PROJECT MANUAL

CDB #630-012-004
Construct Salt Storage Shed
219 Barron Boulevard
Grayslake Team Section Headquarters
Grayslake (Avon Township Lake County), ILLINOIS
CDB BUILDING INV. NO. IDOT 012-0001
CONTRACT: General - 19021610

State of Illinois

CAPITAL DEVELOPMENT BOARD

USING AGENCY: ILLINOIS DEPARTMENT OF TRANSPORTATION

BY: MoDE Architects P.C.
343 W. Erie ST. Suite 210
Chicago, IL 60654

DATE: 01/09/2020

LICENSED ARCHITECT
JUNG J. MO
001-018521
STATE OF ILLINOIS

License Expiration Date: January 9th, 2020

Signature: _____

Date Signed: 12/06/2020

E-MAIL THIS FORM: This form may be submitted to CDB electronically. Attach a completed form to an e-mail addressed to the CDB Project Manager. All CDB e-mail addresses are available on our website: www.cdb.state/il.us

NOTE: Cover Sheet may be submitted electronically only for review purposes. To meet contractual requirements, Cover Sheet submitted to CDB must have an original Seal and Signature.

State of Illinois
CAPITAL DEVELOPMENT BOARD

MoDE Architects P.C.
343 W. Erie St. Suite 210
Chicago, IL 60654

PROJECT MANUAL FOR

CDB Project No. 630-012-004

Construct Salt Storage Building
District 1 – Grayslake Yard
Grayslake, Lake County Illinois
CDB Building No. IDOT 012-0001

DATE: January 9th, 2020

SPECIFIER(*S):

General: J. James Mo – MoDE Architects P.C.
312-475-9918 jmo@modearchitectsp.com

Mechanical: John Nowakowski – Melvin Cohen & Associates
312-663-3700 melcohen@xnet.com

Electrical: Ron Cohen – Melvin Cohen & Associates
312-663-3700 melcohen@xnet.com

Structural: Trevor G. Wickie – Larson Engineering
630-357-0540 twickie@larsonengr.com

Civil: Chelsea Bush – Larson Engineering
630-357-0540 cbush@larsonengr.com

END 00 01 10.

G1	Title Sheet and Location Plans
C0	Survey
C1	Concept Grading and Paving Plans
AS1	Site Demo Plan and New Site Plan
A1	Floor Plan and Details
A2	Building Elevations
S1	Foundation Floor Plan
V1	Ventilation Plan, Notes, and Schedules
E0	Electrical Site Plan, One-line Diagram
E1	Salt Storage Building Electrical Plan

END 00 01 15

TESTING SERVICE CORPORATION

Corporate Office
360 S. Main Place, Carol Stream, IL 60188-2404
630.462.2600 • Fax 630.653.2988

Local Offices:
457 E. Gundersen Drive, Carol Stream, IL 60188-2492
630.653.3920 • Fax 630.653.2726

650 N. Peace Road, Suite D, DeKalb, IL 60115-8401
815.748.2100 • Fax 815.748.2110

1350 TriState Parkway, Unit 122, Gurnee, IL 60031-9135
847.249.6040 • Fax 844.767.4721

2235 23RD Avenue, Rockford, IL 61104-7334
815.394.2562 • Fax 815.394.2566

203 Earl Road, Suite A, Shorewood, IL 60404-9446
815.744.1510 • Fax 815.744.1728

Geotechnical & Environmental Engineering

Construction Materials Engineering & Testing

Laboratory Testing of Soils, Concrete & Asphalt

Geo-Environmental Drilling & Sampling

Report of Soils Exploration

New Salt Storage Facility

IDOT Maintenance Yard

219 Barron Boulevard

Grayslake, Illinois

Larson Engineering of Illinois

GEOTECHNICAL GROUP

TESTING SERVICE CORPORATION

Local Office:

457 E. Gundersen Drive, Carol Stream, IL 60188-2492
630.653.3920 ● Fax 630.653.2726

Corporate Office:

360 S. Main Place, Carol Stream, IL 60188-2404
630.462.2600 ● Fax 630.653.2988

Local Office
May 30, 2019

Mr. Trevor G. Wickie
Larson Engineering of Illinois
1488 Bond Street, Suite 100
Naperville, IL 60563-6503

Re: L-89,619
New Salt Storage Facility
IDOT Maintenance Yard
219 Barron Boulevard
Grayslake, Illinois

Dear Mr. Wickie:

This report presents results of a soils exploration performed in connection with a new salt storage facility at an IDOT Maintenance Yard in Grayslake, Illinois. These geotechnical engineering services have been provided in accordance with TSC Proposal No. 62,517A dated April 12, 2019 and the attached General Conditions, incorporated herein by reference.

The project site is located on the west side of Zieger Drive just north of Center Street, in the central portion of the Village of Grayslake. It is accessed off of Barron Boulevard (IL Route 83) to the west. The property consists of an Illinois Department of Transportation (IDOT) maintenance yard, which contains a 1-story brick building with truck storage area at the north end and a salt storage dome and other smaller material storage structures on the southern half. The site is otherwise covered for the most part with asphalt pavement. It is relatively flat with the ground surface elevations at the boring locations varying by 1 foot.

Current plans call for the construction of a new salt storage facility. It is understood that the proposed building will have a storage capacity on the order of 10,000 tonnes of salt and have a dome-like roof/cover. Two (2) locations are being studied for the new salt storage facility. Based on a Site Plan provided to us which shows the salt storage building footprint at the two (2) locations, it appears that the proposed structure will have plan dimensions on the order of ±80' x 200'.

The results of field and laboratory testing and recommendations based upon these data are included in this report. Specifically addressed are building foundations, site-grading/slab-on-grade support and groundwater management.

Field Investigation and Laboratory Testing

Seven (7) soil borings (Nos. 1 - 7) were performed for this study. The boring locations were selected by others and laid out in the field by TSC. Reference is made to the enclosed Boring Location Plan for the drilling layout, ground surface elevations at the borings also being shown. The elevations were

acquired by TSC using a Trimble R8S GNSS Receiver which uses the North American Vertical Datum of 1988 (NAVD88), being rounded to the nearest 0.5 foot.

Borings 1 - 6 were drilled in the areas of the two (2) locations being studied for the proposed salt storage building and extended to 20 feet below existing grade. Boring 7 was performed between the existing salt dome and 1-story brick building with truck storage and made 10 feet deep (in order to further investigate any variations of the existing pavement and underlying soils for possible future site improvements).

Drilling and sampling procedures were in accordance with currently recommended American Society for Testing and Materials specifications. Soil sampling was performed at 2½-foot intervals to a depth of 15 feet and every 5 feet thereafter. The samples were taken in conjunction with the Standard Penetration Test (SPT), for which driving resistance to a 2" split-spoon sample (N value in blows per foot) provides an indication of the relative density of granular materials and consistency of cohesive soils. Water level readings were taken during and following completion of drilling operations.

Soil samples were examined in the laboratory to verify field descriptions and to classify them in accordance with the Unified Soil Classification System. Laboratory testing included water content determinations for all cohesive and intermediate (silt or loamy) soil types. An estimate of unconfined compressive strength was obtained for all cohesive materials using a calibrated pocket penetrometer. Dry unit weight tests were also run on specimens of cohesive fill.

Reference is made to the attached boring logs which indicate subsurface stratigraphy and soil descriptions, results of field and laboratory tests, as well as water level observations. Definitions of descriptive terminology are also included. While strata changes are shown as a definite line on the boring logs, the actual transition between soil layers will probably be more gradual. Fluctuations in the groundwater table may also occur due to variations in precipitation (short-term and seasonal) as well as rises or drops in pond, creek or other nearby surface water features, i.e. groundwater levels at a future date may be higher or lower than those recorded at the time of drilling.

Discussion of Test Data

Borings 1, 2, 4, 5 and 7 were drilled in existing pavement areas. They encountered 3 to 11 inches bituminous concrete at the surface, being underlain by 2 to 9 inches granular base materials at Borings 4, 5 and 7 and absent at the remainder of them. The pavement thicknesses were estimated from the disturbed sides of the augered boreholes and should be considered approximate; pavement cores may be taken if more accurate measurements or descriptions of the pavements are required (including possible fabric interlayers in the bituminous pavement).

Approximately 2 feet of a sand, crushed asphalt and crushed concrete mixture was found at the surface of Boring 3 and 3 inches of sand and gravel fill at B-6. They were underlain by an apparent native topsoil layer which extended to depths of about 1 and 3 feet in Borings 6 and 3, respectively. An approximate 6-inch thick topsoil layer was also encountered directly beneath the pavement section in Boring 4. A few inches of a sand, crushed asphalt and crushed stone mixture was found underlying the

pavement section in B-7. Silty clay fill materials were found directly beneath the asphalt pavement in Borings 1 and 2, extending to a depth of 3 feet below existing grade. Samples of the silty clay fill materials exhibited dry unit weights of 102 to 107 pounds per cubic foot (pcf) at relatively high water contents of 21 to 24 percent.

The uppermost couple of feet of native soils below the buried topsoil layer in Borings 4 and 6 and the fill materials in B-7, consisted of silty clay of apparent medium to high plasticity. These CL/CH materials (Unified classification) were typified by moderate to relatively high pocket penetrometer readings (estimate of unconfined compressive strength) ranging from 1.25 to 3.0 tons per square foot (tsf) at relatively high water contents of between 24 and 27 percent.

Native soils underlying the pavement section, buried topsoil and existing fill materials consisted predominantly of tough to hard silty clay and very silty clay, typically extending to the bottom of the boreholes. The exceptions included Borings 4 and 6 which ended in strata of firm silty sand and gravel, and relatively clean sand/sand and gravel. Firm sand/sand and gravel deposits were also found interbedded within the predominant cohesive soil mass at a depth of about 13 feet in Borings 1 and 2. The clay soils exhibited unconfined compressive strengths ranging from 1.0 to 10.0 tsf, typically exceeding 1.5 tsf, at water contents generally between 13 and 20 percent (occasionally both lower and higher). The sand and gravel deposits exhibited SPT N-values of 15 to 23 blows per foot (bpf).

Borings 5 and 7 were “dry” both during and upon completion of drilling operations. Free water was otherwise first encountered at depths ranging from 8 to 15 feet below existing grade in the remaining borings (Nos. 1 - 4 & 6). Upon completion of drilling operations the water levels were within 0 to 1½ feet of initial levels.

As discussed above, the borings were dry or found free groundwater at variable depths. However, based on the water color change from brown to gray and the water levels observed in the granular deposits found in some of the borings, it appears that the long-term groundwater table at the project site is on the order of approximate Elevations 771- 773, i.e. at a depth in the range of about 13 to 15 feet below existing grade.

Analysis and Recommendations

Building Foundations - Bearing Table

As previously discussed, two (2) locations are being studied for the new salt storage facility, one near the southeast corner of the site (Borings 1 - 3) and the other near the southwest corner (Borings 4 - 6). Based on a Site Plan provided, it appears that the proposed salt storage building will have plan dimensions on the order of ±80' x 200'. It is understood that the new facility will have a storage capacity on the order of 10,000 tonnes of salt and have a dome-like roof/cover.

Information regarding proposed finished floor (FF) was not available at the time this report was prepared. It is estimated that proposed FF will be near existing grade, i.e. relatively minor grade changes are anticipated for the construction of the proposed building pad.

Borings 1 - 6 were drilled in the areas of the possible locations for the proposed salt storage facility. Based on the results of the borings, the proposed building may be supported on footing foundations designed for a net allowable bearing pressure of 3000 pounds per square foot (psf) as describe below.

In the following table we have summarized the shallowest depth/elevation at which in-situ native materials considered capable of supporting a design bearing stress of 3000 psf were encountered at each boring. Ground surface elevations and depths of existing fill are also shown. The recommended bearing stress of 3000 psf is typical and generally satisfactory for the construction of similar buildings in this area.

Boring Number	Ground Surface Elevation	Existing Fill Depth (Feet)	3000 PSF Design Bearing	
			Depth* (Feet)	Elevation*
1	785.5	3.0	3.0	782.5
2	786.0	3.0	3.0	783.0
3	786.5	3.0 T	3.0	783.5
4	785.5	1.6 T	3.0	785.5
5	786.5	0.8 P	1.0	785.5
6	786.0	1.1 T	1.5	783.5

* Depth/elevation of 3000 psf native bearing soils rounded to lowest 0.5 foot.

T Buried clayey topsoil deposit; depth shown is to the bottom of the layer.

P Pavement section.

As shown in the above table, native soils considered suitable of 3000 psf design bearing were first found at relatively shallow depths of about 1 to 3 feet below existing grade (approximate Elevations 782.5 - 785.5) at the boring locations. They consist of tough to very tough native clay soils, exhibiting unconfined compressive strengths of 1.5 tsf or higher. In areas where foundation undercuts are performed to reach the 3000 psf native bearing soils, the footings may be placed at the bottom of the undercuts or the foundation overexcavations backfilled and footings constructed at design elevations in accordance with the following recommended procedure.

The base of the overexcavations should exceed footing dimensions by at least 12 inches along each side, 6 inches for every foot of overdig where the undercut exceeds 2.0 feet in depth. Replacement materials should consist of crushed stone, crushed gravel or recycled concrete between ¼ to 3 inches in size and containing no fines; IDOT gradations CA-1 and CA-7 meet these criteria. This “structural” fill should be spread in maximum 18-inch layers loose thickness, each lift to be densified using vibratory

compaction equipment or by tamping with a backhoe bucket. The overexcavations may also be backfilled with lean concrete, for which the undercuts do not need to extend more than 6 inches beyond each footing face.

Footings may also be supported on new engineered fill that is placed as part of site grading operations/building pad construction. Assuming that existing pavement, fill materials, buried topsoil and any low-strength/very moist native soils (B-4) are removed from proposed building areas and new fill is placed and compacted in accordance with site-grading recommendations given below, footings constructed on new "engineered" fill may also be sized for a bearing pressure of 3000 psf.

In order to preclude disproportionately small footing sizes, it is recommended that all continuous wall footings be made at least 24 inches wide, trench footings at least 12 inches wide and isolated foundations at least 2.5 feet square, regardless of calculated dimensions. For frost considerations, all exterior footings should be constructed at least 3.5 feet below outside finished grade and 4.0 feet for foundations located outside of heated building limits. Interior footings may be constructed at higher elevations as long as they are protected against frost heave in the event of winter construction.

The 3000 psf bearing value may be increased by up to 33 percent for intermittent loads such as wind and seismic loading; the 33% increase may also be applied to the toe pressure of eccentrically loaded footings as long as the average bearing pressure does not exceed 3000 psf. The above recommendations should otherwise result in total foundation settlements not exceeding 1.0 inch, for which differential settlement of less than 0.7 inches would be anticipated.

Site-Grading/Slab-On-Grade Support

In reference to the construction of a floor slab or pavement inside the salt storage building, it should be noted that slab-on-grade construction utilized without complete removal of existing fill and buried topsoil materials may result in some distress of concrete floors and pavements. In the event no possible distress of the floor slab or pavement inside the salt storage facility can be tolerated, it is recommended that these materials be removed and replaced with engineered fill. The depth to 3000 psf bearing shown in the above table may be used to estimate the undercut depths at the boring locations. If some possible distress can be tolerated, the following construction procedures will help to minimize any distress.

The building area should be cleared of any vegetation prior to site-grading, stripping operations to also include the removal of any surficial topsoil. The existing pavements (which cover most of the site) should also be removed. The pad should then be proof-rolled, in order to detect the presence of unsuitable/unstable soil types. The proof-roll should be performed using a loaded dump truck or other approved piece of heavy construction equipment. All soft or unstable materials determined by proof-rolling should be reworked and recompacted or, if that does not significantly improve subgrade stability, removed and replaced. Solutions to such instability problems would likely consist of undercutting the

unstable soils about 1 to 2 feet and replacement with coarse granular material such as IDOT gradation CA-7 or CA-1.

Existing subgrade soils to be left in-place should be recompacted to at least 95 percent Modified Proctor density. It is also recommended that the concrete floors rest on a thickened base course layer; 8 to 10 inches of well-graded granular material such as IDOT gradation CA-6 will serve this purpose, to be compacted to 95 percent Modified Proctor density. The concrete slabs should be reinforced with heavy mesh as a minimum. Finally, the concrete floors should be isolated from foundation elements, i.e. jointed around columns and foundation walls, to permit minor differential settlement to occur without causing undue cracking or other distress.

New fill should otherwise consist of approved granular materials or inorganic silty clays of medium plasticity. It is recommended that compaction be to a minimum of 95percent of maximum dry density, respectively, as determined by the Modified Proctor test (ASTM D 1557). The fill should be placed in approximate 9 inch lifts loose measure for cohesive soils and up to 12 inches for granular materials, each lift to be compacted to the specified density prior to the placement of additional fill.

Moisture control is important in the compaction of most soil types, and it is recommended that the water content of new fill be within 3 percentage points of optimum moisture as established by its laboratory compaction curve. If the soil is compacted too dry, it will have an apparent stability which will be lost if it later becomes saturated. If the soil is too wet, the Contractor will not be able to achieve proper compaction.

Groundwater Management

Based on the water level observations made in the borings, serious groundwater water problems are not anticipated. However, the accumulation of run-off water or seepage at the base of excavations should still be expected to occur during foundation construction and site work. The Contractor should be prepared to remove these accumulations by pumping from strategically placed sumps.

Closure

It is recommended that full-time observation be provided by Testing Service Corporation personnel during foundation construction, so that the soils at undercut and foundation levels can be observed and tested. In addition, adequacy of building materials, stripping and undercutting, fill placement and compaction as well as slab-on-grade construction should be monitored for compliance with the recommended procedures and specifications.

The analysis and recommendations submitted in this report are based upon the data obtained from the seven (7) soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings, the nature and extent of which

may not become evident until during the course of construction. If variations are then identified, recommendations contained in this report should be re-evaluated after performing on-site observations.

It has been a pleasure to assist you with this work. Please call if there are any questions or if we may be of further service.

Respectfully submitted,

TESTING SERVICE CORPORATION

Alfredo J. Bermudez
Senior Geotechnical Engineer
Registered Professional Engineer
Illinois No. 062-046608

ALFREDO J. BERMUDEZ
062-046608
REGISTERED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS

Samuel J. Patrick, E.I.T.
Staff Engineer

AJB:SJP: ab
Enc.

GENERAL CONDITIONS

Geotechnical and Construction Services

TESTING SERVICE CORPORATION

1. PARTIES AND SCOPE OF WORK: If Client is ordering the services on behalf of another, Client represents and warrants that Client is the duly authorized agent of said party for the purpose of ordering and directing said services, and in such case the term "Client" shall also include the principal for whom the services are being performed. Prices quoted and charged by TSC for its services are predicated on the conditions and the allocations of risks and obligations expressed in these General Conditions. Unless otherwise stated in writing, Client assumes sole responsibility for determining whether the quantity and the nature of the services ordered by Client are adequate and sufficient for Client's intended purpose. Unless otherwise expressly assumed in writing, TSC's services are provided exclusively for client. TSC shall have no duty or obligation other than those duties and obligations expressly set forth in this Agreement. TSC shall have no duty to any third party. Client shall communicate these General Conditions to each and every party to whom the Client transmits any report prepared by TSC. Ordering services from TSC shall constitute acceptance of TSC's proposal and these General Conditions.

2. SCHEDULING OF SERVICES: The services set forth in this Agreement will be accomplished in a timely and workmanlike manner. If TSC is required to delay any part of its services to accommodate the requests or requirements of Client, regulatory agencies, or third parties, or due to any cause beyond its reasonable control, Client agrees to pay such additional charges, if any, as may be applicable.

3. ACCESS TO SITE: TSC shall take reasonable measures and precautions to minimize damage to the site and any improvements located thereon as a result of its services or the use of its equipment; however, TSC has not included in its fee the cost of restoration of damage which may occur. If Client desires or requires TSC to restore the site to its former condition, TSC will, upon written request, perform such additional work as is necessary to do so and Client agrees to pay to TSC the cost thereof plus TSC's normal markup for overhead and profit.

4. CLIENT'S DUTY TO NOTIFY ENGINEER: Client represents and warrants that Client has advised TSC of any known or suspected hazardous materials, utility lines and underground structures at any site at which TSC is to perform services under this Agreement. Unless otherwise agreed in writing, TSC's responsibility with respect to underground utility locations is to contact the Illinois Joint Utility Locating Information for Excavators for the location of public, but not private, utilities.

5. DISCOVERY OF POLLUTANTS: TSC's services shall not include investigation for hazardous materials as defined by the Resource Conservation Recovery Act, 42 U.S.C.§ 6901, et, seq., as amended ("RCRA") or by any state or Federal statute or regulation. In the event that hazardous materials are discovered and identified by TSC, TSC's sole duty shall be to notify Client.

6. MONITORING: If this Agreement includes testing construction materials or observing any aspect of construction of improvements, Client's construction personnel will verify that the pad is properly located and sized to meet Client's projected building loads. Client shall cause all tests and inspections of the site, materials and work to be timely and properly performed in accordance with the plans, specifications, contract documents, and TSC's recommendations. No claims for loss, damage or injury shall be brought against TSC unless all tests and inspections have been so performed and unless TSC's recommendations have been followed.

TSC's services shall not include determining or implementing the means, methods, techniques or procedures of work done by the contractor(s) being monitored or whose work is being tested. TSC's services shall not include the authority to accept or reject work or to in any manner supervise the work of any contractor. TSC's services or failure to perform same shall not in any way operate or excuse any contractor from the performance of its work in accordance with its contract. "Contractor" as used herein shall include subcontractors, suppliers, architects, engineers and construction managers.

Information obtained from borings, observations and analyses of sample materials shall be reported in formats considered appropriate by TSC unless directed otherwise by Client. Such information is considered evidence, but any inference or conclusion based thereon is, necessarily, an opinion also based on engineering judgment and shall not be construed as a representation of fact. Subsurface conditions may not be uniform throughout an entire site and ground water levels may fluctuate due to climatic and other variations. Construction materials may vary from the samples taken. Unless otherwise agreed in writing, the procedures employed by TSC are not designed to detect intentional concealment or misrepresentation of facts by others.

7. DOCUMENTS AND SAMPLES: Client is granted an exclusive license to use findings and reports prepared and issued by TSC and any sub-consultants pursuant to this Agreement for the purpose set forth in TSC's proposal provided that TSC has received payment in full for its services. TSC and, if applicable, its sub-consultant, retain all copyright and ownership interests in the reports, boring logs, maps, field data, field notes, laboratory test data and similar documents, and the ownership and freedom to use all data generated by it for any purpose. Unless otherwise agreed in writing, test specimens or samples will be disposed immediately upon completion of the test. All drilling samples or specimens will be disposed sixty (60) days after submission of TSC's report.

8. TERMINATION: TSC's obligation to provide services may be terminated by either party upon (7) seven days prior written notice. In the event of termination of TSC's services, TSC shall be compensated by Client for all services performed up to and including the termination date, including reimbursable expenses. The terms and conditions of these General Conditions shall survive the termination of TSC's obligation to provide services.

9. PAYMENT: Client shall be invoiced periodically for services performed. Client agrees to pay each invoice within thirty (30) days of its receipt. Client further agrees to pay interest on all amounts invoiced and not paid or objected to in writing for valid cause within sixty (60) days at the rate of twelve (12%) per annum (or the maximum interest rate permitted by applicable law, whichever is the lesser) until paid and TSC's costs of collection of such accounts, including court costs and reasonable attorney's fees.

10. WARRANTY: TSC's professional services will be performed, its findings obtained and its reports prepared in accordance with these General Conditions and with generally accepted principles and practices. In performing its professional services, TSC will use that degree of care and skill ordinarily exercised under similar circumstances by members of its profession. In performing physical work in pursuit of its professional services, TSC will use that degree of care and skill ordinarily used under similar circumstances. This warranty is in lieu of all other warranties or representations, either express or implied. Statements made in TSC reports are opinions based upon engineering judgment and are not to be construed as representations of fact.

Should TSC or any of its employees be found to have been negligent in performing professional services or to have made and breached any express or implied warranty, representation or contract, Client, all parties claiming through Client and all parties claiming to have in any way relied upon TSC's services or work agree that the maximum aggregate amount of damages for which TSC, its officers, employees and agents shall be liable is limited to $50,000 or the total amount of the fee paid to TSC for its services performed with respect to the project, whichever amount is greater.

In the event Client is unwilling or unable to limit the damages for which TSC may be liable in accordance with the provisions set forth in the preceding paragraph, upon written request of Client received within five days of Client's acceptance of TSC's proposal together with payment of an additional fee in the amount of 5% of TSC's estimated cost for its services (to be adjusted to 5% of the amount actually billed by TSC for its services on the project at time of completion), the limit on damages shall be increased to $500,000 or the amount of TSC's fee, whichever is the greater. This charge is not to be construed as being a charge for insurance of any type, but is increased consideration for the exposure to an award of greater damages.

11. INDEMNITY: Subject to the provisions set forth herein, TSC and Client hereby agree to indemnify and hold harmless each other and their respective shareholders, directors, officers, partners, employees, agents, subsidiaries and division (and each of their heirs, successors, and assigns) from any and all claims, demands, liabilities, suits, causes of action, judgments, costs and expenses, including reasonable attorneys' fees, arising, or allegedly arising, from personal injury, including death, property damage, including loss of use thereof, due in any manner to the negligence of either of them or their agents or employees or independent contractors. In the event both TSC and Client are found to be negligent or at fault, then any liability shall be apportioned between them pursuant to their pro rata share of negligence or fault. TSC and Client further agree that their liability to any third party shall, to the extent permitted by law, be several and not joint. The liability of TSC under this provision shall not exceed the policy limits of insurance carried by TSC. Neither TSC nor Client shall be bound under this indemnity agreement to liability determined in a proceeding in which it did not participate represented by its own independent counsel. The indemnities provided hereunder shall not terminate upon the termination or expiration of this Agreement, but may be modified to the extent of any waiver of subrogation agreed to by TSC and paid for by Client.

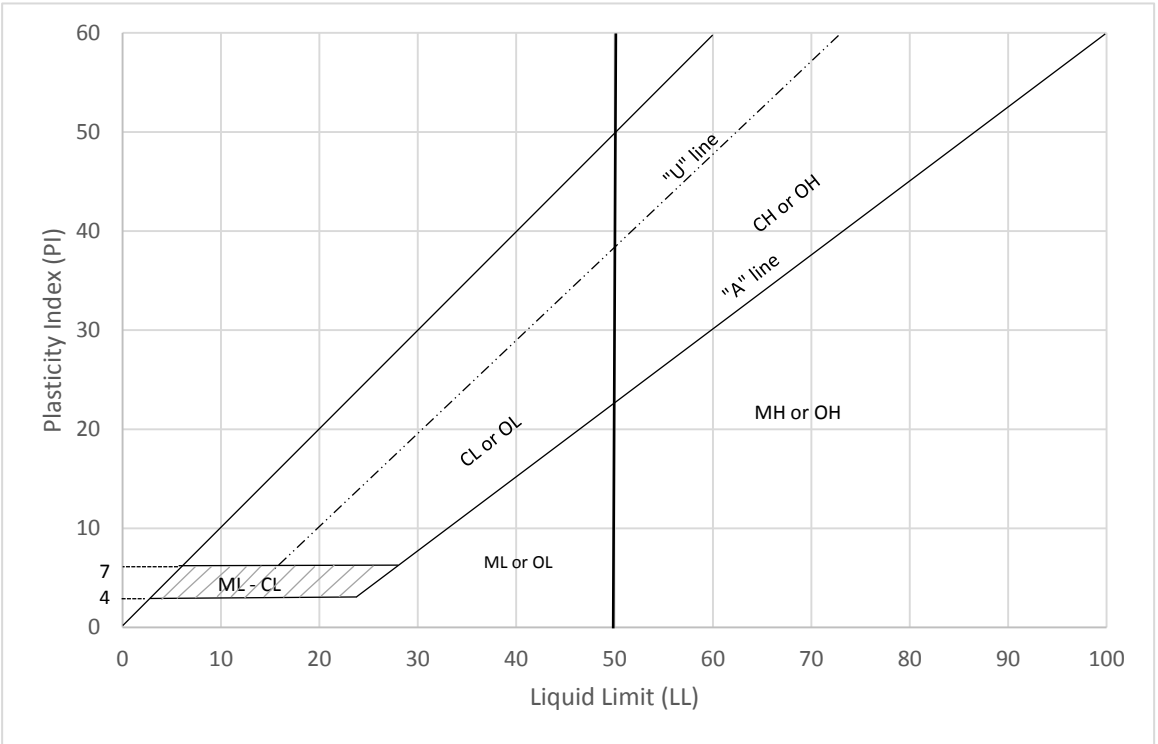
12. SUBPOENAS: TSC's employees shall not be retained as expert witnesses except by separate, written agreement. Client agrees to pay TSC pursuant to TSC's then current fee schedule for any TSC employee(s) subpoenaed by any party as an occurrence witness as a result of TSC's services.

13. OTHER AGREEMENTS: TSC shall not be bound by any provision or agreement (i) requiring or providing for arbitration of disputes or controversies arising out of this Agreement or its performance, (ii) wherein TSC waives any rights to a mechanics lien or surety bond claim; (iii) that conditions TSC's right to receive payment for its services upon payment to Client by any third party or (iv) that requires TSC to indemnify any party beyond its own negligence These General Conditions are notice, where required, that TSC shall file a lien whenever necessary to collect past due amounts. This Agreement contains the entire understanding between the parties. Unless expressly accepted by TSC in writing prior to delivery of TSC's services, Client shall not add any conditions or impose conditions which are in conflict with those contained herein, and no such additional or conflicting terms shall be binding upon TSC. The unenforceability or invalidity of any provision or provisions shall not render any other provision or provisions unenforceable or invalid. This Agreement shall be construed and enforced in accordance with the laws of the State of Illinois. In the event of a dispute arising out of or relating to the performance of this Agreement, the breach thereof or TSC's services, the parties agree to try in good faith to settle the dispute by mediation under the Construction Industry Mediation Rules of the American Arbitration Association as a condition precedent to filing any demand for arbitration, or any petition or complaint with any court. Paragraph headings are for convenience only and shall not be construed as limiting the meaning of the provisions contained in these General Conditions.

Testing Service Corporation
Unified Classification Chart

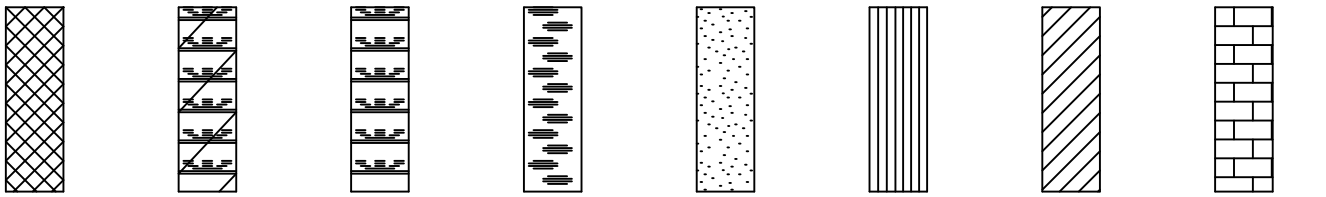
CRITERIA FOR ASSIGNING GROUP SYMBOLS AND GROUP NAMES USING LABORATORY TEST [o]				SOIL CLASSIFICATION	
				Group Symbol	GROUP NAME [b]
COARSE - GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVELS More than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS less than 5% fines [c]	$C_u \geq 4$ and $1 \leq C_C \leq 3$ [e]	GW	Well-graded gravel [f]
			$C_u < 4$ and/or $1 > C_C > 3$ [e]	GP	Poorly-graded gravel [f]
		GRAVELS WITH FINES more than 12% fines [c]	Fines classify as ML or MH	GM	Silty gravel [f, g, h]
			Fines classify as CL or CH	GC	Clayey gravel [f, g, h]
	SANDS 50% or more of coarse fraction passes No. 4 sieve	CLEAN SANDS less than 5% fines [d]	$C_u \geq 6$ and $1 \leq C_C \leq 3$ [e]	SW	Well-graded sand [l]
			$C_u < 6$ and/or $1 > C_C > 3$ [e]	SP	Poorly-graded sand [l]
		SANDS WITH FINES more than 12% fines [d]	Fines classify as ML or MH	SM	Silty sand [g, h, f]
			Fines classify as CL or CH	SC	Clayey sand [g, h, f]
FINE - GRAINED SOILS 50% or more passed the No. 200 sieve	SILTS & CLAYS Liquid limit less than 50%	Inorganic	PI > 7 or plots on or above "A" line j	CL	Lean clay [k, l, m]
			PI < 4 or plots below "A" line j	ML	Silt [k, l, m]
		Organic	$\frac{\text{Liquid limit – oven dried}}{\text{Liquid limit – not dried}} < 0.75$	OL	Organic clay [k, l, m, n] Organic silt [k, l, m, o]
	SILTS & CLAYS Liquid limit 50% or more	Inorganic	PI plots on or above "A" line	CH	Fat clay [k, l, m]
			PI plots below "A" line	MH	Elastic silt [k, l, m]
		Organic	$\frac{\text{Liquid limit – oven dried}}{\text{Liquid limit – not dried}} < 0.75$	OH	Organic clay [k, l, m, p] Organic silt [k, l, m, q]
Highly organic soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

a. Based on the material passing the 3-inch (75-mm) sieve.
b. If field sample contained cobbles and/or boulders, add "with cobbles and/or boulders" to group name
c. Gravels with 5 to 12% fines required dual symbols
GW-GM well graded gravel with silt
GW-GC well graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
d. Sands with 5 to 12% fines require dual symbols
SW-SM well graded sand with silt
SW-SC well graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
e. $C_u = D_{60}/D_{10}$ $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
f. If soils contains ≥ 15% sand, add "with sand" to group name.
g. If fines classify as CL-ML, use dual symbol GC-GM, SC-SM
h. If fines are organic, add "with organic fines" to group name
i. If soils contains ≥ 15% gravel, add "with gravel" to group name
j. If Atterberg Limits plot in hatched area, soil is a CL – ML, silty clay
k. If soils contains 15 to 29% plus No. 200, add "with sand" or "with gravel" whichever is predominant
l. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
m. If soils contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name
n. PI ≥ 4 and plots on or above "A" line
o. PI ≥ 4 and plots below "A" line
p. PI plots on or above "A" line
q. PI plots below "A" line



TESTING SERVICE CORPORATION

LEGEND FOR BORING LOGS



FILL **TOPSOIL** **PEAT** **GRAVEL** **SAND** **SILT** **CLAY** **DOLOMITE**

SAMPLE TYPE

SS = Split Spoon
ST = Thin-Walled Tube
A = Auger
MC = Macro-Core (Geo Probe)

WATER LEVELS:

▼ While Drilling
▽ End of Boring
▼ 24 Hours

FIELD AND LABORATORY TEST DATA

N = Standard Penetration Resistance in Blows per Foot
WC = In-Situ Water Content
Qu = Unconfined Compressive Strength in Tons per Square Foot
* Pocket Penetrometer Measurement: Maximum Reading = 4.5 tsf
γ_{DRY} = Dry Unit Weight in Pounds per Cubic Foot

SOIL DESCRIPTION

MATERIAL	PARTICLE SIZE RANGE
BOULDER	Over 12 inches
COBBLE	12 inches to 3 inches
Coarse GRAVEL	3 inches to ¾ inch
Small GRAVEL	¾ inch to No. 4 Sieve
Coarse SAND	No. 4 Sieve to No. 10 Sieve
Medium SAND	No. 10 Sieve to No. 40 Sieve
Fine SAND	No. 40 Sieve to No. 200 Sieve
SILT and CLAY	Passing No. 200 Sieve

COHESIVE SOILS

CONSISTENCY	Qu (tsf)
Very Soft	Less than 0.3
Soft	0.3 to 0.6
Stiff	0.6 to 1.0
Tough	1.0 to 2.0
Very Tough	2.0 to 4.0
Hard	4.0 and over

COHESIONLESS SOILS

RELATIVE DENSITY	N (bpf)
Very Loose	0 - 4
Loose	4 - 10
Firm	10 - 30
Dense	30 - 50
Very Dense	50 and over

MODIFYING TERM	PERCENT BY WEIGHT
Trace	1 - 10
Little	10 - 20
Some	20 - 35

PROJECT **New Salt Storage Facility, IDOT Maintenance Yard, Grayslake, Illinois**

CLIENT **Larson Engineering of Illinois, Naperville, Illinois**

BORING **1** DATE STARTED **5-17-19** DATE COMPLETED **5-17-19** JOB **L-89,619**

ELEVATIONS

GROUND SURFACE **785.5**

END OF BORING **765.5**

WATER LEVEL OBSERVATIONS

WHILE DRILLING **13.0 '**

AT END OF BORING **12.0 '**

24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0.6	784.9	7" Bituminous Concrete**
	1	SS	10	21.0	2.5*	107			FILL - Brown trace black silty CLAY, little sand, trace gravel, trace organic, moist (CL)
							3.0	782.5	
	2	SS	11	15.9	3.87 3.0*				Very tough brown trace gray silty CLAY, little sand, trace gravel, moist (CL)
							5.5	780.0	
	3	SS	8	23.9	1.62 1.25*				Tough brown trace gray silty CLAY, trace sand and gravel, moist (CL)
							8.0	777.5	
	4	SS	14	16.0	4.5+*				Hard brown silty CLAY, little sand, trace gravel, moist (CL)
							10.5	775.0	
	5	SS	13	11.1	1.5*				▽ Tough brownish-gray very silty CLAY, little sand, trace gravel, moist (CL-ML)
							13.0	772.5	▼
	6	SS	15						Firm gray fine to medium SAND, trace gravel, wet (SP)
							17.0	768.5	
	7	SS	14	16.3	1.75*				Tough gray silty CLAY, some sand, trace gravel, moist (CL)
									End of Boring at 20.0'

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

** Approximate thicknesses determined by flight auger methods

CME Automatic Hammer used for SPTs

DRILL RIG NO. **358**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **New Salt Storage Facility, IDOT Maintenance Yard, Grayslake, Illinois**

CLIENT **Larson Engineering of Illinois, Naperville, Illinois**

BORING **2** DATE STARTED **5-17-19** DATE COMPLETED **5-17-19** JOB **L-89,619**

ELEVATIONS

GROUND SURFACE **786.0**

END OF BORING **766.0**

WATER LEVEL OBSERVATIONS

WHILE DRILLING **13.0 '**

AT END OF BORING **13.0 '**

24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		
							0.9	785.1	11" Bituminous Concrete**
	1	SS	10	24.4	1.75*	102			FILL - Brown trace black silty CLAY, trace sand and gravel, trace organic, moist to very moist (CL)
							3.0	783.0	
	2	SS	12	14.8	5.32 4.5+*				Hard brown silty CLAY, little sand and gravel, moist (CL)
	3	SS	15	15.7	6.23 4.5+*				
	4	SS	21	15.6	4.5+*				
	5	SS	17	14.9	4.66 4.0*				
							13.0	773.0	
	6	SS	19						Firm gray SAND and GRAVEL, trace silt, wet (SP/GP)
							17.0	769.0	
	7	SS	14	14.2	3.21 3.0*				Hard brown silty CLAY, little sand and gravel, moist (CL)
									End of Boring at 20.0'

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

** Approximate thicknesses determined by flight auger methods

CME Automatic Hammer used for SPTs

DRILL RIG NO. **358**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **New Salt Storage Facility, IDOT Maintenance Yard, Grayslake, Illinois**

