CHAPTERS 11 THRU 13):

RISK CATEGORY:	II
SEISMIC IMPORTANCE FACTOR (I_e):	1.0
S_s:	1.257
S_1:	0.433
SITE CLASS:	D
S_{DS}:	0.838
S_{D1}:	0.452
SEISMIC DESIGN CATEGORY:	D
SEISMIC RESPONSE COEFFICIENT (C_s):	0.168
ANALYSIS PROCEDURE USED:	EQUIVALENT LATERAL FORCE PROCEDURE

SEISMIC FORCE-RESISTING SYSTEM	RESPONSE MODIFICATION COEFFICIENT, R	OVERSTRENGTH FACTOR, Ω_0
1. SPECIAL REINFORCED CONCRETE SHEAR WALLS	5	2

NOTE: TABULATED OVERSTRENGTH FACTOR HAS BEEN REDUCED IN ACCORDANCE WITH ASCE 7 TABLE 12.2-1 FOOTNOTE G FOR STRUCTURES WITH FLEXIBLE DIAPHRAGMS.

1.4. STATEMENT OF SPECIAL INSPECTIONS

SEE STATEMENT OF SPECIAL INSPECTION AND TESTING SHEET S0.2.

1.5. SHOP DRAWINGS

1.5.1. SUBMIT SHOP DRAWINGS TO THE ARCHITECT/ENGINEER FOR THE FOLLOWING:

A. CONCRETE MIX DESIGN SUBMITTALS

B. REINFORCING STEEL

C. STRUCTURAL AND MISCELLANEOUS STEEL INCLUDING WELD INSERTS AND ANCHORS

D. PRE-ENGINEERED STEEL JOISTS AND JOIST GIRDERS *

E. TILT UP WALLS

F. PRE-ENGINEERED STEEL STAIRS & CANOPIES *

* DEFERRED SUBMITTALS: PRE-ENGINEERED ITEMS SHALL BE SUBMITTED TO THE BUILDING OFFICIAL AFTER REVIEW BY THE ENGINEER OF RECORD AS A DEFERRED SUBMITTAL.

1.5.2. SHOP DRAWING REVIEW NOTES

A. ENGINEER OF RECORD SHALL REVIEW SHOP DRAWINGS FOR GENERAL CONFORMANCE WITH THE PROJECT CONSTRUCTION DOCUMENTS (PLANS AND SPECIFICATIONS).

B. ENGINEER OF RECORD REVIEW OF SHOP DRAWINGS SHALL NOT RELIEVE THE GENERAL CONTRACTOR OF THEIR RESPONSIBILITY FOR REVIEW OF THE SHOP DRAWINGS FOR COMPLIANCE WITH THE PROJECT REQUIREMENTS.

C. APPROVAL OF THE SHOP DRAWINGS BY THE ENGINEER OF RECORD SHALL NOT BE CONSIDERED AS A GUARANTEE BY THE ENGINEER THAT THE SHOP DRAWINGS COMPLY WITH ALL PROJECT REQUIREMENTS.

D. CONCURRENT SHOP DRAWING REVIEW SHALL ONLY BE PERMITTED IF APPROVED BY THE ARCHITECT/ENGINEER OF RECORD PRIOR TO THE START OF SHOP DRAWING REVIEW.

1.6. MISCELLANEOUS

1.6.1. VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD.

1.6.2. VERIFY SIZE AND LOCATION OF ALL OPENINGS IN THE FLOORS, ROOF AND WALLS WITH ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS.

1.6.3. CONSTRUCTION DETAILS NOT SPECIFICALLY SHOWN ON THE DRAWINGS SHALL FOLLOW SIMILAR DETAILS OR SECTIONS OF THIS PROJECT AS APPROVED BY THE ARCHITECT/ ENGINEER.

1.6.4. SEE ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR DIMENSIONS AND LOCATIONS OF OPENINGS NOT DIMENSIONED OR SHOWN ON STRUCTURAL PLANS.

1.6.5. SEE ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS AND WEIGHTS OF ALL MECHANICAL AND ELECTRICAL EQUIPMENT INCLUDING HOUSEKEEPING PADS.

1.6.6. FOR PIPES, CONDUITS, DUCTS AND MECHANICAL EQUIPMENT SUPPORTED OR BRACED FROM STRUCTURE: CONFORM TO SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC., PUBLICATION "APPENDIX E: SEISMIC RESTRAINT MANUAL GUIDELINES FOR MECHANICAL SYSTEMS." ALL BRACING AND SUPPORTS SHALL BE DESIGNED FOR SEISMIC HAZARD LEVEL (SHL) B. SPRINKLER LINE ATTACHMENTS SHALL CONFORM TO NFPA PAMPHLET 13.

1.6.7. THE STRUCTURE HAS BEEN DESIGNED TO RESIST CODE REQUIRED VERTICAL AND LATERAL FORCES AFTER THE CONSTRUCTION OF ALL STRUCTURAL ELEMENTS HAS BEEN COMPLETED. STABILITY OF THE STRUCTURE PRIOR TO COMPLETION IS THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR. THIS RESPONSIBILITY INCLUDES BUT IS NOT LIMITED TO JOB SITE SAFETY: ERECTION MEANS, METHODS, AND SEQUENCES; TEMPORARY SHORING, FORMWORK, AND BRACING; USE OF EQUIPMENT AND CONSTRUCTION PROCEDURES. WHERE SHORING IS REQUIRED, A SHORING PLAN, STAMPED BY A LICENSED PROFESSIONAL/STRUCTURAL ENGINEER SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

2. SITE PREPARATION/SOIL REMEDIATION

2.1. SOIL DATA

ALLOWABLE SOIL PRESSURE 2500 PSF WHEN SITTING ON 2' OF STRUCTURAL FILL AND PRELOADED SITE. ALLOW 33-1/3% INCREASE FOR LOADS FROM WIND OR SEISMIC ORIGIN. SEE GEOTECHNICAL ENGINEERING REPORT BY TERRA ASSOCIATES INC DATED SEPTEMBER 2019. SEE GEOTECH REPORT FOR ALL SUBGRADE PREPARATION REQUIREMENTS AS WELL AS CAPILLARY BREAK AND VAPOR BARRIER RECOMMENDATIONS.

2.2. EXCAVATION

EXCAVATE TO DEPTH SHOWN AND TO FIRM UNDISTURBED MATERIAL. OVER-EXCAVATIONS SHALL BE BACKFILLED WITH LEAN CONCRETE (f'_c=500-1200 PSI) OR STRUCTURAL FILL AT THE CONTRACTOR'S EXPENSE. EXERCISE EXTREME CARE DURING EXCAVATION TO AVOID DAMAGE TO BURIED LINES, TANKS, AND OTHER CONCEALED ITEMS. UPON DISCOVERY, DO NOT PROCEED WITH WORK UNTIL RECEIVING WRITTEN INSTRUCTIONS FROM THE ARCHITECT. A COMPETENT REPRESENTATIVE OF THE OWNER SHALL INSPECT ALL FOOTING EXCAVATIONS FOR SUITABILITY OF BEARING SURFACES PRIOR TO PLACEMENT OF REINFORCING STEEL. PROVIDE DRAINAGE AS NECESSARY TO AVOID WATER-SOFTENED SUBGRADE.

2.3. FILL, BACKFILL AND COMPACTION

BACKFILL AGAINST WALLS SHALL NOT BE PLACED UNTIL AFTER THE REMOVAL OF ALL MATERIAL SUBJECT TO ROT OR CORROSION. ALL FILL PLACED AGAINST RETAINING WALLS OR BASEMENT WALLS SHALL BE FREE DRAINING GRANULAR MATERIAL. STRUCTURAL FILL OTHER THAN PEA GRAVEL SHALL BE GRANULAR PLACED IN 6-INCH LIFTS AND COMPACTED TO AT LEAST 95% OF ITS MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557 (MOD PROCTOR). PEA GRAVEL FILL SHALL HAVE A MAXIMUM PARTICLE SIZE OF 3/8" DIAMETER.

3. STRUCTURAL CONCRETE

3.1. GENERAL

ALL CONCRETE SHALL BE HARD ROCK CONCRETE MEETING THE REQUIREMENTS OF ACI-301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS." PROPORTIONING OF INGREDIENTS FOR EACH CONCRETE MIX SHALL BE BY METHOD 2 OR THE ALTERNATE PROCEDURE GIVEN IN ACI-301. PLACE CONCRETE PER ACI-304 AND CONFORM TO ACI-604 (306) FOR WINTER CONCRETING AND ACI-605 (305) FOR HOT WEATHER CONCRETING. USE INTERIOR MECHANICAL VIBRATORS WITH 7,000 RPM MINIMUM FREQUENCY. DO NOT OVER-VIBRATE. CONCRETE SHALL BE PLACED MONOLITHICALLY BETWEEN CONSTRUCTION OR CONTROL JOINTS. PROTECT ALL CONCRETE FROM PREMATURE DRYING, EXCESSIVE HOT OR COLD TEMPERATURE FOR SEVEN DAYS AFTER PLACING.

3.2. STRENGTH

TWENTY-EIGHT DAY COMPRESSIVE STRENGTHS SHALL BE AS FOLLOWS:

SLABS ON GRADE	4000 PSI
FOOTINGS	3000 PSI
VERTICALLY FORMED WALLS	4000 PSI
TILT UP WALL PANELS	4000 PSI

CONCRETE SUPPLIER TO PROVIDE TEST RECORDS PER SECTION 26.4 OF ACI 318.

3.3. MATERIALS

3.3.1. CEMENT: ASTM C150, TYPE I OR TYPE II. ENGINEER'S APPROVAL IS NEEDED FOR USE OF TYPE III CEMENT.

3.3.2. COARSE AND FINE AGGREGATE: ASTM C33.

3.3.3. WATER SHALL BE CLEAN AND POTABLE.

3.3.4. FLYASH: ASTM C618 CLASS C OR CLASS F

3.3.5. GROUND GRANULATED BLAST FURNACE SLAG (GGBFS): SHALL NOT BE PERMITTED.

3.4. ADMIXTURES

3.4.1. WATER REDUCING ADMIXTURE: ASTM C494. ADMIXTURES SHALL BE USED IN EXACT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

3.4.2. WATER REDUCING ADMIXTURES SHALL BE USED IN ALL HEAVILY CONGESTED AREAS (I.E. CONCRETE WALLS WITH REINFORCING SPACING OF 4" OR LESS)

3.4.3. CONCRETE USING ADMIXTURES TO PRODUCE FLOWABLE CONCRETE MAY BE USED SUBJECT TO ENGINEER'S APPROVAL.

3.4.4. AIR ENTRAINMENT: ASTM C260 AND ASTM C494 ENTRAIN 5% PLUS/MINUS 1.5% BY VOLUME IN ALL CONCRETE EXPOSED TO WEATHER.

3.4.5. NO OTHER ADMIXTURES PERMITTED UNLESS APPROVED BY THE ENGINEER.

3.5. FORMWORK AND SHORING

3.5.1. FOLLOW RECOMMENDED PRACTICE FOR CONCRETE FORMWORK (ACI-347).

3.5.2. ALL SHORING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. FORMWORK SUPPORTS SHALL BE DESIGNED TO PROVIDE FINISHED CONCRETE SURFACES AT ALL FACES LEVEL, PLUMB AND TRUE TO THE DIMENSIONS AND ELEVATIONS SHOWN. TOLERANCES AND VARIATIONS SHALL BE AS SPECIFIED. A SHORING PLAN, STAMPED BY A LICENSED PROFESSIONAL ENGINEER SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

3.6. REINFORCING STEEL:

3.6.1. DETAIL, FABRICATE, AND PLACE PER ACI-315 AND ACI-318. SUPPORT REINFORCEMENT WITH APPROVED CHAIRS, SPACERS, OR TIES.

3.6.2. DEFORMED BAR REINFORCEMENT: ASTM A615 GR 60

3.6.3. WELDABLE DEFORMED BAR REINFORCEMENT: ASTM A706 GR 60 WHERE NOTED ON STRUCTURAL DRAWINGS

3.6.4. WELDED WIRE FABRIC: ASTM A-185 & ASTM A-82 Fy=65 KSI

3.6.5. DEFORMED BAR ANCHORS: ASTM A-496

3.6.6. EXCEPT AS NOTED SPECIFICALLY ON THE DRAWINGS, ALL CONCRETE REINFORCEMENT SHALL BE LAP-SPLICED AS FOLLOWS:

#6 AND SMALLER 48 X BAR DIAMETER
NO MORE THAN 50% HORIZONTAL OR VERTICAL BARS SHALL BE SPLICED AT ONE LOCATION

3.6.7. EXCEPT AS NOTED SPECIFICALLY ON THE DRAWINGS, PROVIDE CORNER BARS TO MATCH QUANTITY AND DIAMETER OF HORIZONTAL REINFORCEMENT AND LAP WITH HORIZONTAL REINFORCEMENT AS FOLLOWS:

#6 AND SMALLER 48 X BAR DIAMETER
THESE CORNER BARS SHALL BE PLACED AT ALL CORNERS AND INTERSECTIONS IN CONCRETE FOOTINGS AND WALLS.

3.6.8. LAP WELDED WIRE FABRIC 12" OR ONE SPACING PLUS 2", WHICHEVER IS MORE.

3.7. CONCRETE COVER ON REINFORCING SHALL BE AS FOLLOWS (UNLESS SHOWN OTHERWISE):

BOTTOM OF FOOTINGS	3"
FORMED EARTH FACE	2"
WALLS, WEATHER FACE	1-1/2"
WALLS, INSIDE FACE	1"

3.8. CONSTRUCTION AND CONTROL JOINTS

3.8.1. UNLESS NOTED OTHERWISE, LOCATION OF THE CONSTRUCTION OR CONTROL JOINTS IN SLAB ON GRADE SHALL NOT EXCEED THE DISTANCES NOTED BELOW. JOINTS SHALL BE LOCATED ON COLUMN GRIDS OR UNDER PERMANENT PARTITIONS TO THE GREATEST EXTENT POSSIBLE. ADDITIONAL JOINTS SHALL BE REQUIRED AT REENTRANT CORNERS AND CORNERS OF SLAB DEPRESSIONS OR PENETRATIONS. SEE ARCHITECTURAL DRAWINGS FOR JOINT LAYOUT AT EXPOSED CONCRETE CONDITIONS. PROVIDE JOINT SEALANT PER SPECIFICATIONS - INSTALL PER MANUFACTURER RECOMMENDATIONS.

7" SLAB ON GRADE 20'-0" O.C. MAX

3.9. CONDUIT AND PIPING EMBEDDED IN CONCRETE

3.9.1. ELECTRICAL CONDUIT SHALL NOT BE PLACED WITHIN A SLAB ON GRADE, BUT PLACED BELOW THE SLAB IN THE SUB-BASE.

3.10. GROUT FOR BEARING PLATES

THE NON-SHRINK GROUT SHALL MEET ASTM C1107 GRADE B OR EQUIVALENT (MASTERFLOW 928 BY BASF OR APPROVED EQUIVALENT). GROUT SHALL BE A PRE-PACKAGED HYDRAULIC CEMENT BASED MINERAL AGGREGATE GROUT, MIXED, PLACED AND CURED AS RECOMMENDED BY THE MANUFACTURER. COMPRESSIVE STRENGTH SHALL EXCEED 6000 PSI AT 28 DAYS.

3.11. TILT-UP CONCRETE WALLS

3.11.1. TYPICAL AND SPECIAL REINFORCEMENT SHOWN ON PANEL ELEVATIONS IS DESIGNED FOR FORCES OCCURRING AFTER PANEL IS IN PLACE AND TIED TO ROOF AND FLOOR DIAPHRAGMS. USE STRONGBACKS AND EXTRA REINFORCEMENT AS REQUIRED AND DIRECTED BY PANEL LIFT INSERT MANUFACTURER/SUPPLIER FOR ERECTION PURPOSES. LIFT INSERT MANUFACTURER/SUPPLIER SHALL ANALYZE PANELS FOR ADEQUACY DURING COMPLETE LIFTING OPERATION FROM HORIZONTAL TO VERTICAL, INCLUDING LATERAL TRANSPORT (WALKING) OF PANELS.

3.11.2. ALL PANEL DIMENSIONS ON FOUNDATION PLANS ARE TO CENTER LINES OF CONNECTIONS UNLESS NOTED OTHERWISE. DO NOT SCALE PANEL ELEVATIONS.

3.11.3. DO NOT CUT OR DRILL PANELS WITHOUT APPROVAL OF ENGINEER UNLESS SHOWN OR INDICATED ON STRUCTURAL DRAWINGS.

3.11.4. SEE ARCH FOR FINISHES, CURING, ETC.

3.11.5. GROUT UNDER PANEL WITH A 9-SACK PEA GRAVEL CONCRETE GROUT MIX (f'_c=5000 PSI AT 28 DAYS).

3.11.6. PANELS DRAWN SHOW TYPICAL LOCATIONS OF PANEL CONNECTIONS AND ADDITIONAL REINFORCING FOR MOST PANEL OPENINGS. NOT ALL EMBEDDED ITEMS AND MECHANICAL AND ELECTRICAL PENETRATIONS ARE SHOWN. CONTRACTOR SHALL COORDINATE PENETRATIONS WITH MECHANICAL AND ELECTRICAL AND REINFORCING PER PLANS.

3.11.7. GENERAL CONTRACTOR SHALL INCLUDE AN ALLOWANCE FOR STACKING OF PANELS OR RAT SLABS AS REQUIRED WHERE ADEQUATE CASTING AREA IS NOT AVAILABLE AT INTERIOR BUILDING SLAB ON GRADE AREAS.

5. METALS

5.1. STRUCTURAL STEEL GENERAL REQUIREMENTS

5.1.1. ALL DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO AISC 360-10 "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS", AISC 341-10 "SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS" AND AISC 303-10 "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" EXCEPT AS AMENDED BY THESE STRUCTURAL NOTES.

5.2. STRUCTURAL STEEL

5.2.1. STEEL W SHAPES SHALL BE ASTM A992 F_y=50 KSI. OTHER SHAPES AND PLATES SHALL BE ASTM A36 F_y=36 KSI.

5.2.2. RECTANGULAR HOLLOW STEEL SECTIONS (HSS) OR TUBE STEEL SECTIONS (TS) SHALL BE ASTM A500, GRADE B, F_y=46 KSI (F_y=42 KSI FOR ROUND SECTIONS)

5.2.3. BOLTS

A. MACHINE BOLTS NOT SPECIFIED AS HIGH STRENGTH SHALL BE ASTM A-307 GRADE A.

B. HIGH STRENGTH BOLTS SHALL BE ASTM F3125 GRADE A325 OR GRADE A490 AS INDICATED ON STRUCTURAL DRAWINGS. ALL BOLTS SHALL BE CONSIDERED BEARING TYPE WITH THREADS INCLUDED IN SHEAR PLANE (CONNECTION TYPE N) UNLESS NOTED OTHERWISE. ALL HIGH STRENGTH BOLTED CONNECTIONS SHALL BE INSTALLED WITH NUTS CONFORMING TO ASTM A563 AND HARDENED WASHERS CONFORMING TO ASTM F436.

C. ALL HIGH STRENGTH BOLTS SHALL BE INSTALLED PER THE SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS (LATEST EDITION) BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (WWW.BOLTCOUNCIL.ORG).

5.2.4. STEEL ANCHORAGE ELEMENTS:

A. THREADED RODS SHALL BE ALL-THREAD. (F_y=36 KSI) U.N.O.

B. WELDED HEADED STUDS: "NELSON STUDS" SHALL BE BY NELSON STUD WELDING, INC. OR APPROVED EQUIVALENT COMPLYING WITH ASTM A108. STUDS SHALL HAVE A MINIMUM F_u OF 65 KSI.

C. ANCHOR RODS: ANCHOR RODS SHALL BE ASTM F 1554, F_y=36 KSI.

D. EXPANSION ANCHORS SHALL BE CARBON STEEL AS NOTED IN THE FOLLOWING TABLE. ANCHORS IN CONCRETE SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ACI 355.2 AND/OR ICC-ES AC193 FOR CRACKED CONCRETE AND SEISMIC APPLICATIONS. ANCHORS SHALL HAVE A CURRENT CODE REPORT THAT COMPLIES WITH THE CURRENT EDITION OF THE IBC AND SHALL BE RATED FOR USE IN THE SEISMIC DESIGN CATEGORY NOTED IN THE DESIGN CRITERIA SECTION OF THESE NOTES.

EXPANSION ANCHORS IN CONCRETE	CODE REPORT
HILTI KWIK BOLT TZ	ICC ESR-1917
SIMPSON STRONG-BOLT 2	ICC ESR-3037
DEWALT/POWERS POWER-STUD+ SD2	ICC ESR-2502

E. ADHESIVE ANCHORS SHALL BE THREADED ANCHOR RODS OR REBAR DOWELS USING AN INJECTABLE ADHESIVE AS NOTED IN THE FOLLOWING TABLE. ANCHORS IN CONCRETE SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ACI 355.4 AND/OR ICC-ES AC-308 FOR CRACKED CONCRETE AND SEISMIC APPLICATIONS. ANCHORS SHALL HAVE A CURRENT CODE REPORT THAT COMPLIES WITH THE CURRENT EDITION OF THE IBC AND SHALL BE RATED FOR USE IN THE SEISMIC DESIGN CATEGORY NOTED IN THE DESIGN CRITERIA SECTION OF THESE NOTES.

ADHESIVE ANCHORS IN CONCRETE	CODE REPORT
HILTI HIT HY-200 SAFE SET	ICC ESR-3187
SIMPSON AT-XP *	IAPMO ER-263
DEWALT/POWERS PURE 110+	ICC ESR-3298

* SIMPSON SET-XP MAY BE USED WHERE BASE MATERIAL TEMPERATURE IS ABOVE 50 DEGREES FAHRENHEIT OR FOR EMBEDMENT GREATER THAN 12-INCHES FOR LONGER GEL TIME. SEE ICC ESR-2508 (CONC) AND IAPMO ER-265 (MASONRY).

F. POWDER ACTUATED FASTENERS: PDF'S OR PAF'S SHALL BE A MINIMUM 0.157" DIA KNURLED SHANK FASTENER AS NOTED IN THE FOLLOWING TABLE, UNLESS NOTED OTHERWISE. FASTENERS DRIVEN INTO STEEL SHALL BE DRIVEN SO THAT THE POINT OF THE FASTENER COMPLETELY PENETRATES THE STEEL BASE MATERIAL. AT TOPPING SLABS, PT SLABS OR SLABS WITH RADIANT HEAT TUBES EMBEDDED WITHIN THE SLAB, LIMIT THE PDF PENETRATION TO 3/4" MAXIMUM AND COORDINATE WITH TENDON/TUBE PLACEMENT AND COVER.