CLIENT **Larson Engineering of Illinois, Naperville, Illinois**

BORING **3** DATE STARTED **5-17-19** DATE COMPLETED **5-17-19** JOB **L-89,619**

ELEVATIONS

GROUND SURFACE **786.5**

END OF BORING **766.5**

WATER LEVEL OBSERVATIONS

WHILE DRILLING **8.0 '**

AT END OF BORING **8.0 '**

24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
	A								FILL - Brown Sand, Crushed Asphalt and Cruched Concrete, damp
	1	SS	14				2.0	784.5	
	B			32.2	2.5*				Black clayey TOPSOIL, moist (OL)
							3.0	783.5	
	2	SS	11	18.7	3.08 3.0*				Very tough brown trace gray silty CLAY, little sand, trace gravel, moist (CL)
							5.5	781.0	
	3	SS	9	20.3	1.23 1.0*				Tough brown trace gray silty CLAY, some sand, trace gravel, very moist (CL)
							8.0	778.5	
	4	SS	13	15.8	4.25*				Hard brown trace gray silty CLAY, little sand, trace gravel, moist (CL)
	5	SS	16	16.7	5.32 4.5+*				
							13.0	773.5	
	6	SS	11	13.4	1.5*				Tough gray very silty CLAY, little sand, trace gravel, moist (CL-ML)
							18.0	768.5	
	7	SS	14	14.8	4.13 3.75*				Very tough to hard gray silty CLAY, little sand and gravel, moist (CL)
									End of Boring at 20.0'

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

CME Automatic Hammer used for SPTs

DRILL RIG NO. **358**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **New Salt Storage Facility, IDOT Maintenance Yard, Grayslake, Illinois**

CLIENT **Larson Engineering of Illinois, Naperville, Illinois**

BORING **4** DATE STARTED **5-17-19** DATE COMPLETED **5-17-19** JOB **L-89,619**

ELEVATIONS

GROUND SURFACE **785.5**

END OF BORING **765.5**

WATER LEVEL OBSERVATIONS

WHILE DRILLING **14.5 '**

AT END OF BORING **16.0 '**

24 HOURS

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0.3	785.2	4" Bituminous Concrete**
									9" Sand and Gravel**
	A			28.2	2.5*		1.1	784.4	Black clayey TOPSOIL, moist (OL)
	1	SS	9				1.6	783.9	
	B			26.5	1.25*				Tough brown silty CLAY, little sand, very moist (CL/CH)
							3.0	782.5	
	2	SS	10	15.6	7.89 4.5+*				Hard brown trace gray silty CLAY, little sand and gravel, moist (CL)
	3	SS	16	15.8	10.21 4.5+*				
	4	SS	14	13.8	4.5+*				
							10.5	775.0	
	5	SS	12	14.9	2.35 2.5*				Very tough to hard brownish-gray silty CLAY, little sand and gravel, moist (CL)
	A			15.1	4.5+*				
	6	SS	16						
	B						14.5	771.0	
									Firm gray SAND and GRAVEL, trace silt, wet (SP/GP)
							18.0	767.5	
	7	SS	16	16.0					Firm gray silty SAND, little gravel, very moist (SM)
									End of Boring at 20.0'

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

** Approximate thicknesses determined by flight auger methods

CME Automatic Hammer used for SPTs

DISTANCE BELOW SURFACE IN FEET

0 5 10 15 20 25

DRILL RIG NO. **358**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

TSC 89619.GPJ TSC_ALL.GDT 5/30/19

PROJECT **New Salt Storage Facility, IDOT Maintenance Yard, Grayslake, Illinois**

CLIENT **Larson Engineering of Illinois, Naperville, Illinois**

BORING **5** DATE STARTED **5-17-19** DATE COMPLETED **5-17-19** JOB **L-89,619**

ELEVATIONS

GROUND SURFACE **786.5**

END OF BORING **766.5**

WATER LEVEL OBSERVATIONS

WHILE DRILLING **Dry**

AT END OF BORING **Dry**

24 HOURS

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0.3	786.2	3" Bituminous Concrete**
							0.8	785.7	7" Sand and Gravel**
	1	SS	13	20.5	1.5*				Tough dark brown silty CLAY, little sand, trace organic, moist (CL)
							3.0	783.5	
	2	SS	9	10.0	1.75*				Tough brown trace gray very silty CLAY, some sand, trace gravel, occasional silt and sand seams, moist (CL-ML)
							5.5	781.0	
	3	SS	17	16.2	3.74 4.25*				Very tough to hard brown silty CLAY, little sand and gravel, moist (CL)
	4	SS	21	14.1	6.23 4.5+*				
							10.5	776.0	
	5	SS	11	15.4	1.75*				Tough brownish-gray silty CLAY, little sand and gravel, moist (CL)
							13.0	773.5	
	6	SS	12	15.3	2.81 2.0*				Very tough gray silty CLAY, little sand and gravel, moist (CL)
	7	SS	15	14.5	2.25*				
									End of Boring at 20.0'

DISTANCE BELOW SURFACE IN FEET

0 5 10 15 20 25

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

** Approximate thicknesses determined by flight auger methods

CME Automatic Hammer used for SPTs

DRILL RIG NO. **358**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

TSC 89619.GPJ TSC_ALL.GDT 5/30/19

PROJECT **New Salt Storage Facility, IDOT Maintenance Yard, Grayslake, Illinois**

CLIENT **Larson Engineering of Illinois, Naperville, Illinois**

BORING **6** DATE STARTED **5-17-19** DATE COMPLETED **5-17-19** JOB **L-89,619**

ELEVATIONS

GROUND SURFACE **786.0**

END OF BORING **766.0**

WATER LEVEL OBSERVATIONS

WHILE DRILLING **14.5 '**

AT END OF BORING **15.0 '**

24 HOURS

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0.3	785.7	3" Sand and Gravel
							1.1	784.9	Black clayey TOPSOIL (OL)
	1	SS	8	24.6	1.5*				Tough dark brown to brown silty CLAY, little sand, trace organic, moist (CL/CH)
							3.0	783.0	
	2	SS	12	15.4	4.40 4.5*				Hard to very tough brown trace gray silty CLAY, little sand, trace gravel, moist (CL)
	3	SS	14	17.5	2.5*				
							8.0	778.0	
	4	SS	20	14.9	4.5+*				Hard brown silty CLAY, little sand and gravel, moist (CL)
							10.5	775.5	
	5	SS	17	13.4	4.5+*				Hard to very tough brownish-gray silty CLAY, little sand and gravel, moist (CL)
	A 6 B	SS	21	14.2	3.08 2.75*		14.5	771.5	
									Firm brown fine to medium SAND, little gravel, wet (SP)
							17.0	769.0	
	7	SS	23						Firm brown SAND and GRAVEL, wet (SP/GP)
									End of Boring at 20.0'

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

CME Automatic Hammer used for SPTs

DISTANCE BELOW SURFACE IN FEET

0 5 10 15 20 25

DRILL RIG NO. **358**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

TSC 89619.GPJ TSC_ALL.GDT 5/30/19

PROJECT **New Salt Storage Facility, IDOT Maintenance Yard, Grayslake, Illinois**

CLIENT **Larson Engineering of Illinois, Naperville, Illinois**

BORING **7** DATE STARTED **5-17-19** DATE COMPLETED **5-17-19** JOB **L-89,619**

ELEVATIONS

GROUND SURFACE **786.0**

END OF BORING **776.0**

WATER LEVEL OBSERVATIONS

WHILE DRILLING **Dry**

AT END OF BORING **Dry**

24 HOURS

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Qu	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0.3	785.7	4" Bituminous Concrete**
							0.9	785.1	7" Sand and Gravel**
	A						1.5	784.5	FILL - Brown Sand and Crushed Asphalt, little Crushed Stone
	1	SS	12						Very tough dark brown silty CLAY, little sand, trace organic, moist (CL/CH)
	B			23.6	3.0*		3.0	783.0	
	2	SS	11	14.8	4.5+*				Hard brown and gray to brown silty CLAY, little sand and gravel,moist (CL)
	3	SS	15	16.3	4.5+*				
	4	SS	22	15.0	4.5+*				End of Boring at 10.0'

* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.

** Approximate thicknesses determined by flight auger methods

CME Automatic Hammer used for SPTs

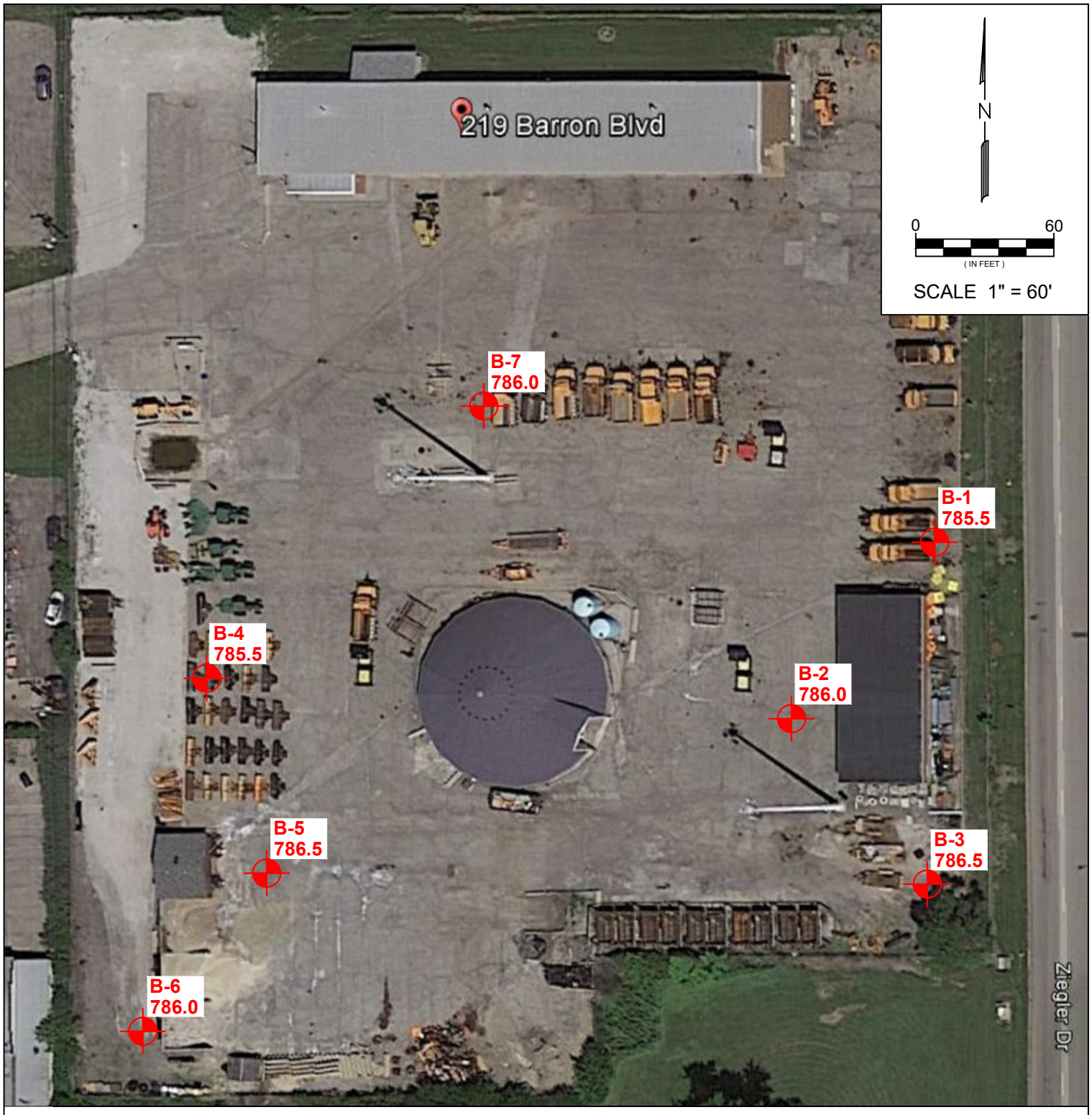
DISTANCE BELOW SURFACE IN FEET

0 5 10 15 20 25

DRILL RIG NO. **358**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

TSC 89619.GPJ TSC_ALL.GDT 5/30/19



NOTE: GROUND SURFACE ELEVATIONS AT THE BORINGS WERE ACQUIRED BY TSC USING A TRIMBLE R8S GNSS RECEIVER, BEING ROUNDED TO THE NEAREST 0.5 FOOT.

LEGEND

SOIL BORING LOCATION

BORING LOCATION PLAN
NEW SALT DOME STORAGE FACILITY
IDOT MAINTENANCE YARD
GRAYSLAKE, ILLINOIS

TSC
TESTING SERVICE CORP.
457 EAST GUNDERSEN DRIVE
CAROL STREAM, ILLINOIS 60188

DRAWN BY:	JAC
CHECKED BY:	AJB
JOB NO. :	L-89,619
DATE:	05-30-19

PAGE NO.
1 OF 1

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid:

1. General Contractor Provide:

a. Handling, temporary storage, hauling, and legal disposal of regulated soils or other wastes found within the project limits. This includes regulated soil, sediments, or water generated during the excavation process in support of construction activities.

b. Comply with all Federal, State, and Local law or ordinances regarding the handling and proper disposal of regulated soils.

c. Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incidental to the lawful completion of the work.

d. Provide an environmental firm for producing required environmental plans and reports, and monitoring and testing all excavation work. Submit plans, reports, and testing as specified using IDOT BDE forms 2730, 2730A, 2732, and 2733 (Available on the IDOT Resources/Forms Design & Environment website).

e. A qualified inspector, in accordance to paragraph 3.1, must be on site at all times during the initial digging of soil designated in paragraphs 3.4.

f. Field sampling and testing results for the purpose of landfill characterization and disposal in accordance to the requirements in Paragraph 3.12 of this specification.

B. Alternate Bid:

(NOT USED)

C. Unit Prices apply to this section: See Sections 00 41 00 & 01 22 00.

1. Method of Measurement:

a. Handling, hauling, legal disposal and temporary storage, of regulated soils or other wastes will be measured for payment in their original positions (i.e. in situ), and the volume(s) in cubic yards; as computed by the method of average end areas. Unit price will apply for only regulated soils being

removed from the site and disposed of legally in the appropriate landfill. (Refer to paragraphs in 3.4(A)(12)

Material moved more than once at either stage construction measured for payment only once.

2. Basis of Payment

a. The transportation and disposal of regulated soil, sediment and other materials from an excavation will be paid for as part of the Unit Prices per cubic yard for NON-SPECIAL WASTE DISPOSAL, SPECIAL WASTE DISPOSAL, or HAZARDOUS WASTE DISPOSAL.

b. The transportation, management, and disposal of uncontaminated soils that is deemed as CCDD/USFO DISPOSAL will be disposed of as a lump sum item by contractor with construction debris.

1.3. RELATED WORK

A. Specified Elsewhere

1. 00 31 32 – Soil Boring Report
2. 00 41 00 – Bid Form
3. 01 11 00 – Project Summary
4. 01 22 00 – Unit Prices
5. 01 33 23 – Shop Drawings, Product Data, & Samples Schedule
6. 01 45 29 – Testing Laboratory Services
7. 31 22 14 – Earthwork

1.4. REFERENCES

A. Preliminary Site Investigation Report; by Wood Environment & Infrastructure Solutions, Inc., dated January 2, 2019. (available upon request).

B. IDOT Standard Specifications for Road and Bridge Construction [SSRBC], including all current edition of Supplemental Specifications, and Recurring Special Provisions (Available for purchase through IDOT).

C. American Petroleum Institute (API) Recommended Practice 1604 (Available for purchase through API).

D. Project Storm Water Pollution Prevention (SWPPP), as applicable (available upon request).

E. Illinois Environmental Protection Agency (IEPA) Forms LPC-663 (available upon request).

F. IDOT Resources/Forms Design & Environment website: http://www.idot.illinois.gov/home/resources/Forms-Folder/d

G. Link to BDE Pre-qual environmental firms and Environmental CDB.

http://www.idot.illinois.gov/doing-business/procurements/engineering-architectural-professional-services/index

1.5. QUALITY ASSURANCE

A. Regulatory Requirements.

1. Shall, at all times, observe and comply with all Federal and State laws, local laws, ordinances, and regulations which in any manner affect the conduct of the work and all such orders or enactments as exist at the present and which may be enacted later, of legislative bodies or tribunals having legal jurisdiction or which may have affect over the work, and no plea or misunderstanding or ignorance thereof will be considered.

2. Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work.

B. Contractor Qualifications per IDOT BDE form 2730:

1. Environmental firm personnel with one (1) year experience in regulated substances.

2. Shall be an environmental firm having completed at least five (5) documented leaking underground storage tank (LUST); and/or five (5) Site Remediation Program (SRP) cleanups following 35 Ill. Admin. Code 734, 740, or 742 within the last ten (10) years; a prequalified firm in “Hazardous Waste – Simple” or “Hazardous Waste – Advanced” by IDOT or “Environmental” by CDB; or in specific cases, with written BDE approval, applicable project experiences outside of the firm may be allowed for key personnel.

3. Documentation includes, but is not limited to; verifying remediation and special waste operations for sites regulated with gasoline, diesel, or waste oil in accordance with all Federal, State, or local regulatory requirements, and shall be provided to the A/E and the Using Agency for review and approvals.

4. The contractor shall not be a former or current consultant or have any ties with any of the properties contained within and/or adjacent to this construction project.

5. UST only; the contractor shall be licensed and certified with the Illinois Office of the State Fair Marshall (OSFM) and shall possess all required permits to perform the work as indicated prior to bidding.

1.6. ABBREVIATIONS/DEFINITIONS

A. A/E – Architect/Engineer

B. API – American Petroleum Institute

C. CFR – Code of Federal Regulations

D. CCDD/USFO – Clean Construction and Demolition Debris / Uncontaminated Soil Fill Operation; as defined in 35 Illinois Administrative Code (Ill. Admin. Code), Subtitle J, Chapter I, Section 1100.

E. CDB PM – Capital Development Board Project Manager

F. COCs – Contaminants of Concern

G. Disturbing Soil – Excavation, hauling away from site, transfer of soil from original location to stock-piled location

H. Excavation – the digging or grading of any soil or fill material, including underground utility works such as installation of fiber optic cabling, water service, and sanitary sewer services for the purposes of installing foundations or structures with the exception of aggregate fills which are not considered a soil or fill material of concern. The following types of maintenance projects are not considered excavation when the excavated material is left on, or incorporated within, the IDOT project area for that project:

- bridge maintenance
- ditch cleaning
- working within the subbase or pavement
- removal and replacement of shoulders, curb and gutter, or sidewalk ramps

I. Hazardous waste – as defined by 40 CFR, Part 261; and 35 Ill. Admin. Code, Sections 722, 723, 726, 728, and 729

J. IEMA – Illinois Emergency Management Agency

K. IEPA – Illinois Environmental Protection Agency

L. IDOT - Illinois Department of Transportation

M. IDOT BDE – IDOT Bureau of Design and Environment

N. LUST – Leaking underground storage tank

O. MAC – Maximum Allowable Concentrations for chemical constituents in uncontaminated soil; as defined in 35 Ill. Admin. Code, Section 1100.605.

P. MSA – Metropolitan Statistical Area county; as defined in 35 Ill. Admin. Code, Section 742.200

Q. NPDES – National Pollutant Discharge Elimination System

R. OSHA – Occupational Safety and Health Administration

S. OSFM – Office of the Illinois State Fire Marshall

T. Special Provisions – Additions and/or revisions to standard and supplemental guide specifications covering conditions peculiar to an individual contract.

U. Special waste – As defined in 35 Ill. Admin. Code, Sections 808 and 809

V. UST – Underground Storage Tank

W. Work Zones – As described in IDOT BDE Form 2730 (IDOT BDE form 2730 (Figures 1-6, fillable form is available on IDOT resources/forms site http://www.idot.illinois.gov/Assets/uploads/files/IDOT-Forms/BDE/BDE%202730.pdf)

1.7. SUBMITTALS

A. **Upon receiving Authorization-To-Proceed (ATP) from CDB, the Contractor must submit 21 calendar days PRIOR to beginning work or working in areas identified herewith**, a Regulated Substance Pre-Construction Plan (RSPCP), IDOT BDE form 2730 (Figures 1-6, fillable form is available on IDOT resources/forms site http://www.idot.illinois.gov/Assets/uploads/files/IDOT-Forms/BDE/BDE%202730.pdf), submit form and all supporting documents to the **Using Agency** for review and approval. The form shall be signed by an Illinois licensed Professional Engineer or Professional Geologist.

As part of the RSPCP, the Contractor(s) or firm(s) performing the work shall meet the following qualifications.

1. Regulated Substances Monitoring. Qualification for environmental observation and field screening of regulated substances work and environmental observation of UST removal shall require either pre-qualification in Hazardous Waste by the Department or demonstration of acceptable project experience in remediation and operations for regulated sites in accordance with applicable Federal, State, or local regulatory requirements using BDE 2730.

   Qualification for each individual performing regulated substances monitoring shall require a minimum of one-year of experience in similar activities as those required for the project.

2. UST Removal. Qualification for UST removal work shall require licensing and certification with the OSFM and possession of all permits required to perform the work. A copy of the permit shall be provided to the Using Agency prior to tank removal.

The qualified Contractor(s) or firm(s) shall also document it does not have any current or former ties with any of the properties contained within, adjoining, or potentially affecting the work.

The Using Agency will require up to 21 calendar days for review of the RSPCP. The review may involve rejection or revision and resubmittal; in which case, an additional 21 days will be required for each subsequent

review. Work shall not commence until the RSPCP has been approved by the Using Agency. After approval, the RSPCP shall be revised as necessary to reflect changed conditions in the field and documented using BDE 2730A "Regulated Substances Pre-Construction Plan (RSPCP) Addendum" and submitted to the Using Agency for approval.

B. The Contractor shall document, **daily**, all field activities relating to monitoring/digging/hauling/excavation of regulated materials using the IDOT BDE form 2732 (Figures 7-8, fillable form is available on IDOT resources/forms site http://www.idot.illinois.gov/Assets/uploads/files/IDOT-Forms/BDE/BDE%202732.pdf) submit form and all supporting documents to CDB PM, A/E, and Using Agency.

C. The Contractor shall submit a Regulated Substances Final Construction Report using the IDOT BDE Form 2733 (Figures 9-10, fillable form is available on IDOT resources/forms site http://www.idot.illinois.gov/Assets/uploads/files/IDOT-Forms/BDE/BDE%202733.pdf) submit form and supporting documents (i.e. manifests, IEPA forms, etc.) to the **Using Agency** at Substantial Completion for review and approval with copies sent to CDB PM and A/E.

D. Provide a State certified manifest to the A/E and Using Agency for the transport and disposal of all non-hazardous special waste (hereafter referred to as special waste) or hazardous waste, as well as any removed USTs.

2. PRODUCTS

2.1 MATERIALS

A. Personal Protective Equipment: Ensure each worker has the proper personal protective equipment (PPE) for the zone and location in which he/she is to perform construction or materials management activities. Also, is responsible for providing all PPE required, and defining the provisions for PPE in the Site Health and Safety Plan.

B. Warning Devices and Barricades: Adequately identify and guard all hazardous areas and conditions by visual warning devices and, where necessary, physical barriers. As required, excavations from which the public is excluded shall be marked or guarded in a manner appropriate to the hazard.

C. Equipment [SSRBC 669.02]:

1. The Contractor shall notify CDB PM, A/E, and Using Agency of all excavation, storage, and transportation equipment to a work area location. The equipment shall comply with OSHA and API guidelines and shall be furnished in a clean condition. Clean condition means the equipment does not contain any residual material classified as a non-special waste, non-hazardous special

waste, or hazardous waste. Residual materials include, but are not limited to, petroleum products, chemical products, sludges, or any other material present in or on equipment.

2. Before beginning any associated soils or groundwater management activity, notify CDB PM, A/E, and Using Agency with the opportunity to visually inspect and approve the equipment. If the equipment contains any regulated residual material, decontamination shall be performed on the equipment as appropriate to the regulated substance and degree of contamination present according to OSHA and API guidelines. All cleaning fluids used shall be treated as the contaminant unless laboratory testing proves otherwise.

3. EXECUTION

3.1 PERSONNEL ACTION:

A. The Site Health and Safety Plan, attached to IDOT BDE form 2730 (Figures 1-6, fillable form is available on IDOT resources/forms site http://www.idot.illinois.gov/Assets/uploads/files/IDOT-Forms/BDE/BDE%202730.pdf), shall pertain to any visitors or State employees at the site.

B. Health and Safety Training. The Contractor shall indicate the designated environmental professional and project safety officer responsible for monitoring activities within designated exclusion or decontamination zones has successfully completed the initial 40-hour Health and Safety Training Course and are current with refresher training pursuant to applicable Federal, State and/or Local standards, including OSHA requirements under 29 CFR 1910.120 (HAZWOPER). The personnel required to have training in accordance with 29 CFR 1910.120 shall have certifications of completion for the Annual 8-Hour HAZWOPER Refresher with them on the jobsite while working in areas regulated under the special provision(s). The designated environmental professional responsible for monitoring activities shall also have successfully completed an additional 8-Hour Supervisor Training Course pursuant to applicable federal, State and/or local standards, including OSHA requirements under 29 CFR 1910.120. The Contractor is responsible for ensuring that other contractor and subcontractor personnel required to be trained under 29 CFR 1920.120 have received required training and updates [IDOT BDE form 2730, pages 3 (paragraph C.) & 6 (paragraph C.)] (Figures 1-6, fillable form is available on IDOT resources/forms site http://www.idot.illinois.gov/Assets/uploads/files/IDOT-Forms/BDE/BDE%202730.pdf).

C. Medical Exams: The Contractor shall indicate all personnel in his/her work force who are required to have the training described in Section 4C of the IDOT BDE form 2730, page 6 (paragraph D) have received and passed a current medical examination as required under applicable Federal, State

and/or Local standards. The Contractor is responsible for ensuring that other contractor and subcontractor personnel subject to medical monitoring under 29 CFR 1910.120 have received and passed a current medical examination under applicable Federal, State, and/or Local standards. (Figures 1-6, fillable form is available on IDOT resources/forms site http://www.idot.illinois.gov/Assets/uploads/files/IDOT-Forms/BDE/BDE%202730.pdf).

3.2 WORK ZONES: Three distinct zones (exclusion, decontamination, and support) shall divide the affected portions of the project. [IDOT BDE form 2730] (Figures 1-6, fillable form is available on IDOT resources/forms site http://www.idot.illinois.gov/Assets/uploads/files/IDOT-Forms/BDE/BDE%202730.pdf).

3.3 DECONTAMINATION: Document in IDOT BDE form 2730, pages 5-6. (Figures 1-6, fillable form is available on IDOT resources/forms site http://www.idot.illinois.gov/Assets/uploads/files/IDOT-Forms/BDE/BDE%202730.pdf)

3.4 REGULATED SUBSTANCES MANAGEMENT AND DISPOSAL:

A. Perform excavation activities in a manner that will limit spills and the potential for regulated soil to be mixed with uncontaminated soil. Direct load regulated soil into roll-off containers or trucks for transportation and disposal, as required. The Contractor shall be responsible for obtaining all approvals for final disposal of regulated and uncontaminated soil.

Management and disposal of regulated soil shall be according to the following: [SSRBC 669.05]

Soil Analytical Results Exceed Most Stringent MAC. When the soil analytical results indicate detected levels exceed the most stringent MAC for chemical constituents in soil established pursuant to Subpart F of 35 Ill. Adm. Code 1100.605, the soil shall be managed as follows:

1. When analytical results indicate inorganic chemical constituents exceed the most stringent MAC but they are still considered within area background levels by the Using Agency, the excavated soil can be utilized within the project area as fill, when suitable. Such soil excavated for storm sewers can be placed back into the excavated trench as backfill, when suitable, unless trench backfill is specified. If the soils cannot be utilized within the project area, they shall be managed and disposed of off-site as NON-SPECIAL WASTE DISPOSAL. [SSRBC 669.09(a)(1)]. **This material can be used on site; otherwise, if there is remaining material it must be disposed at a licensed landfill.**

    a. The conditions described above are met and the Contractor shall manage any excavated soils and sediment in accordance with these criteria within the following areas.

- **Sta. 00+05 to 0+60, 335'LT to 380'LT. The Engineer has determined this material from 0 to 1' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: iron and chloride.**
- **Sta. 00+05 to 0+60, 335'LT to 380'LT. The Engineer has determined this material from 1 to 6' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: iron and chromium.**
- **Sta. 00+05 to 0+60, 380'LT to 418'LT. The Engineer has determined this material from 0 to 1' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: chromium, iron, selenium, cyanide and chloride.**
- **Sta. 0+60 to 1+50, 380'LT to 418'LT. The Engineer has determined this material from 1 to 6' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: iron and chloride.**
- **Sta. 1+50 to 2+05, 335'LT to 380'LT. The Engineer has determined this material from 0 to 1' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: iron, silver and chloride.**
- **Sta. 1+50 to 2+05, 335'LT to 380'LT. The Engineer has determined this material from 1 to 6' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: manganese and chloride.**
- **Sta. 2+05 to 2+90, 350'LT to 400'LT. The Engineer has determined this material from 0 to 3' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: iron, manganese, cyanide and chloride.**
- **Sta. 2+05 to 2+90, 350'LT to 400'LT. The Engineer has determined this material from 3 to 8' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: iron, cyanide and chloride.**

2. When analytical results indicate chemical constituents exceed the most stringent MAC but do not exceed the MAC for a MSA County, the excavated soil can be utilized within the project area as fill, when suitable, or managed and disposed of off-site at a CCDD facility or an USFO within an MSA County provided the pH of the soil is within the range of 6.25 - 9.0, inclusive. Certification. [SSRBC 669.05(a)(2)]. **This material can be used on site; otherwise, if there is remaining material it must be disposed at a CCDD or USFO.**

a. The conditions described above are met and the Contractor shall manage any excavated soils and sediment in accordance with these criteria within the following areas:

Click or tap here to enter text.

3. When analytical results indicate chemical constituents exceed the most stringent MAC but do not exceed the MAC for an MSA County excluding Chicago, or the MAC within the Chicago corporate limits, the excavated soil can be utilized within the project area as fill, when suitable, or managed and disposed of off-site at a CCDD facility or an USFO within an MSA County excluding Chicago or within the Chicago corporate limits provided the pH of the soil is within the range of 6.25 - 9.0, inclusive. [SSRBC 669.05(a)(3)].**This material can be used on site; otherwise, if there is remaining material it must be disposed at a CCDD or USFO.**

   a. The conditions described above are met and the Contractor shall manage any excavated soils and sediment in accordance with these criteria within the following areas:

      - **Sta. 1+50 to 2+05, 380'LT to 418'LT. The Engineer has determined this material from 0 to 1' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminants of concern sampling parameters include: chromium and iron.**

4. When analytical results indicate chemical constituents exceed the most stringent MAC but do not exceed the MAC for an MSA County excluding Chicago, the excavated soil can be utilized within the project area as fill, when suitable, or managed and disposed of off-site at a CCDD facility or an USFO within an MSA County excluding Chicago provided the pH of the soil is within the range of 6.25 - 9.0, inclusive. [SSRBC 669.05(a)(4)]. **This material can be used on site; otherwise, if there is remaining material it must be disposed at a CCDD or USFO.**

5. When the Using Agency determines soil cannot be managed according to paragraphs 3.4(A)(1) through 3.4(A)(4) above and the materials do not contain special waste or hazardous waste, as determined by the Using Agency, the soil shall be managed and disposed of at a landfill as NON-SPECIAL WASTE DISPOSAL. [SSRBC 669.05(a)(5)]. **This material must be disposed at a licensed landfill.**

   a. The conditions described above are met and the Contractor shall manage any excavated soils and sediment in accordance with these criteria within the following areas:

- **Sta. 0+60 to 1+50, 335'LT to 380'LT. The Engineer has determined this material from 0 to 1' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters include: SVOCs, iron, chloride and PID.**

- **Sta. 0+60 to 1+50, 335'LT to 380'LT. The Engineer has determined this material from 1 to 6' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters include: SVOCs, chloride and PID.**

6. When analytical results indicate soil is hazardous by characteristic or listing pursuant to 35 Ill. Admin. Code 721, contains radiological constituents, or the Using Agency otherwise determines the soil cannot be managed according to paragraphs 3.4(A)(1) through 3.4(A)(5) above, the soil shall be managed and disposed of off-site as SPECIAL WASTE DISPOSAL or HAZARDOUS WASTE DISPOSAL, as applicable. [SSRBC 669.05(a)(6)]. **This material must be disposed at a permitted facility.**
   a. The conditions described above are met and the Contractor shall manage any excavated soils and sediment in accordance with these criteria within the following areas:

      Click or tap here to enter text.

7. Soil Analytical Results Do Not Exceed Most Stringent MAC. When the soil analytical results indicate that detected levels do not exceed the most stringent MAC, the excavated soil can be utilized within the project area as fill, when suitable, or managed and disposed of off-site according to Article 202.03 of the SSRBC. However, the excavated soil cannot be taken to a CCDD facility or an USFO for any of the following reasons. **This material can be used on site, taken to another IDOT, CDB project, or disposed of legally such as in a farmer's field as uncontaminated fill.**
   a. The conditions described above are met and the Contractor shall manage any excavated soils and sediment in accordance with these criteria within the following areas:

      Click or tap here to enter text.

      1. The pH of the soil is less than 6.25 or greater than 9.0. [SSRBC 669.05(b)(1)]

- **Sta. 2+90 to 3+75, 380'LT to 418'LT. The Engineer has determined this material from 3 to 8' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(b)(1). Contaminants of concern sampling parameters include: iron and pH.**

2. The soil exhibited elevated photoionization detector (PID) utilizing a lamp of 10.6eV or greater or a flame ionization detector (FID) readings. [SSRBC 669.05(b)(2)]

8. Soil Analytical Results Exceed Most Stringent MAC but Do Not Exceed Tiered Approach to Corrective Action Objectives (TACO) Residential. When the soil analytical results indicate that detected levels exceed the most stringent MAC but do not exceed TACO Tier 1 Soil Remediation Objectives for Residential Properties pursuant to 35 Ill. Admin. Code 742 Appendix B Table A, the excavated soil can be utilized within the project area as fill, when suitable, or managed and disposed of off-site according to Article 202.03 of the SSRBC. However, the excavated soil cannot be taken to a CCDD facility or an USFO. [SSRBC 669.05(c)]. **This material can be used on site, taken to another IDOT, CDB project, or disposed of legally such as in a farmer's field as uncontaminated fill.**

   a. The conditions described above are met and the Contractor shall manage any excavated soils and sediment in accordance with these criteria within the following areas:

      - **Sta. 2+90 to 3+75, 380'LT to 418'LT. The Engineer has determined this material from 0 to 3' bgs. meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: iron and manganese.**

9. Work Zones

   Three (3) distinct OSHA HAZWOPER work zones (exclusion, decontamination, and support) shall apply to projects adjacent to or within sites with documented leaking underground storage tank (LUST) incidents, or sites under management in accordance with the requirements of the Site Remediation Program (SRP), Resource Conservation and Recovery Act (RCRA), or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or as deemed necessary. For this project, the work zones apply for the following ISGS PESA Sites:

   NONE

   Additional information on the above sites collected during the Phase I Engineering process is available through the Using Agency.

10. Aside from the materials listed above in Regulated Soils, Most Stringent MAC and Do Not Exceed Most Stringent MAC, all other construction and demolition debris or waste shall be disposed of in a licensed landfill, recycled, reused, or otherwise disposed of as allowed by State or Federal laws and regulations. When the

Contractor chooses to dispose of uncontaminated soil at a clean construction and demolition debris (CCDD) facility or at an uncontaminated soil fill operation, it shall be the Contractor's responsibility to have the pH of the material tested to ensure the value is between 6.25 and 9.0, inclusive. A copy of the pH test results shall be provided to the A/E and the Using Agency.

11. Suitable excavated materials naturally occurring within the project area shall not be wasted without permission of the Using Agency. The Contractor shall dispose of all surplus, unstable, unsuitable, and organic materials in such a manner that public or private property will not be damaged or endangered.

12. The estimated volumes of "Special Waste", "Non-Special Waste", "Hazardous Waste", or of "Unregulated Soil" are in situ soils to be removed and disposed. These are the A/E's best estimate of in situ or in place quantities. These differ from haul quantities and the Contractor shall use in situ quantities as reference only.

    a. The volume of soil to be managed as non-special waste to a licensed landfill facility is estimated at 1,300 cubic yards (CY) in situ. [Paragraph 3.4(A)(1); 3.4(A)(5)]

    b. The volume of soil to be managed as special waste or hazardous waste to a permitted disposal facility is estimated at ZERO CY in situ. [Paragraph 3.4(A)(6)]

    c. The volume of soil to be managed as uncontaminated soils to a CCDD/USFO facility is estimated at 195 CY in situ. [Paragraphs 3.4(A)(2), 3.4(A)(3), 3.4(A)(4)]

    d. The volume of soil to be managed as uncontaminated soil but not eligible to be disposed at a CCDD/USFO facility due to pH or PID readings is estimated at 290 CY in situ. (This pay item is for excavation only, which is included in the base bid.) [Paragraph 3.4(7)(a)(1), 3.4(7)(a)(2), 3.4(8)(a)]

3.5 GROUNDWATER:

A. When groundwater analytical results indicate the detected levels are above Appendix B, Table E of 35 Ill. Admin. Code 742, the most stringent Tier 1 Groundwater Remediation Objectives for Groundwater Component of the Groundwater Ingestion Route for Class 1 groundwater, the groundwater shall be managed off-site as a special waste or hazardous waste as applicable. Special waste groundwater shall be containerized and trucked to an off-site treatment facility, or may be discharged to a

sanitary sewer or combined sewer when permitted by the local sewer authority. Groundwater discharged to a sanitary sewer or combined sewer shall be pre-treated to remove particulates and measured with a calibrated flow meter to comply with applicable discharge limits. A copy of the permit shall be provided to the Using Agency prior to discharging groundwater to the sanitary sewer or combined sewer.

1. Groundwater encountered within trenches may be managed within the trench and allowed to infiltrate back into the ground. If the groundwater cannot be managed within the trench, it may be discharged to a sanitary sewer or combined sewer when permitted by the local sewer authority, or it shall be containerized and trucked to an off-site treatment facility as a special waste or hazardous waste. The Contractor is prohibited from discharging groundwater within the trench through a storm sewer. The Contractor shall install backfill plugs within the area of groundwater contamination.

2. One backfill plug shall be placed down gradient to the area of groundwater contamination. Backfill plugs shall be installed at intervals not to exceed 50 ft (15 m). Backfill plugs are to be 4 ft (1.2 m) long, measured parallel to the trench, full trench width and depth. Backfill plugs shall not have any fine aggregate bedding or backfill, but shall be entirely cohesive soil or any class of concrete. The Contractor shall provide test data that the material has a permeability of less than 10^{-7} cm/sec according to ASTM D 5084, Method A or per another test method approved by the Using Agency.

3.6 WASTE MINIMIZATION

A. The CONTRACTOR shall minimize the generation of regulated substances to the extent practicable. Take all necessary precautions to avoid mixing regulated substances of differing characteristics.

3.7 TRANSPORTATION OF REGULATED MATERIALS

A. Arrange for all transportation needs of regulated soils or groundwater management and disposal. Ensure the transporters are licensed special/hazardous waste haulers in the State of Illinois.

B. Provide complete manifests necessary and required for transportation and disposal of all regulated waste materials and have them in hand while transporting wastes.

C. Ensure all required placarding and labeling complies with all applicable Federal, State, or local regulations and requirements.

D. Remove all soils, dust, rocks, etc., from the exterior of trucks, trailers, or any other heavy equipment involved with regulated soil excavation, loading, or transportation before they leave the project site.

3.8 TEMPORARY STAGING

A. Soil classified according to paragraphs 3.4(A)(2), 3.4(A)(7)(a), or 3.4(A)(9) may be temporarily staged at the Contractor's option. Soil classified according to paragraphs 3.4(A)(1), 3.4(A)(3), through 3.4(A)(6), or 3.4(A)(7) shall be managed and disposed of without temporary staging to the greatest extent practicable. If circumstances beyond the Contractor's control require temporary staging of these latter materials, the Contractor shall request approval from the Using Agency in writing using BDE 2730. [SSRBC 669.05(a)(2), 669.05(b)(1), 669.05(c); 669.05(a)(1), 669.05(a)(3) through 669.05(a)(6), or 669.05(b)2)]

B. Temporary staging shall be accomplished within the project area and the Contractor's means and methods shall be described in the approved or amended RSPCP. Staging areas shall not be located within 200 feet (61 m) of a public or private water supply well; nor within 100 feet (30 m) of sensitive environmental receptor areas, including wetlands, rivers, streams, lakes, or designated habitat zones.