POWDER ACTUATED FASTENERS	CODE REPORT
HILTI X-U	ICC ESR-2269
SIMPSON PDPA	ICC ESR-2138
DEWALT/POWERS CSI PIN	ICC ESR-2024

5.2.5. METAL PROTECTION: ALL STEEL EXPOSED TO WEATHER, MOISTURE, SOIL, OR AS NOTED SHALL BE GALVANIZED PER ASTM A-123 OR A153 AS APPLICABLE. ALL OTHER STEEL SURFACES SHALL BE SHOP PRIMED AFTER FABRICATION.

REPAIR ALL DAMAGED AREAS OF GALVANIZED PARTS SUCH AS FIELD WELDS, ETC. APPLY REPAIR COATING THICKNESS GREATER THAN OR EQUAL TO ORIGINAL ZINC COATING THICKNESS.

5.2.6. STEEL COLUMNS: ALL VERTICAL LOAD CARRYING MEMBERS HAVE BEEN NOTED AS "COLUMNS" ON THE STRUCTURAL DRAWINGS. THIS NOTATION DOES NOT IDENTIFY THESE MEMBERS AS "POSTS" OR "COLUMNS" AS DEFINED BY THE LATEST OSHA RULES REGARDING COLUMN ANCHORAGE REQUIREMENTS (OSHA 29 CFR PARTS 1926.751 AND 1926.755). THE GENERAL CONTRACTOR, STEEL DETAILER, AND STEEL ERECTOR SHALL BE RESPONSIBLE TO DETERMINE THE CORRECT OSHA DESIGNATION OF EACH MEMBER REGARDLESS OF THE NOTATION SHOWN ON THE STRUCTURAL DRAWINGS.

5.2.7. PRE-ENGINEERED STEEL STAIRS AND CANOPIES: THE MANUFACTURER SHALL SUBMIT SHOP DRAWINGS AND CALCULATIONS SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF THE PROJECT.

5.3. WELDING

5.3.1. ALL WELDING SHALL BE IN ACCORDANCE WITH THE "STRUCTURAL WELDING CODE," AWS D1.1, AWS D1.4 AND AWS D1.8 AS APPROPRIATE.

5.3.2. ALL WELDING SHALL BE BY CERTIFIED WELDERS; USE 70 KSI LOW HYDROGEN FILLER METAL, AND SHALL BE PROTECTED PER AWS D1.1 UNTIL USE. FOR ALL FULL PENETRATION WELDS, FILLER METAL SHALL BE NOTCH TOUGH TO MEET CHARPY V-NOTCH OF 20 FOOT-POUND AT -20°F.

5.3.3. NO WELDING OF REINFORCING STEEL SHALL BE ALLOWED EXCEPT WHERE SHOWN. ALL WELDING OF REINFORCEMENT SHALL BE PER ANSI/AWS D1.4. THE FOLLOWING FILLER METAL SHALL BE USED WHEN WELDING REINFORCEMENT:

A. FOR WELDING OF ASTM A706 GR 60 REBAR, 80 KSI FILLER METAL.

B. FOR WELDING OF ASTM A615 GR 60 REBAR, NOT PERMITTED.

C. FOR WELDING OF ASTM A615 GR 40 REBAR, NOT PERMITTED.

5.3.4. ALL FULL PENETRATION FIELD AND SHOP WELDS SHALL BE FULL TIME INSPECTED AND TESTED BY NON-DESTRUCTIVE PROCEDURES. RESULTS OF TESTS SHALL BE SUBMITTED FOR REVIEW BY THE STRUCTURAL ENGINEER.

5.4. WELDING PROCEDURE SPECIFICATION (WPS)

5.4.1. FOR ALL WELDING OF REINFORCING STEEL AND NON PREQUALIFIED WELDS CONTRACTOR SHALL SUBMIT A WELDING PROCEDURE SPECIFICATION (WPS) TO ENGINEER FOR APPROVAL. PRIOR TO WELDING, EACH WPS SHALL INCLUDE ALL NECESSARY INFORMATION REQUIRED BY AWS D1.1, AWS D1.4 AND AWS D1.8 AND AS FOLLOWS:

A. APPLICABLE BASE METAL TYPES AND THICKNESSES.

B. SKETCH OF JOINT INDICATING APPLICABLE DIMENSIONS. INDIVIDUAL PASSES SHALL BE IDENTIFIED AND NUMBERED TO IDENTIFY THE SEQUENCE. THE SKETCH SHALL IDENTIFY THE MAXIMUM THICKNESS AND BEAD WIDTH. IN NO CASE SHALL THE LAYER THICKNESS EXCEED 1/4" NOR THE BEAD WIDTH EXCEED 5/8."

C. PREHEAT REQUIREMENTS.

D. ELECTRICAL CHARACTERISTICS (I.E., CURRENT, VOLTAGE, TRAVEL SPEED, ETC.).

E. ELECTRODE REQUIREMENTS SHALL MEET THE REQUIREMENTS OF AWS A5.1, AWS A5.5, AWS A5.17, AWS A5.23, AWS A5.18, AWS A5.20, AWS A5.28, AND AWS A5.29, AS APPLICABLE FOR WELDING METHOD USED.

5.5. STEEL JOISTS AND JOIST GIRDERS

5.5.1. DESIGN LOADS SHALL BE AS STATED IN THE DESIGN CRITERIA SECTION OF THESE NOTES PLUS ANY SPECIAL LOADS INDICATED ON THE DRAWINGS. UNLESS OTHERWISE NOTED, MINIMUM DESIGN LOADS SHALL INCLUDE:

A. WHERE PRIMARY ROOF MEMBERS ARE EXPOSED TO A WORK FLOOR A SINGLE NON-CONCURRENT CONCENTRATED LIVE LOAD OF 2000 LBS SHALL BE LOCATED AT ANY PANEL POINT ALONG THE TRUSS BOTTOM CHORD.

B. AT ROOF JOISTS AND JOIST GIRDERS, A MINIMUM NET UPLIFT LOAD OF 10 PSF.

5.5.2. STEEL JOISTS AND JOIST GIRDERS SHALL BE MANUFACTURED PER THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR STEEL JOISTS AND JOIST GIRDERS PUBLISHED BY THE STEEL JOIST INSTITUTE.

5.5.3. ALL STEEL JOISTS AND JOISTS GIRDERS SHALL BE MANUFACTURED BY A FABRICATOR CURRENTLY APPROVED BY ICC (INTERNATIONAL CODE COUNCIL). MANUFACTURER SHALL BE A MEMBER OF SJI, AND ALL STEEL JOISTS AND JOIST GIRDERS SHALL BE SJI APPROVED.

5.5.4. THE MANUFACTURER SHALL SUBMIT SHOP DRAWINGS AND CALCULATIONS SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF THE PROJECT.

5.5.5. IT SHALL BE THE RESPONSIBILITY OF THE MANUFACTURER, THE GENERAL CONTRACTOR, AND THE ERECTOR TO MANUFACTURE AND INSTALL ALL STEEL JOISTS AND JOIST GIRDERS IN CONFORMANCE WITH THE MOST CURRENT OSHA RULES (OSHA 29 CFR PART 1926.757).

5.5.6. LIMIT LIVE LOAD AND/OR SNOW LOAD DEFLECTION TO L/240 FOR ROOF FRAMING MEMBERS.

5.5.7. THE JOIST MANUFACTURER SHALL DESIGN THE JOISTS FOR UNIFORM LOADS INDICATED ON THE STRUCTURAL DRAWINGS AS WELL AS ALL SPECIAL LOADS NOTED ON THE STRUCTURAL PLANS AND DETAILS. SPECIAL LOADS SHALL INCLUDE POINT LOADS FOR SUPPORT OF SECONDARY FRAMING, OVERFRAMING AND SUPPORTED EQUIPMENT (MECHANICAL UNITS, SUSPENDED EQUIPMENT, ETC.).

5.5.8. THE JOIST MANUFACTURER SHALL COORDINATE JOIST BRIDGING AT EXPOSED LOCATIONS FOR ARCHITECTURAL APPEARANCE. BRIDGING LOCATIONS SHALL ALSO BE COORDINATED TO AVOID CONFLICTS WITH MECHANICAL DUCTWORK, SKYLIGHTS AND OTHER BUILDING SYSTEMS.

6. CARPENTRY

DIMENSION LUMBER SHALL BE DF.#2 SAWN LUMBER BEAMS, HEADERS AND COLUMNS SHALL BE DF#2 OR AS SHOWN ON THE DRAWINGS. ALL 2" NOMINAL LUMBER SHALL BE KILN DRIED (KD). EACH PIECE OF LUMBER SHALL BEAR STAMP OF WEST COAST LUMBER INSPECTION BUREAU (WCLIB) AND/OR WESTERN WOOD PRODUCTS ASSOCIATION (WWPA) SHOWING GRADE MARK.

6.1. PRESSURE-PRESERVATIVE TREATMENT IN ACCORDANCE WITH AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) STANDARD U1, LATEST EDITION TO THE USE CATEGORY AS FOLLOWS:

6.1.1. TREAT ALL WOOD IN CONTACT WITH CONCRETE, MORTAR, GROUT, MASONRY AND WITHIN 12" OF EARTH TO THE REQUIREMENTS OF USE CATEGORY UC2 (INTERIOR/DAMP).

6.2. CARPENTRY HARDWARE

6.2.1. MACHINE BOLTS SHALL BE ASTM A-307.

6.2.2. PROVIDE MALLEABLE IRON WASHERS (MIW) OR HEAVY PLATE CUT WASHERS WHERE BOLT HEADS, NUTS OR LAG SCREWS BEAR ON WOOD.

6.2.3. NAILS SHALL BE COMMON, AMERICAN OR CANADIAN MANUFACTURER ONLY WITH MIN. DIAMETERS AS FOLLOWS:

NAIL SIZE	MINIMUM NAIL SHANK DIAMETER	MINIMUM NAIL LENGTH
8d	0.131"	2 1/2"
10d	0.148"	3"
12d	0.148"	3 1/4"
16d SINKER	0.148"	3 1/4"
16d	0.162"	3 1/2"
20d	0.192"	4"

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PROJECT:

PUYALLUP CORPORATE CENTER

EAST MAIN AVENUE AT LINDEN LANE
PUYALLUP, WASHINGTON

Description:	No:	Date:
PERMIT SUBMITTAL		04/03/2020
PRICING SET	△	07/21/2020
PERMIT RESUBMITTAL		08/24/2020

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SEAL:

DANIEL L. BOOTH
STATE OF WASHINGTON
28466
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

CITY STAMP:

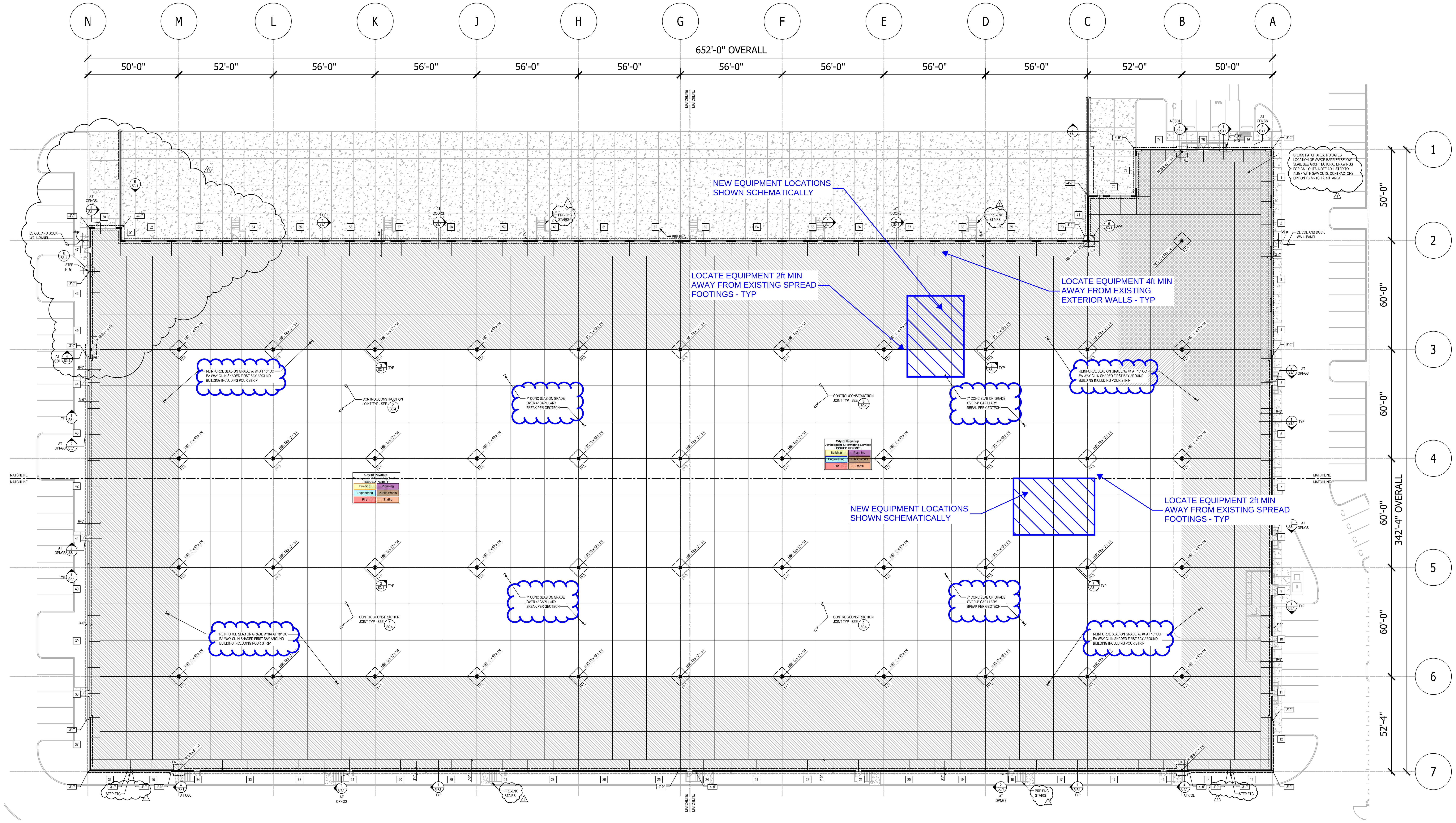
NOTICE:

STRUCTURAL NOTES

Proj. No: 2190390.20
Reviewed By: LAH/CLR

S0.1

PRCTI20221709



OVERALL FOUNDATION PLAN

NTS

1

SCALE IN FEET (0, 32, 64)

FOUNDATION NOTES:

1. SEE SHEET S0.1 AND S0.2 FOR GENERAL NOTES. SEE SHEET S0.4 FOR TYPICAL DETAILS. SEE SHEET S0.3 FOR TESTING AND INSPECTION NOTES.
2. SEE GEOTECHNICAL ENGINEERING REPORT FOR ALL FOUNDATION AND SLAB SUPPORT REQUIREMENTS. THIS INCLUDES ALL EXCAVATION, FILL AND FILL PLACEMENT REQUIREMENTS.
3. SEE ARCHITECTURAL/MECHANICAL DRAWINGS FOR DRAINS, SLOPES, AND OTHER FLOOR DEPRESSIONS NOT SHOWN.
4. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS, ELEVATIONS, AND WALLS NOT SHOWN.
5. VERIFY ALL WINDOW AND DOOR WIDTH AND HEIGHTS WITH ARCHITECTURAL DRAWINGS.
6. SEE ARCHITECTURAL DRAWINGS FOR STUD SIZE, SPACING, AND CALLOUTS AT NON-STRUCTURAL WALLS.
7. FOR TYPICAL CONNECTION OF NON-LOAD BEARING WALLS TO SLAB, USE POWER ACTUATED FASTENERS AT 16" O.C.
8. PANEL DIMENSIONS SHOWN ARE TO CENTERLINE OF PANEL JOINT. SEE ARCHITECTURAL DRAWINGS FOR ADDITIONAL PANEL DIMENSIONS.
9. ELEVATIONS OF PANELS ARE SHOWN STARTING ON SHEET S5.1 THROUGH S5.6.
10. UNLESS NOTED OTHERWISE, TILT-UP PANEL ELEVATIONS SHOW PANELS VIEWED FROM INSIDE OF BUILDING LOOKING TOWARDS BUILDING EXTERIOR.
11. POUR STRIP CONTROL JOINTS, LOCATE AT PANEL JOINTS AND MIDWAY BETWEEN. AT TURNS IN POUR STRIP ADD JOINTS FROM MAIN SLAB TO OUTSIDE WALL.
12. SEE 1/S3.2 FOR TRASH ENCLOSURE. SEE ARCHITECTURAL SITE PLAN FOR LOCATION.

LEGEND:

— TILT-UP CONCRETE WALL. FOR REINFORCING REQUIREMENTS AND JOINT LOCATIONS, SEE TILT-UP CONCRETE PANEL ELEVATIONS ON SHEETS S5.1 THRU S5.6.

PANEL JOINT BETWEEN TILT-UP CONCRETE WALL PANELS.

FOOTING SCHEDULE

MARK	SIZE	REINFORCING	REMARKS
F6.0	6'-0" x 6'-0" x 1'-2"	(7) #5 EACH WAY AT BOTTOM OF FOOTING	
F7.5	7'-6" x 7'-6" x 1'-4"	(7) #6 EACH WAY AT BOTTOM OF FOOTING	

FOOTINGS SCHEDULE NOTES:

1. TOP OF FOOTING ELEVATION = -1'-0" UNLESS NOTED OTHERWISE ON PLAN.
2. FOOTING DESIGN BASED ON 2500 PSF ALLOWABLE SOIL BEARING PRESSURE.
3. EQUALLY SPACE REINFORCING IN EACH DIRECTION.
4. PROVIDE 3" CLEAR TO REINFORCING AT BOTTOM OF FOOTING.

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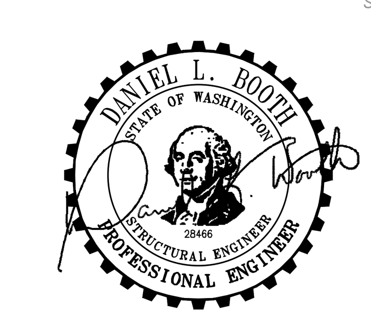
SEAL:



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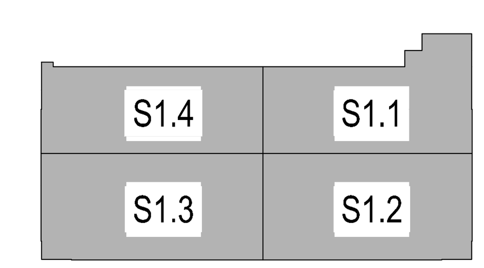

KEY PLAN

OVERALL FOUNDATION PLAN

Proj. No: 2190390.20

Reviewed By: LAH/CLR

S1.0

⚠ This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

ℹ The ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

ATC Hazards by Location

PRCTI20221709

Search Information

Coordinates: 47.19119836700967, -122.2611706795929

Elevation: 55 ft

Timestamp: 2022-10-05T02:44:43.491Z

Hazard Type: Wind

Map data ©2022 Imagery ©2022 , Maxar Technologies, U.S. Geological Survey, USDA/FPAC/GEO

ASCE 7-16

MRI 10-Year	67 mph
MRI 25-Year	73 mph
MRI 50-Year	78 mph
MRI 100-Year	82 mph
Risk Category I	92 mph
Risk Category II	97 mph
Risk Category III	104 mph
Risk Category IV	108 mph

ASCE 7-10

MRI 10-Year	72 mph
MRI 25-Year	79 mph
MRI 50-Year	85 mph
MRI 100-Year	91 mph
Risk Category I	100 mph
Risk Category II	110 mph
Risk Category III-IV	115 mph

ASCE 7-05

ASCE 7-05 Wind Speed	85 mph

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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⚠ This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

ℹ The ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

ATC Hazards by Location

PRCTI20221709

Search Information

Map data ©2022 Imagery ©2022 , Maxar Technologies, U.S. Geological Survey, USDA/FPAC/GEO

Coordinates: 47.19119836700967, -122.2611706795929

Elevation: 55 ft

Timestamp: 2022-10-05T02:47:09.267Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: II

Site Class: D-default

Basic Parameters

Name	Value	Description
S_S	1.258	MCE_R ground motion (period=0.2s)
S_1	0.433	MCE_R ground motion (period=1.0s)
S_{MS}	1.509	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.006	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

▾Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.914	Coefficient of risk (0.2s)
CR_1	0.898	Coefficient of risk (1.0s)
PGA	0.5	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA

PRCTI20221709

PGA_M	0.6	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
SsRT	1.258	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.376	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.433	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.482	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.5	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

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Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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3.3 Groundwater

We observed light to moderate groundwater seepage in 6 of the 14 test pits at depths ranging from 7.5 to 10 feet below existing site grades. Additionally, we observed wet soil from 7.5 to 10 feet in 8 of the test pits. We performed two pore water dissipation tests. One at CPT-1 and one at CPT-5. Based on the test results, the static groundwater level was indicated to be at a depth of four to seven feet below current site grades. Fluctuations in the static groundwater level will occur seasonally. Based on the time of year of our testing, we expect the groundwater levels indicated to be near their seasonal lows. Typically, groundwater will reach maximum levels during the wet winter months.

3.4 Seismic

Liquefaction is a phenomenon where there is a reduction or complete loss of soil strength due to an increase in water pressure induced by vibrations. Liquefaction mainly affects geologically recent deposits of fine-grained sands underlying the groundwater table. Soils of this nature derive their strength from intergranular friction. The generated water pressure or pore pressure essentially separates the soil grains and eliminates this intergranular friction; thus, eliminating the soil's strength.

We completed a liquefaction analysis using the computer program LiquefyPro published by CivilTech Corporation. The analysis was completed using a ground acceleration value of 0.55g, which is the ASCE 7-16 site-modified peak ground acceleration value (PGA_M) determined using the map-based online ground motion parameter calculator at https://seismicmaps.org/ for Latitude 47.191033ºN and Longitude 122.261465ºW. The results of the liquefaction analysis are attached in Appendix B.

The results of our analysis indicate soil liquefaction could occur during the design earthquake event. Analysis indicates that liquefaction of the alluvial soil layers could result in total settlements between three and three and one half inches, half of which could be differential. If unmitigated, these settlements would result in some cracking of building walls and floor slabs, as well as distortion of doors and windows, but would not structurally impair the building's use, in our opinion. If the Owner is not willing to accept the risk associated with the potential settlements due to liquefaction of the site soils, the building should be supported on densified aggregate piers.

Based on the soil conditions encountered and the local geology, the 2018 International Building Code (IBC) indicates that site class "D" should be used in structural design.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 General

Based on our study, in our opinion, development of the site as proposed is feasible from a geotechnical engineering standpoint. The primary geotechnical concern at the site is the presence of compressible soil strata susceptible to consolidation under the planned fill placement and building loads. If unmitigated, compression of these soft soils under project loads would result in unacceptable levels of differential settlement.