C. The method of staging shall consist of containerization or stockpiling as applicable for the type, classification, and physical state (i.e., liquid, solid, semisolid) of the material. Materials of different classifications shall be staged separately with no mixing or co-mingling.

D. When containers are used, the containers and their contents shall remain intact and inaccessible to unauthorized persons until the manner of disposal is determined. The Contractor shall be responsible for all activities associated with the storage containers including, but not limited to, the procurement, transport, and labeling of the containers. The Contractor shall not use a storage container if visual inspection of the container reveals the presence of free liquids or other substances that could cause the waste to be reclassified as a hazardous or special waste.

E. When stockpiles are used, they shall be covered with a minimum 20-mil plastic sheeting or tarps secured using weights or tie-downs. Perimeter berms or diversionary trenches shall be provided to contain and collect for disposal any water that drains from the soil. Stockpiles shall be managed to prevent or reduce potential dust generation.

F. When staging non-special waste, special waste, or hazardous waste, the following additional requirements shall apply:

    1. Non-Special Waste. When stockpiling soil classified according to paragraph 3.4(A)(1) or 3.4(A)(5), an impermeable surface barrier between the materials and the ground surface shall be installed. The impermeable barrier shall consist of a minimum 20-mil plastic liner material and the surface of the stockpile area shall be clean and free of debris prior to placement of the liner. Measures shall also be taken to limit or discourage access to the staging area. [669.05(a)(1) or 669.05(a)(5) SSRBC]

2. Special Waste and Hazardous Waste. Soil classified according to paragraph 3.4(A)(6) shall not be stockpiled but shall be containerized immediately upon generation in containers, tanks or containment buildings as defined by RCRA, Toxic Substances Control Act (TSCA), and other applicable State or local regulations and requirements, including 35 Ill. Admin. Code Part 722, Standards Applicable to Generators of Hazardous Waste. [669.05(a)(6) SSRBC]

   The staging area(s) shall be enclosed (by a fence or other structure) to restrict direct access to the area, and all required regulatory identification signs applicable to a staging area containing special waste or hazardous waste shall be deployed.

   Storage containers shall be placed on an all-weather gravel-packed, asphalt, or concrete surface. Containers shall be in good condition and free of leaks, large dents, or severe rusting, which may compromise containment integrity. Containers must be constructed of, or lined with, materials that will not react or be otherwise incompatible with the hazardous or special waste contents. Containers used to store liquids shall not be filled more than 80 percent of the rated capacity. Incompatible wastes shall not be placed in the same container or comingled.

   All containers shall be legibly labeled and marked using pre-printed labels and permanent marker in accordance with applicable regulations, clearly showing the date of waste generation, location and/or area of waste generation, and type of waste. The Contractor shall place these identifying markings on an exterior side surface of the container.

   Storage containers shall be kept closed, and storage pads covered, except when access is needed by authorized personnel.

   Special waste and hazardous waste shall be transported and disposed within 90 days from the date of generation

3.9 UNDERGROUND STORAGE TANKS: [SSRBC 669.08]

A. Prior to removing an UST, IDOT D&E will determine whether the Department is considered an "owner" or "operator" of the UST as defined by the UST regulations (41 Ill. Adm. Code Part 176). Ownership of the UST refers to the Department's owning title to the UST during storage, use or dispensing of regulated substances. The Department may be considered an "operator" of the UST if it has control of, or has responsibility for, the daily operation of the UST. The Department may however voluntarily undertake actions to remove an UST from the ground without being deemed an "operator" of the UST.

B. In the event the Department is deemed not to be the "owner" or "operator" of the UST, the OSFM removal permit shall reflect who was the past "owner" or "operator" of the UST. If the "owner" or "operator" cannot be determined from past UST registration documents from OSFM, then the OSFM removal permit will state the "owner" or "operator" of the UST is the Department. The Department's Office of Chief Counsel (OCC) will review all UST removal permits prior to submitting any removal permit to the OSFM. If the Department is not the "owner" or "operator" of the UST then it will not register the UST or pay any registration fee.

C. The Contractor shall be responsible for obtaining all permits required for removing the UST, notification to the OSFM, using an OSFM certified tank contractor, removal and disposal of the UST and its contents, and preparation and submittal of the OSFM Site Assessment Report in accordance with 41 Ill. Adm. Code Part 176.330.

D. The Contractor shall contact IDOT (DOT.CI@illinois.gov) and the OSFM's office at least 72 hours prior to removal to confirm the OSFM inspector's presence during the UST removal. Removal, transport, and disposal of the UST shall be according to the applicable portions of the latest revision of the " API Recommended Practice 1604".

E. The Contractor shall collect and analyze tank content (sludge) for disposal purposes. The Contractor shall remove as much of the regulated substance from the UST system as necessary to prevent further release into the environment. All contents within the tank shall be removed, transported and disposed of, or recycled. The tank shall be removed and rendered empty according to IEPA definition.

F. The Contractor shall collect soil samples from the bottom and sidewalls of the excavated area in accordance with 35 Ill. Adm. Code Part 734.210(h) after the required backfill has been removed during the initial response action, to determine the level of contamination remaining in the ground, regardless if a release is confirmed or not by the OSFM on-site inspector.

G. In the event the UST is designated a leaking underground storage tank (LUST) by the OSFM's inspector, or confirmation by analytical results, the Contractor shall notify the CDB PM, A/E, IDOT (DOT.CI@illinois.gov). Upon confirmation of a release of contaminants from the UST and notifications to the Using Agency, the Contractor shall report the release to the Illinois Emergency Management Agency (IEMA) (e.g., by telephone or electronic mail) and provide them with whatever information is available ("owner" or "operator" shall be stated as the past registered "owner" or "operator", or the IDOT District in which the UST is located. Contact the Using Agency for the specific personnel to list);

H. The Contractor shall perform the following initial response actions if a release is indicated by the OSFM inspector:

1. Take immediate action to prevent any further release of the regulated substance to the environment, which may include removing, and disposing of up to 4 ft (1.2 m) of the regulated material, as measured from the outside dimension of the tank
2. Identify and mitigate fire, explosion and vapor hazards;
3. Visually inspect any above ground releases or exposed below ground releases and prevent further migration of the released substance into surrounding soils and groundwater; and
4. Continue to monitor and mitigate any additional fire and safety hazards posed by vapors and free product that have migrated from the UST excavation zone and entered into subsurface structures (such as sewers or basements).

I. The UST excavation shall be backfilled according to applicable portions of SSRBC Sections 205, 208, and 550 with a material that will compact and develop stability. The material shall be approved prior to placement. All uncontaminated concrete and soil removed during tank extraction may be used to backfill the excavation, at the discretion of the Using Agency.

J. After backfilling the excavation, the site shall be graded and cleaned.

3.10 ENGINEERED BARRIER

A. The Contractor shall provide engineered barriers, when required, and shall include materials sufficient to completely line excavation surfaces, including sloped surfaces, bottoms, and sidewall faces, within the areas designated for protection

3.11 SEALING ABANDONED WELLS

A. The work shall consist of sealing abandoned water wells and monitoring wells.

B. Work shall be performed according to the “Illinois Water Well Construction Code” (77 Ill. Admin. Code 920) and shall be performed by a licensed water well driller. A list of licensed water well drillers is available from the Illinois Department of Public Health offices in Springfield.

Any available information , such as well type, diameter, depth and geological data will be shown on the plans. Unless otherwise noted, monitoring wells are assumed to be 2 in. (50 mm) in diameter and a maximum of 25 ft (7.6m) deep.

3.12 DISPOSAL FACILITY ACCEPTANCE SAMPLING AND ANALYSIS

A. When the waste material for disposal requires sampling for landfill acceptance, the samples shall be analyzed for TCLP VOCs, TCLP SVOCs, TCLP RCRA metals, TCLP pesticides, TCLP herbicides, PCBs, pH, flash point, paint filter, reactive cyanide, and reactive sulfide. Note that

the list of analytes is considered comprehensive; however, testing requirements for individual disposal facilities may vary. The Contractor shall be responsible for determining the specific disposal facilities to be utilized; and collect and analyze any samples required for disposal facility acceptance using a NELAP certified analytical laboratory registered with the State of Illinois.

Click or tap here to enter text.

3.13 NON-SPECIAL WASTE CERTIFICATION [SSRBC 669.06]:

A. An authorized representative of the Using Agency shall sign and date all non-special waste certifications. These certifications may include but not limited to *Republic Services Special Waste Profile, Generator Non-Special Waste Certification, and Third Party Signature Authorization*. The Contractor shall be responsible for providing the Using Agency with the required information and/or report that will allow the Using Agency to certify the waste is not a special waste.

1. Definition. A waste is considered a non-special waste as long as it is not:

a. A potentially infectious medical waste.

b. A hazardous waste as defined in 35 Ill. Admin. Code 721.

c. An industrial process waste or pollution control waste that contains liquids, as determined using the paint filter test set forth in subdivision (3)(A) of subsection (m) of 35 Ill. Admin. Code 811.107.

d. A regulated asbestos-containing waste material, as defined under the National Emission Standards for Hazardous Air Pollutants in 40 CFR 61.141.

e. A material containing polychlorinated biphenyls (PCB's) regulated pursuant to 40 CFR Part 761.

f. A material subject to the waste analysis and record keeping requirements of 35 Ill. Admin. Code 728.07 under land disposal restrictions of 35 Ill. Admin. Code 728.

g. A waste material generated by processing recyclable metals by shredding and required to be managed as special waste under Section 22.29 of the Environmental Protection Act.

h. An empty portable device or container, in which a special or hazardous waste has been stored, transported, treated, disposed of, or otherwise handled.

2. Certification information. All information used to determine the waste is not a special waste shall be attached to the certification. The information shall include but not be limited to:

a. The means by which the generator has determined the waste is not a hazardous waste;

b. The means by which the generator has determined the waste is not a liquid;

c. If the waste undergoes testing, the analytic results obtained from testing, signed and dated by the person responsible for completing the analysis;

d. If the waste does not undergo testing, an explanation as to why no testing is needed;

e. A description of the process generating the waste; and

f. Relevant material safety data sheets.

3.14 SPECIAL ENVIRONMENTAL CONDITIONS:

A. (NOT USED)

3.15 REGULATED SUBSTANCES FINAL CONSTRUCTION REPORT [IDOT BDE Form 2733]:

A. At substantial completion, the Contractor shall submit a hard copy and electronic files of the Regulated Substances Final Construction Report [IDOT BDE Form 2733] on the activities conducted during the life of the project. The form shall be signed by an Illinois licensed Professional Engineer or Professional Geologist and distributed as follows:

1. One (1) electronic copy (pdf.) shall be submitted to the CDB Project Manager.

2. One (1) hardcopy and electronic copy (pdf.) shall be submitted to the A/E.

3. One (1) electronic (pdf.) shall be emailed to the Using Agency (DOT.CI@illinois.gov).

3.16 UNEXPECTED SUBSTANCES:

A. If abnormal conditions are exposed during the construction which may indicate the presence of a regulated substance, work in this area shall be immediately discontinued. Notify the A/E and Using Agency immediately. A regulated substance is a hazardous substance, special waste or petroleum or any fraction thereof, as those terms are defined in the Illinois Compiled Statutes. The Contractor shall also complete a BDE 2730A and provide to the Using Agency. Work shall not continue in this area until the BDE 2730A is accepted by the Using Agency. http://www.idot.illinois.gov/Assets/uploads/files/IDOT-Forms/BDE/BDE%202730A.pdf

B. Abnormal conditions include but are not limited to the following: Presence of underground storage tanks (UST's), drums, barrels, discolored earth, metal, wood, etc. Visible fumes, obnoxious or unusual odors, excessively

hot earth, smoke, or any other condition which appears abnormal and be a possible indicator of the presence of regulated substances. The conditions shall be treated with extraordinary caution. Appropriate action shall be taken to ensure public and employee safety.

C. Operations shall not resume until directed by the A/E or the Using Agency. The Using Agency may contact the Illinois Emergency Management Agency (IEMA) and/or the Illinois Environmental Protection Agency (IEPA). Further removal and disposal operations shall be in accord to the project specifications and the CDB SDC.

D. Disposition of regulated substances shall be made according to the requirements of the IEMA. Any waste generated as a special waste or hazardous waste shall be manifested off-site using the IDOT facility generator number. The A/E will sign all manifests for the disposal of the regulated material and confirm the Contractor transported volume.

E. Any waste generated as a non-special waste may be disposed of off-site at a facility permitted by the IEPA without a manifest, a special waste transporter, and a generator number.

Figure 1: BDE Form 2730 - Regulated Substances Pre-Construction Plan (RSPCP), page 1

Illinois Department of Transportation

Regulated Substances Pre-Construction Plan (RSPCP)

The Contractor shall submit this Regulated Substances Pre-Construction Plan (RSPCP), describing the methods and manners in which regulated substances will be managed during construction activities. The RSPCP is applicable for all personnel working in areas regulated under the special provision(s). The Site Contamination Health and Safety Plan (SCHASP), an attachment to the RSPCP, shall pertain to the Contractor, state employees, and any visitors at the site. After approval, the RSPCP shall be revised, as necessary, to reflect changed conditions in the field.

Section 1.

A. Project Information

District | Route | Marked Route | Section

Job Number | County | Municipality(ies)

Contract Number | PESA Site Number(s) | PESA Date(s)

Bureau of Design and Environment (BDE) Use Only

BDE Sequence Number

B. Endorsement

This plan must be approved by an Illinois licensed Professional Engineer (PE) or Professional Geologist (PG) to comply with the plans, specifications and special provisions for management of regulated substances encountered during construction activities.

Print Name | Title | Company/Firm

☐ By checking this box and typing my name below, I certify this plan has been approved by an Illinois licensed Professional Engineer (PE) or Professional Geologist (PG).

Signature | Date

IL PE/PG Registration Number | IL PE/PG License Expiration Date

Section 2. Experience and Qualifications

A. Experience

The Contractor, or firm, herein referred to collectively as Contractor, performing the on-site monitoring of regulated substance work and/or on-site monitoring of UST removal shall be pre-qualified in Hazardous Waste by the Department, or demonstration of acceptable project experience. Acceptable project experience includes, but is not limited to, having completed at least five (5) documented Leaking Underground Storage Tank (LUST); and/or five (5) Site Remediation Program (SRP) cleanups following 35 Ill. Admin. Code 734, 740 or 742 within the last ten (10) years. Acceptable qualifications shall also be demonstrated with project experience in remediation and regulated substances operations for contaminated sites in accordance with applicable federal, State, or local regulatory requirements. Documentation of qualifications shall be provided to the Engineer for evaluation and acceptance. Acceptable project documentation shall include, at a minimum, the regulatory identification numbers, project completion dates, and description of the Contractor's role in the projects.

The qualified on-site monitoring personnel performing work shall have a minimum of one year experience in similar activities as those required for the project and shall meet Section 669 of the Standard Specifications for Road and Bridge Construction requirements.

Is contractor or firm pre-qualified in Hazardous Waste by IDOT? ☐ Yes ☐ No

☐ Hazardous Waste - Simple ☐ Hazardous Waste - Advanced

SEFC ID Number | Date Approved (Not Submitted)

If not pre-qualified, complete Section 2.B.

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Figure 2: BDE Form 2730 - Regulated Substances Pre-Construction Plan (RSPCP), page 2

B. Contractors and Subcontractors Completing Regulated Substance Work

Provide a list of proposed subcontractors, related project experience, and the work that each will perform related to environmental or regulated substances services.

Company/Firm's Name | Company/Firm's Address

Contact Name | Contact Title

Phone Number | Email Address

Work To Be Performed

Site Monitoring and other Personnel* | Duties

*Site monitoring and other personnel includes those physically conducting on-site monitoring, observing and documenting UST removals, soil disposal and other regulated substances field activities, the person preparing the SCHASP and related duties.

Years Related Experience | 40-Hour HAZWOPER ☐ Yes ☐ No | Annual 8-Hour HAZWOPER Refresher Date | 8-Hour Supervisor Training Course ☐ Yes ☐ No

Add Personnel | Remove Personnel

Project Experience (5 project minimum)

Project # 1 Name | IEPA LPC Number

IEMA Incident Number | Applicable Regulation(s)

Period Firm Worked on Project

From Date | To Date

Company/Firm's Responsibilities

Project Status (Include NFR or 4Y Date, if applicable)

Project # 2 Name | IEPA LPC Number

IEMA Incident Number | Applicable Regulation(s)

Period Firm Worked on Project

From Date | To Date

Company/Firm's Responsibilities

Project Status (Include NFR or 4Y Date, if applicable)

Project # 3 Name | IEPA LPC Number

IEMA Incident Number | Applicable Regulation(s)

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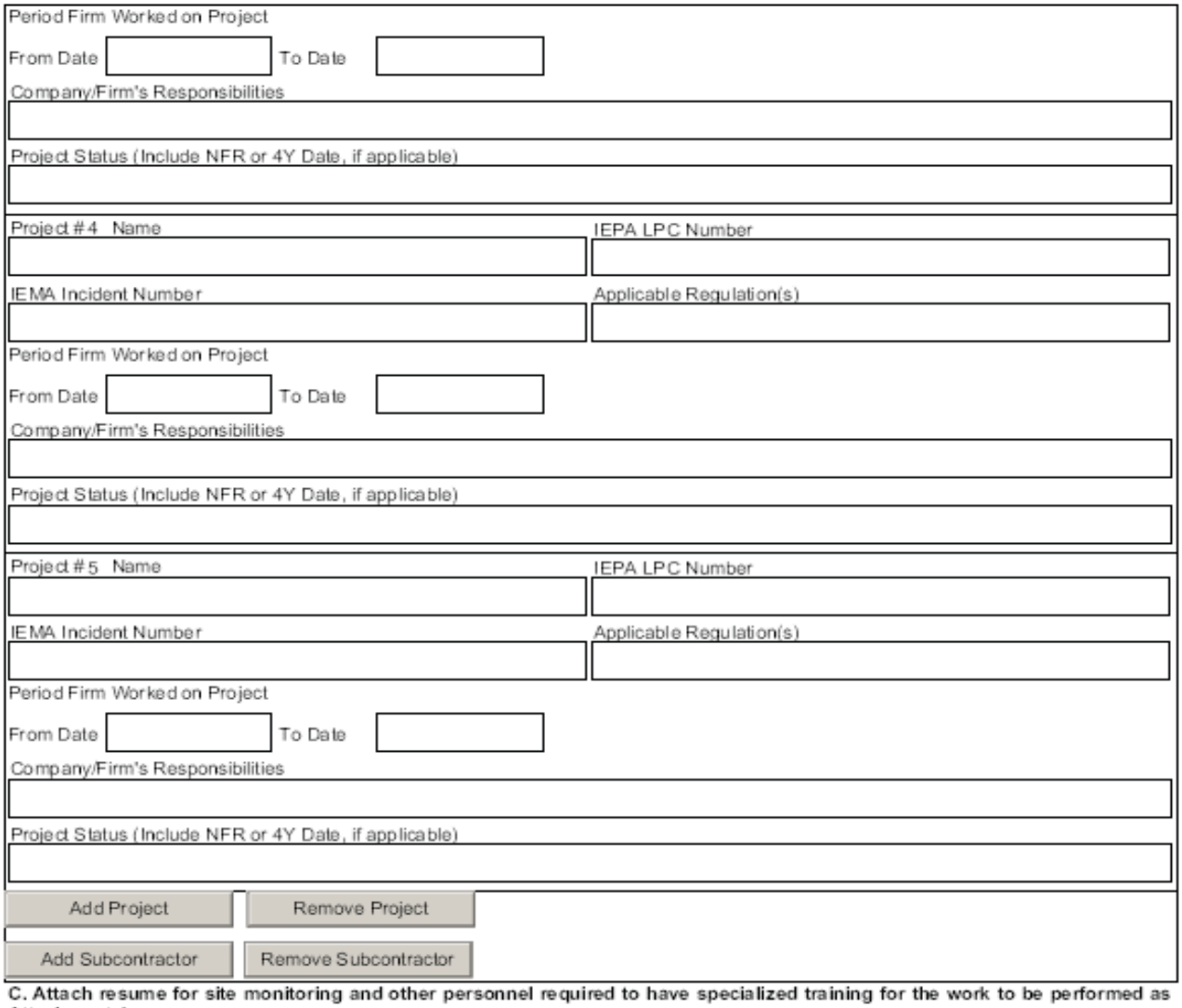
Figure 3: BDE Form 2730 - Regulated Substances Pre-Construction Plan (RSPCP), page 3



Period Firm Worked on Project

From Date | To Date

Company/Firm's Responsibilities

Project Status (Include NFR or 4Y Date, if applicable)

Project #4 Name | IEPA LPC Number

IEMA Incident Number | Applicable Regulation(s)

Period Firm Worked on Project

From Date | To Date

Company/Firm's Responsibilities

Project Status (Include NFR or 4Y Date, if applicable)

Project #5 Name | IEPA LPC Number

IEMA Incident Number | Applicable Regulation(s)

Period Firm Worked on Project

From Date | To Date

Company/Firm's Responsibilities

Project Status (Include NFR or 4Y Date, if applicable)

Add Project | Remove Project

Add Subcontractor | Remove Subcontractor

C. Attach resume for site monitoring and other personnel required to have specialized training for the work to be performed as Attachment 1.

D. Contractor must attach a copy of the current certification of completion of the Annual 8-Hour HAZWOPER Refresher for each person assigned site monitoring duties as Attachment 2. (Include personnel preparing the SCHASP)

Does the Contractor or subcontractor have any current or former ties within, adjoining or potentially affecting this construction project?

☐ Yes ☐ No

If yes, please describe

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Figure 4: BDE Form 2730 - Regulated Substances Pre-Construction Plan (RSPCP), page 4

Section 3. Site Contamination Operation Plan (SCOP)

A. Mark all Regulated Substances Management concerns that apply.

- ☐ Soil Management
- ☐ UST Removal
- ☐ Engineered Barriers
- ☐ Monitoring Well Abandonment
- ☐ Railroad Ties
- ☐ Landfill Waste Disposal Characterization Sample(s)
- ☐ Other, describe below
- ☐ Groundwater Management
- ☐ Backfill Plugs
- ☐ Radiation Monitoring
- ____ Number of samples to be collected for landfill waste disposal characterization

B. Outline the procedures to mobilize all required subcontractors materials and equipment in a timely fashion and provisions to continue work in the potentially contaminated areas identified in the special provision.

C. Describe the methods that will be used to manage soil and/or groundwater for each regulated area. Include a description of disposal methods, if applicable, or if the material will remain on-site.
(Best Management Practice - copy and paste regulated substances special provision and discuss each area)

D. Provide as Attachment 3: site maps illustrating location(s) of soil and/or ground waste management areas, identified USTs to be removed, engineered barriers, backfilled plugs, landfill waste disposal characterization sample locations, site PESA numbers and other pertinent information.

Section 4. Site Contamination Health and Safety Plan (SCHASP)

The contractor shall develop a project specific SCHASP and submit the plan as Attachment 4.

The SCHASP shall specify procedures and equipment to protect site workers and observers from hazards encountered during activities in locations containing contaminated material. **A qualified Industrial Hygienist or Health and Safety Specialist shall prepare the Site Contamination Health and Safety Plan. The Contractor's Corporate Officer responsible for worker health and safety shall approve and sign the plan before submittal to the Department.**

A qualified Industrial Hygienist is defined as having a minimum of five years of experience in the industrial hygiene field, an academic degree in a related science field, and successful completion of two days of testing presented by the American Board of Industrial Hygiene. A Certified Industrial Hygienist (CIH) meets the above definition.

A qualified Health and Safety Specialist is defined as having a minimum of three years experience in hazardous waste operations, familiar with applicable health and safety procedures and protocols, and holds current training status according to 29 CFR 1910.120. This person may be a Certified Safety Professional (CSP) or an Illinois Registered Professional Engineer. A CSP has a minimum of four years of professional safety experience, has a baccalaureate degree in safety, and has successfully completed the safety fundamentals examination and subsequent specialty examination presented by the Board of Certified Safety Professionals.

The Contractor's corporate officer responsible for the Contractor's health and safety program and approval of the SCHASP shall be able to identify hazards; assess employee exposure and risk; have knowledge of Occupational Safety and Health Administration (OSHA) standards, hazards correction techniques and practices, work place safety, and health program requirements. This person shall also be able to effectively communicate this knowledge both orally and in writing or contract for these abilities with a qualified Industrial Hygienist or Health and Safety Specialist.

The responsibility for the implementation and enforcement of all health and safety requirements lies solely with the Contractor. The Contractor shall take all necessary precautions for the safety of, and provide the necessary protection to prevent damage, injury or loss to construction personnel performing work within the exclusion and decontamination zones. The Contractor shall ensure all workers involved in any activities within the contaminated locations or associated with the contaminated materials are conversant with all the requirements of SCHASP and have signed off and dated personal acknowledgment of the plan. The Contractor shall post copies of SCHASP at various locations throughout the work area to facilitate spontaneous review.

A. Zones. Three distinct zones (exclusion, decontamination, and support) shall apply to projects adjacent to or within documented leaking underground storage tank (LUST) incidents, or under management in accordance with the requirements of the Site Remediation Program (SRP) Resource Conservation and Recovery Act (RCRA) or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or as deemed necessary in the special provision(s).

Figure 5: BDE Form 2730 - Regulated Substances Pre-Construction Plan (RSPCP), page 5

1. Exclusion Zones are the areas where contamination does or could occur. These zones have the highest inhalation exposure potential and/or a high probability of skin contact with potential contaminants/contaminated material. The exclusion zone designation shall remain until the entire excavated area has been completely backfilled. The Contractor shall ensure that neither their employees nor subcontractors execute maintenance nor repair operations on equipment located in the exclusion zone.

2. Decontamination Zones are areas established to prevent the transfer of contaminants outside the exclusion zones. This zone eliminates the possibility of the physical transfer of contaminating substances on people, equipment, or in the air to unregulated areas. A combination of decontamination, distance from active work areas, zone restrictions, and work function shall eliminate the possibility of physical transfer of contamination. This zone has the next highest inhalation hazard, but does not pose a high probability of skin contact. This zone shall contain the equipment decontamination facility, areas designated for personnel decontamination, and emergency equipment.

3. Support zones shall include the remaining areas of the job site. This zone shall contain the change and shower rooms, lunch and break areas, operation direction, and support facilities (including supplies, equipment storage, and maintenance areas). No equipment or personnel shall enter the support zone from the exclusion zone without passing through the personnel or equipment decontamination zone. Eating, drinking, smoking, etc., shall be allowed only in this zone.

   The Contractor shall ensure each worker has the proper personal protective equipment for the zone and location in which he/she is to perform construction or material management activities. The Contractor shall be responsible for providing all personal protective equipment required by the Department and Contractor personnel. The Contractor shall define the provisions for personal protective equipment in the SCHASP.

   The Contractor, through the SCHASP, shall determine the appropriate level of protection. The Contractor shall ensure the appropriate protective equipment is being used during activities in the exclusion zone and decontamination zone. The Contractor shall notify the Engineer of any variations from the defined levels of protection as stipulated in the Contractor's health and safety plan in writing before implementation of the modifications.

B. Decontamination. All personnel who have participated in construction or soil management activities within the exclusion zone shall go through decontamination. Additionally, the Contractor shall perform a wet and/or dry decontamination process on excavation and construction equipment as specified when equipment is in contact with contaminated material. No equipment or vehicle shall track visible material from a contaminated facility.

1. Personnel Decontamination. All outer protective clothing used by personnel who contact contaminated material while in the exclusion zone shall be collected in plastic bags and placed in leak-proof sealable containers, such as 55 gal (208 L) open-top drums. The Contractor shall transport all containers to a secure staging area for temporary storage. The Contractor shall inform the Engineer of the time and manner of disposal of containers containing contaminated protective clothing. The Contractor shall be responsible for transporting and disposing of the containers. The Contractor shall be responsible for ensuring the personnel decontamination portion of this zone contains clean, unused 6 mil (150 micron) polyethylene sheeting.

2. Equipment Decontamination.

   a. Dry Decontamination. The Contractor shall perform dry decontamination on equipment that has contacted material classified as a non-special waste, special waste, or hazardous waste before moving that equipment to any other location, whether the new location is contaminated or uncontaminated. Dry equipment decontamination shall consist of the removal of material from excavation and construction equipment parts, such as shovels, wheel tracks, and buckets. During dry decontamination, the Contractor shall ensure that removed contaminated material does not contact the ground surface. The Contractor shall place all contaminated material removed during dry decontamination with contaminated material of similar classification and dispose of it with other excavated material from the facility location.

   b. Wet Decontamination. The Contractor shall perform the wet documentation process when construction/soil management activities associated with non-special waste, special waste, or hazardous waste are followed by construction/soil management activities associated with uncontaminated excavation or fill material. If the Engineer observes residual and/or non-special waste, special waste, or hazardous waste material during the initial (or subsequent) inspection of equipment, the Engineer will require the Contractor to perform either wet and/or dry decontamination before approving equipment for use at another location. Before departure from the project area, all equipment and vehicles contacting contaminated material shall be wet decontaminated by the Contractor.

      Personnel shall perform all wet equipment decontamination within the decontamination zone on equipment decontamination pad(s). The Contractor shall be responsible for the construction and maintenance of the decontamination pad(s) and for all equipment, materials, and personnel. The pad(s) shall be designed to prevent loss of decontamination liquids to the surrounding environment through vertical infiltration and/or surface runoff from any part of the pad(s).

Figure 6: BDE Form 2730 - Regulated Substances Pre-Construction Plan (RSPCP), page 6

The Contractor shall place all removed wastes from the decontamination pad(s) in leak-proof containers and store temporarily in a secure staging area. The Contractor shall containerize the solids separate from the liquids. The Contractor shall be responsible for the transport and disposal of all waste generated from the decontamination process.

C. Health and Safety Training. The Contractor shall indicate the designated environmental professional and the project safety officer responsible for monitoring activities within designated exclusion or decontamination zones have successfully completed the initial 40-hour Health and Safety Training Course and are current with refresher training pursuant to applicable federal, State and/or local standards, including OSHA requirements under 29 CFR 1910.120 (HAZWOPER). The personnel required to have training in accordance with 29 CFR 1910.120 shall have certifications of completion for the Annual 8-Hour HAZWOPER Refresher with them on the jobsite while working in areas regulated under the special provision(s). The designated environmental professional responsible for monitoring activities shall also have successfully completed an additional 8-Hour Supervisor Training Course pursuant to applicable federal, State and/or local standards, including OSHA requirements under 29 CFR 1910.120. The Contractor is responsible for ensuring that other contractor and subcontractor personnel required to be trained under 29 CFR 1920.120 have received required training and updates.

D. Medical Exams. The Contractor shall indicate all personnel in his/her work force who are required to have the training described in Section 4C of this form have received and passed a current medical examination as required under applicable federal, State and/or local standards. The Contractor is responsible for ensuring that other contractor and subcontractor personnel subject to medical monitoring under 29 CFR 1910.120 have received and passed a current medical examination under applicable federal, State, and/or local standards.

SCHASP is attached: ☐ Yes ☐ No

Medical exams are current for field personnel: ☐ Yes ☐ No

Section 5. Site Contamination Erosion Control Plan (SCECP)

The Contractor shall prevent flow of precipitation storm water into excavated contaminated areas. The Contractor shall divert all storm water away from the exclusion and decontamination zones using appropriate storm water erosion control methods.

Provide a description of how the Contractor plans to prevent precipitation storm water flowing into excavated areas and how all storm water will be diverted away from the exclusion and decontamination zones.

Failure to use appropriate measures to divert storm water will subject the Contractor to removing and properly containing the water at their own expense. The Contractor shall provide pumps and collect standing water from the excavation before continuing removal activities or other construction activities. The Contractor shall collect the removed water, place it in leak-proof storage containers, and store it in a secure staging area for future testing by the Contractor. The Contractor shall ensure the storage containers have access points to facilitate sampling. The Contractor shall inform the Engineer about management and disposal requirements for the water following the evaluation of the analytical results.

Provide a description of the Contractor's plan to collect, transfer, test, store, and dispose of potentially impacted water from construction areas.

The Contractor shall control and minimize the release of dust during non-special waste, special waste, or hazardous waste removal activities. The Contractor may use water or acceptable chemicals to control dust emissions. Within the SCECP, the Contractor shall include a description of intended dust control measures.

Provide a description of the Contractor's plan for dust control measures.

DESU shall submit this form to the RE to return to the Contractor.

Reviewed By	Title	Date

BDE 2730 Recommended for acceptance by:	Date	
		OR

Rejected By	Date

☐ By checking this box and typing my name below, I certify this form has been reviewed and approved by the Resident Engineer.

Resident Engineer Name	Date

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Figure 7: IDOT BDE Form 2732 - Regulated Substances Monitoring Daily Record (RSMDR), page 1

Illinois Department of Transportation

Regulated Substances Monitoring Daily Record (RSMDR)

A Regulated Substances Monitoring Daily Sheet (RSMDS) shall be completed and submitted to the Resident Engineer (RE) for all project locations regulated under a regulated substances special provision by the monitoring personnel who completed the field work.

Date	Contract Number	Route	Marked Route

Payment Item No.	Description	Excavation Contractor

On-Site Monitoring Personnel	Monitoring Company/Firm

Time On-Site (24 hr format)	Time Offsite (24 hr format)

	Contractor's Monitoring Equipment				
	Equipment Used On Site	Model No.	Serial No.	Equipment Operator	Firm's Name
-					

Add

	FID/PID Calibration Gas	Time (24 hr)	Reading
-			

Add

Weather	Time (24 hr)	Temp. (F)	Conditions

Note: The FID/PID should be calibrated regularly, including, the start of work day, significant temperature changes, precipitation event, change in wind direction, barometric pressure or humidity, change in work location, non-zeroing meter, equipment malfunction, etc.

Provide a narrative of the activities completed during the daily monitoring activities.

Variations From Special Provisions			
Authorized By:	Station/PESA Site No.	Station/PESA Site No.	Station/PESA Site No.
☐ None Found Today			
☐ Found variations that require corrective action or deduction			
-			

Add

*Note: Areas shown in the Special Provision shall not be reduced without prior approval.

Narrative of Variations From Regulated Substances Special Provision

Other	Remarks
1. Provide photo log sheet(s), as an attachment showing primary activities. Include captions, date/time, direction, PESA site number, pertinence of information, etc. 2. Attach copies of associated manifests. 3. Attach copies of disposal weight tickets.	

☐ By checking this box and typing my name below, I certify this form is accurate to the best of my knowledge.

Prepared By	Company/Firm	Date

☐ By checking this box and typing my name below, I certify this form has been reviewed and approved by the Resident Engineer.

Accepted by IDOT RE/RT Name	Date

Figure 8: IDOT BDE Form 2732 - Regulated Substances Monitoring Daily Record (RSMDR), page 2

Regulated Substances Daily Monitoring Record

Field Data											Office Follow-Up	
	Time (24 Hour)	Station From (include off-set)	Station To (include off-set)	PESA Site Number	Classification from Special Provision	PID/FID Reading (MU)	Manifest Number	Volume (CY)	Management Method	Management Facility	Landfill Weight Ticket Number	Disposal Weight (Tons)
-												
-												
-												
-												
-												
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Add

NSW Landfill - Non-Special Waste Landfill (manifest not required)
SW Landfill - Special Waste Landfill (manifest required)
HW Landfill - Hazardous Waste Landfill (manifest required)
CCDD - Clean Construction / Demolition Debris
USFO - Uncontaminated Soil Fill Operation
MU - Meter Unit
Other - Provide a full description and copy of written authorization for alternative disposal method.
CY - Cubic Yard

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Figure 9: IDOT BDE Form 2733 - Regulated Substances Final Construction Report (RSFCR), page 1

Illinois Department of Transportation

Regulated Substances
Final Construction Report (RSFCR)

The Contractor shall prepare and submit one hard copy and one electronic copy of the Regulated Substances Final Construction Report (RSFCR) to the resident engineer (RE) describing the regulated substances related activities conducted during the life of the project. The RSFCR shall describe the methods and manners in which impacted and potentially impacted materials were managed during construction activities.

Section 1.

A. Project Information

District | Route | Marked Route | Section

Job Number | County | Municipality(ies)

Contract Number | PESA Site Number(s) | PESA Date(s)

Bureau of Design and Environment (BDE) Use Only

BDE Sequence Number | BDE PTB Item/ WO Number | OR | RMP Number

B. Endorsement

Print Name | Title | Company/Firm

☐ By checking this box and typing my name below, I certify this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, is to the best of my knowledge, true, accurate and complete.

Signature | Date

IL PE/PG Registration Number | IL PE/PG License Expiration Date

C. Contractors and Subcontractors Completing Regulated Substances Work

List personnel and firm name that conducted monitoring on the regulated substances project.

Name | Company/Firm

Add Personnel | Remove Personnel

Section 2.

A. Background

1. Mark all Regulated Substances Management concerns that were addressed.

☐ Soil Management
☐ UST Removal
☐ Engineered Barriers
☐ Monitoring Well Abandonment
☐ Railroad Ties
☐ Landfill Waste Disposal Characterization Sample(s)
☐ Other, describe below
☐ Groundwater Management
☐ Backfill Plugs
☐ Radiation Monitoring
____ Number of samples to be collected for landfill waste disposal characterization

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Figure 10: IDOT BDE Form 2733 - Regulated Substances Final Construction Report (RSFCR), page 2

2. Contractor shall provide a narrative discussing the regulated substances concerns applied to the project and how they were addressed. (Best Management Practice - List each Regulated Substances Special Provision and how the material was managed)

B. Describe the measures taken to mark, monitor, handle, and dispose of soil and/or groundwater containing regulated substances to prevent further migration of regulated substances and to protect workers. Provide Regulated Substances Daily Monitoring Record (BDE 2732). Each BDE 2732 shall be signed by the qualified monitoring personnel completing the monitoring, and shall have been accepted by the RE.
This information shall be provided as Attachment 1.

1. Were there any deviations of the management of soils and/or groundwater from the contract Regulated Substances Special Provisions?

☐ Yes ☐ No

2. If yes, describe the deviation(s) from the special provision.

3. If yes, provide a copy of the prior written documentation from the Bureau of Design and Environment (BDE) allowing a deviation from the special provision as Attachment 1A.

C. In a tabular format, provide the costs charged to IDOT for marking, monitoring, handling, transporting and disposing of soil and/or groundwater containing regulated substances; the cost of preventing further migration of regulated substances; and the cost for worker protection from the regulated substances. All costs shall be in the format of the contract pay items listed in the contract plans. This information shall be provided as Attachment 2.

D. Provide copies of plan sheet excerpts showing the areas containing the regulated substances as defined in the contract special provisions with delineation of actual removal boundaries. Backfill plugs (unit/location) and all other regulated substances management concerns identified in Section 2.A.1. of this RSFCR, if applicable shall also be shown on plan sheets as well as the PESA site number, stationing, and off-sets. This information shall be provided as Attachment 3.

E. Provide the field sampling and testing results collected by Contractor for landfill characterization and disposal as Attachment 4. In the event unexpected regulated substances were encountered, additional filed sampling and testing results used to identify the nature and extent of the regulated substances shall be provided as Attachment 4A. This attachment shall also include the date the amended Regulated Substances Pre-Construction Plan (RSPCP) was submitted to IDOT and the date that IDOT accepted the amended RSPCP.

F. Provide copies of waste manifests for special or hazardous waste disposal. This information shall be provided as Attachment 5. Provide a comprehensive summary table of all soil removal associated with a special provision. The table shall include: Date removed, ticket ID, manifest number, customer, waste profile number, PESA site number and weight in tons.

G. Provide copies of landfill tickets (identified by PESA site number with stationing and off-sets) for non-special, special or hazardous waste disposal. This information shall be provided as Attachment 6. Provide a comprehensive summary table of all soil removal associated with a special provision. The table shall include: Date removed, ticket ID, manifest number, customer, profile number, PESA site number and weight in tons.

H. Provide UST system removal results and diagram, when applicable. Representative photographs shall be provided with captions including date/time, direction, PESA site number, pertinence of information, etc. This information shall be provided as Attachment 8.

I. Provide any additional information relevant to regulated substances activities not described in the above sections (e.g., technical data sheets, well abandonment forms, drawings, photographs, groundwater discharge permit application, and approval, when applicable, etc.

Reviewed By	Title	Date

BDE 2733 Recommended for acceptance by:	Date	
		OR

Rejected By	Date

☐ By checking this box and typing my name below, I certify this form has been reviewed and approved by the Resident Engineer.

Resident Engineer Name	Date

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PART 1 - GENERAL

1.1 WORK INCLUDES

A. Base Bid: General contractor shall provide all work as specified below.

1. Section includes cast-in-place concrete for salt storage building including:

a. All cast-in-place including reinforcement, concrete materials, mixture design, placement procedures, and finishes.
b. Waterborne cure and seal product to exposed interior walls only.

1.2 RELATED WORK

A. Specified Elsewhere:

1. 00 31 32 – Geotechnical Information
2. 05 50 00 – Miscellaneous Metal Fabrications
3. 07 92 00 – Joint Sealants
4. 31 23 00 – Excavating Backfilling and Compacting

B. Concrete Testing: DB Contractor shall provide concrete testing services. Contractor shall notify Using Agency and Bridging Architect no less than (3) days prior to placement to conduct testing.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans.

1.4 SUBMITTALS

A. Product Data: Submit preprinted data for each type of manufactured material and product demonstrating compliance requested by the Architect.

B. Design Mixes: Submit design mix for each concrete mix. Include field test data used to establish the required average strength in accordance with ACI 301. Review of design mixes and field test data will be for general information only. Production of concrete to comply with specified requirements is the responsibility of the contractor. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until each mix has been reviewed by the Architect.

1. Indicate amounts of mix water to be withheld for later addition at Project site.

C. Shop Drawings:

1. Steel Reinforcement Shop Drawings: Submit details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

D. Steel Certificate: Provide certificate from fabricator that all steel components are produced in the USA per Illinois Steel Products Procurement Act

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

F. Publications: Comply with the latest edition of the following, except as modified by the Contract Documents. Maintain a copy of the latest edition of ACI 301, 117, 318, and 347 at the project site at all times. Where provisions of the above codes and standards are in conflict with the building code in force for the Project, the building code shall govern.

1. IDOT Standard Specifications for Road and Bridge Construction
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
3. ACI 301, "Standard Specification for Structural Concrete."
4. ACI 302, “Guide for Concrete Floor and Slab Construction.”
5. ACI 305, “Hot Weather Concreting”
6. ACI 306 , “Cold Weather Concreting”
7. ACI 308, “ Standard Practice for Curing Concrete”
8. ACI 318 “ Building Code Requirements for Structural Concrete”
9. ACI 347 “ Recommended Practice for Concrete Formwork”
10. ASTM C494 Standard Specification for Chemical Admixtures for Concrete
11. AWS D12.1 “Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction.”
12. CRSI “Manual of Standard Practice.”

G. Concrete Testing Service: The DB Contractor will employ a testing laboratory to perform initial field quality control testing.

1. All concrete testing by third party ITL contracted by DB contractor. Notify A/E and Using Agency no later than 48 hours in advance of pouring all concrete. Contractor shall also provide test cylinders for compressive strength tests.
2. Any concrete which fails to meet the compressive strength requirements when tested shall be removed and replaced at the Contractor's expense.

3. Slump test shall be made for all strength tests to confirm the required slump. Concrete batches which fail to meet the maximum slump requirements shall be rejected and replaced at the Contractor's expense.
4. Air content shall meet the requirements of the specifications and the standard IDOT mix design from the ready mix plant. Any concrete failing to meet these requirements shall be rejected and replaced at the Contractor's expense.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Avoid damaging coatings on steel reinforcement.

1.7 PROJECT CONDITIONS

A. Before commencing work, examine all adjoining work on which this work is in any way dependent for proper installation and workmanship and report to the Contractor any condition which prevents performing first class work.

B. Protection of Footings Against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.

C. Protect adjacent finish materials against spatter during concrete placement.

D. Provide all barricades and safeguards at all pits, holes, shaft and stairway openings, and the like. Provide all safeguards as required by authorities having jurisdiction. Take full responsibility for safety precautions and methods.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Formed Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints. Furnish all formwork and accessories according to ACI 301M

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M. All reinforcing shall be epoxy coated. No uncoated steel reinforcing

C. Plain-Steel Wire: ASTM A 82, as drawn.

D. Deformed-Steel Wire: ASTM A 496.

E. Epoxy-Coated Wire: ASTM A 884/A 884M, Class A coated, plain-steel wire.

F. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

1. Welded wire fabric maybe used in lieu of carbon steel fibers for interior slabs on grade and interior elevated concrete topping on metal deck when acceptable to the Architect.

G. Epoxy-Coated Welded Wire Fabric: ASTM A 884/A 884M, Class A, plain steel.

2.3 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
4. Do not use wood, masonry, concrete or other similar supports.

B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

C. Epoxy-Coated Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars.

D. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 755M.

E. Mechanical Reinforcement Couplers: ASTM A-519, Minimum tensile strength 100,000 psi

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I.

1. Use only one brand of cement throughout project, except as otherwise indicated.

B. Fly Ash: ASTM C618, Class C or F

C. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120

D. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:

1. Class: Severe weathering region, but not less than 3S.
2. Nominal Maximum Aggregate Size: 3/4 inch (19 mm) unless otherwise indicated.

E. Water: Potable and complying with ASTM C 94.

2.5 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride thyocyanates or admixtures containing more than 0.1 percent chloride ions.

B. Air-Entraining Admixture: ASTM C 260.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range, Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F.

2.6 WATERSTOPS

A. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Volclay Waterstop-RX; Colloid Environmental Technologies Co.
b. Conseal CS-231; Concrete Sealants Inc.
c. Swellseal Joint; De Neef Construction Chemicals (U.S.) Inc.
d. Hydrotite; Greenstreak.
e. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.
f. Adeka Ultra Seal; Mitsubishi International Corporation.
g. Superstop; Progress Unlimited Inc.

2.7 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

1. Silane or modified Siloxane applied to the interior side only of all exposed concrete walls.

2.8 RELATED MATERIALS

A. Joint-Filler Strips: ASTM D 1752, cork or self-expanding cork.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.9 CONCRETE MIXES

A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:

1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.

C. Provide a minimum 28 day compressive strength of 4000 psi (27.7 MPa) and a maximum water-cementitious material ratio of 0.50, unless otherwise indicated.

D. Footings and Foundation Walls: Proportion normal-weight concrete mix as follows unless otherwise indicated:

1. Minimum Compressive Strength (28 Days): 4000 psi (27.6 MPa) with a maximum water cementitious material ratio of 0.50 (non air-entrained).
2. Maximum Slump at point of placement: 4 inches (100 mm).
3. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches (200 mm) after admixture is added to concrete with 2- to 4-inch (50- to 100-mm) slump.
4. Aggregate Size: Gradations up to and including 1".

E. Cementitious Materials:

1. For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements.

    a. Fly Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by a maximum of 20 percent.

F. Air Content: Use air-entraining admixture in exterior exposed concrete within range permitted by ACI 301. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:

1. Air Content: 6 percent for 1-inch (25-mm) nominal maximum aggregate size.

G. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixes where indicated.

H. Prepare design mixes for each type and strength of concrete by either laboratory trial batch of field experience methods as specified in ACI 301. If trial batch method is used, use an independent testing facility acceptable to the Architect for preparing and reporting proposed mix designs.

2.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice." In the case of fabrication errors, do not rebend or straighten reinforcement.

B. Unacceptable Materials: Reinforcement with any of the following defects will not be permitted in the Work:

1. Bar lengths, depths or bends exceeding specified fabrication tolerances.
2. Bends or kinks not indicated on the Drawings or final Shop Drawings
3. Bars with reduced cross section due to excessive corrosion or other cause.
4. Bars with damaged corrosion resistive coating (if specified).

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads within acceptable deflection limits.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages, ind inserts, and other features required.

C. Construct forms tight enough to prevent loss of concrete mortar.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

1. Do not use rust-stained steel form-facing material.

E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

G. Chamfer exterior corners and edges of permanently exposed concrete with ¾" x3/4" strips (unless otherwise indicated) accurately formed and surfaced to produce uniform straight lines and tight edges. Unexposed corners may be formed square or chamfered.

H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items, including those under separate prime contracts (if any).

I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

K. Coat contact surfaces of forms with non-staining, rust preventative form-release agent, according to manufacturer's written instructions, before placing reinforcement. Rust stained steel formwork is not acceptable.

L. Support form facing materials by structural members spaced sufficiently close to prevent deflection. Fit forms placed in successive units for continuous surfaces of accurate alignment, from irregularities and within allowable tolerances

M. Elevate formwork as required for anticipated deflections due to weight and pressures of fresh concrete, shortening of formwork system, and construction loads.

N. Carefully inspect falsework and formwork during and after concrete placement to determine abnormal deflection or signs of failure; make necessary adjustments to produce work of required dimensions.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required.

3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. At a spacing not to exceed 4'-0" on center in either direction. For slabs on grade, use supports not to exceed 4'-0" o.c. with sand plates or horizontal runners where base material will not support chair legs.
2. Shop- or field-weld reinforcement according to AWS D1.4, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls at not more than 60 feet in any horizontal direction. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Isolation Joints in Slabs-on-Grade: Install joint-filler strips at all slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (12 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

D. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.

1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.5 CONCRETE PLACEMENT

A. Pre-Placement Inspection:

1. Before concrete placement, check the lines and levels of erected formwork. Make corrections and adjustments to ensure proper size and location of concrete members and stability of forming systems. During concrete placement, check formwork and related supports to ensure that forms are not displaced and that completed Work will be within specified tolerances.
2. Before placing concrete, inspect and complete the formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts involved in ample time to permit the installation of their Work; cooperate with other trades in setting such Work, as required.
3. Thoroughly wet wood forms immediately before placing concrete, as required where form coatings are not used.
4. Soil at bottom of foundation systems are subject to testing for soil bearing value by the testing laboratory, as directed by the Architect. Place concrete immediately after approval of foundation excavations.
5. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
6. Remove soil, debris, standing water, ice, snow, loose mill scale or coating and other foreign matter from formwork and metal deck.

B. Do not add water to concrete during delivery, at Project site, or during placement, unless indicated on trip ticket.

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.

D. Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.

1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

F. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections.

1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
2. Do not apply rubbed finish to smooth-formed finish.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.7 FINISHING FLOORS AND SLABS

A. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

3.8 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

3.9 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 301, ACI 306.1 for cold-weather protection, and with recommendations in ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive resilient sheet floor coverings. Cure concrete surfaces to receive other floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval. Comply with ACI 301.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: DB contractor is to engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.

B. CDB Representative and Bridging Architect shall observe all steel reinforcement, ties etc prior to placement of concrete in forms for compliance with DBE final design documents, and shall be notified 48 hours prior to any pours or placement of concrete.

C. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m), but less than 20 cu. yd. (19 cu. m), plus one set for each additional 20 cu. yd. (38 cu. m) or fraction thereof.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.

6. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of five standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39

    a. Test two specimens at 7 days, two at 28 days and one at 56 days if 28-day compressive strength has not yet been obtained.
    b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.

D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

E. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

H. Defective Work: Concrete work which does not conform to the specified requirements, including strength, tolerances, and finishes, shall be corrected at the Contractor's expense without extension of time . The contractor shall also be responsible for the cost of corrections to any other work affected by or resulting from corrections to the concrete work.

END OF SECTION 03 30 00

PART 1 - GENERAL

1.1 WORK INCLUDES

A. BASE BID:

1. Contractor Provide

a. All miscellaneous metal fabrications as required for the project shown on the drawings and specified herein. Including;

1. Miscellaneous steel framing and supports.
2. Cast-In-Place, 4” x 4” corner protection angles on inside and outside corners of both sections of concrete base wall at rolling door opening.
3. Primed and field painted concrete filled metal bollards located inside and outside of each rolling door jamb as indicated on the drawings.

1.2 RELATED WORK

1. 03 30 00 Cast-In-Place Concrete
2. 09 91 23 Painting

PRODUCTS

2.1 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

2.2 FASTENERS

A. Post-Installed Anchors: Torque-controlled expansion anchors.

1. Material for Exterior Locations: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use.

2.3 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

B. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

2.5 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Prime miscellaneous steel trim with zinc-rich primer**.**

2.6 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe.

B. Prime bollards with zinc-rich primer.

2.7 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.8 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

B. Shop prime iron and steel items unless they are to be embedded in concrete or unless otherwise indicated.

1. Shop prime with universal shop primer indicated.
2. Field prime all exterior exposed steel with zinc rich primer.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING METAL BOLLARDS

A. Anchor bollards in place with concrete footings. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

B. Fill bollards solidly with concrete, mounding top surface to shed water.

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Base Bid: General Contractor to provide all work as indicated in specifications for sealants for the following applications at project site:

1. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:

a. Control and expansion joints in cast-in-place concrete.
b. Perimeter joints between materials listed above and frames of doors and windows.

2. Exterior joints in the following horizontal traffic surfaces:

a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
b. Joints between different materials listed above.
c. Other joints as indicated.

1.2 RELATED WORK

A. Specified Elsewhere:

1. 03 30 00 – Cast in Place Concrete
2. 08 11 13 – Hollow Metal Doors and Frames

1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

A. Product Data: Submit complete printed data for each joint-sealant product indicated.

B. Samples: Submit manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

D. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
2. When joint substrates are wet.

B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Submit written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Preliminary Acceptance, plus five year special manufacturer’s warranty

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

1. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range for this characteristic.

B. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint-Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

C. Additional Movement Capability: Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.

2.2 ELASTOMERIC SEALANT MATERIALS

A. One-Part Silicone Sealant (1-SCS): Low-Modulus Nonacid-Curing Silicone Sealant : Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following :

    a. 790; Dow Corning.
    b. Silpruf; GE Silicones.
    c. Omniseal; Sonneborn Building Products Div., Degussa.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Additional Movement Capability: 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement.
5. Use Related to Exposure: NT (nontraffic).
6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

B. Multi-Part Nonsag Urethane for Use NT (2-PUS1): Type M, Grade NS, Class 25, and complying with the following requirements for Uses:

1. Uses NT, M, A and, as applicable to joint substrates indicated, O.
2. Products: Subject to compliance with requirements provide one of the following:

    a. Vulkem 227; Tremco.
    b. Dualthane; W.R. Meadows.
    c. Dynatrol II; Pecora.
    d. Sonolastic NP2; Sonneborn Building Products Div. Degussa.
    e. Dymeric; Tremco.

2.3 JOINT SEALANT BACKING

A. Provide sealant backings of material and type which are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Type C: Closed-cell material with a surface skin, unless open cell is indicated or recommended by sealant manufacturer.
2. Type O: Open-cell material.
3. Type B: Bicellular material with a surface skin.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:

    a. Concrete.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

    a. Metal.

B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.

E. Install sealants by proven techniques to comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses provided for each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

    a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Preliminary Acceptance. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

3.6 SEALANT SCHEDULE

TYPE	POLYMER	EXPOSURE/TRAFFIC	USES/APPLICATIONS
SCS	Silicone	Exterior joints in vertical surfaces and non-traffic horizontal surfaces	• Control and expansion joints in cast-in-place concrete. • Control and expansion joints in masonry. • Aluminum windows and between windows and other materials. • Aluminum storefront and entrances and between storefront and entrances and other materials • Joints between materials listed above and frames of doors and windows. • Control and expansion joints in plaster soffit and overhead surfaces. • Other joints as indicated.
2 – PUS1	Two-part Urethane	Exterior joints in horizontal traffic surfaces	• Control, expansion, and isolation joints in cast-in-place concrete slabs. • Joints in paving. • Other joints as indicated.
SCS or 2 – PUS1	Silicone or Two-part Urethane.	Interior moving joints in vertical surfaces and horizontal nontraffic surfaces	• Control and expansion joints on exposed interior surfaces of exterior walls. • Perimeter joints of exterior openings where indicated. • Joints between tops of non-fire rated walls and underside of floors and beams. • Tile control and expansion joints • Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions. • Perimeter joints between interior wall surfaces and frames.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Base Bid: General Contractor shall provide work as specified in this section and as shown on the drawings:

1. Hollow Metal Doors – galvanized/galvanealed
2. Hollow Metal Frames

1.2 RELATED WORK

A. Specified Elsewhere:

1. 07 92 00 – Joint Sealants
2. 08 71 00 – Door hardware
3. 09 91 00 – Painting

1.3 SUBMITTALS

A. Product Data: Submit complete printed data for each type of door and frame indicated, include door designation, type, level and model, material description, core description, construction details, label compliance, sound and fire-resistance ratings, and finishes.

B. Shop Drawings: Submit complete shop drawings; show the following:

1. Elevations of each door design.
2. Details of doors including vertical and horizontal edge details.
3. Frame details for each frame type including dimensioned profiles.
4. Details and locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, accessories, joints, and connections.
7. Coordination of glazing frames and stops with glass and glazing requirements.

C. Door Schedule: Use same reference designations indicated on Drawings in preparing schedule for doors and frames.

1.4 QUALITY ASSURANCE

A. Steel Door and Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated.

B. Thermal Performance: Provide exterior door assembly (door and frame) having as certified by the manufacturer to have a maximum U-factor of 0.70.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Inspect doors and frames on delivery for damage, and notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect. Remove and replace damaged items that cannot be repaired as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4 inch (100 mm) high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber. If door packaging becomes wet, remove cartons immediately. Provide minimum 1/4 inch (6 mm) spaces between stacked doors to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amweld Building Products, Inc.
2. Benchmark Commercial Doors; a division of General Products Co., Inc.
3. Ceco Door Products; a United Dominion Company.
4. Copco Door Co.
5. Curries Company.
6. Deansteel Manufacturing, Inc.
7. Mesker Door, Inc.
8. Pioneer Industries Inc.
9. Republic Builders Products.
10. Steelcraft; a division of Ingersoll-Rand.

2.2 MATERIALS

A. Hot-Rolled Steel Sheets: ASTM A 569/A 569M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

B. Cold-Rolled Steel Sheets: ASTM A 366/A 366M, Commercial Steel (CS), or ASTM A 620/A 620M, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness.

C. Metallic-Coated Steel Sheets: ASTM A 653/A 653M, Commercial Steel (CS), Type B, with an A40 (ZF120) zinc-iron-alloy (galvannealed) coating; stretcher-leveled standard of flatness.

2.3 DOORS

A. General: Provide doors of sizes, thicknesses, and designs indicated.

B. Interior Doors: Provide doors complying with requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), Model 1 Full Flush

C. Exterior Doors: Provide insulated doors meeting thermal performance requirements specified in "performance requirements" of this specification and complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:

1. Level 3 and Physical Performance Level A (Extra heavy duty) Model 1. (Full flush).

2.4 FRAMES

A. General: Provide steel frames for doors, transoms, sidelights, borrowed lights, and other openings that comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated.

B. Exterior Frames: Fabricate frames of 0.067 inch (1.7 mm) thick metallic-coated steel sheet.

C. Door Silencers: Except on weather-stripped frames, fabricate stops to receive three silencers on strike jambs of single-door frames and two silencers on heads of double-door frames.

D. Plaster Guards: Provide 0.016 inch (0.4 mm) thick, steel sheet plaster guards or mortar boxes to close off interior of openings; place at back of hardware cutouts where mortar or other materials might obstruct hardware operation.

E. Supports and Anchors: Fabricated from not less than 0.042 inch (1.0 mm) thick, electrolytic zinc-coated or metallic-coated steel sheet.

1. Wall Anchors in Masonry Construction: 0.177 inch (4.5 mm) diameter, steel wire complying with ASTM A 510 (ASTM A 510M) may be used in place of steel sheet.

F. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where zinc-coated items are to be built into exterior walls, comply with ASTM A 153/A 153M, Class C or D as applicable.

2.5 FABRICATION

A. General: Fabricate steel door and frame units to comply with ANSI A250.8 and to be rigid, neat in appearance, and free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site.

B. Exterior Door Construction: For exterior locations and elsewhere as indicated, fabricate doors, panels, and frames from metallic-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053 inch (1.3 mm) thick, metallic-coated steel channels with channel webs placed even with top and bottom edges.

C. Interior Door Faces: Fabricate exposed faces of door from cold-rolled steel sheet.

D. Core Construction: Manufacturer's standard core construction that produces a door complying with SDI standards.

E. Core Construction: One of the following manufacturer's standard core materials that produce a door complying with SDI standards:

1. Polyurethane where code compliant.
2. Polystyrene where code compliant
3. Rigid mineral-fiber board.

F. Clearances for Non-Fire-Rated Doors: Not more than 1/8 inch (3.2 mm) at jambs and heads, except not more than 1/4 inch (6.4 mm) between pairs of doors. Not more than 3/4 inch (19 mm) at bottom.

G. Single-Acting, Door-Edge Profile (strike jamb).

H. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

I. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

J. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

K. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies.

1. Unless otherwise indicated, provide thermal-rated assemblies with a maximum of 0.700.

L. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.

M. Frame Construction: Fabricate frames to shape shown.

1. For exterior applications, fabricate frames with mitered or coped and continuously welded corners and seamless face joints.
2. Provide welded frames with temporary spreader bars.

N. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

O. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.

P. Glazing Stops: Manufacturer's standard, formed from 0.032 inch (0.8 mm) thick steel sheet.

1. Provide nonremovable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.
2. Provide screw-applied, removable, glazing stops on inside of glass, louvers, and other panels in doors.
3. Coordinate stop location for the type and thickness of glazing required.

2.6 FINISHES

A. Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.

B. Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

1. Except for frames located in existing walls or partitions, place frames before construction of enclosing walls and ceilings.
2. In masonry construction, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike

jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.

3. In existing concrete or masonry construction, provide at least three completed opening anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.
4. In metal-stud partitions, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Attach wall anchors to studs with screws.
5. For in-place gypsum board partitions, install knock-down, drywall slip-on frames.
6. Install fire-rated frames according to NFPA 80.
7. For openings 90 inches (2286 mm) or more in height, install an additional anchor at hinge and strike jambs.

C. Door Installation: Comply with ANSI A250.8. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A115.1G.

1. Fire-Rated Doors: Install within clearances specified in NFPA 80.

3.2 ADJUSTING AND CLEANING

A. Prime-Coat Touchup: Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch up of compatible air-drying primer.

B. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION

SECTION 08 3323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. BASE BID

1. Contractor provide 15’ high x 24’ wide, insulated, overhead rolling, (coiling) steel service door suitable for heavy-duty commercial use with motorized operation as indicated on the plans and specified herein.

    a. Contractor to insure all product data and installation details are provided to fabric structure manufacturer to insure proper steel support is provided to anchor all components of the system to the fabric structure framing and concrete base wall as necessary.

1.2 RELATED WORK

A. Specified elsewhere:
1. 05 50 00 Metal Fabrications
2. 13 12 10 Frame Supported Membrane Structure
3. 26 05 00 Electrical Work

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance, Exterior Doors: Exterior overhead coiling doors shall withstand the wind loads, the effects of gravity loads, and loads and stresses within limits and under conditions indicated according to Building Code.

1. Wind Loads: 20 psf.
2. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.

B. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.

C. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to Building Code.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the emergency-egress-door component will be fully operational after the seismic event."

D. Operation Cycles: Provide overhead coiling door components and operators capable of operating for not less than 50,000 cycles. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

1.4 SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory. Include the following:

1. Construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
2. Rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Show locations of replaceable fusible links.
3. Wiring Diagrams: For power, signal, and control wiring.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

B. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

1. Obtain operators and controls from overhead coiling door manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and California Access Compliance Statutes.

1.6 WARRANTY

A. Manufacturer’s limited door and operator system, except the counterbalance spring and finish, to be free from defects in materials and workmanship for 3 years or 20,000 cycles, whichever occurs first.
B. Manufacturer’s 2-year limited door warranty for all parts and components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

1. Obtain operators and controls from overhead coiling door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.

1. Design Wind Load: As indicated on Drawings.
2. Testing: According to ASTM E 330.
3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
4. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.

B. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Component Importance Factor: 1.0.

2.3 EXTERIOR DOOR ASSEMBLY

A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

a. Cookson Company.
b. Raynor.
c. Wayne-Dalton Corp.

B. Operation Cycles: Door components and operators capable of operating for not less than 50,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

1. Include tamperproof cycle counter.

C. Air Infiltration: Maximum rate of 1.0 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283.

D. STC Rating: 26.

E. Curtain R-Value: 6.0 deg F x h x sq. ft./Btu.

F. Door Curtain Material: Galvanized steel.

G. Door Curtain Slats: Flat profile slats of 3-1/4-inch center-to-center height.

1. Insulated-Slat Interior Facing: Metal.
2. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

H. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from hot-dip galvanized steel and finished to match door.

I. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.

J. Hood: Match curtain material and finish.

1. Shape: As shown on Drawings.
2. Mounting: Face of wall.

K. Locking Devices: Equip door with locking device assembly and chain lock keeper.

1. Locking Device Assembly: Cremone type, both jamb sides locking bars, operable from inside and outside with cylinders.

L. Electric Door Operator:

1. Usage Classification: Medium duty, up to 12 cycles per hour and up to 50 cycles per day.
2. Operator Location: Front of hood or as shown on Drawings.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use.
4. Motor Exposure: Exterior, wet, and humid.
5. Emergency Manual Operation: Chain type.
6. Obstruction-Detection Device: Automatic electric sensor edge on bottom bar or pneumatic sensor edge on bottom bar.

    a. Sensor Edge Bulb Color: Black.

7. Control Station(s): Interior mounted.

M. Curtain Accessories: Equip door with weatherseals.

N. Door Finish:

1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.
2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.4 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural steel sheet; complying with ASTM A 653/A 653M, with G90 (Z275) zinc coating; nominal sheet thickness (coated) of 0.028 inch and as required to meet requirements.
2. Aluminum Door Curtain Slats: ASTM B 209 (ASTM B 209M) sheet or ASTM B 221 (ASTM B 221M) extrusions, alloy and temper standard with manufacturer for type of use and finish indicated; thickness of 0.050 inch (1.27 mm); and as required.
3. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within slat faces.
4. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face.
5. Gasket Seal: Provide insulated slats with manufacturer's standard interior-to-exterior thermal break or with continuous gaskets between slats.

B. Endlocks and Windlocks for Service Doors: Malleable-iron casings galvanized after fabrication, secured to curtain slats with galvanized rivets or high-strength nylon. Provide locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.

C. Bottom Bar for Service Doors: Consisting of two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from manufacturer's standard hot-dip galvanized steel, stainless steel, or aluminum extrusions to match curtain slats and finish.

D. Bottom Bar for Counter Doors: Manufacturer's standard continuous channel or tubular shape, fabricated from manufacturer's standard hot-dip galvanized steel, stainless steel, or aluminum extrusions to match curtain slats and finish.

E. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

1. Removable Posts and Jamb Guides for Counter Doors: Manufacturer's standard.

2.6 HOOD

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Galvanized Steel: Nominal 0.064-inch-thick, hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A 653/A 653M..
2. Include automatic drop baffle on fire-rated doors to guard against passage of smoke or flame.
3. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

2.7 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

B. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

1. Lock Cylinders: Provide cylinders specified in Section 08 7100 "Door Hardware" and keyed to building keying system.
2. Keys: Provide three for each cylinder.

C. Chain Lock Keeper: Suitable for padlock.

D. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.8 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Spring Balance: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24 V, ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Door Operator Location(s): Operator location indicated for each door.

1. Top-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on top of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Headroom is required for this type of mounting.
2. Front-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on coil side of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Front clearance is required for this type of mounting.
3. Wall Mounted: Operator is mounted to the inside front wall on the left or right side of door and connected to door drive shaft with drive chain and sprockets. Side room is required for this type of mounting. Wall mounted operator can also be mounted above or below shaft; if above shaft, headroom is required.
4. Through-Wall Mounted: Operator is mounted on other side of wall from coil side of door.

D. Electric Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Section 11 0513 "Common Motor Requirements for Equipment" unless otherwise indicated.

1. Electrical Characteristics:

   a. Phase: Polyphase.
   b. Volts: 208 V.
   c. Hertz: 60.

2. Motor Type and Controller: Reversible motor and controller (disconnect switch) for motor exposure indicated.
3. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
4. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
5. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.

E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

F. Obstruction Detection Device: Equip motorized door with indicated external automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel. For fire-rated doors, activation delays closing.

1. Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

   a. Self-Monitoring Type: Four-wire configured device designed to interface with door operator control circuit to detect damage to or disconnection of sensor edge.

G. Remote-Control Station: Momentary-contact, three-button control station with push-button controls labeled "Open," "Close," and "Stop."

1. Interior units, full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
2. Exterior units, full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.

I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

K. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with regulatory requirements for accessibility.

2.10 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 STEEL AND GALVANIZED-STEEL FINISHES

A. Factory Prime Finish: Manufacturer's standard primer, compatible with field-applied finish. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

B. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Perform installation and startup checks according to manufacturer's written instructions.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Test door closing when activated by detector or alarm-connected fire-release system. Reset door-closing mechanism after successful test.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide weathertight fit around entire perimeter.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 08 33 00

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Base Bid: General Contractor shall provide work as specified in this section and as shown on the drawings.

1. Hinges
2. Closers
3. Exiting Devices
4. Keying

1.2 RELATED WORK

A. Specified Elsewhere:

1. 08 11 13 – Hollow Metal Doors and Frames

1.3 SUBMITTALS

A. Product Data: Submit manufacturers technical product data for each item of hardware. Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.

B. Hardware Schedule: Submit finish hardware schedule in a vertical format separate from door and frame schedule, conforming to "Sequence and Format for the Hardware Schedule" published by the Door and Hardware Institute (DHI). Horizontal and coded schedules are not acceptable.

1. Finish Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Schedules not having the following information will be rejected:

a. Type, style, function, size and finish of each hardware item.
b. Name and manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
e. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
f. Mounting locations for hardware.
g. Door and frame sizes and materials.

2. Submit schedule at earliest possible date, particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) that is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware,

and other information essential to the coordinated review of hardware schedule. Review and acceptance by the Architect does not relieve Contractor of responsibility to fulfill requirements of Contract Documents.

C. Keying Schedule: Submit keying schedule after meeting with Using Agency agent for keying instructions.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers.

B. Accessibility Requirements: For door hardware on doors in an accessible route, comply with Illinois Accessibility Code and ICC/ANSI A117.1

C. Maximum Opening-force requirements: For exterior, non fire-rated doors, 5 lbf applied perpendicular to door.

1. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

1.5 DELIVERY, STORAGE AND HANDLING

B. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.

C. Inventory hardware jointly with representatives of the hardware supplier and the hardware installer until each is satisfied that the count is correct.

D. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

E. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

PART 2 - PRODUCTS

2.1 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of door hardware item is indicated in the Schedule of Hardware sets.

B. Manufacturer's Product Designations: A manufacturer's symbol in the hardware sets indicates whose product designation is used in the Schedule of Hardware Sets for purposes of establishing minimum requirements. Provide either the product designated,

or, where more than one manufacturer is listed, the comparable product of one of the other manufacturers that comply with requirements including those specified elsewhere in this section.

C. ANSI/BHMA designations used elsewhere in this section or in schedules to describe hardware items or to define quality or function are derived from the following standards. Provide products complying with these standards and requirements specified elsewhere in this section.

1. Butts and Hinges: ANSI/BHMA A156.1.
2. Locks & Lock Trim: ANSI/BHMA A156.13.
3. Exit Devices: ANSI/BHMA A156.3.
4. Door Controls - Closers: ANSI/BHMA A156.4.
5. Auxiliary Locks: ANSI/BHMA A 156.5.
6. Architectural Door Trim: ANSI/BHMA A156.6.
7. Template Hinge Dimensions: ANSI//BHMA A156.7.
8. Auxiliary Hardware: ANSI//BHMA A156.16.
9. Materials & Finishes: ANSI/BHMA A156.18.
10. Thresholds: ANSI/BHMA A156.21.
11. Door Gasketing Systems: ANSI/BHMA A156.22.

2.2 MATERIALS AND FABRICATION, GENERAL

A. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement shown.

B. Manufacturer's Name Plate: Do not use manufacturer's products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to Architect.

C. Manufacturer's identification will be permitted on rim of lock cylinders, and armor front.

D. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser quality than specified for the applicable hardware units by applicable ANSI A156 series standard for each type hardware and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

E. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.

F. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

G. Provide concealed fasteners for hardware units that are exposed when door is closed, except to extent no standard units of the type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on the opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex screw fasteners.

2.3 HARDWARE FINISHES

A. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock set (or push-pull units if no latch- lock sets) for color and texture.

B. Provide finishes that match those established by BHMA as indicated in the hardware schedule or, if none indicated, match the finish to which the item is applied.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for the applicable units of hardware by referenced standards.

D. Finish Designations: Scheduled designations refer to ANSI A156.18 "Materials & Finishes Standard", including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

2.4 HINGES, BUTTS

A. Templates: Provide only template- produced units.

B. Screws: Furnish Phillips flat-head or machine screws for installation of units, except furnish Phillips flat-head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges or pivots.

C. Hinge Pins: Except as otherwise indicated in the hardware schedule, provide hinge pins as follows:

1. Material: Stainless steel pins.
2. Exterior Doors: Non-removable pins (NRP).
3. Tips: Flat button and matching plug, finished to match leaves.
4. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90 inches or less in height and one additional hinge for each 30 inches of additional height.
5. All hinges shall be ball bearing type.
6. Provide safety stud and locking hole for hinges where scheduled.

D. Manufacturer, (Butts): Subject to compliance with requirements, provide products of one of the following:

1. Bommer Industries.; BB5002
2. Hager Hinge Co. BB1191
3. Ives; 5BB1
4. McKinney Mfg. Co.; Assa Abloy Co.; TA2314
5. PBB, Inc.; BB81

2.5 LOCK CYLINDERS AND KEYING

A. General: Supplier shall meet with Using Agency to finalize keying requirements and obtain final instructions in writing. Comply with Using Agency's instructions for master keying and except as otherwise indicated, provide individual change key for each lock which is not designed to be keyed alike with a group of related locks.

B. Standard System: Keying system should reflect District 1's current system.

C. All cylinder cores shall be keyed at the factory by the cylinder manufacturer where records will be established and maintained.

D. Provide construction cores and keys during the construction period. Construction control and operating keys and cores shall not be part of the Using Agency's permanent key system or be furnished on the same key way as the Using Agency's permanent key system. Permanent core and keys shall be furnished by the hardware supplier direct to the Contractor as specified in Part 3.

E. Permanent keys shall be stamped with the key system symbol (VKC). Do not mark the keys with the cylinder biting. Permanent cores shall be marked with the key system symbol in such a manner that the mark is not visible when the core is installed in the cylinder (CVKC).

F. Except where otherwise specified, locksets, cylinders and cores shall be by the same manufacturer, to assure proper operations.

G. During construction, all cylinder cores shall be keyed alike. The Contractor shall receive three (3) copies of this key. Under no circumstances shall the Contractor receive any of the permanent building master keys or changes keys.

1. Quantity of Keys:

a. 3 Master Keys.

2.6 LOCKS, LATCHES AND BOLTS

A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set.

1. Foot Bolts: Provide dust-proof strikes, except where special threshold construction provides non-recessed strike for bolt.

2. Roller Strikes: Provide where recommended by manufacturer of the latch and lock units.

B. Exit Devices:

1. Surface applied rim, mortise and vertical rod exit devices shall be available as a complete series, listed in UL "Accident Equipment List-Panic Hardware" and "Fire Exit Hardware". All devices shall be the modern push type. These devices shall have met Performance Test Requirements in accordance with ANSI Standard A156.3 for Grade 1 exit devices. All exit devices shall be furnished with thru-bolts and sex nuts. Provide cylinder dogging for all devices except “Fire Exit Devices”
2. Rim exit device for single doors and pairs of doors with fixed or removable mullions shall be equipped with one of the following type of latch bolts, deadlocking, guarded or square bolt with a minimum 3/4 inch throw.
3. All rim exit devices for pairs of doors with fixed or removable mullion shall have two-piece interlocking stabilizer blocks installed above and below the latch case.
4. Exit devices shall be the type, function, and design as listed in the schedule of finish hardware sets and shall have a manufacturer’s warranty of five (5) years.
5. Subject to compliance with specifications, provide one of the following:

a.	Dorma; Dorma Co.	9000 Series
b.	Precision; Prevision Co.	Apex Series
c.	Sargent; Assa Abloy Co.	80 Series
d.	Yale Security; Assa Abloy Co.	7000 Series
e.	Von Duprin; Ingersoll-Rand Co.	98 Series

2.7 CLOSERS AND DOOR CONTROL DEVICES

A. Closers shall be rack and pinion construction with both rack and pinion of heat treated steel and with a cast iron or cast aluminum case. Closing the door will be controlled by 2 valves, one to control closing speed and one to control latching speed. Closers shall be regularly furnished with fully adjustable backcheck allowing approximate 70 degrees backcheck on both regular and parallel are closers. Delayed action shall be available. Valves shall be concealed against unauthorized adjustment and non-critical needle valve type. Spring power adjustment shall be standard with an adjustment size 1 to size 6. Closers shall be surface applied with rectangular metal covers, void of manufacturers' trademarks. All door closers intended to be mounted to the door shall be furnished with thru-bolts and sex nuts.

B. Closers shall be certified as meeting the ANSI A156.4 Grade 1 requirements, be listed by UL for all classes of labeled doors and shall have a manufacturer’s warranty of ten (10) years.

C. Size of units: Except as otherwise specifically indicated, comply with the manufacturers recommendations for size of door control unit depending upon size of door, exposure to weather and anticipated frequency of use.

1. Provide heavy duty arms.

2. Provide spring cushion stops on parallel arm closers.
3. Provide all necessary plates, brackets, arms and shoes required for proper installation of closer.

D. Acceptable Manufacturers:

1. Dorma 8600 Series.
2. LCN 4040 Series.
3. Norton 8501 Series.
4. Sargent 281 Series.

2.8 DOOR TRIM UNITS

A. Frame Mutes: BMHA A156.16 Neopren push in type

B. Acceptable Manufacturers:

1. Glynn Johnson.; GJ64
2. Don-Jo; 1608
3. Ives; SR64

2.9 THRESHOLDS, WEATHER SEALS AND RAIN DRIPS

A. Provide thresholds and weather seals on all exterior doors as scheduled.

B. Acceptable Manufacturers:

1. National Guard Products. 17 Sweep, 16A Drip, 190_V Weatherstrip, 700S Head Weatherstrip, 425HD Threshold
2. Pemko; 345A Sweep, 346 Drip, 303_S Jamb Weatherstrip, 2891_S Head Weatherstrip, 271 Threshold.
3. Hager; 770S Sweep, 810S Drip, 862S Weatherstrip, 413S Threshold, 627S Threshold
4. Reese; HD5A Threshold, 688A Weatherstrip, 353A Sweep, R201A Drip

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mounting Locations: As indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, and "ADA Accessibility Guidelines for Buildings and Facilities", except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or

into surfaces that are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.

C. Install door hardware units using fasteners provided by the manufacturer as specified.

1. Hinges: Phillips flat head wood screws into wood Phillips flat head machine screws into metal.
2. Exit devices: Through bolts and sex nuts.
3. Closers Through bolts and sex nuts.
4. Door holder/release; armature mounted with through bolts and sex nuts.