4.4 Foundations

Spread Footings

The industrial building may be supported on conventional spread footing foundations bearing on foundation subgrade prepared as recommended in Section 4.2 of this report. Perimeter foundations exposed to the weather should bear at a minimum depth of 1.5 feet below final exterior grades for frost protection. Interior foundations can be constructed at any convenient depth below the floor slab.

Following the completion of a successful surcharge program, we recommend designing foundations for a net allowable bearing capacity of 2,500 pounds per square foot (psf). For short-term loads, such as wind and seismic, a one-third increase in this allowable capacity can be used in design. Following successful completion of the surcharge program, with structural loading as anticipated and this bearing stress applied, estimated immediate foundation settlements of about 1-inch and differential settlement of ½-inch should be expected.

For designing foundations to resist lateral loads, a base friction coefficient of 0.35 can be used. Passive earth pressures acting on the sides of the footings can also be considered. We recommend calculating this lateral resistance using an equivalent fluid weight of 300 pounds per cubic foot (pcf). We recommend not including the upper 12 inches of soil in this computation because it can be affected by weather or disturbed by future grading activity. This value assumes the foundations will be backfilled with structural fill, as described in Section 4.2 of this report. The values recommended include a safety factor of 1.5.

Ground Improvement

As discussed above, as a foundation support alternative in lieu of implementing a surcharge fill program, we recommend using ground improvement techniques to establish support for conventional spread footing designs. Methods that could be considered include vibrated stone columns or aggregate rammed piers. Both of these methods create highly densified columns of graded aggregate that would extend through the upper softer soils into the underlying medium dense soils.

Because of the methods used to construct the columns, some improvement of the adjacent soils is also realized. Moreover, these methods can provide liquefaction mitigation by providing drainage paths and reduced pore pressures during ground shaking, and by constructing relatively high strength, non-liquefiable inclusions in the soils. Once constructed, conventional spread footing foundations can be designed to bear immediately above the stone column/aggregate pier locations.

These ground improvement techniques are typically completed on a design/build approach with both design and construction completed by a specialty contractor. We can assist in selecting the specialty contractor, if desired.

4.5 Slab-on-Grade Floors

Slab-on-grade floors may be supported on a subgrade as recommended in Section 4.2. Immediately below the floor slab, we recommend placing a four-inch thick capillary break layer composed of clean, coarse sand or fine gravel that has less than three percent passing the No. 200 sieve. This material will reduce the potential for upward capillary movement of water through the underlying soil and subsequent wetting of the floor slab.

The capillary break layer will not prevent moisture intrusion through the slab caused by water vapor transmission. Where moisture by vapor transmission is undesirable, such as covered floor areas, a common practice is to place a durable plastic membrane on the capillary break layer and then cover the membrane with a layer of clean sand or fine gravel to protect it from damage during construction, and to aid in uniform curing of the concrete slab. It should be noted that if the sand or gravel layer overlying the membrane is saturated prior to pouring the slab, it will not be effective in assisting uniform curing of the slab and can actually serve as a water supply for moisture bleeding through the slab, potentially affecting floor coverings. Therefore, in our opinion, covering the membrane with a layer of sand or gravel should be avoided if floor slab construction occurs during the wet winter months and the layer cannot be effectively drained. We recommend floor designers and contractors refer to the current American Concrete Institute (ACI) Manual of Concrete Practice for further information regarding vapor barrier installation below slab-on-grade floors.

4.6 Infiltration Feasibility

Based on our study, it is our opinion that subsurface conditions are generally not favorable for infiltration of site stormwater. The native soils observed at the site contain a high percentage of soil fines that would impede any downward migration of site stormwater. Additionally, mottling was observed that indicates a shallow groundwater table develops at the site that would further impede any stormwater migration. Even low impact development (LID) techniques would likely fill up and overtop during rain events and cause minor local flooding. The USDA Natural Resources Conservation Service (NRSC) categorizes the soils at the lower southern portion of the site as Briscot loam. These soils fall into Hydrologic Group C as outlined in Table B.5 in Appendix III-B of the *2015 Pierce County Stormwater and Site Development Manual (PCSSDM)* and are classified as having low infiltration rates when wetted. Based on these soil conditions, it is our opinion that the stormwater should be managed using a conventional system.

4.7 Lateral Earth Pressures

The magnitude of earth pressure development on retaining walls will partly depend on the quality of wall backfill. Where fill is placed behind retaining walls, we recommend placing and compacting it as structural fill as described in Section 4.2. To guard against the build-up of hydrostatic pressure, wall drainage must also be installed. We recommend that wall drainage consist of a minimum 12-inch thick layer of washed gravel placed adjacent to the wall. Alternatively, a composite drainage panel such as Mirafi G100N or equal can be used. A four-inch diameter perforated pipe should be placed on a bed of gravel along the base of the wall footing and directed to a suitable outlet. A typical wall drainage detail is attached as Figure 4.

With granular backfill placed and compacted as recommended and drainage properly installed, we recommend designing restrained (not free to deflect) retaining walls for an at-rest earth pressure equivalent to a fluid weighing 50 pcf. A value of 35 pcf may be used for the case where the wall is unrestrained. These values do not include other surcharge loading such as from fill backslopes or adjacent footings that may act on the wall. If such conditions will exist, then the imposed loading must be included in wall design. Values of friction at the base of wall foundations and passive earth pressure that are used in design to resist lateral loads are provided in Section 5.4 of this report.

Red Dot Foundations

- Foundations Needed
  - Mitsubishi Laser
  - 720t Injection Press
- Foundation Review
  - Environmental Chamber
    - Drawing attached to email
  - 950t Injection mold machine
    - Drawing attached to email

Mitsubishi Laser

EQUIVALENT UNIFORM LOAD IS LESS THAN 250 PSF - SPECIFIED SLAB IS OK BY INSPECTION

- Machine Dimensions
  - 629” x 244”
- Machine Weight
  - 22,000lb
- Machine Anchoring
  - Anchors not specified by manufacturer.
  - Anchor locations provided on attached drawing.

Foundation Conditions	1. The difference in the level of the floor can be no more than 0.393” (10mm) over the length of the machine. 2. Foundation must be able to receive anchors. Please confirm that there are no buried gas, air, electrical or water lines.
Floor Vibration	For safe and stable operation, vibrations should be within the following limits. 1. Acceleration .5m/s², 0.05G or less 2. Amplitude .5micron or less

FLOOR / FOUNDATION REQUIREMENTS

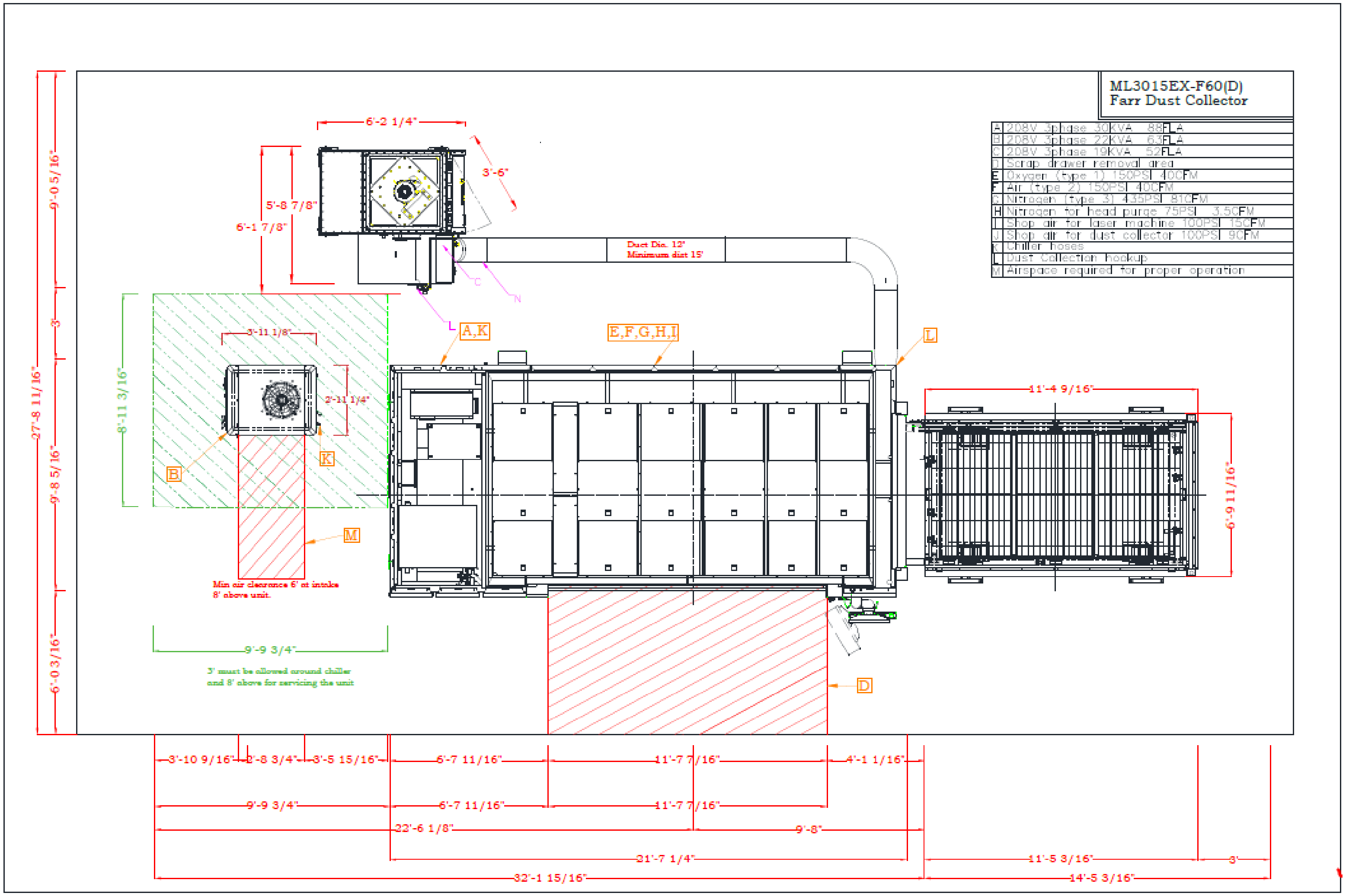
- The manufacturer requires that the machine to be installed on 10 inches (250mm) or more of reinforced concrete to minimize floor vibration.
- If the machine is installed on a foundation less than 10 inches thick, the customer must be aware that maintenance may be required at more frequent intervals than specified. An inadequate foundation can also affect part tolerance and quality.
- The floor where the laser is to be installed must be level to 0.39 inches (10mm) over the entire length of the machine.
- For safe and stable operation, floor vibrations should be below the following limits.
  - Acceleration.........0.5m/s² Max
  - Max. Amplitude.....5.0µm.

⚠ If the machine is installed in an area that is not properly prepared, maintenance may be required at more frequent intervals than specified and result in premature wear of parts due to shifting or settling of the foundation slab. In some cases, an improper foundation can affect the accuracy of the machine as well as the ability to achieve maximum cutting speeds.

- The machine must be anchored. If the machine is not anchored, damage will occur.