D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. Set thresholds for exterior doors in full bed of butyl- rubber or polyisobutylene mastic sealant. Thresholds shall be notched or coped to fit around removable mullions.

G. Removable mullion sill brackets shall be secured to the concrete floor with approved fasteners and anchors.

H. Hardware shall be installed with the fasteners and anchors provided by the manufacturer of that hardware item.

3.2 ADJUSTMENT, CLEANING AND KEYING

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Clean adjacent surfaces soiled by hardware installation.

C. Permanent cores and keys shall be delivered by the hardware supplier directly to the contractor at the keying meeting. The contractor and representative of the hardware supplier shall jointly install the permanent cores in the presence of the Using Agency's agent who shall receive the keys. Hardware supplier shall return the construction cores and construction keys to the manufacturer.

D. Tools and instructions: At the time of keying the hardware supplier shall provide a complete set of specialized tools and maintenance instructions and shall instruct the Using Agency's agent in the proper maintenance.

E. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to

acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

1. Instruct Using Agency's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

F. Continued Maintenance Service: Approximately three months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re- adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Using Agency's personnel in recommended additions to the maintenance procedures. Replace hardware items that have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.3 SCHEDULE OF FINISH HARDWARE SETS

A. Provide finish hardware for each door to comply with requirements of this Section, hardware set numbers indicated on Door Schedule and the schedule of hardware sets on drawings.

B. MODEL FUNCTIONS LISTED ARE TO INDICATE FEATURES OF DEVICES.

C. Other Abbreviations:

1. LDW - Less Door Width
2. TBS - To Be Selected

3.4 FINISH HARDWARE SETS.

HARDWARE SET # 1

HINGES	4 ½ X 4 ½ (3)	TBS
EXIT DEVICE	CYLINDER DOGGING	TBS
CYLINDERS	AS REQUIRED	
DOOR CLOSER	SPRING- CUSH	TBS
THRESHOLD		TBS
WEATHERSTRIP		TBS
SWEEP		TBS
DRIP CAP		TBS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Base Bid:

1. Contractor shall size and provide fixed, extruded-aluminum or formed-metal louvers for fresh air intake, exhaust and wall mounted propeller exhaust fan to meet the volume requirements of the building size specified by the award of the project.

1.2 Related Work:

A. 13 12 10 Frame Supported Membrane Structure

B. 23 05 00 Ventilation Work

C. 26 05 00 Electrical Work

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors.

1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
2. Wind Loads: Determine loads based on a uniform pressure of 30 lbf/sq. ft. (1436 Pa), acting inward or outward.

B. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.
1. Include manufacturer’s full-range color chart.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Galvanized-Steel Sheet: ASTM A 653/A 653M, G60 zinc coating, mill phosphatized. Exterior galvanized shall be painted. Color shall be approved by architect/owner from manufacturer's standard range.

D. Fasteners: Use types and sizes to suit unit installation conditions.

1. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
2. For fastening galvanized steel, use hot-dip-galvanized steel or 300 series stainless-steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.

2.2 FABRICATION, GENERAL

A. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

B. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal Storm-Resistant Louver

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following as submitted to and accepted by the CDB Representative.:

1.
   a. Air Balance Inc.; a Mestek company.
   b. Greenheck Fan Corporation.
   c. Ruskin Company; Tomkins PLC.

2. Louver Depth: Coordinate with fabric structure manufacturer.
3. Frame and Blade Nominal Thickness: Not less than 0.060 inch for blades and 0.080 inch for frames.
4. Louver Performance Ratings:
   a. Free Area: Not less than 14.5 sq. ft. for 80-inch- wide by 50-inch- high louver.
5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 FIXED, FORMED-METAL LOUVERS

A. Horizontal, Drainable-Blade Louver

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:

   a. Air Balance Inc.; a Mestek company.
   b. Greenheck Fan Corporation.

c. Ruskin Company; Tomkins PLC.

2. Louver Depth: Coordinate with fabric structure manufacturer.
3. Frame and Blade Material and Nominal Thickness: Galvanized-steel sheet, not less than 0.052 inch for frames and 0.040 inch for blades.
4. Frame and Blade Material and Nominal Thickness: Stainless-steel sheet, not less than 0.050 inch.
5. Louver Performance Ratings:
   a. Free Area: Not less than 14.5 sq. ft. for 80-inch- wide by 50-inch- high louver.
6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.5 LOUVER SCREENS

1. Provide manufacturer's standard bird screens at each exterior louver constructed of aluminum or stainless steel mesh, not to exceed ½" x ½" pattern, using wire not less than 1.25mm secured in a metal frame that is the same kind and form of metal indicated for the louver to which the screen is attached.

2.6 ALUMINUM FINISHES

A. High-Performance Organic Finish: 3-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions. Color and gloss as selected by Architect from manufacturer's full range.

2.7 GALVANIZED-STEEL SHEET FINISHES

A. Finish louvers after assembly.

B. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and repair according to ASTM A 780.

C. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard 2-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils. Color and gloss as selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work using concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

B. Provide perimeter reveals and openings of uniform width for sealants and joint fillers.

C. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory and refinish entire unit or provide new units.

D. Protect galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint.

END OF SECTION 089000

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Base Bid:
1. Contractor provide surface preparation and the application of paint systems on the following substrates.

a. Galvanized hollow metal swing doors and frames.
b. Primed steel pipe bollards
c. Galvanized embedded corner guards
d. Concrete (interior salt fill line)

1.2 RELATED WORK

A. 03 30 00 Cast-In-Place Concrete

B. 05 50 00 Metal Fabrications

C. 08 11 13 Hollow Metal Doors and Frames

1.3 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each finish and for each color and texture required.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Non-flat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.

C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

D. Colors: As selected by Architect from manufacturer's full range except pipe bollards, embedded corner protection and salt fill line shall all be manufacturer’s commercial/industrial premixed “Safety Yellow”.

E. Products

1. Provide complete 2 or 3 step paint application process from one manufacturer. Subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:
   a. BM: Benjamin Moore
   b. P&L: Pratt & Lambert
   c. PPG: Pittsburg Paints
   d. SW: Sherwin Williams

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Begin coating application only after unsatisfactory conditions have been corrected, surfaces are dry and ambient weather conditions meet or exceed the paint manufacturer’s minimum requirements

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND APPLICATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and re-prime substrate with compatible primers as required to produce paint systems indicated.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

D. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

E. Prepare surfaces in accordance with manufacturer's instructions for specified coatings and indicated materials, using only methods and materials recommended by the coating manufacturer.

F. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.3 INTERIOR PAINTING SCHEDULE

A. Concrete Surface: (salt fill line)

1. Semi-Gloss Finish – High Performance Acrylic-Latex System: (MPI INT 9.2B)
   a. Prime Coat: Interior Latex Block Filler
   b. Intermediate Coat: Acrylic Semi-gloss enamel. (MPI 141)
   c. Topcoat: Latex: Acrylic Semi-Gloss enamel. (MPI 141)

B. Concrete Surface: Water and Salt Repellant Sealer
1. Natural Seal Penetrating Clear Water Based Concrete Sealer
   a. Concrete surface must be cleaned and have all loose and deterioration removed.
   b. Topcoat: Single coat required.

3.4 EXTERIOR PAINTING SCHEDULE

A. Exposed Structural Steel Substrates and all Ferrous Metals: (including embedded angles and pipe bollards)

1. Semi-Gloss Finish Acrylic-Enamel System:
   a. Prime Coat: Acrylic metal primer. (MPI 107)
   b. Intermediate Coat: Acrylic Semi-gloss enamel. (MPI 141)
   c. Topcoat: Latex: Acrylic Semi-Gloss enamel. (MPI 141)

B. Galvanized Hollow Metal Doors and Frames:

1. Semi-Gloss Finish Acrylic-Enamel System:
   a. First Coat: Acrylic Semi-gloss enamel. (MPI 141)
   b. Second Coat: Acrylic Semi-Gloss enamel. (MPI 141)

END OF SECTION 099123

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Contractor shall provide all labor including engineering as well as all materials, equipment, incidentals, warranties and guarantees for the design, manufacture and installation of a clear span, tensioned, fabric membrane covered, high tensile strength, pre-galvanized clear coated steel truss type frame structure, anchored to a steel reinforced concrete base wall whose overall dimensions measure approximately 80’ wide x 200’ long x 14’ high, with steel reinforced foundation wall and footings.

1. Contractor shall be responsible for the design of the reinforced concrete base wall, foundations and footings and shall consider soil type and conditions as well as all dead and live loads including reactions from the fabric structure manufacturer plus the outward natural force of the salt stored and the “push” action of the salt loading equipment. Concrete wall width and thickness indicated on plans is subject to modification by the foundation/base designer and to meet standard modular span fabrications of the selected manufacturer.

    a. Base wall design must comply with IBC 2015, (including ASCE 7-10 and ACI 318-11 by reference) and all local, state and federal requirements applicable.

    b. Reduction below the indicated height of the reinforced concrete base wall above the Finished Floor line are prohibited.

2. Fabric structure manufacturer shall be responsible for the design of the anchoring system required to attach the fabric structure to the reinforced concrete base.

3. Fabric structure manufacturer shall be responsible for the design of the end wall steel framing to not only support the structure but also the coiling overhead door, ventilation exhaust fan assembly and the intake and exhaust ventilation louvers. Coordinate with the suppliers of this equipment for their specific requirements.

1.2 RELATED WORK

A. Specified Elsewhere:

1. 00 31 32 – Geotechnical Information
2. 03 30 00 – Cast in Place Concrete

1.3 SYSTEM DESCRIPTION

A. This Section specifies the furnishing and installation of a structural frame supported membrane fabric covered roof and wall structure. This system includes the installation of structural framing and fabric membrane at roof and at walls to the extent shown on the project drawings. Scope includes:

1. The design, engineering, manufacture, shipping and handling and erection of a fixed prefabricated tension membrane structure.

2. The structure membrane shall be tensioned over a Half-Round Style structural truss framework. The interior of the structure below the main arch shall be clear and free of any structural members and shall provide unobstructed floor space. No exterior purlins guy ropes or cables shall be used for anchoring the structure.

3. The structure shall be rectangular in shape with a clear span of at least 80', with two vertical end walls with provisions to support overhead coiling doors and louvers.

4. Connections for structural elements and PVC membrane shall be properly designed with required safety factors so as to transfer all the maximum forces present in a given joint. The structure membrane shall form a continuous, uninterrupted weather tight shell over the framework. The membrane system shall be designed such that the PVC cladding panels can be supplied with optional overlap joints to allow adjacent panels to be field heat sealed together. The structure membrane shall not be designed to function as a structural member such that, should any damage to or penetrations of the membrane occur, the integrity of the structural framework shall not be affected.

5. The structure shall also include accessories and items required and necessary for the scope and intended use and as herein specified.

    a. Electrical systems including building lighting.

1.4 REFERENCES AND STANDARDS

A. The following publications are for the standards listed below but referred to thereafter by basic letter designation only. They form a part of this specification to the extent referenced thereto use latest editions.

1. American Institute of Steel Construction (AISC):
    a. M016 Manual of Steel Construction
    b. S326 Design, Fabrication and Erection of Structural Steel Buildings
    c. S329 Structural Joints Using ASTM A325 or A490

2. American Iron and Steel Institute (AISI):
   a. SG 503 Manual of Steel Construction, Ninth Edition

3. American Society for Testing and Materials (ASTM):
   a. A36 Structural Steel
   b. A 123 Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
   c. A 307 Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
   d. A325 High-Strength Bolts for Structural Steel Joints
   e. A 500 Standard Specifications for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
   f. A 563 Rev Carbon and Alloy Steel Nuts g. A 687 High-Strength Non-Headed Steel Bolts and Studs

4. American Society of Civil Engineers (ASCE):
   a. ASCE 7 Minimum Design Loads for Building and Other Structures

5. American Welding Society (AWS):
   a. D1.1 Structural Welding Code – Steel

6. National Fire Protection Association (NFPA):
   a. 701 Standard Methods of Fire Tests for Flame Resistant Textiles and Films

1.5 QUALITY ASSURANCE

A. Single source responsibility: obtain fabric covered building system components including structural framing, industrial covering, and accessories from one source.

B. Manufactures Qualifications: provide a fabric covered building system manufactured by a reputable manufacturer, which is experienced in design, engineering and manufacturing of fabric covered building systems, meet all of the required specifications, has been in continuous operation for ten (10) years with the same corporate identity, with a successful record in service and performance in the fabric covered building industry.

1.6 SUBMITTALS

A. Shop Drawings:

   1. Provide prints including: plan view, section views, connection details, base plate location and design, and structural analysis data signed by fabricator engineer of record. ALL DRAWINGS AND CALCULATIONS SHALL BE SEALED BY A LICENSED ILLINOIS STRUCTURAL ENGINEER. See section 03 30 00 Cast In Place Concrete for additional engineering scope to be coordinated by manufacturer.

B. Certifications:

1. **Fabric Certification** – Provide a signed statement from the fabric manufacturer that fabric material supplied meets the specifications and the fabric material is of standard quality and free from defects; provide original product data sheets from approved fabric suppliers; include 8.5”x11” samples for color selection; upon request provide seam testing procedures per ASTM D4851: sheer test and creep test and fire retardant treatment
2. **Welding Certification** – Provide a signed statement from the building manufacture that all welding was performed by a certified welder in accordance with AWS D1.1 requirements, include a copy of the welders certificate with welding certification. Provide evidence that all on site welding will be performed by AWS qualified welders.
3. **ASTM A123 Certification** – Provide a signed statement from the source of zinc application that the coating meets the minimum of 2.2 oz/ft2 (+/- 5%), of continuous zinc coating on interior and exterior surfaces, also certify that the zinc used in the process is 99.9% lead free, unless specified by contract documents 1 oz. of zinc/ft² (320g/m²) of surface = to 1.7 mil (43um).

C. Steel Certificate: Provide certificate from fabricator that all steel components are produced in the USA per Illinois Steel Products Procurement Act

D. Product Data for all components of assembly

E. Operations and Maintenance Data

F. Statement of Compliance with IBC 2015 Section 1704.2.5.2

1.7 WARRANTY

A. Standard material warranty on fabric covered building system for all parts and components free from material or workmanship defects for 5 years; warranty for fabric, 20 year pro-rated warranty; warranty for hot dip galvanized manufactured components, including corrosion and structural integrity; end user must comply with maintenance schedule; see warranty for specific details and limitations.

1.8 ENGINEERING DESIGN CRITERIA

A. The structure shall be designed in accordance with appropriate building code standards using methodology from ASCE 7-10. Primary and secondary framing shall comply with current issues of AISC, AISI, NEMA and ASTM specifications, as applicable. Structural members shall be designed using Allowable Stress Design (ASD) or Load Resistance Factored Design (LRFD) for the design loads given below. Appropriate safety factors to yield and ultimate shall be maintained. Wind load factors and coefficients used in design of structural members must be in accordance with ASCE 7-10 guidelines (as referenced by IBC 2015). Chord plastification calculations must be provided on structural drawings where

chords are designed for fabrication lighter than 10 ga.

1. Structure shall be classified as Category I, Minimum surface Roughness B, Minimum Exposure class B.
2. Occupancy Class: U – Utility and Miscellaneous Group
3. Roof Loads: The structure shall be designed based upon a ground snow load of 30 pounds per square foot (psf) plus a 3 psf collateral load. At minimum, the structure shall be capable of supporting a minimum roof live load of 20 pounds per square foot and a collateral load of 3 pounds per square foot projected over the entire roof area or a portion of the roof area, and any probable arrangement of loading resulting in the highest stress in the members.

4. Wind Loads: The structure shall be capable of withstanding 3 second gusts wind loads from any direction of 90 miles per hour but no less than 20 psf. The structure shall be designed using exposure category "C" for determining design wind pressure of the structure. The methodology is to be taken from ASCE 7-05.

5. Seismic: The structure shall be capable of withstanding seismic forces determined in accordance with ASCE 7-10 standards (as referenced by IBC 2015).

6. Rainfall: The structure shall be capable of withstanding the effects of rainfall up to 4 inches per hour for at least 2 hours.

7. Deflection: The maximum allowable deflection of any point on the steel framework shall be no more than 1/180 of the clear span width of the structure when subjected to the design loads described herein.

8. Design Loads: The design shall be based as a minimum on the following load cases: (ASCE 7-05 (ASD) Listed)

a. D	D = Dead Load + Collateral Load
b. D + S	S = Symmetrical Snow or Live Load
c. D + (Ws or 0.7E)	(Balanced or Unbalanced)
d. D + (Wp or 0.7E)	Ws = Wind with internal suction
e. D + S + (Ws or 0.7E)	Wp = Wind with internal pressure

9. Structure Manufacturer shall employ an independent third party Illinois Licensed Structural Engineer to review and confirm all load calculations are in conformance with ASCE 7-10 Standard. Load report shall meet all code and local and CDB requirements. Structural Load Report prepared and sealed by Structural engineer shall include date signed and date of license expiration, and Engineer shall stamp fabrication and eerection drawings.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Clear Span Fabric Structures; www.clearspan.com
2. Structures Unlimited, LLC; www.structuresunlimited.com
3. Big Top Fabric Structures; www.bigtopshelters.com
4. AccuSteel Fabric Covered Buildings; www.asicoverbuildings.com
5. Rubb Building Systems; www.rubbusa.com
6. Britespan Building Systems Inc.; www.britespanbuildings.com

2.2 MATERIALS

All materials used in the structure shall be new, without defects and free of repairs. The quality of the materials used shall be such that the structure is in conformance with the performance requirements specified herein.

A. Primary Framing Members

1. Manufacturer's standard structural primary framing system designed to withstand required loads and specified requirements; primary framing includes transverse frames; rafter, and canopy beams; sidewall; end wall; and corner columns; and wind bracing. Chord plastification calculations must be provided on structural drawings where chords are designed for fabrication lighter than 10 ga.

2. **Open Web Truss** – Manufactured from High Strength Structural Tubing, ASTM A500 / A513; minimum allowable tubing thickness 14 gauge or .083 inch; minimum 50 KSI yield, 55 KSI tensile. Steel tubing should be round and hot dipped galvanized inside and out after fabrication to ASTM 123. Truss cords are to be cold formed and shop welded; sheared, flattened, or deformed tubing is not allowed in the truss design; diagonal center material supporting rafter truss cords shall not be gapped greater than 1 inch; diagonal center material that requires venting for hot dip galvanizing shall be in a uniform manner to promote strength and coating quality; irregular venting by torching or grinding will not be allowed for hot dip galvanizing.

B. Secondary members

1. Manufacturer's standard secondary framing members, include purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members; fabricate framing from cold formed or structural steel, hot dip galvanized coating to meet ASTM A123 unless specified by contract documents.

C. Bracing

1. Shall be designed so not to interfere with clear span interior space, engineered from cable or rod and be made from a material or have a coating that is consistent with the buildings performance standards; brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin to girt web, so flange compression strength is within allowable limits for any combination of loading.

2. **Cable** – Minimum ASTM A475, 5/16" diameter, extra high strength grade, class B zinc-coated, 7 strand steel, with threaded end anchors.

3. **Rods** – ASTM A36/ A36M; ASTM A572/ A572M, grade 50 or ASTM 529A/A529M grade 50; minimum 1/2 inch diameter zinc coated (hot dip galvanized) steel; minimum of 6" threaded on each end.

D. Fabric Membrane

1. All materials used in the structure shall be new, without defects and free of repairs. The quality of the materials used shall be such that the structure is in conformance with the performance requirements specified herein.

2. Cladding Membrane: The structure shall be clad with a PVC coated polyester fabric manufactured by an approved and reputable supplier with demonstrated long term performance. Laminated materials are not acceptable for use on the outer weather membrane. The PVC coated membrane fabric shall be waterproof and free from defects. All roofs, end walls and connecting sections shall be weather tight. The material will be selected from the manufacturer's standard colors for the side walls and will be translucent white on the roof. The material must be UV stabilized and flame retardant, must carry a minimum five year manufacturer's warranty and must have life expectancy of 15 to 20 years. The minimum fabric specification is as follows:

    a. Coated Weight: 28 +/- 2 oz/sy (Method 5401)
    b. Base Fabric Weight: 6.9 oz/sy
    c. Finished Thickness: 30 mils
    d. Grab Tensile Strength, lbs: 690/620 (ASTM D751)
    e. Tongue Tear: 180/180 lbs/in (ASTM D2261)
    f. Cold Crack Resistance: -40°F (ASTM D2136)
    g. Flame Resistance: 2 sec flameout (NFPA 701)
    h. Flame Spread: 25 or less (ASTM E84)

3. **Pre-approved fabric membrane supplier**

    a. Serge Ferrari Precontraint 1002 S2 or 1202 S2
    b. Mehler Texnologies Valmex Tent FR 650-2
    c. Seaman Shelter-Rite 8028
    d. Naizil Big Cover Type 2

e. Sattler Global Type II

E. Fabric Retention Cover

1. Fabric membrane shall be attached to primary members only; any primary member that has fabric attached shall be braced. Fabric shall not be designed as a structural member such that damage or penetration of membrane compromises integrity of structural framework.

2. Fabric cover building shall be designed to be tensioned vertically, horizontally, and around the structure perimeter using a ratchting system as per manufacturer's standard design

3. Fabric panels shall be supplied with overlapping joints to allow the panels to be sealed together. Panel joining shall be per fabric manufacturer's recommendation. Provide fully tensioned and neat seals at all penetrations.

4. Fabric Panels should be installed in such a manner as to permit repair and replacement of a single panel without removal of multiple panels or the complete fabric panel system.

F. Fasteners

1. Provide a minimum 3.9 mils hot dip galvanized, ASTM A123, of zinc on all manufactured building components unless Stainless Steel where specified by contract documents.

2. Hot-dip galvanizing zinc or other specified by contract documents coating shall be applied after steel fabrication.

3. All manufactured steel component surfaces shall have a minimum of 2.2 oz/ft2 (+/- 5%), of continuous zinc coating on interior and exterior, unless specified by contract documents. 1 oz. of zinc/ft² (320g/m²) of surface = to 1.7 mil (43um).

4. **Structural bolts, nuts, and washers are to be Hot Dip Galvanized to ASTM A153**
Items supplied by building manufacturer but not fabricated by building manufacturer shall be made from a durable material or have a factory finish or coating appropriate for building use and application.

G. Corrosion Resistance Package – provide manufacturer standard finishes for high corrosion environments

PART 3 - EXECUTION

3.1 DELIVERY

A Deliver material to job site in manufacture's original, unopened containers and packaging with labels clearly identifying building items
B Store materials in accordance with manufacture instructions, clean dry and well ventilated area, above ground on blocking, do not allow material to become wet, stained, or dirty
C Handle materials as to protect materials, coatings, and finishing during transportation and installation to prevent damage or staining, handle fabric in accordance with manufacturer's instructions to avoid fabric material and coating damage

3.2 ANCHORAGE AND FOUNDATIONS

A. **Building Anchorage** – building anchors bolts shall be designed to resist the maximum column reactions resulting from the specified load combinations, have a coating appropriate for building use, the design and loading shall be specified by the manufacturer, anchor bolts will be sized and supplied by the manufacturer, verified by third party licensed Illinois engineer.

B. **Foundation** – foundations shall be adequately designed by a licensed structural engineer to support the building reactions and other loads which may be imposed by the building use, design shall be based on the specific soil conditions of building site, foundation shall be designed and installed by DB contractor, see Section 03 30 00 Cast in Place Concrete.

3.3 INSTALLATION

A. Erector Qualifications: experienced erector who specialized in installing work similar in material, design, and extent to that is certified in writing by the fabric cover building system manufacturer as qualified for erection of manufacturer's products, using proper tools and equipment, erector shall follow good sound, and safe procedures and guidelines and in accordance with any applicable federal, state, or local laws

B. Weather Limitations: proceed with installation only when weather conditions permit metal and fabric components to installed according to manufacturer's written instructions, warranty requirements, and in a safe and efficient manner.

END SECTION

1. GENERAL

1.1 WORK INCLUDES

A. BASE BID

1. Contractor shall size and provide passive and active ventilation systems as shown on the drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. Contractor Responsibilities:

1. Responsibilities include sizing necessary equipment to complete the design intent. Fabricating, and installing a passive and active ventilation and control system as herein specified and shown on the drawings.

1.3 RELATED WORK

A. 05 50 00 Metal Fabrications
B. 08 90 00 Louvers and Vents
C. 13 34 19 Pre-Engineered Manufactured Fabric Structures
D. 26 05 00 Electrical Work

1.4 REGULATORY REQUIREMENTS

1. American Society for Testing and Materials
   a. ASTM C 1107-97: Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
   b. ASTM C 1173-97: Specification for Flexible Transition Couplings for Underground Piping Systems
   c. ASTM D 1785-96b: Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
   d. ASTM D 2235-96a: Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings
   e. ASTM D 2564-96a: Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
   f. ASTM D 2672-96a: Specification for Joints for IPS PVC Pipe Using Solvent Cement
   g. ASTM D 2855-96: Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
   h. ASTM D 3139-98: Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
   i. ASTM F 402-93: Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermostatic Pipe and Fittings
   j. ASTM F 493-97: Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings
   k. ASTM F 656-96a: Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings

2. American Welding Society

a. AWS A5.8-92: Specification for Filler Metals for Brazing and Braze Welding
b. AWS D1.1-98: Structural Welding Code--Steel
c. AWS D10.12-89: Recommended Practices and Procedures for Welding Low Carbon Steel Pipe
d. Brazing Handbook. Latest Edition.

3. ASME International
   a. ASME B1.20.1-83 (Reaffirmed 1992): Pipe Threads, General Purpose (Inch)
   b. ASME B16.21-92: Nonmetallic Flat Gaskets for Pipe Flanges
   c. ASME B18.2.1-96: Square and Hex Bolts and Screws--Inch Series
   d. ASME B31 Series: Code for Pressure Piping
   e. 1ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications"

4. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.
   a. MSS SP-107-91: Transition Union Fittings for Joining Metal and Plastic Products

1.5 SUBMITTALS

A. Design Drawing Elevations indicating location of all intake/exhaust louvers and the exhaust fan.

B. Shop Drawings: Submit shop drawings for the following equipment:
   1. Exhaust Fan
   2. Carbon Monoxide / Nitrogen Dioxide Sensors
   3. Carbon Monoxide / Nitrogen Dioxide detection system control panel
   4. Louvers
   5. Dampers
   6. Controls
   7. Low Voltage Control Wiring Schematic

C. Product Data: Submit manufacturer's data for:
   1. Exhaust Fan
   2. Carbon Monoxide / Nitrogen Dioxide Sensors
   3. Carbon Monoxide / Nitrogen Dioxide detection system control panel
   4. Louvers
   5. Dampers
   6. Controls
   7. Low Voltage Control Wiring
   8. Exhaust Fan Motor Starter

D. Test and balance reports.

1.6 DESIGN CRITERIA

A. Outside Temperatures

   1. Heating: -10° F (97.5% ASHRAE Design Conditions).
   2. Cooling: 91° F DB, 74° F WB at mean coincident wet bulb (2.5% ASHRAE Design Conditions), 78° F WB for cooling tower (1% ASHRAE Design Condition).

D. Air Handling Devices Noise Levels: Noise levels of equipment, ducts, grilles, registers, diffusers, dampers, air valves, terminal units, and accessories in occupied

spaces shall meet NC-40 performance, except as noted. Noise Criteria (NC) curves are indicated in the ASHRAE Handbook.

2. PRODUCTS

2.1 FACTORY FINISHING

A. Painting: Equipment shall be provided with standard factory finish coating. Unless specified otherwise, the minimum finish for materials shall be as follows:

1. Factory applied baked enamel finish on equipment shall be hard enamel finish, not tinted primers.

2. Finished coatings shall be a minimum 3 mil dry thickness.

2.2 INSERTS

A. Inserts for support of ductwork shall be similar as those specified for piping, and shall conform to requirements of SMACNA's Duct Construction Standards.

2.3 DUCT AND EQUIPMENT SUPPORTS

A. Furnish and install all necessary equipment supports or hangers, which shall include all structural steel members and shapes, standards, rods, nuts, bolts, concrete inserts, expansion shields, beam clamps as indicated or required to support and/or suspend all equipment, in a manner as approved and acceptable to the Architect and the Fabric Structure Manufacturer.

1. Provide supports of which materials, design, and manufacture comply with ANSI/MSS SP-58, and MSS SP-69.
2. All supports shall be of corrosive resistant materials such as stainless steel, galvanized steel or aluminum. Black iron is not acceptable unless it is coated with a zinc rich primer and finish coated with an enamel based factory finished coating.

B. Acceptable Manufacturers:

1. Subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:
   a. B-Line Systems, Inc.
   b. Grinnell Supply Sales Co.
   c. Fee & Mason Mfg. Co.
   d. The Michigan Hanger Co.

2.4 AIR DISTRIBUTION

A. Provide all air distribution work necessary for the construction of the project as indicated on the Drawings and specified herein. Such work includes, but is not limited to the following:

1. Natural Ventilation of the Building. Intake louvers shall be installed in the South and North Face of the Building for natural cross ventilation of the building.
2. Mechanical ventilation consisting of North wall intake louvers and a mechanical

propeller style sidewall exhaust system with discharge louver, control panel, motor starter, controls and wiring with dampers as shown on the drawings (South end of building), including air balancing the system.

3. Carbon Monoxide / Nitrogen Dioxide sensors with CO / NO2 detection system, wiring and control panel. Upon detection of CO (25 PPM adjustable) or NO2 (1 PPM) the system shall activate mechanical exhaust fan, close the motorized dampers closest to the fan and the fan shall exhaust the space/building. The CO / NO2 control panel shall have a manual override switch where a user can manually "turn on" the exhaust fan at any time.
5. The structural steel supports for equipment.
6. All hangers, supports, dampers, louvers, controls, wiring, etc.
7. All motorized dampers and controls shall be fully compatible with 24V actuators and transformers furnished, installed and wired as required to deliver a fully functional ventilation and CO / NO2 detection control system.

B. FAN MOTORS

1. Furnish a motor for each fan unit of size and rpm required.
2. Motors shall be complete with adjustable slide rail base.

C. V-BELT DRIVES

1. Provide belt drives for all fan units that are not direct connected to motors. Each drive shall consist of fan and motor sheaves and a minimum of two (2) matched and identical "B" or "C" V-belts rated for 1.5 times the horsepower nameplate rating of the motor. Motor sheaves for motors 10 HP and smaller shall be of the adjustable type. Larger motors shall have fixed diameter sheaves, but if it is necessary to change the rpm of the unit to deliver the air quantities listed, the drive shall be removed and replaced with properly sized sheaves and belts.
2. Pulley ratio shall not exceed 5 to 1.
3. Drives shall be fan manufacturer's standards.

D. CARBON MONOXIDE / NITROGEN DIOXIDE DETECTION SYSTEM

1. Furnish and install all required wiring, controls, logic, programming, and CO / NO2 detection control panel, etc. to deliver a fully functional Detection System which shall activate exhaust fan and open intake louver upon CO / NO2 set point being reached.

2. System shall be a low voltage dual relay, electronic system for parking garage/warehouse use with connection for up to 12 points/detectors and shall be able to activate an exhaust fan and motorized damper actuator.CO detectors shall be adjustable to activate upon detection of 25PPM, 35PPM (standard), 50 PPM, or 100PPM Carbon Monoxide and 0 to 3 PPM Nitrogen Dioxide within the space. Each detector shall cover approx 4,000 square feet of floor space.

3. System shall be ETL or UL listed and shall be able to be calibrated and adjusted in the field.

4. A problem with the detector and or fan shall be relayed to a local alarm to notify user of a problem/failure with the CO detection system.

5. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:
   1) Macurco
   2) Honeywell
   3) Johnson Controls

I. MOTORIZED DAMPERS

1. Maximum blade length to be 80".
2. Each damper to be controlled by an individual actuator in sections not to exceed 80" wide x 50" high or as recommended by manufacturer.
3. Damper frames shall be not less than 14 gauge galvanized steel formed for extra strength with mounting holes for flange and enclosed duct mounting.
4. Temperature control contractor shall furnish and install all linkage and damper motors.
5. No damper blade shall be greater than 8" in width and shall be fabricated of 14 gauge galvanized steel; bearings shall be nylon with ½" zinc plated steel shafts and shall be readily accessible.
6. The leakage through outdoor air intake dampers and exhaust dampers shall be not more than 1% at 1500 fpm approach velocity at 4" static closing torque.
7. All automatic dampers equipped with electronic end switches shall operate from control rod of motor operator, not a damper blade.

   a. Linkage to blades will not be allowed

2.5 FRESH AIR AND EXHAUST LOUVERS

A. Fixed exterior fresh air and exhaust louvers and bird screens will be provided under Division 08 90 00 Louvers and Vents of the specifications but work included under this section shall include the final connections to fresh air intakes and exhaust louvers.

2.6 LUBRICATION AND START-UP

A. Prior to operation, all equipment shall be properly lubricated in accordance with the manufacturer's instructions. After proper lubrication, all units shall be started by the Contractor, in the presence of the Architect or his representative and the following data recorded:

1. Equipment serial number.
2. Drive information.
3. Motor serial number, HP and other data.
4. Motor ampere and voltage readings on all phases.
5. Four (4) certified copies of data shall be delivered to CDB's representative.

1. EXECUTION

3.1 TESTING, ADJUSTING AND BALANCING PROCEDURES

A. In order to meet the required tolerance of the plans and specifications, general testing, adjusting and balancing procedures shall be in accordance with procedures as outlined in applicable standards.

1. Submit air balance, noise and vibration testing procedures to the Architect for approval prior to performing TAB work.

C. Patch holes in insulation, ductwork and housing, which have been cut or drilled for test purposes, in manner recommended by original installer.

G. Mark equipment settings, including damper control positions, fan speed control levers, and similar controls and devices, to show final settings at completion of TAB work. Provide markings with paint or other suitable permanent identification materials.

H. Determine if HVAC equipment is operating with satisfactory vibration levels to assure that objectionable vibration and the resultant noise are not transmitted to the building structure.

3.2 INTERFERENCE WITH OCCUPANCY

A. No service or system shall be interrupted, even momentarily, without CDB's permission and only at such time as designated by him.

3.3 CARE AND PROTECTION

A. Exposed surfaces of all material and equipment provided herein shall be protected against oxidation and rusting.

B. Touch-up all damaged prefinished surfaces as required or as directed by the CDB Representative before acceptance by CDB and the Using Agency.

C. All material and equipment shall be left in a clean, presentable condition to the satisfaction of the CDB Representative and Using Agency.

D. All equipment shall be clean from dust and debris before acceptance by CDB and the Using Agency. All contacts in the above equipment and control equipment shall be free from dust deposits.

3.4 CORING, CUTTING AND PATCHING

A. Provide all necessary coring or cutting in walls, floors, and ceilings related to ventilation work.

B. All work shall be neatly and carefully executed and repaired in an approved and workmanlike manner.

C. No cutting into the structural work of the building shall be done without the approval of the Architect.

3.5 STRUCTURAL DIFFICULTIES

A. Should any structural difficulties prevent installation of ventilation work at points indicated on drawings, minor deviations therefrom, as approved by the Architect, may be permitted and shall be made without additional cost.

3.6 WARRANTY

A. Provide one year contractor warranty on material and labor for all related work.

3.7 CLEANING UP

A. Clean-up all debris as it accumulates, and leave premises in a clean and orderly fashion each day.

3.8 INSTALLATION OF EQUIPMENT AND COMPONENTS

A. Install equipment and components in accordance with manufacturer's published installation instructions, with recommended locations to ensure that the specified products serve the intended function. Provide recommended clearances for service, maintenance and inspection.

END 23 05 00

1. GENERAL

1.1 WORK INCLUDES

A. Base Bid: Contractor shall design and provide a complete electrical power and lighting system including extending service from the existing MDP in the Maintenance Building as shown on the drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. Contractor Responsibilities:
   1. Responsibilities include designing, fabricating, and installing lighting and power systems including, but not limited to drawing preparation, for submittal to the CDB Bridging Document A/E for review and compliance with project requirements.

1.3 RELATED WORK

A. 23 05 00 Ventilation Work
B. 31 23 00 Excavating Backfilling & Compacting
C. 32 01 00 Surface Restorations

1.4 REGULATORY REQUIREMENTS

A. Nationally recognized testing laboratory.

B. National Fire Protection Association, NFPA.
   1. NFPA 101: Life Safety Code - 2006.

C. Illinois State Fire Marshal Regulations/Local Fire Department.
   1. Comply with governing regulations for emergency lighting and exit sign systems.

D. International Building Code (IBC) - 2015.

E. International Energy Conservation Code (IECC) - 2018.

F. ASHRAE 90.1 - 2013

G. National Electrical Code (NEC) - 2017.

1.5 SUBMITTAL

A. Product Data:
   1. Submit manufacturer's data for:
      A. Wire and cable.
      B. Conduit and outlet boxes.
      C. Switches and receptacles.
      D. Disconnect switches.
      E. Lighting fixtures.
      F. Distribution and lighting panel
      G. Time Clock

B. At completion of work, provide record documents in compliance with CDB Requirements.

1. PRODUCTS

2.1 WIRE AND CABLE (600 VOLTS OR LESS)

A. All wire and cable used in this installation shall be copper conductor and shall have 600 volt insulation unless otherwise noted. All direct burial wiring shall be RHW.

B. Unless otherwise noted, conductors for lighting and power circuits shall be #12 AWG minimum size.

C. Conductors for control circuits shall be #14 AWG, minimum size.

D. Insulation types shall be as follows:
   1. Type THHN/THWN - #14 to #3 AWG.
   2. Type XHHW - #2 AWG and larger.
   3. Type RHW - #12 AWG and larger for outdoors.

E. All A.C. branch circuit wiring shall be done with color-coded conductors throughout the installation, as follows:

	120/240 V System (1ϕ)
"A" Phase	Black
"C" Phase	Blue
Neutral	White
Equipment Ground	Green

2.2 WIRE CONNECTIONS

A. All branch circuit wire and cable splices in conductors up to and including No. 10 AWG shall be as follows:
   1. Connectors: Solderless, screw-on, reusable pressure cable type, 600 volt, 105° Celsius with integral insulation, approved for copper and aluminum conductors.
   2. The integral insulator shall have a skirt to completely cover the stripped wires.

3. The number, size, and combination of conductors, as listed on the manufacturers' packaging shall be strictly complied with.

B. All wire and cable connections or splices in conductors of Size 8 AWG and larger shall be made with O.Z./Gedney Co., Burndy, or T&B solderless connectors.

C. "Six inch" loops or ends shall be left at each outlet for connection to fixtures or devices.

D. All wire and cable splices shall be neatly and carefully made, exercising extreme skill to insure neat workmanship and proper insulation over the splice.

2.3 CONDUIT

A. Conduit:
1. Unless otherwise noted, all conduit used in this installation shall be rigid heavy wall PVC and shall meet in all respects, a nationally recognized laboratory's standard for conduit.
2. Minimum Trade Size: 3/4 inch unless otherwise noted.
3. Conduit for electric feeders shall have an insulated equipment ground conductor installed throughout its entire length.

B. Flexible Metallic Conduit (Liquidtight):
1. Flexible metal conduit (liquidtight) shall be flexible steel with PVC jacket. Fittings shall be of steel or malleable materials with steel compression rings.
2. Acceptable locations for flexible metallic conduit (liquidtight) shall be motor connections and damp or wet locations.