PRCTI20221709

Mitsubishi Laser



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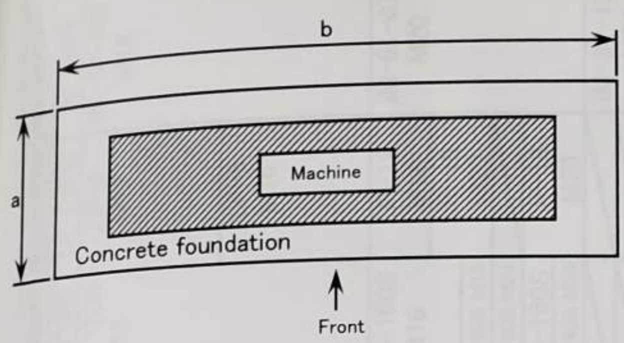
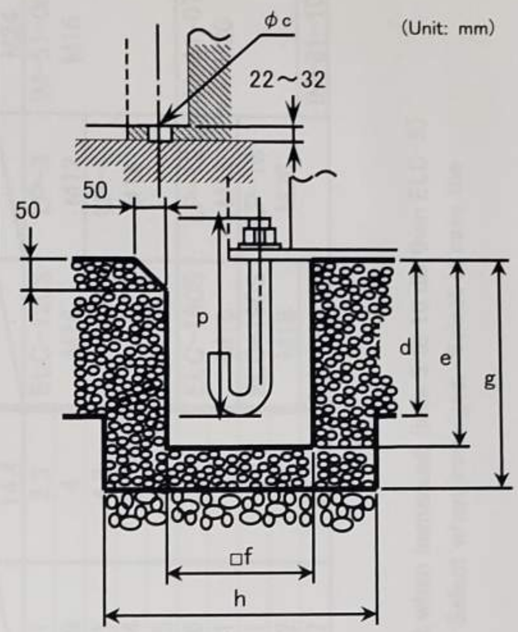
4. Reference Foundation Drawings



(Unit: mm)

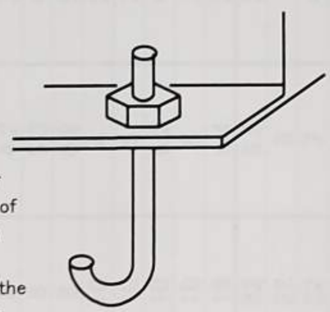


【INSTALLATION DETAILS WHEN ANCHOR BOLTS ARE USED】

(1) When the oil, rust, paint etc. is stick to where the mortar touches the machine base and side, remove it.

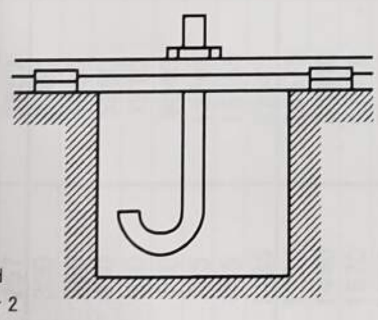
(2) Place the anchor bolts in the anchor bolt holes of the concrete foundation beforehand.

(3) Place the machine on the foundation. At this time insert the anchor bolts through the bolt holes of the machine, and temporarily secure them with nuts.



(4) Lay inclined liners or leveling blocks, etc. as close to the anchor bolts as possible. (If the interval of the anchor bolts hole is more than 1.5m, lay them on the way too.) And carry out leveling. (Only for the machine that is clamp and injection unit separated-type, carry out leveling and centering.)

(5) When leveling and centering of the machine completely adjusted, pour mortar into anchor bolt holes of the concrete foundation.



(6) Confirm that the mortar is thoroughly dried and hardened (7 days for ordinary mortar, or 2 to 3 days for non-shrink mortar). Re-adjust the levering and centering while tightening the anchor bolts.

(7) When all adjustments are completed, point weld the inclined liner, etc. so that they cannot be moved.

(8) If necessary, make the lower part of the bed hard by mortar over the circumference.

【NOTE】

① According to the ground conditions, consult the subcontractor to make the foundation with rubble and ballast, etc.

② Ground power required to support the machine weight is 5ton/m²

【REFERENCE】

① Concrete mixing rate
cement 1 : sand 2 : ballast 4

② Mortar mixing rate
cement 1 : sand 1

【Foundation size adjustment as guidelines】 (unit: mm)

Consult the subcontractor after checking the "Specifications", "Floor Plan Drawing" and working environment, etc.

a･･･Machine floor size + over 500

b･･･Machine floor size + over 500

c･･･Refer to "Floor Plan Drawing"

d･･･Clamping force is up to 100 ton･･･over 150
Clamping force is 150～200 ton･･･over 200
Clamping force is 250～350 ton･･･over 300
Clamping force is over 500 ton･･･over 500

e･･･Over 〔p+50〕

f･･･Approximately 170～300

g･･･Over 〔e+50〕

h･･･350～

p･･･200～ (Take a larger number for the middle or large type machines.)

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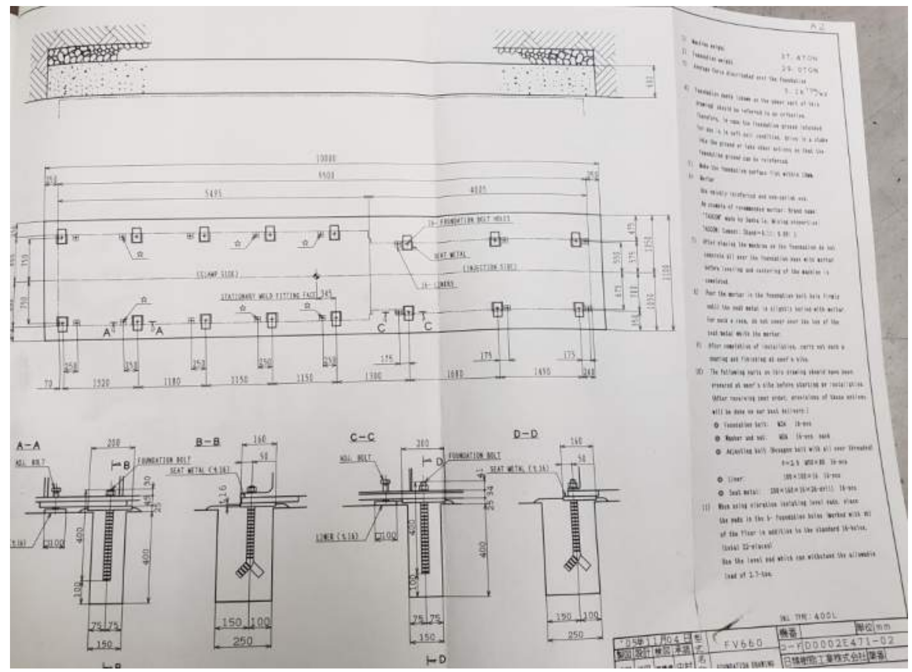
720t Injection Press

EQUIVALENT UNIFORM LOAD IS LESS THAN 350 PSF - SPECIFIED SLAB OK BY INSPECTION

- Machine Dimensions
  - 393.7” x 82.67”
  - Bolt locations specified in drawing
- Machine Weight
  - 37.4ton
- Machine Anchoring
  - No Anchoring.



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EQUIVALENT TO 658 PSF - OK PER GEOTECH REPORT

1) Machine weight 37.4TON

2) Foundation weight 29.0TON

3) Average force discributed over the foundation 3.16 TON/m2

4) Foundation depth (shown on the upper part of this drawing) should be referred to as criterion. Therefore, in case the foundation ground intended for use is in soft soil condition, drive in a stake into the ground or take other actions so that the foundation ground can be reinforced.

5) Make the foundation surface flat within 10mm.

6) Mortar

Use quickly reinforced and non-shrink one.
An example of recommended mortar: Brand name: "TASCON" made by Danka Co. Mixing proportion:
TASCON: Cement: Stand=0.11: 0.89: 1

7) After placing the machine on the foundation do not concrete all over the foundation base with mortar before leveling and centering of the machine is completed.

8) Pour the mortar in the foundation bolt hole firmly until the seat metal is slightly buried with moltar. For such a case, do not cover over the top of the seat metal whith the mortar.

9) After completion of installation, carry out such a pouring and finishing at user's site.

10) The following parts on this drawing should have been prepared at user's site before starting up installation. (After receiving your order, provisions of these options will be done on our best delivery.)

◎ Foundation bolt: M24 16-pcs

◎ Washer and nut: M24 16-pcs each

◎ Adjusting bolt (Hexagon bolt with all over threaded) P=2.0 M30×80 16-pcs

◎ Liner: 100×100×16 16-pcs

◎ Seat metal: 200×160×16×26-drill 16-pcs

11) When using vibration isolating level pads, place the pads in the 6- foundation holes (marked with ☆) of the floor in addition to the standard 16-holes. (total 22-places)
Use the level pad which can withstand the allowable load of 2.7-ton.

A

1180

ION B

SEA

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Project RED DOT
Project No. 2220760.20
Subject
Phone
With/To
Fax #
Address
Faxed Pages
Date 10/5/22
By ADM

☐ Page ____ of ____
☒ Calculations
☐ Fax
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Land Surveyors

SEISMIC ANALYSIS PER ASCE 7 SECTION 13.3

$$F_p = \frac{0.4\, a_p S_{DS} W_p}{(R_p / I_p)} \left(1 + 2\, z/h\right)$$

GIVEN

$a_p = 1.0$
$R_p = 2.5$
$S_{DS} = 1.006$
$I_p = 1.0$
$z/h = 0.0$

$$= \frac{0.4(1.0)(1.006)W_p}{(2.5/1.0)} \left(1 + 2(0)\right)$$

$$= 0.16\, W_p$$

RSR FOR RIGID NONBUILDING STRUCTURES PER 15.4.2

$$V = 0.30\,(S_{DS})\, W\, (I_e)$$

$$= 0.30\,(1.006)\, W\, (1.0)$$

$$= 0.302\, W$$

∴ USE $V = 0.302\, W$

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Engineering	Public Works
Fire	Traffic

If this does not meet with your understanding, please contact us in writing within seven days. THANK YOU.

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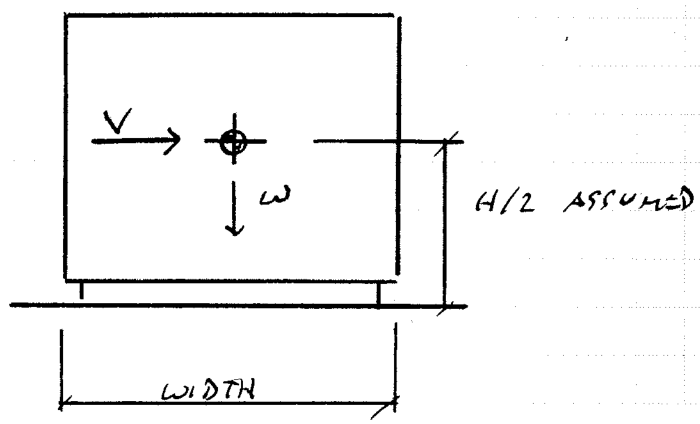
SEISMIC ANALYSIS



720 # + 950 # INJECTION EQUIPMENT

V = 0.302 (37.4 TONS)
= 22.6 k ULT
= 15.8 k ASD ⟶ ASSUME 1.5 k/ANCHOR

OT = [15.8 k (10') − 2/3 (37.4 TONS)(3.5')] / 7'

= 0 k → NO NET OVERTURNING

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MITSUBISHI LASER

$V = 0.302\,(22.0^k)$
$= 6.6^k$ ULT
$= 4.7^k$ ASD → ASSUME 1.5^k/ANCHOR

$OT = [[4.7^k(10') - 2/3(22^k)(10')]]/20'$

$= 0^k$ → NO NET OVERTURNING

ANCHORAGE DESIGN

APPLY OVERSTRENGTH FACTOR TO ANCHOR LOADS PER ACI 318 SECTION 17.2.3.5.3 (c)

$\Omega_o = 2.0$ ∴ USE $V_{MIN} = 3.0^k$ PER ANCHOR

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AHBL Engineers
2215 North 30th Street
Suite 300
Tacoma, WA 98403
253.383.2422