2.4 OUTLET BOXES

A. Boxes shall be fiber glass, single piece, with suitable finish ring where flush mounted.

B. Provide solid gang boxes for multiple gang devices.

C. Weatherproof boxes shall be cast type with suitable gasketed cover.

2.5 SWITCHES AND RECEPTACLES

A. Toggle switches and convenience receptacles shall be specification grade heavy duty type.

B. Color of devices shall be ivory.

C. Duplex receptacles shall be rated 20 amps, 125 volts, NEMA 5-20R.

D. Duplex receptacles with ground fault circuit interrupter (GFI) shall be rated 20 amperes, 125 volts, NEMA 5-20R.

E. All toggle switches shall be rated 20 amps, 120/277 volts.

F. All devices shall be full gang type construction; interchangeable type are not acceptable.

G. Devices shall be manufactured by: Subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:

		Switches	Receptacles
1.	Harvey Hubbell, Inc.	#1221-1	5262-1
2.	Pass & Seymour	#20AC1-1	6200-1
3.	General Electric	#5951-2G	5262-2

H. Device plates shall be smooth "nylon" thermoplastic colored ivory.

I. Provide thermal overload switches on all singe phase motors. Subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:

1.	Allen Bradley	Bulletin No. 600
2	Square “D”	Class 2510
3.	ITE	Type MSF11

2.6 DISCONNECT SWITCHES

A. Disconnect switches shall be heavy-duty type, stainless steel, rated 600 volts, fused or non-fused type as indicated on the Drawings:
1. Indoor Enclosure – NEMA 1, stainless steel
2. Outdoor Enclosure – NEMA 3R.

B. Disconnect switches shall be as manufactured by: Subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:

1. General Electric.
2. Square D, (IL).
3. Cutler-Hammer.

2.7 SUPPORTING DEVICES

A. Surface Mounted Cabinets: Secure cabinets directly to wall using suitable wall anchors, or provide a suitable frame for mounting and supporting the cabinets using "Unistrut" type supports as required.

B. All supporting devices shall be stainless steel.

C. Hanger Rods:

1. Provide rods of proper length for all electrical items necessitating same.
2. Minimum rod diameter shall be 3/8".
3. Provide after-set inserts as required.
4. All hanger rods shall be stainless steel.

D. Cable Supports: All riser cables shall be supported by means of O.Z./Gedney Co. cable supports at each panel and pull box in accord with Code requirements.

E. Conduit Supports and Hangers:
1. All individually suspended conduits shall be supported with stainless steel pipe clamps, from threaded stainless steel rods.
2. The stainless steel rods shall be affixed to the building structure by means of inserts in concrete slab or beam clamps affixed to the steel structure.
3. Where multiple conduits are installed adjacent to each other, a trapeze hanger consisting of stainless steel Unistrut suspended from at least two threaded stainless steel rods, shall be used. The conduits shall be affixed to the Unistrut with stainless steel split pipe clamps.
4. All hangers and clamps shall be as manufactured by Unistrut, Power Strut or equal, as approved.

2.8 LIGHTING FIXTURES

A. Provide lighting fixtures in accord with the schedule shown on the drawings.
1. Interior General Illumination – Pendant Mount, 24" Linear Highbay fixture with LED lamp equivalent to 400 watt metal halide. Tag: F1
2. Exterior Security Lighting – Surface Mounted Traditional style wall pack with LED lamp equivalent to 175 watt metal halide. Tag F2
3, Interior Combination Emergency/Exit – Wall Mounted – LED with battery backup. Tag F3

B. Fixtures shall be provided complete with lamps, ballasts, hanger and support fittings, finish trim and required connections.

C. Fixtures shall be suitable for a highly corrosive environment.

D. Acceptable Manufacturers: Subject to the design specifications set forth herein. Provide same manufacturer for all fixtures of the same type. Refer to Lighting Fixture Schedule on Drawings.

2.9 DISTRIBUTION AND LIGHTING PANEL

A. Provide, ready for operation, the service rated lighting and receptacle panel as herein specified and as shown on the drawings. Panels shall be suitable for 120/240 volts, 1 phase, 3 wire, 60 Hertz system and include one 20amp duplex mechanics receptacle surface mounted adjacent to the panel.

B The panels, together with their cabinets, subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:

1. General Electric Co.
2. Square “D” Company.
3. Eaton

C. The lighting distribution panels shall have short circuit interrupting rating as shown on drawings.
   1. Panel with a main circuit breaker mounted in the cabinet shall have fully-rated main and branch circuit devices.
   2. The panel bus bars shall be braced to withstand the maximum fault current that is available at the main terminals of the panelboard.

D. Each branch circuit protective device shall have a numbering strip showing the circuit number, mounted adjacent to same for identification.

E. The lighting distribution panels shall have main circuit breakers.

F. The branch circuit breakers shall be bolt-on type.

G. All interconnections on the panels shall be made with copper bus bars, of such cross-section that the maximum current density shall not exceed 1000 amperes per square inch. The bus bar interconnections shall be arranged with main terminal lugs at the top or bottom, all covered with blank section of the same composition as the breaker sections.

H. The distribution panels’ buses shall be arranged for connection to three phase, four wire feeders with the single phase branch circuits equally divided among the three phases.

I. Each panel shall be mounted in its cabinet on adjusting nuts to allow the panel to be leveled and aligned in the cabinet.

J. The main and branch circuit protective devices shall be as manufactured by the same manufacturer providing the panel.

K. The panel cabinets shall be constructed in accord with article “Distribution Panel Cabinets” of this specification.

2.10 DISTRIBUTION PANEL CABINETS

A. All lighting and power panels shall be enclosed in a code gauge sheet stainless steel cabinet having doors and trim of a type to conform to the cabinet mounting.

B. Cabinet Fixed Trim Plates:
   1. Flush Mounted Cabinets:
      a. Trim plate shall be equipped with guide pins.
   2. Surface Mounted Cabinets:
      a. The fixed trim plate shall be hung on the cabinet tub with a heavy-duty continuous piano type hinge.
      b. Manufacturer's standard mounting.

C. Cabinet Doors:
   1. All cabinet doors shall be an integral part of the fixed trim plate, and shall be hung thereon with a heavy duty continuous piano type hinge.

D. Cabinet Door Catches:
   1. All cabinet doors shall be locked and keyed alike.
   2. All cabinet doors less than 30" high shall have one Corbin lever type catch #15767 with key to match existing.
   3. Cabinet doors 30" to 48" in height shall be equipped with two Corbin catches with keys.
   4. All cabinet doors which are over 48" high shall be equipped with standard vault handles having three point catches.
   5. Manufacturer's standard door catches.

E. Cabinet Wiring Gutters:
   1. All cabinets shall be of sufficient size to allow ample wiring gutters on the top, bottom and both sides and not at the rear.
   2. Wiring gutters shall be sized equal to or larger than size required by code.

F. Cabinet Equipment Ground Bus:
   1. The cabinets shall have an equipment ground copper bus bar bonded to the enclosure.
   2. The size of ground bus to equal ampacity of equipment ground conductor connected to cabinet.
   3. The equipment ground bus shall be properly marked.

G. Cabinet Mounting Height:
   1. Cabinet shall be installed with the top approximately 6" below top of enclosure.

H. Cabinet Finish:
   1. Cabinets shall be degreased and prime coated inside and outside.
   2. Cabinets shall be sprayed in the shop with two (2) coats of aluminum Lacquer for final finish.

3. Touch-up as required after installation.

G. Cabinet Directory:
1. Provide typewritten directories of circuits for each panel. Directory shall be mounted in back of a durable transparent plastic cover set in a suitable frame fastened on the inside of the panel door.
2. Final payment will not be made on the contract until all circuit directories are in place.

2.11 TIMER

A. Electronic Time Switches: Electronic seven-day timer with independently programmable SPDT contacts rated for a 20 amp ballast, inductive, tungsten or combination load at a voltage coordinated with the load controlled. The lighting control shall allow multiple input voltages of 120/240. Lighting control shall be listed by a nationally recognized testing laboratory and shall meet all requirements of the International Energy Conservation Code. Enclosure shall be NEMA 3R. Features shall include the following:
1. 24-hour time-of-day programming.
2. Automatic daylight savings adjustment.
3. Holiday and weekend programming (365 days)
4. Astronomic capability (dusk on/dawn off)
5. A minimum of 5 ON and 5 OFF setpoints.
6. Time indicated on AM/PM format.
7. Manual override to ON and OFF positions.
8. Manual skip to next scheduled event.
9. Battery backup to maintain time and program memory for a minimum of 7 days.
10. Transient protection for up to 6,000 volts.
11. Functions over temperature range of -40°F to 122°F.

B. Timer manufacturer shall be subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:

:

1. Intermatic, Inc.
2. Paragon Electrical Products
3. Tork

2.12 PHOTOCELL

A. Description: Solid state, with SPST dry contacts rated for 1800-VA tungsten or 1000-VA inductive, to operate connected relay, contactor coils, or microprocessor input; complying with nationally recognized testing laboratory.
1. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range, and a directional lens in front of photocell to prevent fixed light sources from causing turn-

off.
2. Time Delay: 15-second minimum, to prevent false operation.
3. Surge Protection: Metal-oxide varistor, complying with IEEE C62.41.1, IEEE C62.41.2, and IEEE 62.45 for Category A1 locations.
4. Mounting: Provide stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.

B. Photocell shall manufacturer shall be same as timer.

2.13 LIGHTING CONTACTOR

A. Description: Electrically operated, multiple pole and mechanically held, combination type with fusible switch, complying with NEMA ICS 2 and nationally recognized testing laboratory.
1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).
2. Fault Current Withstand Rating: 18KA.
3. Enclosure: Comply with NEMA 4, stainless steel
4. Provide with control and pilot devices as indicated on Drawings, matching the NEMA type specified for the enclosure.

B. Lighting Contactor shall be subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:
1. Allen-Bradley/Rockwell Automation.
2. ASCO Power Technologies, LP; a division of Emerson Electric Co.
3. Eaton Electrical, Inc.; Cutler-Hammer Products.
4. GE Industrial Systems; Total Lighting Control.
5. Square D; Schneider Electric.

3. EXECUTION

3.1 INCOMING ELECTRICAL SERVICE

A. Incoming service shall remain as is.

3.2 GROUNDING

A. Provide all labor and material necessary for properly grounding the electrical wiring system, including new panelboard, as required by National Electrical Code.

B. All feeder conduits shall be equipped with grounding type bushings.

3.3 INTERFERENCE WITH OCCUPANCY

A. The existing building is presently occupied and will continue to be during the course of construction. It is imperative, therefore, that the work covered by this specification be executed with a minimum of inconvenience to the building personnel.

B. No service or system shall be interrupted, even momentarily, without the Owner's permission and only at such time as designated by him.

3.4 CARE AND PROTECTION

A. Exposed surfaces of all material and equipment provided herein shall be protected against oxidation and rusting.

B. Touch-up all damaged prefinished surfaces as required or as directed by the Architect before acceptance by the Owner.

C. All material and equipment shall be left in a clean, presentable condition to the satisfaction of the Architect and Owner.

D. All panels and cabinets, starters, motors, lighting fixtures, etc., shall be clean from dust, plaster or other debris before acceptance by the Owner. All contacts in the above equipment and control equipment shall be free from dust deposits.

3.5 PHASE SEQUENCE, ROTATION AND IDENTIFICATION

A. All lighting receptacles and motor branch circuits shall be completely phased out for sequence and motor rotation. Phase identification shall be permanently identified using color coded conductors.

3.6 SLEEVES AND OPENINGS

A. Provide all openings and sleeves in walls and floor as required for this work.

B. Sleeves shall be stainless steel conduit or fiberglass conduit, as noted. Aluminum conduit shall not be used.

C. Unless specific sizes are indicated on the drawings, sleeves shall be sized to provide one-half (1/2) inch clearance around outside surface of the item for which they are installed.

D. Annular space between sleeve and surface of item protruding shall be suitably provided with fire stop material as hereinafter specified.

E. Sleeves shall be cut flush with wall surfaces, and shall extend 1-1/2 inches

above finished floors unless otherwise indicated.

3.7 CORING, CUTTING AND PATCHING

A. Provide all necessary coring or cutting in walls, floors, and ceilings related to electrical work.

B. All work shall be neatly and carefully executed and repaired in an approved and workmanlike manner.

C. No cutting into the structural work of the building shall be done without the approval of the Architect.

D. See Special Conditions for specific coring instructions and procedures.

3.8 REMOVAL OF SCRAP MATERIAL

A. All electrical materials removed, unless otherwise designated by the Owner or Architect, shall become the property of the General Contractor and shall be removed from the premises by him.

3.9 STRUCTURAL DIFFICULTIES

A. Should any structural difficulties prevent installation of electrical work at points indicated on drawings, minor deviations therefrom, as approved by the Architect, may be permitted and shall be made without additional cost.

3.10 LOCATION OF OUTLETS

A. The location of outlets shown on the plans is approximate. The exact location shall be coordinated on the job site.

B. The heights of the various outlet boxes installed in walls or other vertical surfaces shall be as indicated on the architectural drawings.

END 26 05 00

1. GENERAL

1.1 WORK INCLUDES

A. BASE BID

1. Contractor provide:

a. Sawcut and remove existing asphalt pavement as required to facilitate construction as indicated on the drawings.

b. Excavate as required for new structure, utilities and grade alterations. Haul all spoils off-site to approved disposal sites for clean and contaminated spoils.

1. Contractor shall exercise great care with excavations near existing improvements. Do not undermine existing structures and utilities that are to remain.

c. Implement IDOT specified procedures for excavation, storage, protection, recording and disposal of contaminated soils and related material per Section 02 61 13

c. Place and compact aggregate backfill and bed under structures.

d. Excavate as required, (including directional boring) as noted on plans to extend electrical service from source to new building.

e. Compact fill over utilities as required.

f. Compaction testing of subgrade and backfill materials.

g. Protection of new and existing drainage structures.

h. Cleanup and Restoration.

1.2 RELATED WORK

A. Specified Elsewhere:

1.	02 31 32	Geotechnical Data
2.	02 61 13	Excavation & Handling of Contaminated Materials
3.	26 05 00	Electrical Work
4.	32 01 00	Surface Restoration
5.	32 12 16	Asphalt Paving
6.	32 75 10	Cement Concrete Pavement
7.	33 41 00	Storm Drainage Piping

1.3 REFERENCES

A. IDOT Standard Specifications for Road and Bridge Construction and IDOT Supplemental Specifications and Recurring Special Provisions, latest edition, except:

1. Methods of Measurement and Basis of payments do not apply.

2. References to "Engineer" shall mean "Architect/Engineer."

1.4 FIELD QUALITY CONTROL

A. General Contractor shall allow the testing representative to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work has been verified to be in compliance with the project requirements.

1.5 PROTECTION

A. Protect excavations by shoring, bracing, sheet piling, underpinning or other methods to prevent cave-in or loose soil from falling into the excavation.

B. Underpin adjacent structures that may be damaged by excessive excavation work, including utilities and pipe chases and removal of unsuitable soil for bearing.

C. Notify A/E immediately of unexpected subsurface conditions. Confirm notification in writing. Discontinue work until A/E issues written notification to resume work.

D. Provide equipment necessary to maintain excavation in a relatively dry state including sump pit, pumps, piping, etc… to properly dewater the site from groundwater seepage, snow and or rainfall.

1. Excavations for foundations shall be protected by all reasonable means necessary to avoid damage or saturation by exposure to inclement weather.

E. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

F. Grade top perimeter of excavations to prevent surface water runoff from getting into the excavation.

G. Protect new and existing drainage structures from accepting sediment, aggregates, and other deleterious construction materials until Substantial Completion. Follow IDOT Standards.

1.6 SUBMITTALS

A. Verification of compliance from aggregate supplier that each aggregate furnished to the site is IDOT grade certified compliant.

1. PRODUCTS

2.1 POROUS GRANULAR BACKFILL: Comply with IDOT specification Section 1003, Fine Aggregate and Section 1004, Coarse Aggregate.

A. For base under finished interior concrete slabs, CA-6 minimum or finer.

B. For base under asphalt paved areas, CA-6.

2.2 COMMON FILL MATERIALS: Subsoil; May reuse excavated topsoil and subsoil that is free of gravel larger than 2” and free of deleterious debris.

2. EXECUTION

3.1 INSPECTION

A. Verify stockpiled fill to be used has been accepted by A/E.

B. Verify and confirm in writing that the areas to be backfilled are free of debris, snow, ice or water and surfaces are not frozen

3.2 PREPARATION

A. Compact subgrade surfaces to the density specified for backfill materials.

3.3 EXCAVATION

A. Cut excavations wide enough to enable utility connections and to allow inspection.

B. Hand trim excavation and leave free of loose matter.

C. Remove lumped subsoil, boulders and rock up to 1/3 cubic yard in size.

D. Excavation shall not interfere with normal 45 degree bearing distribution of existing foundations.

E. Do not undermine adjacent foundation and footings. Excavate to the depth required to install new footings as indicated on plans or to match the existing building footing.

F. Promptly correct any unauthorized excavation.

G. Excavated materials required for backfilling may be temporarily stored on site until needed. Contractor shall coordinate with the Using Agency for location of deposition of all excess excavated materials.

1. Contractor shall separate topsoil, subsoil and aggregate laden excavated materials into specific piles.

2. Contractor shall promptly haul all excessive excavated materials off-site.

3. On-site deposition of excavated material shall be placed in such a manner as to not interrupt natural site drainage or impede operations of the Using Agency.

3.4 BACKFILLING

A. Support pipe and conduit during placement and compaction of bedding fill.

B. Backfill excavations to meet existing grade and contours. Backfill systematically and as early as possible to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Place and compact select fill materials including aggregate fill in continuous layer not exceeding eight inches (8") in loose depth.

D. Place and compact common fill materials in continuous layers not exceeding twelve inches (12") in loose depth.

E. Use a placement method that will not disturb or damage direct buried electric service cables, utilities in trenches or adjacent structures.

3.5 COMPACTION

Contractor shall perform compaction testing of subgrade and all backfill materials. Do not proceed with subsequent work until testing has been completed and satisfactory results have been presented to the A/E for concurrence.

A. Subgrade under structures shall have a minimum bearing capacity as indicated on the drawings.

1. Do not proceed with foundation construction until subgrade has been verified and accepted by the A/E.

2. Verify bearing capacity with A/E upon reaching finished grade.

B. Place backfill and fill materials in layers not more than twelve inches (12") in loose depth for material compacted by heavy compaction

equipment and not more than four inches (4") of loose depth for material compacted by hand-operated tampers.

C. Place backfill and fill materials evenly and uniformly on all sides of structures to the required elevations. No heavy equipment shall be permitted within 6, (six) feet of any concrete structural wall.

D. Percentage of Maximum Dry Density Requirements: Compact soil and aggregate fill to not less than the following percentages in accord with ASTM D1557 (Modified Proctor):

1. Under structures and pavements compact subgrade and each layer of backfill or fill material at 95% maximum dry density.

2. Under walkways, compact subgrade and each layer of backfill or fill material at 95% maximum dry density.

3. Under lawn or unpaved areas, compact the top six inches (6") below subgrade and each layer of backfill or fill material at 90% maximum dry density.

END 31 23 00

1. GENERAL

1.1 WORK INCLUDES

A. BASE BID

1. Contractor provide:

   a. Backfill asphalt paved areas disturbed by construction operations with aggregate and compact to not less than 4" of the surrounding pavement.
   b. Patch all disturbed areas adjacent to asphalt surfaces with a minimum of 4" of asphalt. Place, pitch and rolled to match existing grade and to form a smooth transition to existing asphalt pavement.
   c. Perform cut and fill operations as necessary to establish final grades as indicated on plans. Provide for compacted aggregate base and asphalt surface where specified.
   d. Restore existing landscape areas disturbed by construction operations with topsoil graded to meet existing contours and seed as specified herein.

1.2 RELATED REQUIREMENTS

A. 31 23 00 Excavating, Backfilling & Compacting
B. 32 12 16 Asphalt Paving

1.3 REGULATORY REQUIREMENTS

A. IDOT Standard Specifications for Road and Bridge Construction, latest edition, except:

1. Methods of Measurement and Basis of payments do not apply.
2, References to "Engineer" shall mean "Architect/Engineer."

1.4 PROTECTION

A. Protect landscaping and other features remaining.
B. Protect adjacent fences, roads, sidewalks paving and curbs.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver grass seed in original containers showing analysis of seed mixture, percentage of seed, year of production, net weight, date and location of packaging. Damaged packaging or non-labeled packaging is not acceptable. Provide Architect with content label for record.
B. Deliver fertilizer in waterproof bags showing weight, chemical analysis and manufacturer's name. Provide Architect with content label for record.
C. Store all products off the ground, in a dry location out of the way of construction operations. Protect to prevent damage until installed.

2 PRODUCTS

2.1 MATERIALS:

A. Aggregate: Crushed limestone meeting IDOT Specifications for CA-6 gradation.

1. At Contractor's option, crushed concrete in compliance with Article 1004 of the IDOT Standard Specification screened for CA6 gradation that also meets all provisions of Policy Memorandum 7-08-1 dated June 1, 2012 is acceptable.

B. Asphalt: See Reference Specification. Hot-Mix asphalt only. Cold patch material is prohibited.

C. Turf: Reuse excavated topsoil where possible.

1. Topsoil shall not be in a frozen or muddy condition and shall be free from subsoil, slag, clay, stones, lumps, live plants, roots, sticks, crabgrass, coughgrass, noxious weeds and foreign matter including construction debris.
2. If additional topsoil is required to complete the contract to the grades and minimum thickness specified herein, the Contractor shall obtain additional topsoil that meets the requirements of IDOT Standard Specification Article 1081.05.

D. Seed: Comply with IDOT Specification Article 1081.4

1. Seed Mixture: 45% Kentucky Blue Grass, 50% Creeping Red Fescue and 5% Norlea Perennial Rye.

E. Fertilizer: Comply with IDOT Specification 1081.08. 8-32-16 mix.

F. Erosion Control Blanket:

1. Natural fiber blanket capable of degrading within +/- 1 year
2. Complies with IDOT Specification 1081.10

3. EXECUTION

3.1 INSPECTION

A. Inspect site conditions and notify A/E in writing of all conditions that would impair proper execution of the work.

B. Beginning work constitutes acceptance of existing conditions.

3.2 PREPARATION

A. Remove all foreign materials from site. Do not bury foreign material.

B. Trim and dress edges of existing pavement so that they are clean and free of cracked or otherwise damaged material that could break free during aggregate base and pavement restoration operations.

C. Cultivate areas to receive topsoil to a depth of 3". Repair cultivation in areas where equipment has compacted subgrade.

3.3 Placing Aggregate Base:

A. At all asphalt pavement areas to be restored, place aggregate in not more than four inch (4") evenly distributed lifts and compact each lift as specified in Section 312300.
B. Depth of aggregate base restoration shall be a minimum of eight inches (8") when fully compacted to specification and shall be level to within 3" of adjacent asphalt paved areas. Tolerance of +/- ½".

3.4 Spreading Topsoil:

A. Spread topsoil to a minimum depth of four inches (4") over areas to be seeded. Place during dry weather and on dry, non-frozen subgrade.
B. Cultivate topsoil to a depth of four inches (4") with a mechanical tiller. Remove all foreign materials collected during cultivation from site and rake until smooth.
C. Grade to eliminate rough spots and low areas where ponding may occur. Maintain smooth uniform grade that meets existing contours.
D. Finish ground level firm and sufficient to prevent sinkage pockets when irrigation is applied.

3.5 Fertilizer Application:

A. Apply per IDOT Specification Article 250.04 at a rate of ten (10) pounds actual nutrients per 1,000 s.f.
B. Do not apply grass seed and fertilizer at the same time in the same machine.
C. Lightly water to aid breakdown of fertilizer and to provide moist soil for seed.

3.6 SEEDING

A. Do not sow immediately following rain, when ground is too dry or during windy periods.
B. Apply seed at a rate of six (6) pounds per 1,000 s.f. Seed in turf areas shall be sown with a machine that mechanically places the seed in direct contact with the soil, packs and covers the seed in one continuous operation per IDOT Specification Article 250.06.
C. Broadcasting or hydraulic seeding will be allowed as approved by the A/E in accessible areas where use of the equipment specified is physically impossible.
E. Roll seeded area with roller not exceeding 112 pounds.
F. Apply water with fine spray immediately after each area has been sown.

3.7 EROSION CONTROL BLANKET

A. Install blankets on all sloped areas in accordance with IDOT Specifications.
B. Place within 24 hours after seeding operations have been completed.
C. Lay blankets smooth without stretching, butting ends snugly.

` 3.8 MAINTENANCE AND PROTECTION

A. Maintenance shall include watering, as well as, temporary protective fences, barriers and signs where deemed necessary until substantial completion of the project.
B. Water to insure uniform seed germination and to keep surface of soil damp.
C. Apply water slowly so that surface of soil will not puddle and crust.
D. Replant damaged areas showing root growth failure, deterioration, bare or thin spots and eroded areas.

END 32 01 00

1. GENERAL

1.1 WORK INCLUDES

A. BASE BID

1. Contractor provide hot-mix asphalt paving and patching including all base and sub-base preparation as indicated on the drawings and as specified herein including;

a. Building Flooring Surface
b. Patching of disturbed areas due to construction including re-worked drainage areas and new concrete containment pad at north overhead door.

1.2 RELATED WORK

A. Specified elsewhere:

1. 31 23 00 Excavating, Backfilling & Compacting

2. 32 01 00 Surface Restoration, Grading & Seeding

3. 33 41 00 Storm Drainage Piping

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing hot-mix asphalt similar to that indicated for this Project and with a record of successful in-service performance.

B. Hot-Mix Plant: Registered with and approved by IDOT.

C. Testing and Inspection Requirements:

1. Testing shall be performed by IDOT personnel. Inspection shall be performed by the Architect. Contractor shall notify the Architect not less than 48 hours in advance of all work requiring testing or inspection. Architect will notify responsible party at IDOT for testing.

2. Asphalt paving shall be tested for gradation, asphalt content and in-place depth and density.

1.4 REGULATORY REQUIREMENTS

A. Comply with applicable sections of the IDOT Standard Specifications for Road and Bridge Construction, latest edition and especially:

1. Division 300 – Subgrades, Subbases and Base Courses
2. Division 400 – Surface Courses, Pavements, Rehabilitation and Shoulders

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Tack Coat: Minimum surface temperature of 60 deg. F.
2. Asphalt Base Course: Minimum surface temperature of 40 deg. F and rising at the time of placement.
3. Asphalt Surface Course: Minimum surface temperature of 60 deg. F at time of placement.

1.6 SUBMITTALS

A. Job Mix Designs: For each job mix proposed for the Work.

B. Material Test Reports: For each paving material

C. Material Certificates: For each paving material, signed by the provider.

2. PRODUCTS

2.1 AGGREGATES

A. Course Aggregate: ASTM D 692, sound angular crushed stone, crushed gravel or properly cured crushed blast furnace slag.

B. Fine Aggregate: ASTM D 1073, sharp edged natural sand or sand prepared from stone, gravel, properly cured blast furnace slag, or combination thereof.

C. Mineral Filler: ASTM D 242, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO MP 1, PG 64-22 conforming to the requirements of IDOT Specifications.

B. Tack Coat: AASHTO M 140 emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

C. Water: Potable only

2.3 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot mix asphalt plant mixes. Furnish job-mix formulas for each pavement type, conforming to the requirements of IDOT Specifications. Mix aggregates and bituminous materials in accordance with the requirements of IDOT Specifications. Mix to comply with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area of the Project that are suitable for the intended purpose.

3. EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is unfrozen, free of water, snow and ice and is otherwise in suitable condition to support paving and imposed loads.

B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction. Scarify, regrade and recompact surface of subgrade that is pumping or deforming as required to provide true levels, uniform slopes and proper total thickness of paving.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches extending 12 inches into adjacent sound pavement unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound aggregate base course to form new subgrade.

B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.20 gal/s.y.

C. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and while still hot, compact. Cover asphalt base course with compacted hot-mix surface layer finished flush with adjacent surfaces.

3.3 SURFACE PREPARATION

A. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

1. Sweep loose granular particles from surface of unbound aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of the base course.

B. Tack Coat: apply uniformly to surfaces of existing pavement (including base course) and exposed concrete wall footings at the rate indicated above.

1. Allow tack coat to cure undisturbed before applying hot-mix paving.
2. Provide adequate protection to avoid smearing or staining adjoining surfaces. Immediately remove spillages and clean affected areas.

3.4 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of the mix. Place each course to required grade, cross section and thickness when compacted.

1. Place surface course in a single 2" lift.
2. Spread mix at not less than 250 degrees in accordance with IDOT Specifications.
3. Regulate paver machine speed to obtain a smooth continuous surface, free of pulls and tears in asphalt paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind the paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix. Use suitable hand tools to smooth the surface.

3.5 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of the hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
3. Compact asphalt at joints to a density within 2% of specified course density.

3.6 COMPACTION

A. Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot hand tampers or vibratory plate compactors in areas that are inaccessible to rollers.

1. When paving surface temperature falls below 185 deg. F no further compaction effort will be permitted unless otherwise approved.

B. Breakdown Rolling: Complete breakdown, or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until course has been uniformly compacted to the following density:

1. Pavement shall be compacted to a density of 92% - 96% of the maximum theoretical density determined by IDOT Specifications. Field density determination will be in accordance with IDOT Specification Procedure.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Removed paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to the specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

1. Erect barricades to prevent paving from traffic until mixture has cooled enough not to become marked.

3.7 INSTALLATION TOLERENCES

A. Thickness: Compact each course to produce the thickness indicated on the drawings within the following tolerances:

1. Base Course: Plus or minus ¼ inch
2. Surface Course: Plus ¼ inch. No minus

B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: ¼ inch
2. Surface Course: 3/16 inch

3.8 FIELD QUALITY CONTROL

A. Testing Agency: IDOT personnel qualified to perform on-site testing will perform field tests and prepare reports.

B. Additional testing to ensure corrective action is satisfactory will be performed at the Contractor's expense for any Work in place that does not meet Project requirements.

C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that the Work does not comply with specified requirements.

3.9 DISPOSAL

A. Promptly remove surplus and/or excavated materials from work area and dispose of on-site in the area(s) so designated by IDOT site personnel.

END 32 12 16

1. GENERAL

1.1 WORK INCLUDES

A. General Contractor provide design and complete installation of steel reinforced exterior cement concrete pavement for the following:

1. 24’ x 24’ Pitched containment slab sloped to inlet as indicated on the plans and specified herein.

1.2 RELATED WORK

A. Specified elsewhere:

1. 31 23 00 Excavating, Backfilling & Compacting

2. 32 01 00 Surface Restorations

3. 32 12 16 Asphalt Paving

4. 33 41 00 Storm Drainage Piping

1.3 REFERENCES

A. IDOT Standard Specifications for Road and Bridge Construction and IDOT Supplemental Specifications and Recurring Special Provisions, latest edition, except:

1. Methods of Measurement and Basis of payments do not apply.

2. References to “Engineer” shall mean “Architect/Engineer.”

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete productswho complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. ACI Publications: Comply with ACI 301-10, “Specifications for Structural Concrete” (2010 edition)

C. ACI 306.1-90 “Standard Specification for Cold Weather Concreting”

1.5 SUBMITTALS

A. Design Mixtures: For each concrete pavement mixture provided.

2. PRODUCTS

2.1 STEEL REINFORCEMENT

A. Epoxy Coated Reinforcing Bars: ASTM A 775/A 775M, Grade 60; deformed.

B. Bar Supports: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and dowels in place manufactured according to CRSI's "Manual of Standard Practice."

2.2 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials of the same type, brand and source.

1. Portland Cement: ASTM 150, Type 1, (grey) supplement with the following:

a. Fly Ash: ASTM C 618 Class C or F.

b. Ground-Granulated Blast Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal Weight Aggregate: ASTM C 33 coarse aggregate, uniformly graded, 1" nominal size.

C. Water: ASTM C 94/C 94M

2.3 ADMIXTURES

A. Air Entraining Admixture: ASTM C 260

B. Chemical Admixtures: ASTM C 494/C 494M, of type suitable for application Certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

2.4 CURING MATERIALS

A. Moisture Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

B. Evaporation Retarder: Waterborne, non-molecular film forming; manufactured for application to fresh concrete.

C. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B

2.5 RELATED MATERIALS

A. Expansion and Isolation Joint Filler Strips: ASTM D 1751, asphalt saturated cellulosic fiber.

2.6 CONCRETE MIXTURES

A. Prepare design mixture proportioned according to ACI 301 with the following properties:

1. Compressive Strength: 3500 psi (28 days)

2. Maximum Water-Cementitious Materials Ratio: 0.45 at point of placement.

3. Slump Limit: 4 inches, plus or minus 1 inch.

4. Air Content: maintain within range permitted by ACI 301.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

B. When air temperature is above 90 deg. F, reduce mixing and delivery time to no more than 60 minutes

3. EXECUTION

3.1 PLACING AGGREGATE BASE

A. Place aggregate in not more than four inch (4") evenly distributed lifts and compact each lift as specified in Section 312300.

B. Depth of aggregate base shall be a minimum of eight inches (8") when fully compacted to specification.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace and secure edge forms, bulkheads and intermediate screed guides for pavement to required lines, grades and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after placement.

3.3 STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing and supporting reinforcement.

3.4 JOINTS

A. Construction Joints: Set at side and end terminations of concrete pavement and at locations where pavement operations are stopped for more than ½ hour unless pavement terminates at an isolation joint.

B. Isolation Joints: Form from premolded joint-filler strips. Install abutting concrete curb, catch basins and pipe bollard bases.

C. Contraction Joints: Form tooled weakened plane contraction joints, sectioning concrete containment pitch pan slab as indicated on drawings. Construct joints to be not less than ¾" deep nor more than one fourth of the concrete slab thickness.

D. Edging: Tool edges of pavement, gutters and joints in concrete after initial floating with an edging tool to a 3/8" radius. Repeat tooling of edges after surface finishing. Eliminate tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.

B. Comply with ACI 301 requirements for measuring, mixing, transporting and placing concrete.

C. Screed pavement surfaces with a straightedge and strike off.

D. Screed gutter surfaces to concave form indicated on drawings to form a continuous trough and strike off.

E. Commence initial floating to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations.

3.6 FLOAT FINISHING

A. Do not add water to concrete surfaces during finishing operations.

B. Begin the second floating operation when bleed water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface by hand. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine Textured Broom Finish: Draw a soft bristle broom across float finished surface to provide a uniform, fine-line texture.

3.7 CONCRETE PROTECTION AND CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Evaporation Retarder: Apply to concrete surfaces if dry, hot or windy conditions cause moisture loss before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding and bull floating or darbying concrete but before final float finishing.

C. Cure Methods: Cure concrete by moisture retaining cover, curing compound, or a combination of these methods.

3.8 REPAIRS AND PROTECTION

A. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement.

B. Remove and replace concrete pavement that is broken, damaged or defective or, that does not comply with requirements of this Section.

C. Maintain concrete pavement free of stains, discoloration, dirt and other foreign material. Broom sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END 32 75 10

1. GENERAL

1.1 WORK INCLUDES

A. BASE BID

1. Contractor provide hot-mix asphalt paving and patching including all base and sub-base preparation as indicated on the drawings and as specified herein including;

a. Building Flooring Surface
b. Patching of disturbed areas due to construction including re-worked drainage areas and new concrete containment pad at north overhead door.

1.2 RELATED WORK

A. Specified elsewhere:

1. 31 23 00 Excavating, Backfilling & Compacting

2. 32 01 00 Surface Restoration, Grading & Seeding

3. 33 41 00 Storm Drainage Piping

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing hot-mix asphalt similar to that indicated for this Project and with a record of successful in-service performance.

B. Hot-Mix Plant: Registered with and approved by IDOT.

C. Testing and Inspection Requirements:

1. Testing shall be performed by IDOT personnel. Inspection shall be performed by the Architect. Contractor shall notify the Architect not less than 48 hours in advance of all work requiring testing or inspection. Architect will notify responsible party at IDOT for testing.

2. Asphalt paving shall be tested for gradation, asphalt content and in-place depth and density.

1.4 REGULATORY REQUIREMENTS

A. Comply with applicable sections of the IDOT Standard Specifications for Road and Bridge Construction, April 1, 2016 edition and especially:

1. Division 300 – Subgrades, Subbases and Base Courses
2. Division 400 – Surface Courses, Pavements, Rehabilitation and Shoulders

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Tack Coat: Minimum surface temperature of 60 deg. F.
2. Asphalt Base Course: Minimum surface temperature of 40 deg. F and rising at the time of placement.
3. Asphalt Surface Course: Minimum surface temperature of 60 deg. F at time of placement.

1.6 SUBMITTALS

A. Job Mix Designs: For each job mix proposed for the Work.

B. Material Test Reports: For each paving material

C. Material Certificates: For each paving material, signed by the provider.

2. PRODUCTS

2.1 AGGREGATES

A. Course Aggregate: ASTM D 692, sound angular crushed stone, crushed gravel or properly cured crushed blast furnace slag.

B. Fine Aggregate: ASTM D 1073, sharp edged natural sand or sand prepared from stone, gravel, properly cured blast furnace slag, or combination thereof.

C. Mineral Filler: ASTM D 242, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO MP 1, PG 64-22 conforming to the requirements of IDOT Specifications.

B. Tack Coat: AASHTO M 140 emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

C. Water: Potable only

2.3 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot mix asphalt plant mixes. Furnish job-mix formulas for each pavement type, conforming to the requirements of IDOT Specifications. Mix aggregates and bituminous materials in accordance with the requirements of IDOT Specifications. Mix to comply with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area of the Project that are suitable for the intended purpose.

3. EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is unfrozen, free of water, snow and ice and is otherwise in suitable condition to support paving and imposed loads.

B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction. Scarify, regrade and recompact surface of subgrade that is pumping or deforming as required to provide true levels, uniform slopes and proper total thickness of paving.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches extending 12 inches into adjacent sound pavement unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound aggregate base course to form new subgrade.

B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.20 gal/s.y.

C. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and while still hot, compact. Cover asphalt base course with compacted hot-mix surface layer finished flush with adjacent surfaces.

3.3 SURFACE PREPARATION

A. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

1. Sweep loose granular particles from surface of unbound aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of the base course.

B. Tack Coat: apply uniformly to surfaces of existing pavement (including base course) and exposed concrete wall footings at the rate indicated above.

1. Allow tack coat to cure undisturbed before applying hot-mix paving.
2. Provide adequate protection to avoid smearing or staining adjoining surfaces. Immediately remove spillages and clean affected areas.

3.4 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of the mix. Place each course to required grade, cross section and thickness when compacted.

1. Place surface course in a single 2" lift.
2. Spread mix at not less than 250 degrees in accordance with IDOT Specifications.
3. Regulate paver machine speed to obtain a smooth continuous surface, free of pulls and tears in asphalt paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind the paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix. Use suitable hand tools to smooth the surface.

3.5 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of the hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
3. Compact asphalt at joints to a density within 2% of specified course density.

3.6 COMPACTION

A. Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot hand tampers or vibratory plate compactors in areas that are inaccessible to rollers.

1. When paving surface temperature falls below 185 deg. F no further compaction effort will be permitted unless otherwise approved.

B. Breakdown Rolling: Complete breakdown, or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until course has been uniformly compacted to the following density:

1. Pavement shall be compacted to a density of 92% - 96% of the maximum theoretical density determined by IDOT Specifications. Field density determination will be in accordance with IDOT Specification Procedure.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Removed paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to the specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

1. Erect barricades to prevent paving from traffic until mixture has cooled enough not to become marked.

3.7 INSTALLATION TOLERENCES

A. Thickness: Compact each course to produce the thickness indicated on the drawings within the following tolerances:

1. Base Course: Plus or minus ¼ inch
2. Surface Course: Plus ¼ inch. No minus

B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: ¼ inch
2. Surface Course: 3/16 inch

3.8 FIELD QUALITY CONTROL

A. Testing Agency: IDOT personnel qualified to perform on-site testing will perform field tests and prepare reports.

B. Additional testing to ensure corrective action is satisfactory will be performed at the Contractor's expense for any Work in place that does not meet Project requirements.

C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that the Work does not comply with specified requirements.

3.9 DISPOSAL

A. Promptly remove surplus and/or excavated materials from work area and dispose of on-site in the area(s) so designated by IDOT site personnel.

END 32 12 16

1. GENERAL

1.1 WORK INCLUDES

A. General Contractor provide design and complete installation of steel reinforced exterior cement concrete pavement for the following:

1. 24’ x 24’ Pitched containment slab sloped to inlet as indicated on the plans and specified herein.

1.2 RELATED WORK

A. Specified elsewhere:

1. 31 23 00 Excavating, Backfilling & Compacting

2. 32 01 00 Surface Restorations

3. 32 12 16 Asphalt Paving

4. 33 41 00 Storm Drainage Piping

1.3 REFERENCES

A. IDOT Standard Specifications for Road and Bridge Construction, April 1, 2016 and IDOT Supplemental Specifications and Recurring Special Provisions adopted January 1, 2018 except:

1. Methods of Measurement and Basis of payments do not apply.

2. References to “Engineer” shall mean “Architect/Engineer.”

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. ACI Publications: Comply with ACI 301-10, “Specifications for Structural Concrete” (2010 edition)

C. ACI 306.1-90 “Standard Specification for Cold Weather Concreting”

1.5 SUBMITTALS

A. Design Mixtures: For each concrete pavement mixture provided.

2. PRODUCTS

2.1 STEEL REINFORCEMENT

A. Epoxy Coated Reinforcing Bars: ASTM A 775/A 775M, Grade 60; deformed.

B. Bar Supports: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and dowels in place manufactured according to CRSI's "Manual of Standard Practice."

2.2 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials of the same type, brand and source.

1. Portland Cement: ASTM 150, Type 1, (grey) supplement with the following:

a. Fly Ash: ASTM C 618 Class C or F.

b. Ground-Granulated Blast Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal Weight Aggregate: ASTM C 33 coarse aggregate, uniformly graded, 1" nominal size.

C. Water: ASTM C 94/C 94M

2.3 ADMIXTURES

A. Air Entraining Admixture: ASTM C 260

B. Chemical Admixtures: ASTM C 494/C 494M, of type suitable for application Certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

2.4 CURING MATERIALS

A. Moisture Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

B. Evaporation Retarder: Waterborne, non-molecular film forming; manufactured for application to fresh concrete.

C. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B

2.5 RELATED MATERIALS

A. Expansion and Isolation Joint Filler Strips: ASTM D 1751, asphalt saturated cellulosic fiber.

2.6 CONCRETE MIXTURES

A. Prepare design mixture proportioned according to ACI 301 with the following properties:

1. Compressive Strength: 3500 psi (28 days)

2. Maximum Water-Cementitious Materials Ratio: 0.45 at point of placement.

3. Slump Limit: 4 inches, plus or minus 1 inch.

4. Air Content: maintain within range permitted by ACI 301.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

B. When air temperature is above 90 deg. F, reduce mixing and delivery time to no more than 60 minutes

3. EXECUTION

3.1 PLACING AGGREGATE BASE

A. Place aggregate in not more than four inch (4") evenly distributed lifts and compact each lift as specified in Section 312300.

B. Depth of aggregate base shall be a minimum of eight inches (8") when fully compacted to specification.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace and secure edge forms, bulkheads and intermediate screed guides for pavement to required lines, grades and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after placement.

3.3 STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing and supporting reinforcement.

3.4 JOINTS

A. Construction Joints: Set at side and end terminations of concrete pavement and at locations where pavement operations are stopped for more than ½ hour unless pavement terminates at an isolation joint.

B. Isolation Joints: Form from premolded joint-filler strips. Install abutting concrete curb, catch basins and pipe bollard bases.

C. Contraction Joints: Form tooled weakened plane contraction joints, sectioning concrete containment pitch pan slab as indicated on drawings. Construct joints to be not less than ¾" deep nor more than one fourth of the concrete slab thickness.

D. Edging: Tool edges of pavement, gutters and joints in concrete after initial floating with an edging tool to a 3/8" radius. Repeat tooling of edges after surface finishing. Eliminate tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.

B. Comply with ACI 301 requirements for measuring, mixing, transporting and placing concrete.

C. Screed pavement surfaces with a straightedge and strike off.

D. Screed gutter surfaces to concave form indicated on drawings to form a continuous trough and strike off.

E. Commence initial floating to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations.

3.6 FLOAT FINISHING

A. Do not add water to concrete surfaces during finishing operations.

B. Begin the second floating operation when bleed water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface by hand. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine Textured Broom Finish: Draw a soft bristle broom across float finished surface to provide a uniform, fine-line texture.

3.7 CONCRETE PROTECTION AND CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Evaporation Retarder: Apply to concrete surfaces if dry, hot or windy conditions cause moisture loss before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding and bull floating or darbying concrete but before final float finishing.

C. Cure Methods: Cure concrete by moisture retaining cover, curing compound, or a combination of these methods.

3.8 REPAIRS AND PROTECTION

A. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement.

B. Remove and replace concrete pavement that is broken, damaged or defective or, that does not comply with requirements of this Section.

C. Maintain concrete pavement free of stains, discoloration, dirt and other foreign material. Broom sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END 33 41 00

1. GENERAL

1.1 WORK INCLUDES

A. BASE BID

1. Contractor provide:

a. New precast inlet and gravity flow, non-pressure storm drainage piping to daylight as indicated on the drawings.

1.2 RELATED WORK

A. Specified elsewhere:

1. 31 23 00 Excavating, Backfilling & Compacting

2. 32 01 00 Surface Restoration, Grading & Seeding

3. 32 12 16 Asphalt Paving

4. 32 75 10 Cement Concrete Pavement

1.3 PERFORMANCE REQUIREMENTS

A. Gravity flow, non-pressure drainage piping pressure rating: 10 foot head of water.

1.4 REGULATORY REQUIREMENTS

A. Comply with applicable sections of the IDOT Standard Specifications for Road and Bridge Construction, latest edition.

1.6 SUBMITTALS

A. Product Data: For each type of product submitted.

2. PRODUCTS

2.1 PVC PIPE AND FITTINGS

A. Pipe shall be constructed of quality PVC resin, compounded to provide physical and mechanical properties that equal or exceed cell class 12454 or 12364 as defined in ASTM D1784. Sized as indicated on the drawings suitable for use as a gravity sewer conduit and meeting the requirements of ASTM F794 and D3034 with bell and spigot ends for gasketed joints with elastomeric seals.

B. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include one of the following or an approved equal as submitted to and accepted by the CDB Representative.:
   1. Contech Engineered Solutions LLC – West Chester, OH
   2. Cresline Plastic Pipe Co., Inc. – Evansville, IN
   3. GF Harvel LLC – Easton, PA
   4. JM-Eagle (JM Manufacturing Co., Inc.) – Livingston, NJ
   5. North American Pipe Corporation – Houston, TX (IL Plant in Litchfield)

2.2 NONPRESSURE-TYPE PIPE COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type reducing or transition coupling for joining underground non-pressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant, metal tension band and tightening mechanism on each end.

B. Sleeve Materials For Plastic Pipes: ASTM F 477, elastomeric seal.

C. Unshielded Flexible Couplings: Non-pressure type flexible coupling consisting of elastomeric sleeve with corrosion-resistant, metal tension band and tightening mechanism on each end.

   1) Acceptable Manufacturers:
      a. Dallas Specialty & Mfg. Co.
      b. Fernco Inc.
      c. The Logan Clay Products Company
      d. Mission Rubber Company (a division of MCP Industries, Inc.)

D. Shielded Flexible Couplings: Non-pressure type flexible coupling consisting of elastomeric or rubber sleeve meeting ASTM C 1460 with full-length corrosion resistant outer shield with corrosion-resistant, metal tension band and tightening mechanism on each end.

   1. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:
      a. Cascade Waterworks Mfg.
      b. Dallas Specialty & Mfg. Co.
      c. Mission Rubber Company (a division of MCP Industries, Inc.)

2.3 INLET

A. Standard Precast Concrete Basin: IDOT Inlet Type A, Standard Detail 602001-02, precast reinforced concrete of depth indicated on drawings with provision for sealant joints.

1. Base Section: Interlocking 4" thick prefabricated reinforced concrete floor with 3" thick minimum precast reinforced concrete wall sections.

2. Joint Sealant: ASTM C 990 bitumen or butyl rubber.

3. Acceptable Manufacturers: Manufacturers approved by IDOT to supply specified precast catch basin as indicated in the latest published edition of the IDOT – Bureau of Materials and Physical Research Approved List of Certified Precast Concrete Producers.

B. Cast, Frame and Lids: IDOT Type 1, Standard Detail 604001-03 ductile iron open lid designed for structural loading with approximately 50% open area.

1. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following or an approved equal as submitted to and accepted by the CDB Representative.:
   a. East Jordan Iron Works – East Jordan, MI
   b. Neenah Enterprises, Inc. – Neenah, WI
   c. U.S. Foundry (Eagle Manufacturing Group) – Medley, FL

3. EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Install piping as indicated, to the extent practical. Where specific installation is not indicated, follow manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated, with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves and couplings according to manufacturer's written instructions for using lubricants, cements and other installation requirements.

C. Install piping pitched down in direction of flow at a minimum slope of 0.4% unless otherwise indicated.

D. Install piping with restrained joints at changes in direction. Use corrosion resistant rods, pipe, manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.

E. Install piping below frost line. Minimum cover shall be 36 inches.

F. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.

G. Pipe joint construction: Join PVC piping according to ASTM D2321 and ASTM 3034 for elastomeric joints.

3.2 INLET INSTALLATION

A. Set precast basin firm, level and true on aggregate base (sand) as per IDOT Standard Specifications.

B. Set frames and grates to elevations indicated.

3.3 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place and again at completion of installation.

1. Defects requiring correction include the following:

a. Alignment: Less than full diameter of inside pipe is visible between structures.

b. Deflection: Flexible piping with deflection that prevents passage of a ball or cylinder of a size not less than 92.5% of the piping diameter.

c. Crushed, broken, cracked or otherwise damaged piping.

d. Infiltration: Water leakage into piping.

e. Exfiltration: Water leakage from or around piping.

2. Replace defective piping using new materials and repeat inspections until defects are within allowances permitted.

B. Test new piping systems and parts of existing systems that have been altered for leaks and defects.

1. Do not enclose, cover or put into service before inspection and approval.

2. Provide at least 24 hours advance notice to the Architect before conducting any activity requiring tests, inspections or observation.

3. Test PVC sewer piping in accordance with ASTM F 1417

a. Replace defective piping using new materials and repeat inspections until defects are within allowances permitted.

END 33 41 00

CDB - PROJECT NUMBER 630-012-004

CONSTRUCT SALT STORAGE BUILDING
DISTRICT - 1 GRAYSLAKE YARD
GRAYSLAKE, LAKE COUNTY ILLINOIS
CDB BUILDING NO. IDOT 012-0001

FOR:

STATE OF ILLINOIS
CAPITAL DEVELOPMENT BOARD

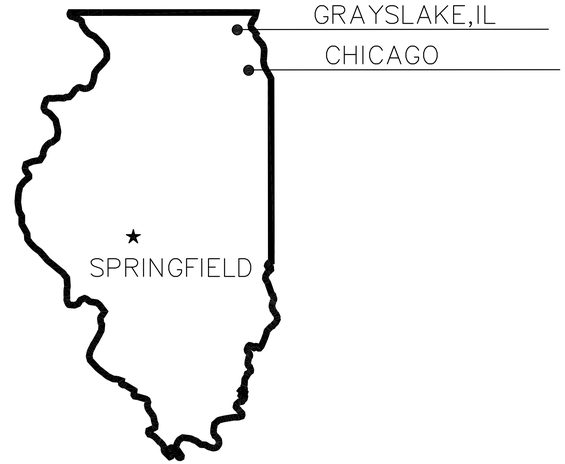
USING AGENCY:
DEPARTMENT OF TRANSPORTATION

BY:

MODE ARCHITECTS, P.C.
343 W. ERIE #210
CHICAGO, 60654 t:312-475-9918

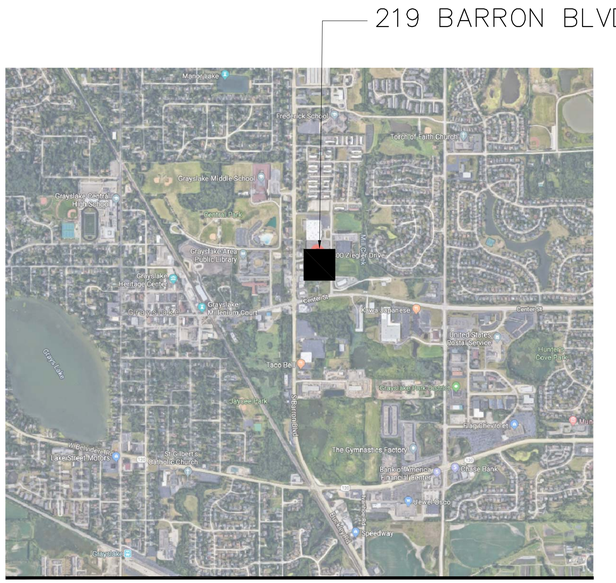
MELVIN COHEN ASSOCIATES
223 W. JACKSON, SUITE 820,
CHICAGO, 60606 t:312-663-3700

LARSON ENGINEERING INC.
118 S. CLINTON ST. #250
CHICAGO, 60661 t:312-345-0540

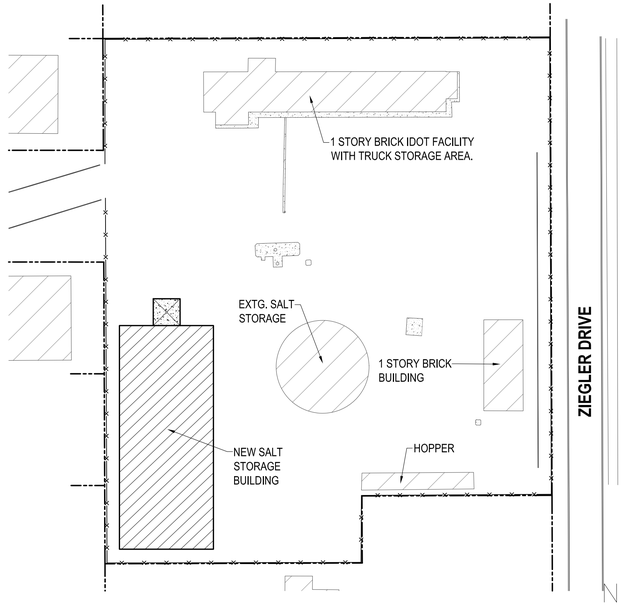


STATE LOCATION PLAN

INDEX OF DRAWINGS



PROJECT LOCATION MAP



PROJECT KEY PLAN

NOTE: CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

REVISIONS			DRAWN	PREPARED
NO.	DATE	REMARKS		OFF.
			TRACED	APPROVED
			CHECKED	APPROVED

LICENSED ARCHITECT
JUNG J. MO
001-018521
STATE OF ILLINOIS

Melvin Cohen & Associates, Inc.
233 W. Jackson, Suite 820
Chicago, IL 60606
T. 312.663.3700
F. 312.663.4161

Larson Engineering Inc
118 S. Clinton St. #250
CHICAGO, IL 60661
T.312.345.0540 F.312.332.0540

ARCHITECT OF RECORD
MoDE architects, p.c.
343 W. ERIE ST. Suite 210
CHICAGO, IL 60654
T.312.475.9918
Design Firm Registration No.:
184.004451

Capital Development Board
Building a Better Illinois

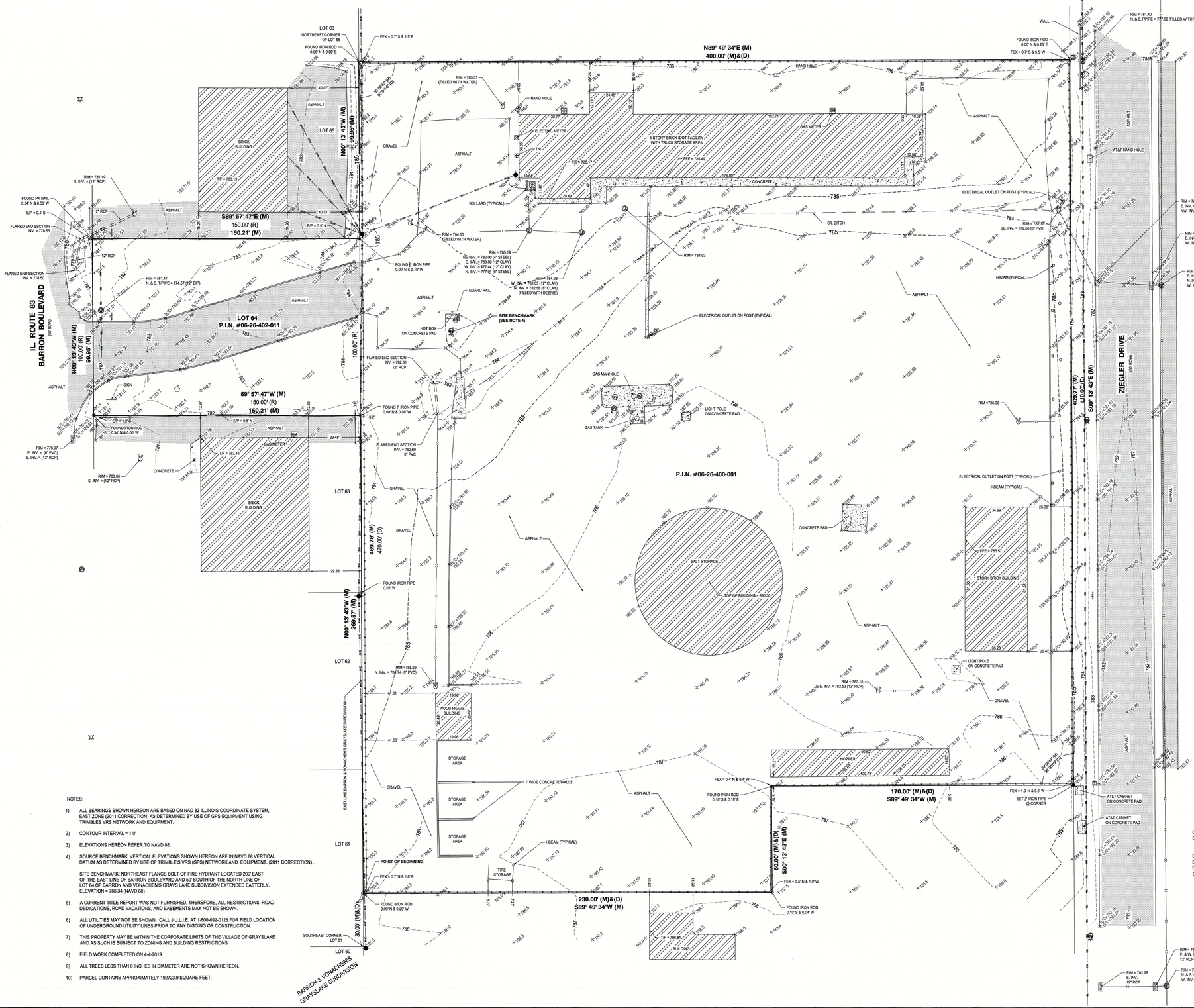
State of Illinois
JB PRITZKER, GOVERNOR
Illinois Capital Development Board

TITLE SHEET AND LOCATION PLANS

CONSTRUCT SALT STORAGE BUILDING
IDOT DISTRICT - 1 GRAYSLAKE YARD

219 BARRON BLVD., GRAYSLAKE, ILLINOIS

PROJECT NO. 630-012-004
DATE 01/09/2020
SHEET NO. **G1**



Boundary and Topographic Survey

LINE TYPE LEGEND

- BUILDING SETBACK = —— – —— – ——
- COMBINED SEWER = —— CMD —— CMD —— CMD ——
- DEPRESSED CURB = ————————
- EASEMENT = – – – – – – – –
- ELECTRIC LINE = —— E —— E —— E ——
- FENCE = ——x——x——x——x——x——
- FIBER OPTIC CABLE = —— FO —— FO —— FO —— FO ——
- GAS LINE = —— GAS —— GAS —— GAS —— GAS ——
- GUARD RAIL = o——o——o——o——o——o
- CENTERLINE OF OVERHEAD WIRES = —— OHW —— OHW ——
- SANITARY SEWER = ——>——>——>——
- STORM SEWER = ——>>——>>——>>——
- TREE OR BRUSH LINE = ⌒⌒⌒⌒⌒
- WATER MAIN = —— WM —— WM —— WM —— WM ——

UNDERGROUND UTILITIES PER J.U.L.I.E.

- CABLE LINE = —— UGC —— UGC —— UGC —— UGC —— UGC ——
- ELECTRIC LINE = —— UGE —— UGE —— UGE —— UGE ——
- GAS LINE = —— UGG —— UGG —— UGG —— UGG ——
- SANITARY SEWER = —— UGSAN —— UGSAN ——
- STORM SEWER = —— UGST —— UGST —— UGST ——
- TELEPHONE LINE = —— UGT —— UGT ——
- WATER LINE = —— UGW —— UGW —— UGW —— UGW ——

LEGAL DESCRIPTION:

THAT PART OF THE WEST HALF OF THE SOUTHEAST QUARTER OF SECTION 26, TOWNSHIP 45 NORTH, RANGE 10 EAST OF THE THIRD PRINCIPAL MERIDIAN, LAKE COUNTY, ILLINOIS, DESCRIBED AS LOT 64 IN BARRON AND VONACHEN'S GRAYSLAKE SUBDIVISION, ACCORDING TO THE PLAT THEREOF RECORDED IN BOOK "M" OF PLATS, PAGE 21 AS DOCUMENT NUMBER 230485; AND ALSO THAT PART OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 26, TOWNSHIP 45 NORTH, RANGE 10 EAST OF THE THIRD PRINCIPAL MERIDIAN, LAKE COUNTY, ILLINOIS, DESCRIBED AS FOLLOWS: BEGINNING ON THE EAST LINE OF BARRON AND VONACHEN'S GRAYSLAKE SUBDIVISION AT A POINT 30.00 FEET NORTH OF THE SOUTHEAST CORNER OF LOT 61 IN SAID SUBDIVISION; THENCE NORTH ALONG SAID EAST LINE 470.00 FEET TO THE NORTHEAST CORNER OF LOT 65 IN SAID SUBDIVISION; THENCE EAST AT RIGHT ANGLES TO SAID EAST LINE OF BARRON AND VONACHEN'S GRAYSLAKE SUBDIVISION, 400.00 FEET; THENCE SOUTH PARALLEL TO SAID EAST LINE OF SAID SUBDIVISION, 410.00 FEET; THENCE WEST AT RIGHT ANGLES TO SAID EAST LINE, 170.00 FEET; THENCE SOUTH PARALLEL TO SAID EAST LINE OF SAID SUBDIVISION, 60.00 FEET; THENCE WEST 230.00 FEET TO THE PLACE OF BEGINNING, SITUATED IN THE CUNT OF LAKE, IN THE STATE OF ILLINOIS.

COMMONLY KNOWN AS 219 BARRON BOULEVARD, GRAYSLAKE, ILLINOIS.

ABBREVIATION LEGEND

A = ASPHALT
ADA = AMERICANS WITH DISABILITY ACT
B/C = BACK OF CURB
B/CD = BACK OF DEPRESSED CURB
BSL = BUILDING SETBACK LINE
B/W = BOTTOM OF WALL ELEVATION
BLC = BUILDING CORNER
C = CONCRETE
C.E. = CITY EASEMENT
CHD = CHORD
C/L = CENTERLINE
CMP = CORRUGATED METAL PIPE
CPP = CORRUGATED PLASTIC PIPE
CW = CONCRETE WALK
(D) = DEED
DIP = DUCTILE IRON PIPE
E = EAST
E/B = EDGE OF BRICK
E/C = EDGE OF CONCRETE
E/G = EDGE OF GRAVEL
E'LY = EASTERLY
E/P = EDGE OF PAVEMENT
E/W = EDGE OF WATER
FES = FLARED END SECTION
FEX = FENCE CORNER
FFE = FINISHED FLOOR ELEVATION
G = GROUND
GFE = GARAGE FLOOR ELEVATION
GUT = GUTTER
ICV = IRRIGATION CONTROL VALVE
(M) = MEASURED DISTANCE
MW = MONITORING WELL
MT = MULTI TRUNK
N = NORTH
N'LY = NORTHERLY
P.O.B. = POINT OF BEGINNING
P.O.C. = POINT OF COMMENCEMENT
PVC = POLYVINYL CHLORIDE PIPE
P.U.E. = PUBLIC UTILITY EASEMENT
P.U. & D.E. = PUBLIC UTILITY & DRAINAGE EASEMENT
(R) = RECORD DISTANCE
RAD = RADIUS
RCP = REINFORCED CONCRETE PIPE
R.O.W. = RIGHT OF WAY
S = SOUTH
S'LY = SOUTHERLY
T/C = TOP OF CONCRETE
T/F = TOP OF FOUNDATION ELEVATION
T/PIPE = TOP OF PIPE
T/W = TOP OF WALL ELEVATION
T/WW = TOP OF WINDOW WELL ELEVATION
U.&D.E. = UTILITY & DRAINAGE EASEMENT
VCP = VITREOUS CLAY PIPE
W = WEST
W'LY = WESTERLY

SYMBOL LEGEND

▨ = ASPHALT
⊠ = AIR CONDITIONER
(BB) = B BOX
▦ = BRICK
[C] = CABLE TV PEDESTAL
CB ○ = CATCH BASIN
(CO) = CLEANOUT
(CS) = COMBINED STORM & SANITARY MANHOLE
▨ = CONCRETE
⊕ = DECIDUOUS TREE
(DS) = DOWNSPOUT
[EM] = ELECTRIC MANHOLE
[E] = ELECTRIC PEDESTAL
[ET] = ELECTRIC TRANSFORMER
[F] = FIBER OPTIC PEDESTAL
= FLAG POLE
× = FOUND CUT CROSS
○ = FOUND MONUMENT
(G) = GAS MANHOLE
▨ = GRAVEL
(= GUY ANCHOR
= HYDRANT
☼ = LIGHT
= MAIL BOX
✺ = PINE TREE
(S) = SANITARY MANHOLE
● = SET IRON PIPE 1/2" DIA x 24"
= SIGN
(ST) = STORM MANHOLE
☰☰ = SQUARE CURB DRAIN
(T) = TELEPHONE MANHOLE
⊠ = TELEPHONE NETWORK INTERFACE
[T] = TELEPHONE PEDESTAL
8 = TRAFFIC LIGHT
[TR] = TRAFFIC MANHOLE
(U) = UNKNOWN MANHOLE
(W) = WATER MANHOLE
(WV) = WATER VALVE
▭ = WOOD
● = WOOD UTILITY POLE

NOTES:

1) ALL BEARINGS SHOWN HEREON ARE BASED ON NAD 83 ILLINOIS COORDINATE SYSTEM, EAST ZONE (2011 CORRECTION) AS DETERMINED BY USE OF GPS EQUIPMENT USING TRIMBLES VRS NETWORK AND EQUIPMENT.

2) CONTOUR INTERVAL = 1.0'

3) ELEVATIONS HEREON REFER TO NAVD 88.

4) SOURCE BENCHMARK: VERTICAL ELEVATIONS SHOWN HEREON ARE IN NAVD 88 VERTICAL DATUM AS DETERMINED BY USE OF TRIMBLE'S VRS (GPS) NETWORK AND EQUIPMENT. (2011 CORRECTION).

SITE BENCHMARK: NORTHEAST FLANGE BOLT OF FIRE HYDRANT LOCATED 200' EAST OF THE EAST LINE OF BARRON BOULEVARD AND 50' SOUTH OF THE NORTH LINE OF LOT 64 OF BARRON AND VONACHEN'S GRAYS LAKE SUBDIVISION EXTENDED EASTERLY. ELEVATION = 786.34 (NAVD 88)

5) A CURRENT TITLE REPORT WAS NOT FURNISHED, THEREFORE, ALL RESTRICTIONS, ROAD DEDICATIONS, ROAD VACATIONS, AND EASEMENTS MAY NOT BE SHOWN.

6) ALL UTILITIES MAY NOT BE SHOWN. CALL J.U.L.I.E. AT 1-800-892-0123 FOR FIELD LOCATION OF UNDERGROUND UTILITY LINES PRIOR TO ANY DIGGING OR CONSTRUCTION.

7) THIS PROPERTY MAY BE WITHIN THE CORPORATE LIMITS OF THE VILLAGE OF GRAYSLAKE AND AS SUCH IS SUBJECT TO ZONING AND BUILDING RESTRICTIONS.

8) FIELD WORK COMPLETED ON 4-4-2019.

9) ALL TREES LESS THAN 6 INCHES IN DIAMETER ARE NOT SHOWN HEREON.

10) PARCEL CONTAINS APPROXIMATELY 192723.9 SQUARE FEET.

Vicinity Map
(No Scale)

STATE OF ILLINOIS)
COUNTY OF KANE) SS

WE, RIDGELINE CONSULTANTS, LLC., ILLINOIS PROFESSIONAL DESIGN FIRM NO. 184-004766, HAVE PREPARED THIS BOUNDARY AND TOPOGRAPHIC SURVEY. SURVEYOR HAS MADE NO INVESTIGATION OR INDEPENDENT SEARCH FOR EASEMENTS OF RECORD, ENCUMBRANCES, RESTRICTIVE COVENANTS, OWNERSHIP TITLE EVIDENCE, OR ANY OTHER FACTS WHICH AN ACCURATE TITLE SEARCH MAY DISCLOSE. THIS PROFESSIONAL SERVICE CONFORMS TO THE CURRENT ILLINOIS MINIMUM STANDARDS FOR BOUNDARY AND TOPOGRAPHIC SURVEYS.

DATED AT MONTGOMERY, ILLINOIS ON APRIL 15, 2019.

STACY L. STEWART
035-003415

Ridgeline
CONSULTANTS
CONSULTING ENGINEERS
LAND SURVEYORS

GEORGE H. SKULAVIK P.L.S 035-002580 EXPIRATION DATE 11/30/2020
STACY L. STEWART P.L.S. 035-003415 EXPIRATION DATE 11/30/2020

PROFESSIONAL DESIGN FIRM NO. 184-004766

1661 AUCUTT ROAD
MONTGOMERY, ILLINOIS 60538
PHONE 630-801-7927 FAX 630-701-1385
Survey is valid only if original seal is shown in red.

Rev. Date	Rev. Description

Book #: RL-187	Dwg. Size: U
Drawn By: TMS(MH)	Checked By: SLS
Reference:	
Date: 4-12-2019	
Client: LARSON ENGINEERING	
Project Number: 2019-0146	

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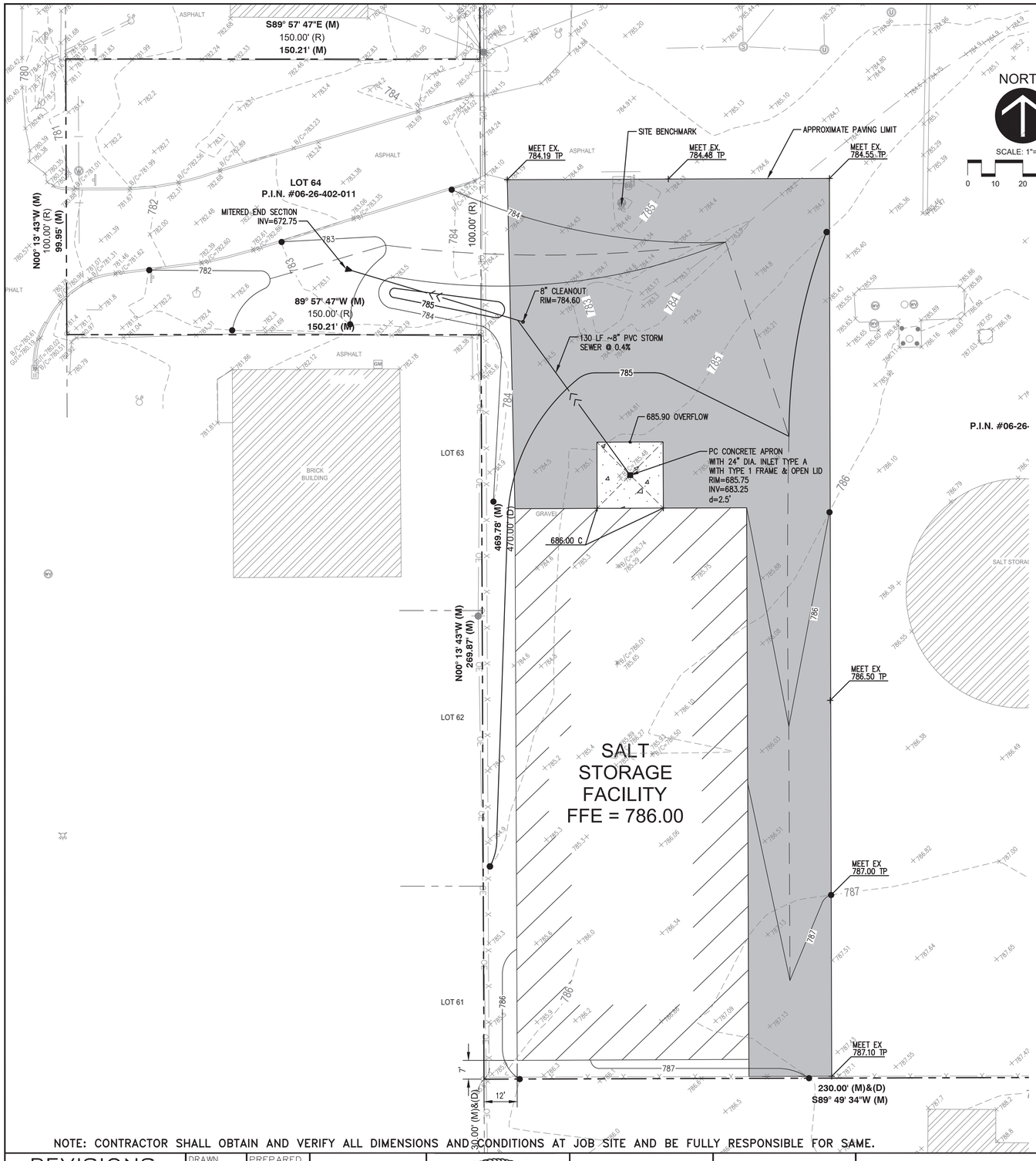


NOTE: CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

SURFACE LEGEND

ASPHALT PAVEMENT
4" MIN BITUMINOUS ASPHALT PAVEMENT

CONCRETE PAVEMENT
8" PC CONCRETE (CLASS PV) W/ STEEL REINFORCING

PAVEMENT NOTES

1. SEE ARCHITECTURAL DRAWINGS FOR BUILDING DIMENSIONS.
2. ALL NON-PAVED AREAS DISTURBED OR REGRADED SHALL BE BACKFILLED WITH A MINIMUM OF 6" TOPSOIL AND SEEDED.

BENCHMARK

SOURCE BENCHMARK: VERTICAL ELEVATIONS SHOWN HEREON ARE IN NAVD 88 VERTICAL DATUM AS DETERMINED BY USE OF TRIMBLE'S VRS (GPS) NETWORK AND EQUIPMENT. (2011 CORRECTION).

SITE BENCHMARK: NORTHEAST FLANGE BOLT OF FIRE HYDRANT LOCATED 200' EAST OF THE EAST LINE OF BARRON BOULEVARD AND 50' SOUTH OF THE NORTH LINE OF LOT 64 OF BARRON AND VONACHEN'S GRAYSLAKE SUBDIVISION EXTENDED EASTERLY.