Project Title: PRCTI20221709 Red Dot Corporation Equipment Foundation
Engineer: ADM
Project ID: 2220760.20
Project Descr: New Equipment Foundations

Point Load on Slab

Project File: 2220760.20.ec6

LIC# : KW-06014847, Build:20.22.7.25 AHBL, INC (c) ENERCALC INC 1983-2022

DESCRIPTION: Existing Slab Capacity

Code References

Calculations per IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2018

Analytical Values

d - Slab Thickness	7.0 in	Ks - Soil Modulus of Subgrade Reac	100.0 pci
FS - Req'd Factor of Safety	3.0 : 1	Ec - Concrete Elastic Modulus	3,605.0 ksi
		f'c - Concrete Compressive Strength	4.0 ksi
		μ - Poisson's Ratio	0.150
		Min. Adjacent Load Distance	48.064 in

Analysis Formulas

Pn = 1.72 [(Ks R1 / Ec) 10,000 + 3.6] Fr d'
Ks = Soil modulus of subgrade reaction
R1 = 50% plate average dimension = sqrt(PlWid * PlLer
Ec = Concrete elastic modulus
Fr - Concrete modulus of rupture = 7.5 * sqrt(f'c)
d - Slab Thickness

Min Adjacent Column Distance = 1.5 * ([Ec d^3 / (12 * (1- u^2) Ks] ^ 1
Ec = Concrete elastic modulus
d - Slab Thickness
u - Poisson's ratio
Ks = Soil modulus of subgrade reaction

Load & Capacity Table

Load ID	Plate (in) Wid	Len	R1 (in)	Applied Concentrated Load on Plate - (kip) D	Lr	L	S	W	E	Governing Ld Comb	Pu (kip)	Pn (kip)	Check
Point Load	4.00	4.00	2.00	50.00						D Only	50.0	166.1	Pass, FS= 3.32 >= 3

MAXIMUM POINT LOAD ON EXISTING
7" THICK CONCRETE SLAB

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SIMPSON Strong-Tie® Anchor Designer™ Software
Version 3.0.7775.0

Company:	AHBL	Date:	10/4/2022
Engineer:	ADM	Page:	1/5
Project:	Red Dot Equipment Foundations		
Address:	2215 North 30th, Suite 300		
Phone:	253.383.2422		
E-mail:	dmceachern@ahbl.com		

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location: Laser Anchorage
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Bonded anchor
Material: F1554 Grade 36
Diameter (inch): 0.750
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: ICC-ES ESR-2508
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 10.38
c_{ac} (inch): 10.50
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 12.00
State: Cracked
Compressive strength, f'_c (psi): 3000
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Periodic
Temperature range, Short/Long: 150/110°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 3.00 x 3.00 x 0.25

Recommended Anchor
Anchor Name: SET-XP® - SET-XP w/ 3/4"Ø F1554 Gr. 36
Code Report: ICC-ES ESR-2508

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PRCTI20221709

Anchor Designer™
Software
Version 3.0.7775.0

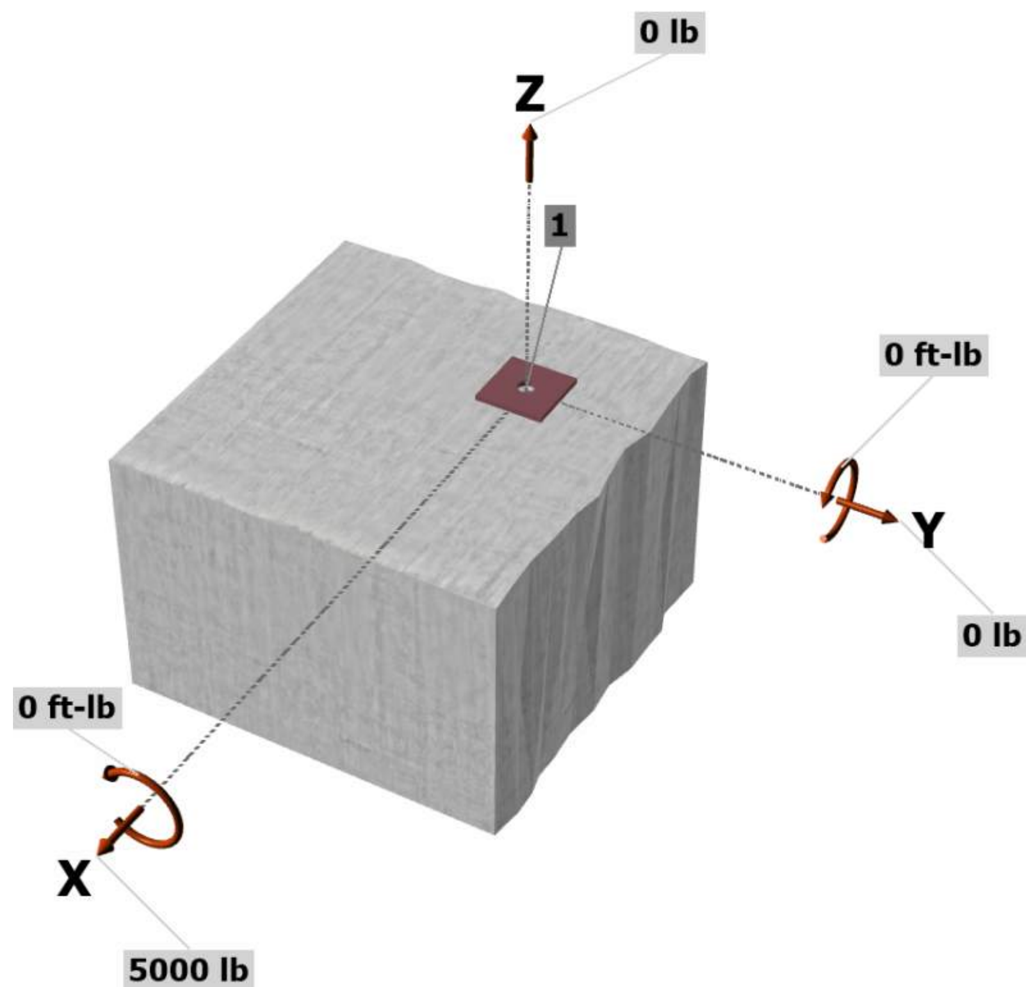
Company:	AHBL	Date:	10/4/2022
Engineer:	ADM	Page:	2/5
Project:	Red Dot Equipment Foundations		
Address:	2215 North 30th, Suite 300		
Phone:	253.383.2422		
E-mail:	dmceachern@ahbl.com		

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: Yes
Anchors subjected to sustained tension: No
Ductility section for tension: 17.2.3.4.2 not applicable
Ductility section for shear: 17.2.3.5.2 not applicable
Ω_0 factor: not set
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: Yes

Strength level loads:

N_{ua} [lb]: 0
V_{uax} [lb]: 5000
V_{uay} [lb]: 0
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0

<Figure 1>



Company:	AHBL	Date:	10/4/2022
Engineer:	ADM	Page:	3/5
Project:	Red Dot Equipment Foundations		
Address:	2215 North 30th, Suite 300		
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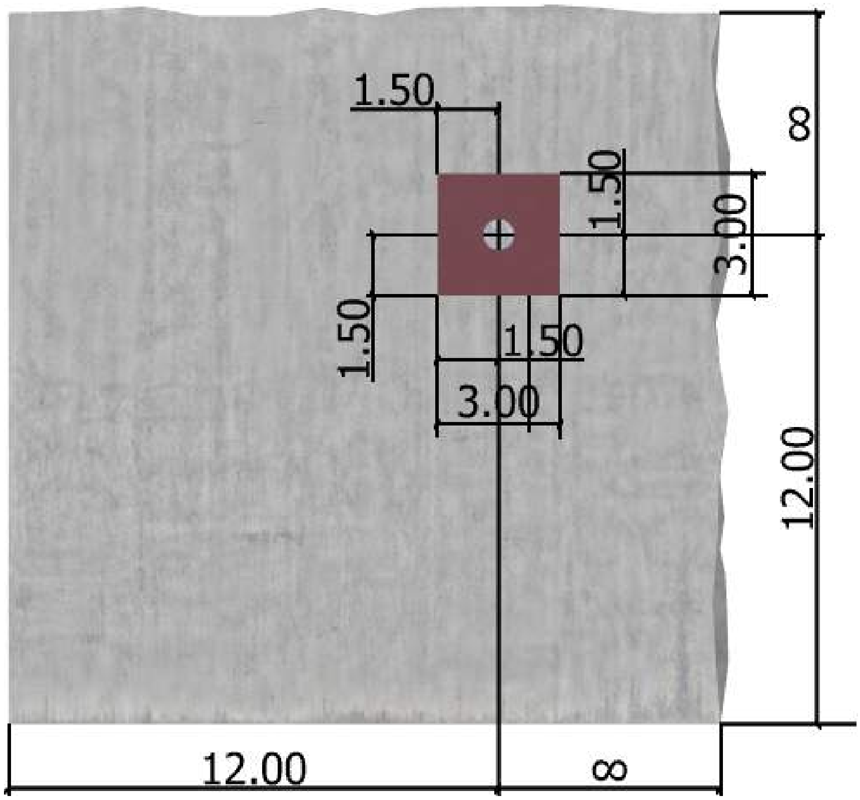
E-mail:	dmceachern@ahbl.com		

<Figure 2>



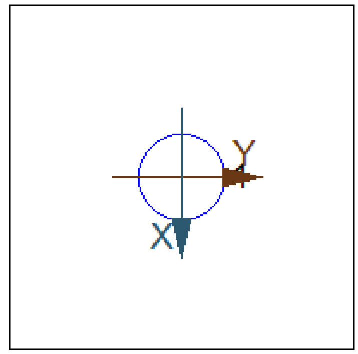
PRCTI20221709

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	0.0	5000.0	0.0	5000.0
Sum	0.0	5000.0	0.0	5000.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 0
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\alpha_{V,seis}$	$\phi_{grout}\alpha_{V,seis}\phi V_{sa}$ (lb)
11625	1.0	0.65	0.68	5138

9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.5.2)

Shear perpendicular to edge in x-direction:

$V_{bx} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
6.00	0.750	1.00	3000	12.00	20492

$\phi V_{cbx} = \phi (A_{Vc} / A_{Vco}) \Psi_{ed,V} \Psi_{c,V} \Psi_{h,V} V_{bx}$ (Sec. 17.3.1 & Eq. 17.5.2.1a)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbx} (lb)
360.00	648.00	0.900	1.000	1.225	20492	0.70	8784

Shear parallel to edge in y-direction:

$V_{bx} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
6.00	0.750	1.00	3000	12.00	20492

$\phi V_{cby} = \phi (2)(A_{Vc} / A_{Vco}) \Psi_{ed,V} \Psi_{c,V} \Psi_{h,V} V_{bx}$ (Sec. 17.3.1, 17.5.2.1(c) & Eq. 17.5.2.1a)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cby} (lb)
360.00	648.00	1.000	1.000	1.225	20492	0.70	19520

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$\phi V_{cp} = \phi \min|k_{cp}N_a ; k_{cp}N_{cb}| = \phi \min|k_{cp}(A_{Na} / A_{Na0}) \Psi_{ed,Na} \Psi_{cp,Na} N_{ba} ; k_{cp}(A_{Nc} / A_{Nco}) \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b|$ (Sec. 17.3.1 & Eq. 17.5.3.1a)

k_{cp}	A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{cp,Na}$	N_{ba} (lb)	N_a (lb)
2.0	341.26	341.26	1.000	1.000	9362	9362

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ	ϕV_{cp} (lb)
324.00	324.00	1.000	1.000	1.000	12492	12492	0.70	13106

11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Shear	Factored Load, V_{ua} (lb)	Design Strength, $øV_n$ (lb)	Ratio	Status
Steel	**5000**	**5138**	**0.97**	**Pass (Governs)**
T Concrete breakout x+	5000	8784	0.57	Pass
|| Concrete breakout y-	5000	19520	0.26	Pass
Pryout	5000	13106	0.38	Pass

SET-XP w/ 3/4"Ø F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.

12. Warnings

- When cracked concrete is selected, concrete compressive strength used in concrete breakout strength in tension, adhesive strength in tension and concrete pryout strength in shear for SET-XP adhesive anchor is limited to 2,500 psi per ICC-ES ESR-2508 Section 5.3.

- Per designer input, the tensile component of the strength-level earthquake force applied to anchors does not exceed 20 percent of the total factored anchor tensile force associated with the same load combination. Therefore the ductility requirements of ACI 318 17.2.3.4.2 for tension need not be satisfied – designer to verify.

- Per designer input, the shear component of the strength-level earthquake force applied to anchors does not exceed 20 percent of the total factored anchor shear force associated with the same load combination. Therefore the ductility requirements of ACI 318 17.2.3.5.2 for shear need not be satisfied – designer to verify.

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

SIMPSON Strong-Tie®

Anchor Designer™ Software
Version 3.0.7775.0

Company:	AHBL	Date:	10/4/2022
Engineer:	ADM	Page:	1/5
Project:	Red Dot Equipment Foundations		
Address:	2215 North 30th, Suite 300		
Phone:	253.383.2422		
E-mail:	dmceachern@ahbl.com		

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location: 720t Injection Press Anchorage
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Bonded anchor
Material: Steel Grade 5.8
Diameter (mm): 24
Effective Embedment depth, h_{ef} (inch): 11.339
Code report: ICC-ES ESR-3372
Anchor category: -
Anchor ductility: No
h_{min} (inch): 16.85
c_{ac} (inch): 16.02
C_{min} (inch): 1.77
S_{min} (inch): 2.99

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 24.00
State: Cracked
Compressive strength, f'c (psi): 3000
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Periodic
Temperature range, Short/Long: 150/110°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 3.00 x 3.00 x 0.25

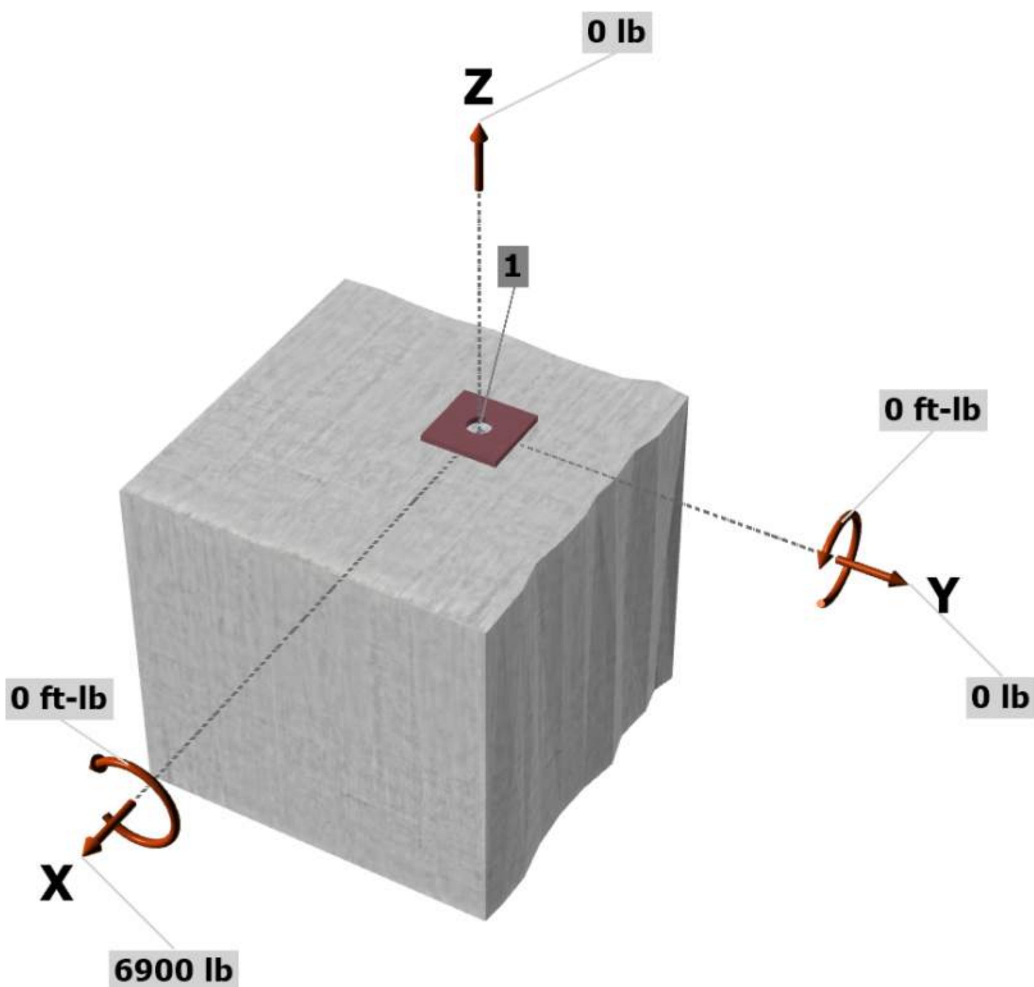
Recommended Anchor
Anchor Name: ET-HP® Metric - ET-HP w/ 24 mm Class 5.8
Code Report: ICC-ES ESR-3372

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: Yes
Anchors subjected to sustained tension: No
Ductility section for tension: 17.2.3.4.2 not applicable
Ductility section for shear: 17.2.3.5.2 not applicable
Ω_0 factor: not set
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: Yes

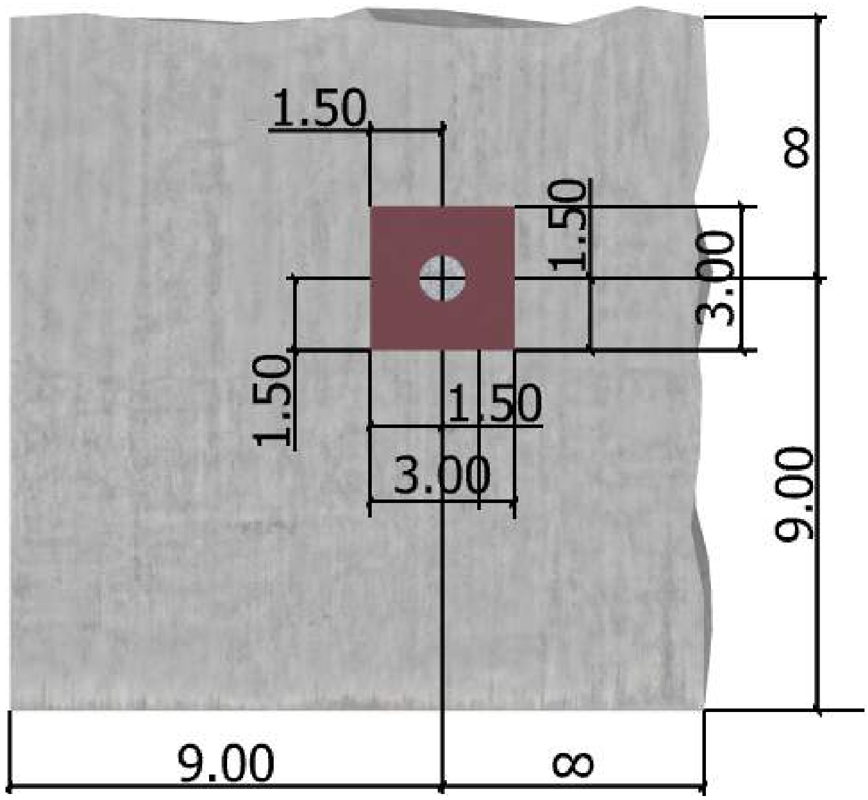
Strength level loads:

N_{ua} [lb]: 0
V_{uax} [lb]: 6900
V_{uay} [lb]: 0
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0

<Figure 1>



<Figure 2>



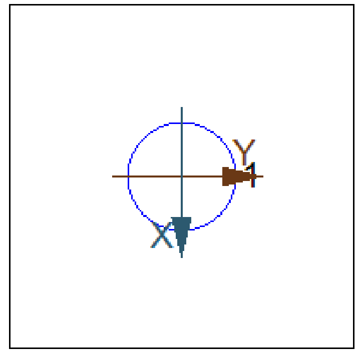
PRCTI20221709

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	0.0	6900.0	0.0	6900.0
Sum	0.0	6900.0	0.0	6900.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 0
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\alpha_{V,seis}$	$\phi_{grout}\alpha_{V,seis}\phi V_{sa}$ (lb)
23830	1.0	0.60	0.85	12153

9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.5.2)

Shear perpendicular to edge in x-direction:

$V_{bx} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
7.56	0.945	1.00	3000	9.00	13310

$\phi V_{cbx} = \phi (A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. 17.3.1 & Eq. 17.5.2.1a)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbx} (lb)
303.75	364.50	0.900	1.000	1.000	13310	0.70	6988

Shear parallel to edge in y-direction:

$V_{bx} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
7.56	0.945	1.00	3000	9.00	13310

$\phi V_{cby} = \phi (2)(A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. 17.3.1, 17.5.2.1(c) & Eq. 17.5.2.1a)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cby} (lb)
303.75	364.50	1.000	1.000	1.000	13310	0.70	15528

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
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10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$\phi V_{cp} = \phi \min|k_{cp}N_a ; k_{cp}N_{cb}| = \phi \min|k_{cp}(A_{Na}/A_{Na0})\Psi_{ed,Na}\Psi_{cp,Na}N_{ba} ; k_{cp}(A_{Nc}/A_{Nco})\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b|$ (Sec. 17.3.1 & Eq. 17.5.3.1a)

k_{cp}	A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{cp,Na}$	N_{ba} (lb)	N_a (lb)
2.0	268.23	268.23	1.000	1.000	14375	14375

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ	ϕV_{cp} (lb)
676.41	1157.07	0.859	1.000	1.000	35551	17847	0.70	20124

11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Shear	Factored Load, V_{ua} (lb)	Design Strength, $øV_n$ (lb)	Ratio	Status
Steel	6900	12153	0.57	Pass
T Concrete breakout x+	**6900**	**6988**	**0.99**	**Pass (Governs)**
|| Concrete breakout y-	**6900**	**15528**	**0.44**	**Pass (Governs)**
Pryout	6900	20124	0.34	Pass

ET-HP w/ 24 mm Class 5.8 with hef = 11.339 inch meets the selected design criteria.

12. Warnings

- Per designer input, the tensile component of the strength-level earthquake force applied to anchors does not exceed 20 percent of the total factored anchor tensile force associated with the same load combination. Therefore the ductility requirements of ACI 318 17.2.3.4.2 for tension need not be satisfied – designer to verify.

- Per designer input, the shear component of the strength-level earthquake force applied to anchors does not exceed 20 percent of the total factored anchor shear force associated with the same load combination. Therefore the ductility requirements of ACI 318 17.2.3.5.2 for shear need not be satisfied – designer to verify.

- Designer must exercise own judgement to determine if this design is suitable.

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