ELEVATION = 786.34 (NAVD 88)

LEGEND

EXISTING		PROPOSED
	SANITARY SEWER	
	STORM SEWER	
	WATER MAIN	
	SANITARY SEWER MANHOLE	
	CATCH BASIN	
	INLET	
	WATER MANHOLE	
	WATER VALVE	
	FIRE HYDRANT	
	UNKNOWN MANHOLE	
	UTILITY POLE	
	STREET LIGHT	
	LIGHT STANDARD	
x 621.12	SPOT ELEVATION	+ 686.02 TC 685.62 FL
621	CONTOUR	621
RIM XXX.XX INV XXX.XX	SANITARY MANHOLE ELEVATIONS	RIM XXX.XX INV XXX.XX
RIM XXX.XX INV XXX.XX	STORM STRUCTURE ELEVATIONS	RIM XXX.XX INV XXX.XX
	PROPERTY LINE & R.O.W.	
— X — X —	CHAIN FENCE	— X — X —
—OE— —OT—	OVERHEAD UTILITY LINE	—OE— —OT—

FOR BURIED AND OVERHEAD UTILITIES:
E=ELECTRIC T=TELEPHONE C=COMMUNICATIONS G=GAS

REVISIONS			DRAWN	PREPARED
NO.	DATE	REMARKS		OFF.
			TRACED	APPROVED
			CHECKED	APPROVED

Digitally signed by Joseph Tinder
Date: 2019.12.10 12:58:44-05'00'

JOSEPH B. TINDER 062-053275 LICENSED PROFESSIONAL ENGINEER ILLINOIS
Date: 12/10/19
Exp: 11/30/21

Larson Engineering Inc
1488 Bond St. Suite 100
NAPERVILLE, IL 60563
T.630.357.0540 F.630.357.0164
Design Firm Registration No.:
#184-001442

Capital Development Board
Building a Better Illinois

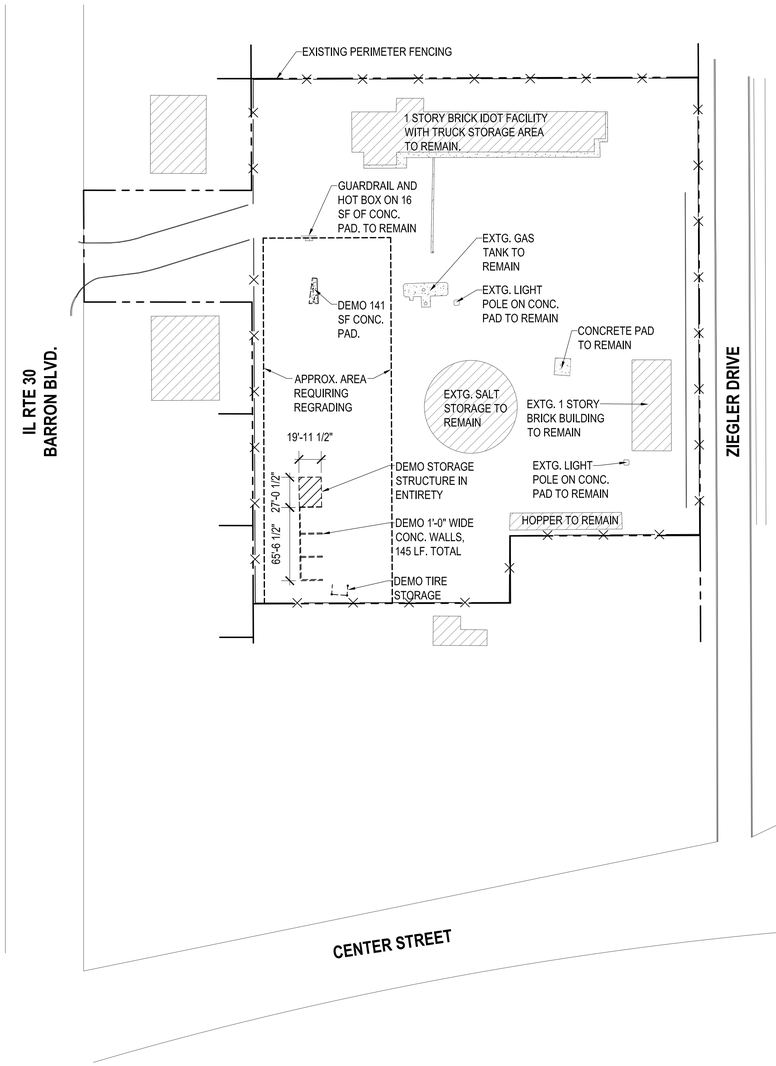
State of Illinois
JB PRITZKER, GOVERNOR
Illinois Capital Development Board

CONCEPT GRADING AND PAVING PLAN

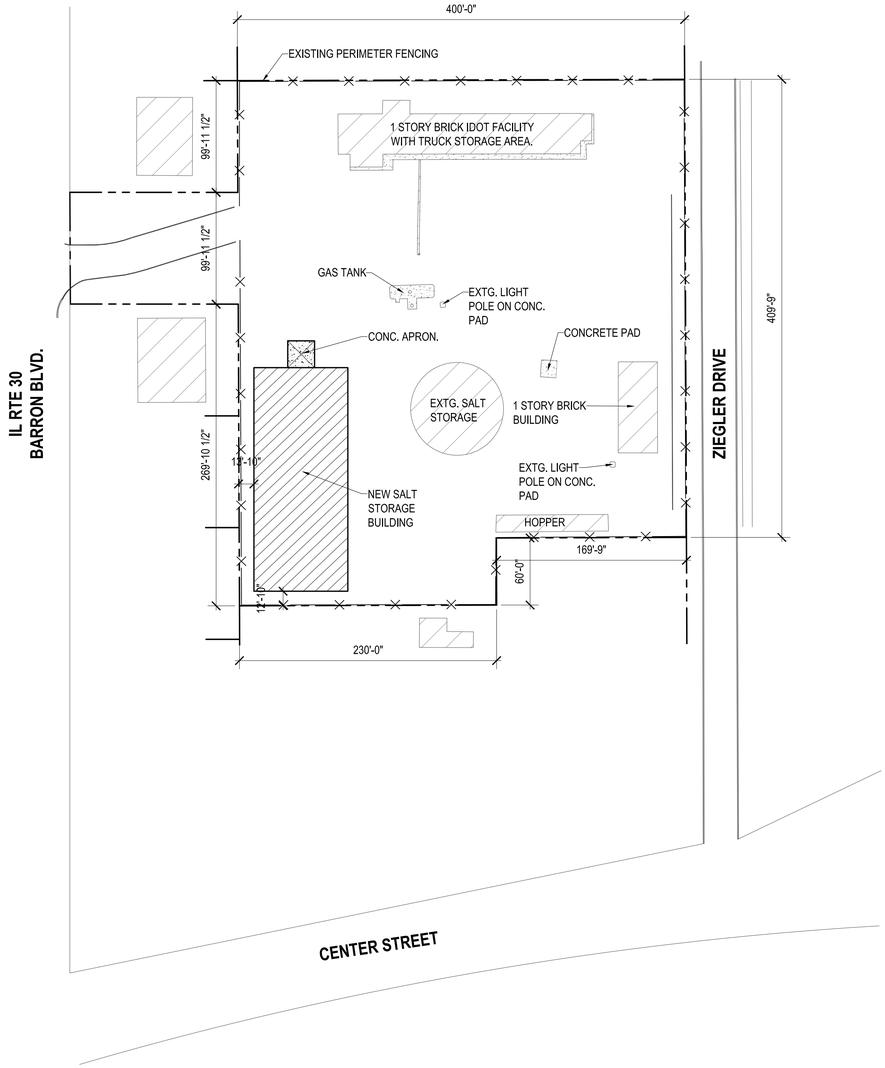
CONSTRUCT SALT STORAGE BUILDING
IDOT DISTRICT - 1 GRAYSLAKE YARD

219 BARRON BLVD., GRAYSLAKE, ILLINOIS

PROJECT NO. 630-012-004
DATE 01/09/2020
SHEET NO. **C1.0**



1 SITE DEMO PLAN
1/64"=1'-0"



2 SITE PLAN
1/64"=1'-0"

NOTE: CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

REVISIONS			DRAWN	PREPARED
NO.	DATE	REMARKS		OFF.
			TRACED	APPROVED
			CHECKED	APPROVED

LICENSED ARCHITECT
JUNG J. MO
001-018521
STATE OF ILLINOIS

Melvin Cohen & Associates, Inc.
233 W. Jackson, Suite 820
Chicago, IL 60606
T. 312.663.3700
F. 312.663.4161

Larson Engineering Inc
118 S. Clinton St. #250
CHICAGO, IL 60661
T.312.345.0540 F.312.332.0540

ARCHITECT OF RECORD
MoDE architects, p.c.
343 W. ERIE ST. Suite 210
CHICAGO, IL 60654
T.312.475.9918
Design Firm Registration No.: 184.004451

Capital Development Board
Building a Better Illinois

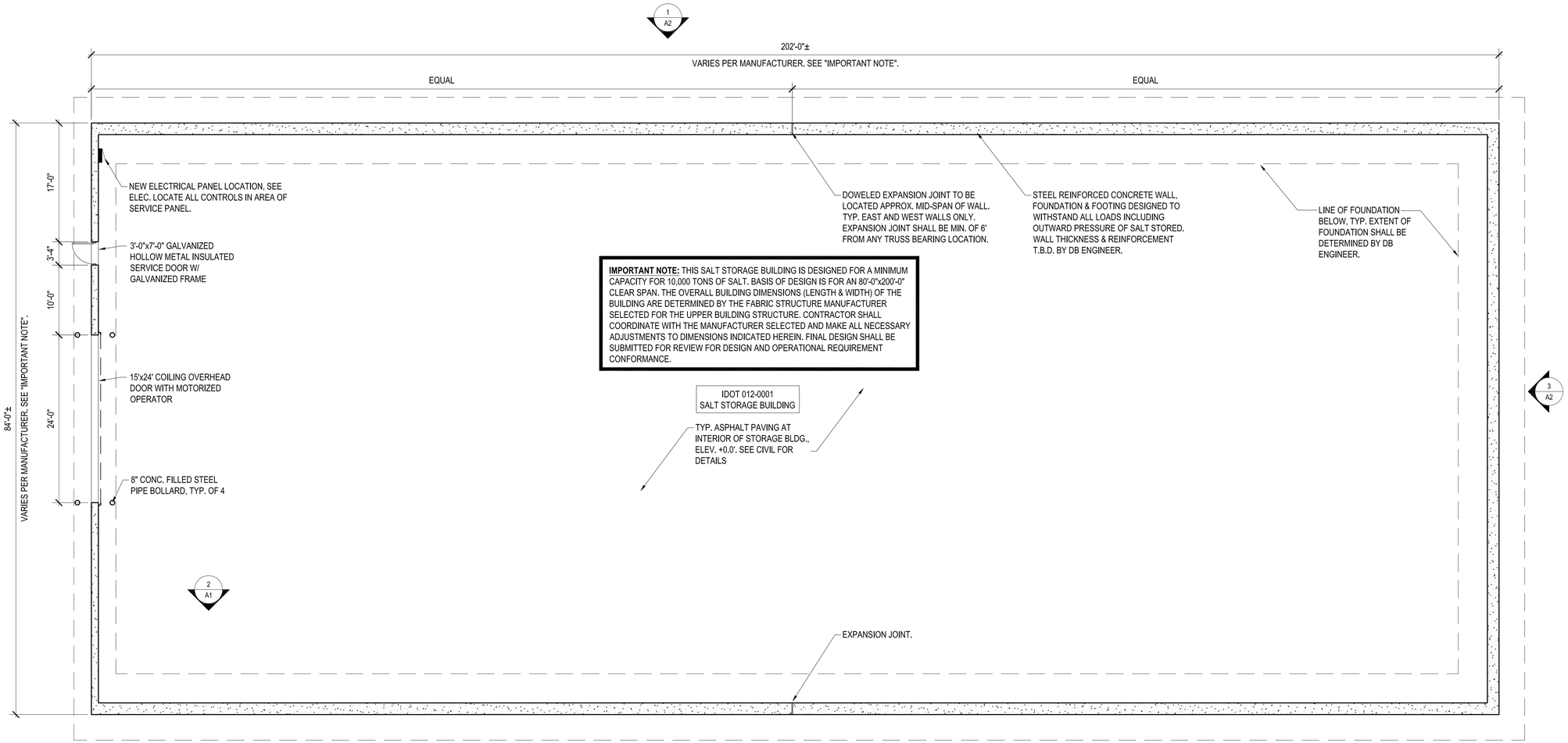
State of Illinois
JB PRITZKER, GOVERNOR
Illinois Capital Development Board

SITE DEMO AND NEW SITE PLAN

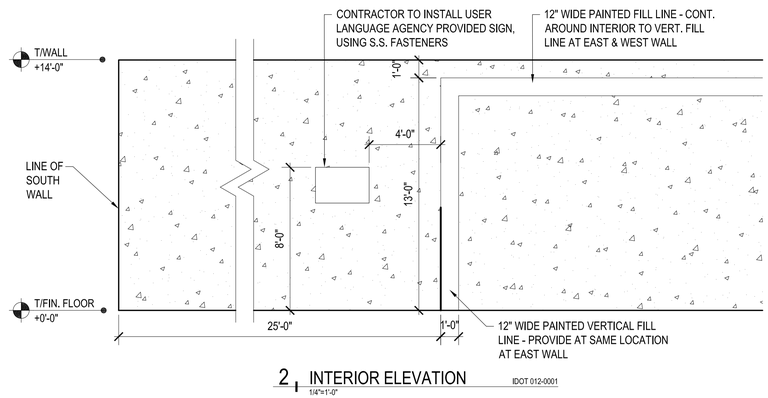
CONSTRUCT SALT STORAGE BUILDING
IDOT DISTRICT - 1 GRAYSLAKE YARD

219 BARRON BLVD., GRAYSLAKE, ILLINOIS

PROJECT NO. 630-012-004
DATE 01/09/2020
SHEET NO. **AS1**



1 FLOOR PLAN
1/8"=1'-0"
IDOT 012-0001



2 INTERIOR ELEVATION
1/4"=1'-0"
IDOT 012-0001

NOTE: CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

REVISIONS			DRAWN	PREPARED
NO.	DATE	REMARKS		OFF.
			TRACED	APPROVED
			CHECKED	APPROVED

LICENSED ARCHITECT
JUNG J. MO
001-018521
STATE OF ILLINOIS

Melvin Cohen & Associates, Inc.
233 W. Jackson, Suite 820
Chicago, IL 60606
T. 312.663.3700
F. 312.663.4161

Larson Engineering Inc
118 S. Clinton St. #250
CHICAGO, IL 60661
T.312.345.0540 F.312.332.0540

ARCHITECT OF RECORD
MoDE architects, p.c.
343 W. ERIE ST. Suite 210
CHICAGO, IL 60654
T.312.475.9918
Design Firm Registration No.: 184.004451

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State of Illinois
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Illinois Capital Development Board

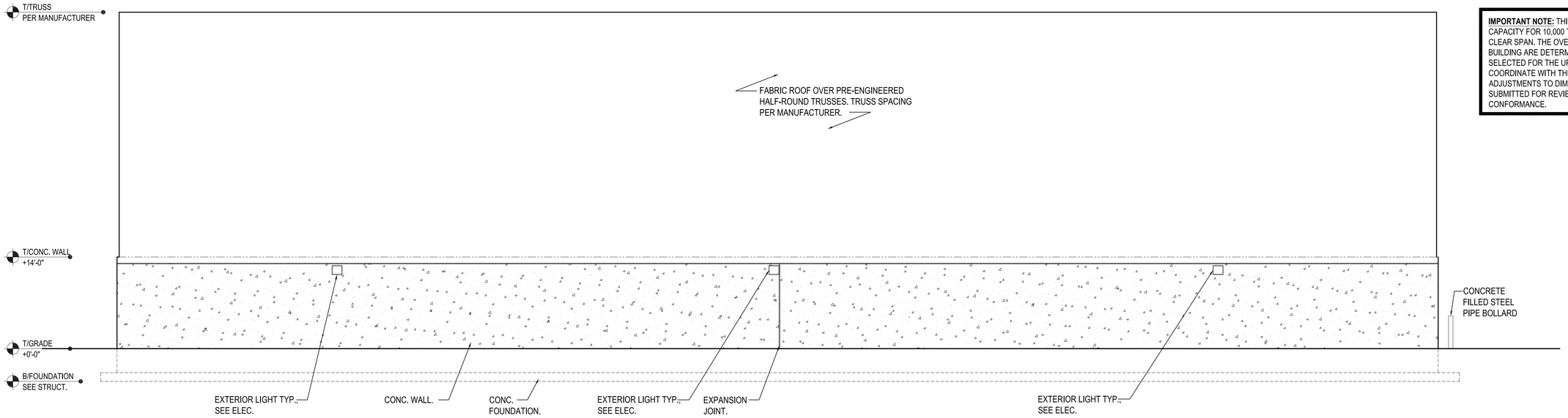
FLOOR PLAN AND DETAILS

CONSTRUCT SALT STORAGE BUILDING
IDOT DISTRICT - 1 GRAYSLAKE YARD

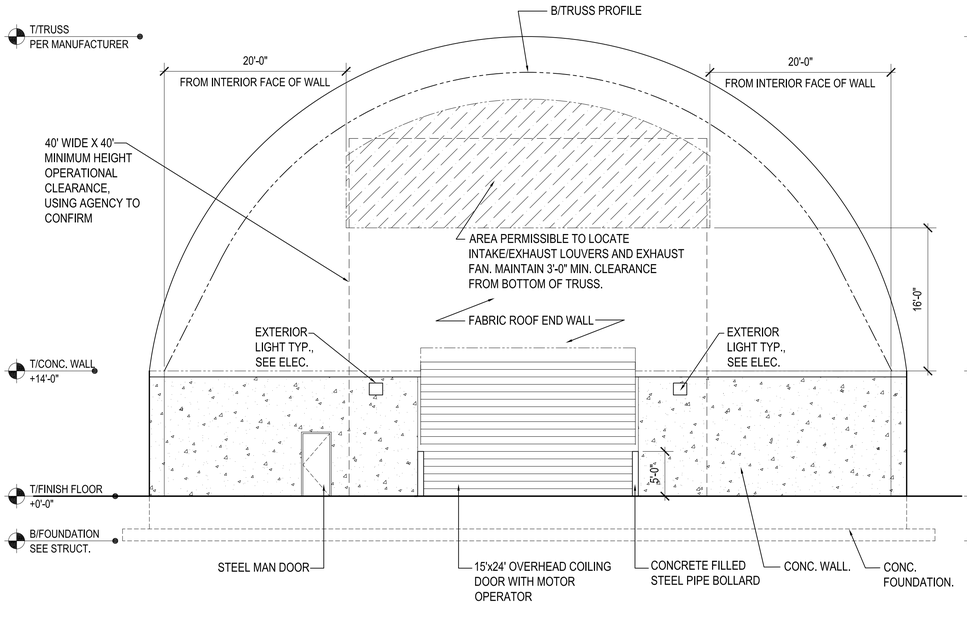
219 BARRON BLVD., GRAYSLAKE, ILLINOIS

PROJECT NO. 630-012-004
DATE 01/09/2020
SHEET NO. **A1**

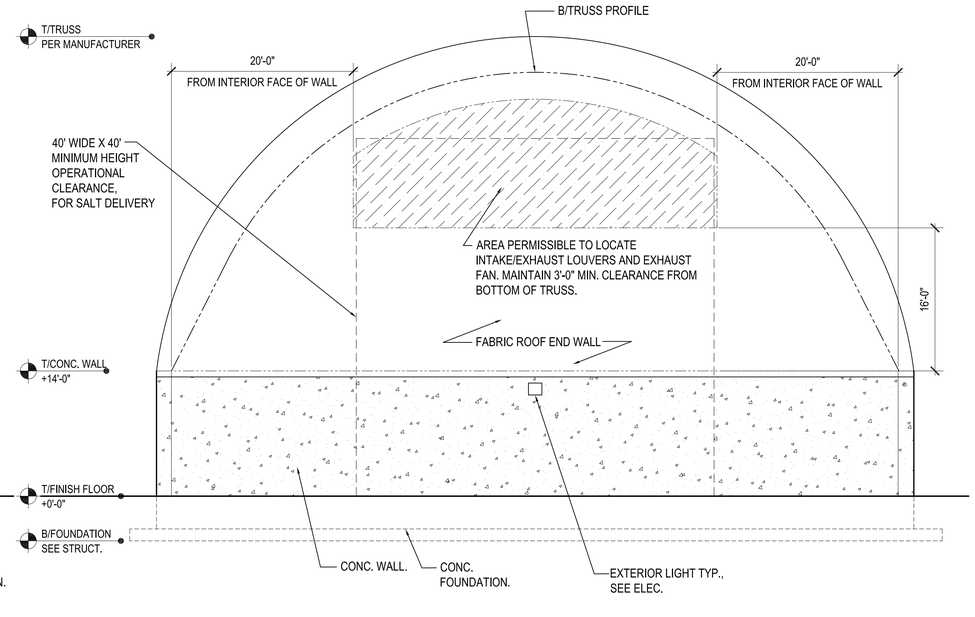
IMPORTANT NOTE: THIS SALT STORAGE BUILDING IS DESIGNED FOR A MINIMUM CAPACITY FOR 10,000 TONS OF SALT. BASIS OF DESIGN IS FOR AN 80'-0"x200'-0" CLEAR SPAN. THE OVERALL BUILDING DIMENSIONS (LENGTH & WIDTH) OF THE BUILDING ARE DETERMINED BY THE FABRIC STRUCTURE MANUFACTURER SELECTED FOR THE UPPER BUILDING STRUCTURE. CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER SELECTED AND MAKE ALL NECESSARY ADJUSTMENTS TO DIMENSIONS INDICATED HEREIN. FINAL DESIGN SHALL BE SUBMITTED FOR REVIEW FOR DESIGN AND OPERATIONAL REQUIREMENT CONFORMANCE.



1 EAST ELEVATION
1/8"=1'-0" IDOT 012-0001



2 NORTH ELEVATION
1/8"=1'-0" IDOT 012-0001



3 SOUTH ELEVATION
1/8"=1'-0" IDOT 012-0001

NOTE: CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

REVISIONS			DRAWN	PREPARED
NO.	DATE	REMARKS		OFF.
			TRACED	APPROVED
			CHECKED	APPROVED

LICENSED ARCHITECT
JUNG J. MO
001-018521
STATE OF ILLINOIS

Melvin Cohen & Associates, Inc.
233 W. Jackson, Suite 820
Chicago, IL 60606
T. 312.663.3700
F. 312.663.4161

Larson Engineering Inc
118 S. Clinton St. #250
CHICAGO, IL 60661
T.312.345.0540 F.312.332.0540

ARCHITECT OF RECORD
MoDE architects, p.c.
343 W. ERIE ST. Suite 210
CHICAGO, IL 60654
T.312.475.9918
Design Firm Registration No.:
184.004451

Capital Development Board
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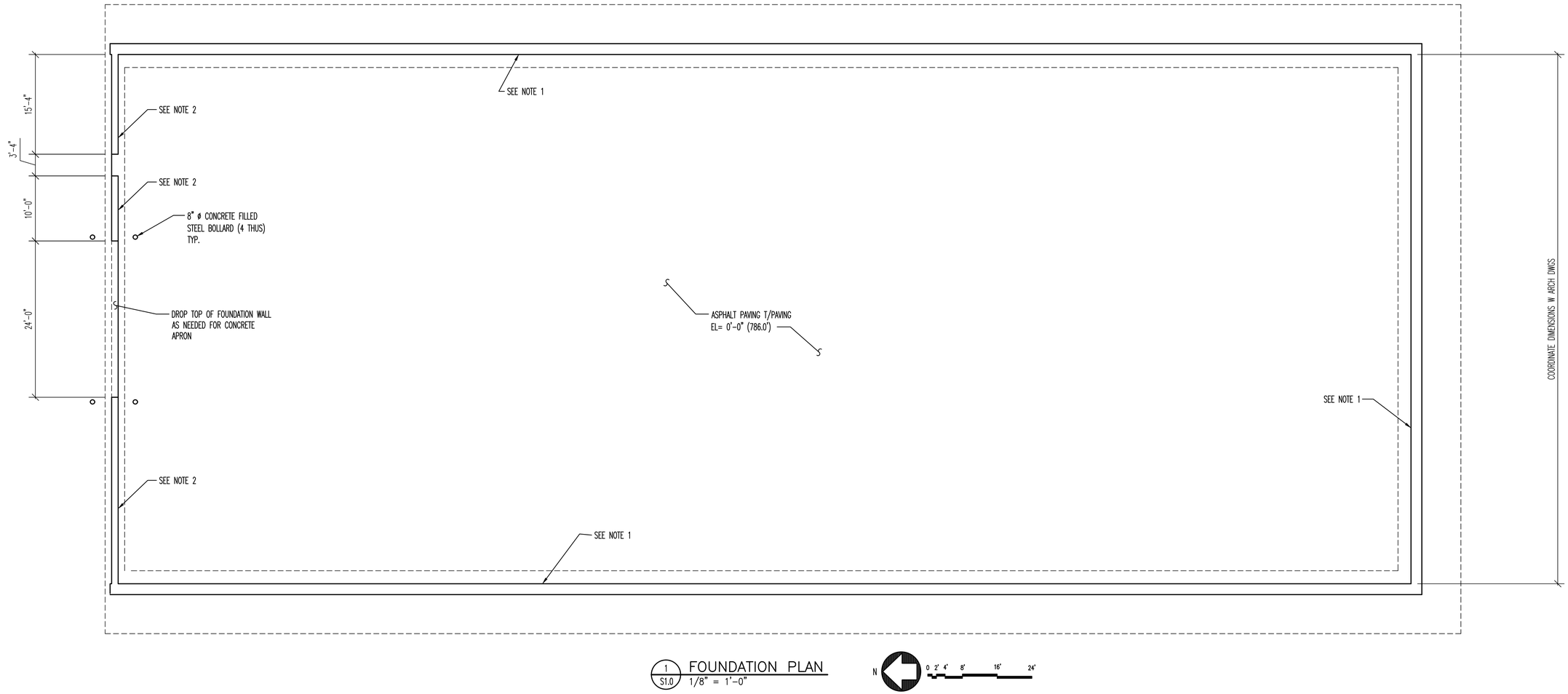
State of Illinois
JB PRITZKER, GOVERNOR
Illinois Capital Development Board

BUILDING ELEVATIONS

CONSTRUCT SALT STORAGE BUILDING
IDOT DISTRICT - 1 GRAYSLAKE YARD

219 BARRON BLVD., GRAYSLAKE, ILLINOIS

PROJECT NO. 630-012-004
DATE 01/09/2020
SHEET NO. **A2**



1 / S1.0 FOUNDATION PLAN
1/8" = 1'-0"

N 0 2' 4' 8' 16' 24'

WORK NOTES:

1) REINFORCED CONCRETE WALL, FOUNDATION & FOOTING TO BE DESIGNED BY DBE TO WITHSTAND ALL LOADS INCLUDING OUTWARD PRESSURE OF SALT STORED.
2) REINFORCED CONCRETE WALL, FOUNDATION AND FOOTING DESIGNED BY DBE TO WITHSTAND ALL LOADS EXCEPT OUTWARD PRESSURE OF SALT STORED
3) THE OVERALL DIMENSIONS (LENGTH AND WIDTH) OF THE BUILDING ARE DETERMINED BY THE FABRIC STRUCTURE MANUFACTURER SELECTED FOR THE UPPER BUILDING STRUCTURE. CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER SELECTED AND MAKE ALL NECESSARY ADJUSTMENTS TO DIMENSIONS INDICATED HEREIN.
4) T/EXTERIOR FOOTING ELEVATION = -3'-0" UNLESS NOTED THUS ( ).
5) THE SOILS AND FOUNDATION ENGINEERING REPORT IS FOR INFORMATIONAL PURPOSES ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. FURTHERMORE, NO WARRANTY IS MADE BY THE OWNER WITH REGARD TO THE COMPLETENESS AND ACCURACY OF THE SUBSURFACE INVESTIGATION DATA, SOIL TEST DATA OR STATEMENTS AND INTERPRETATIONS GIVEN IN REPORT NO. L-89,619 PREPARED BY TSC (TESTING SERVICE CORPORATION) ON 5-30-19.

NOTE: CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

REVISIONS			DRAWN	PREPARED
NO.	DATE	REMARKS		OFF.
			TRACED	APPROVED
			CHECKED	APPROVED

LICENSED STRUCTURAL ENGINEER
Nancy H. Ferrini
081-005511
Date: 12/10/19
Exp: 11/30/20

Larson Engineering Inc
1488 Bond St. Suite 100
NAPERVILLE, IL 60563
T.630.357.0540 F.630.357.0164
Design Firm Registration No.:
#184-001442

Capital Development Board
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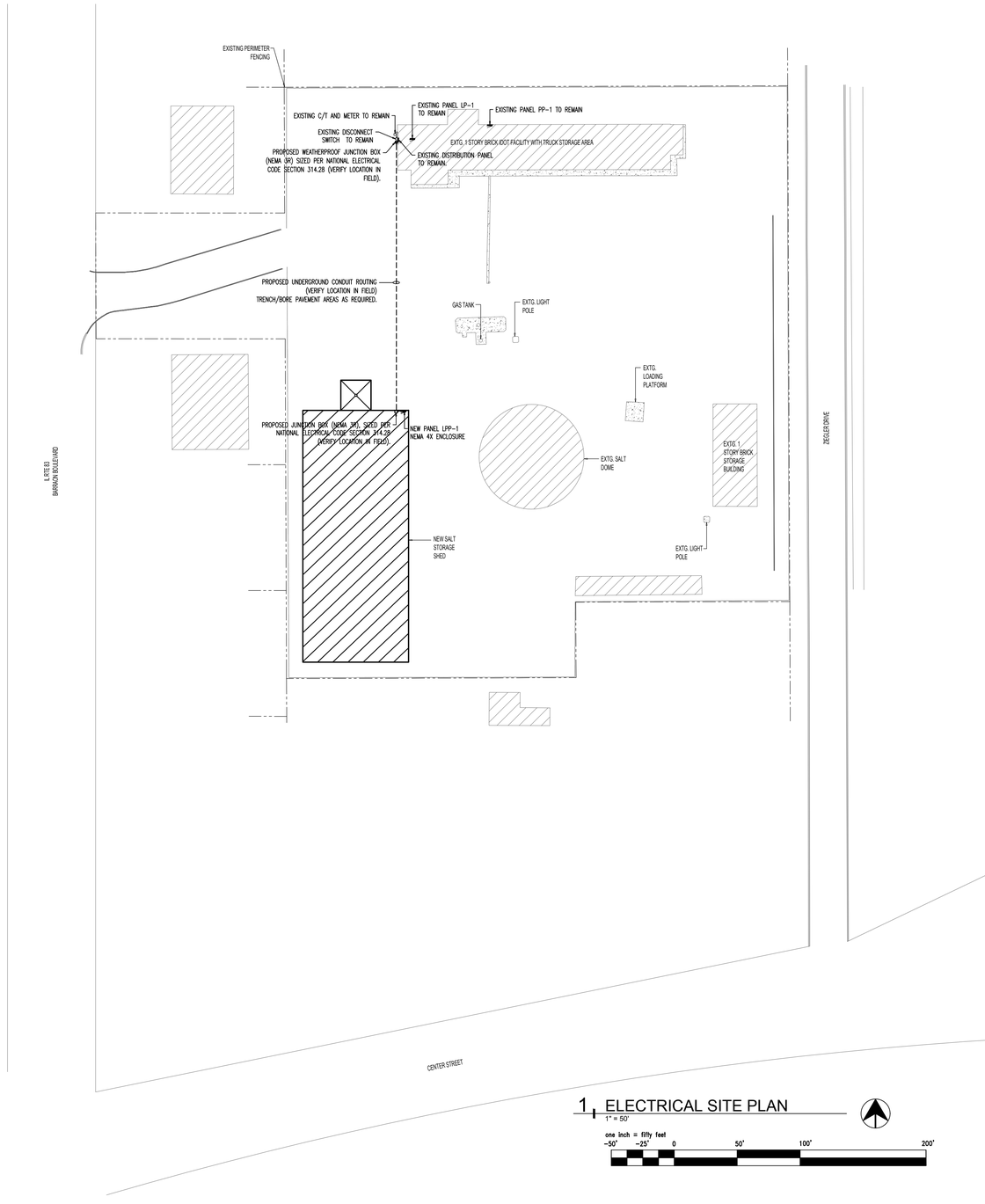
State of Illinois
JB PRITZKER, GOVERNOR
Illinois Capital Development Board

FOUNDATION PLAN

CONSTRUCT SALT STORAGE BUILDING
IDOT DISTRICT - 1 GRAYSLAKE YARD

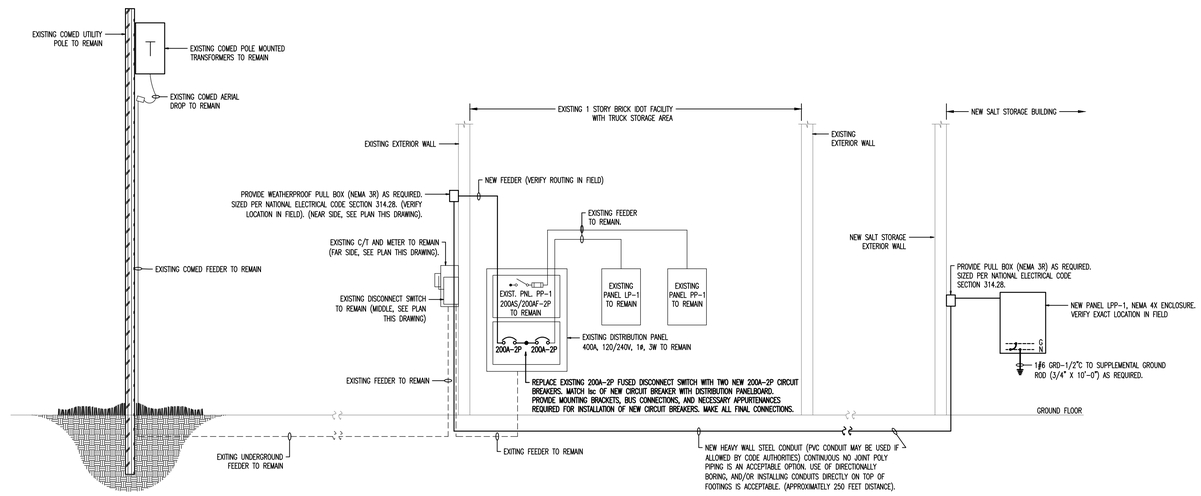
219 BARRON BLVD., GRAYSLAKE, ILLINOIS

PROJECT NO. 630-012-004
DATE 01/09/20
SHEET NO. **S1.0**



1 ELECTRICAL SITE PLAN
1" = 50'

one inch = fifty feet
-50' -25' 0 50' 100' 200'



EXISTING PARTIAL ONE-LINE DIAGRAM - 120/240V -1Ø, 3W

SCALE : N T S

NOTE: CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

REVISIONS			DRAWN	PREPARED
NO.	DATE	REMARKS		OFF.
			TRACED	APPROVED
			CHECKED	APPROVED

MELVIN COHEN AND ASSOCIATES
CONSULTING ENGINEERS
223 W. JACKSON, SUITE 820, CHICAGO, IL 60606
PH: 312-663-3700
FAX: 312-663-4161
E-MAIL: melcohen@xnet.com

Larson Engineering Inc
118 S. Clinton St. #250
CHICAGO, IL 60661
T.312.345.0540 F.312.332.0540

ARCHITECT OF RECORD
MoDE architects, p.c.
213 W. Institute Pl. Suite 712
CHICAGO, IL 60610
T.312.475.9918 F.312.262.2516
Design Firm Registration No.: 184.004451

Capital Development Board
Building a Better Illinois

State of Illinois
JB PRITZKER, GOVERNOR
Illinois Capital Development Board

ELECTRICAL SITE PLAN,ONE LINE DIAGRAM

CONSTRUCT SALT STORAGE BUILDING
IDOT DISTRICT - 1 GRAYSLAKE YARD

219 BARRON BLVD., GRAYSLAKE, ILLINOIS

PROJECT NO. 630-012-004
DATE 01/09/20
SHEET NO. **E-0**

ELECTRICAL NEW WORK NOTES:

1. ALL WIRING SHALL BE NEW. ALL WIRING SHALL BE INSTALLED IN A CONDUIT SYSTEM. ALL CONDUIT IN FINISHED AREAS SHALL BE CONCEALED WHEREVER EXISTING OR NEW CONSTRUCTION, ETC. PERMIT.

2. ALL FLEXIBLE CONDUITS SHALL BE EQUIPPED WITH A GROUNDING CONDUCTOR, THE SAME AS THE CIRCUIT CONDUCTORS AND INSTALLED IN THE SAME CONDUIT AS THE CIRCUIT CONDUCTORS.

3. PENETRATIONS OF FIRE RATED WALL AND FLOOR ASSEMBLIES SHALL BE PROTECTED WITH AN APPROVED THROUGH-PENETRATION SYSTEM AND SHALL BE A TESTED ASSEMBLY IN ACCORDANCE WITH ASTM E119. ALL CONDUIT PENETRATIONS THROUGH FLOORS AND WALLS SHALL BE FIRE SEALED. SEALANT RATING SHALL MEET OR EXCEED THE FIRE RATING OF FLOOR AND WALL CONSTRUCTION.

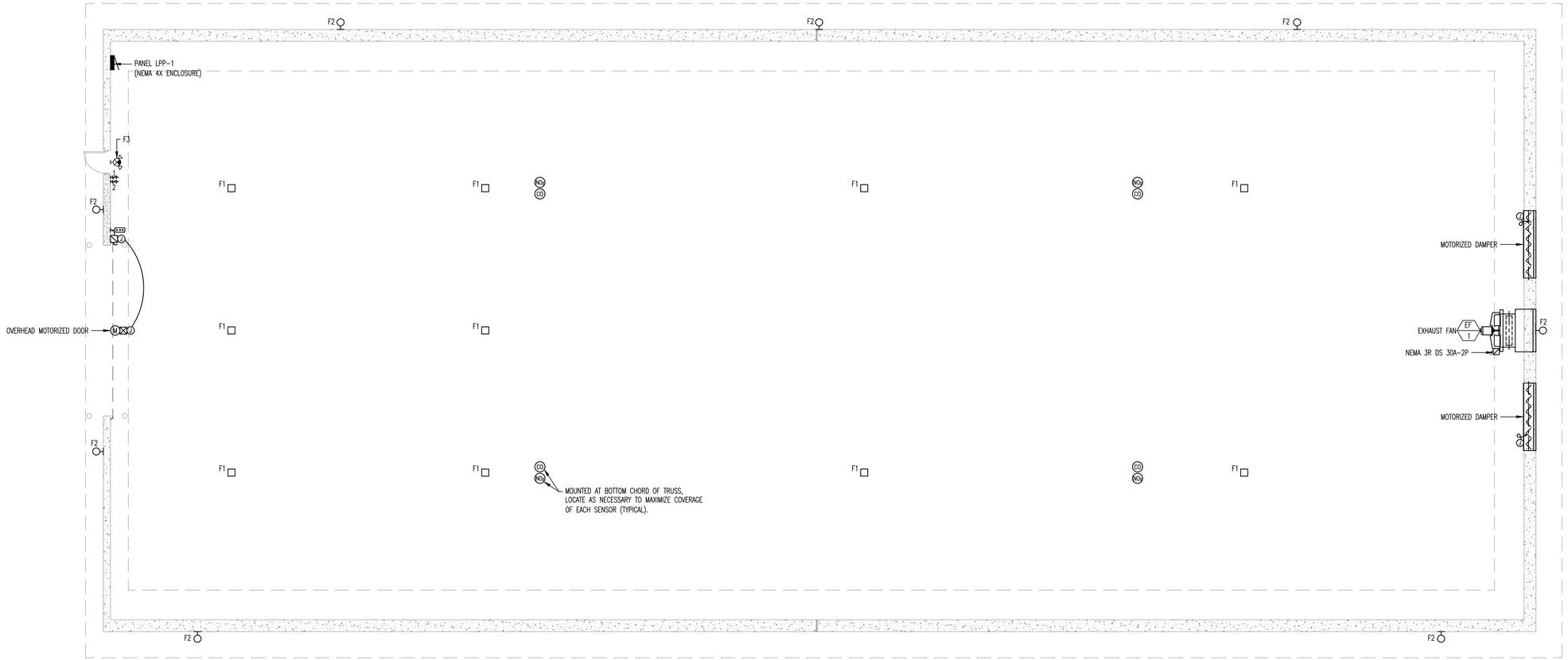
4. USE MINIMUM NO. 12 WIRE FOR ALL EMERGENCY LIGHTING CIRCUITS AND USE NO. 10 WIRE FOR CIRCUITS IN EXCESS OF 75 FEET. NORMAL BRANCH CIRCUIT WIRING IN EXCESS OF 75 FEET SHALL BE NO. 10 WIRE.

5. ALL RECEPTACLES EXPOSED TO WEATHER SHALL BE GFI TYPE IN WEATHERPROOF LOCKABLE ENCLOSURE UL LABELED FOR USE WHEN RECEPTACLE HAS A CORD PLUGGED IN. ALL WIRING SHALL BE #12.

6. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND SERVICES IN ORDER TO CORE DRILL THROUGH ALL FOUNDATION WALLS AS REQUIRED INCLUDING BUT NOT LIMITED TO INSTALLING ALL ELECTRICAL FEEDER CONDUITS, AND ALL MISCELLANEOUS CONDUITS AS REQUIRED FOR A COMPLETE INSTALLATION. COORDINATE WITH APPLICABLE TRADES. PROVIDE CONDUIT SEALING BUSHINGS ON INSIDE AND OUTSIDE OF WALL.

7. CONTRACTOR SHALL PROVIDE ALL POWER AND CONTROL WIRING FOR MOTORIZED OVERHEAD DOORS INCLUDING ALL FINAL CONNECTIONS, COMPLETE IN PLACE, READY FOR OPERATION. MOTORIZED OVERHEAD DOOR SHALL BE WIRED IN CONFORMANCE TO THE APPLICABLE CODE AND IN ACCORDANCE WITH THE MANUFACTURER'S WIRING DIAGRAMS AND INSTRUCTIONS. VERIFY EXACT LOCATION OF MOTORIZED DOOR OPERATOR PRIOR TO ROUGH-IN. WIRE DOOR LIMIT SWITCHES.

8. CONTRACTOR SHALL PROVIDE SEPARATE CONDUIT SYSTEM FOR ALL EXIT SIGNS AND EMERGENCY LIGHTING CIRCUITS. PROVIDE SEPARATE NEUTRALS FOR EACH CIRCUIT. USE NO. #12 AWG MINIMUM FOR THESE CIRCUITS. PROVIDE AN INSULATED COPPER GROUNDING CONDUCTOR FOR ALL CIRCUITS.



ELECTRICAL SYMBOL LIST

SYMBOL	DESCRIPTION	MTG. HT.
□	CEILING FIXTURE	
⊢○	BRACKET FIXTURE	
⊢$	SINGLE POLE SWITCH	44" A.F.F.
◪	NON-FUSED DISCONNECT SWITCH	
⊠	MAGNETIC MOTOR STARTER	
◻	FUSED DISCONNECT SWITCH	
(J)	JUNCTION BOX	
(M)	MOTOR CONNECTION. HORSEPOWER AS INDICATED ON PLAN.	
(CO)	CARBON MONOXIDE DETECTOR.	
(NO2)	NITROGEN DIOXIDE DETECTOR.	
▰	ELECTRICAL PANELBOARD/LOADCENTER	
⊣⊢	CONDUIT RUN INSTALLED EXPOSED IN ALL UNFINISHED AREAS	
—●	GREEN GROUNDING WIRE CONDUCTOR INSTALLED WITH CIRCUIT CONDUCTORS	
⏚	FLEXIBLE CONDUIT CONNECTION. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR WITH CIRCUIT CONDUCTOR IN ALL FLEXIBLE CONDUITS.	
⊢GFI	GFI DUPLEX RECEPTACLE	15" A.F.F.
⊢▭	MOTOR PUSH BUTTON STATION (UP, DOWN, STOP)	48" A.F.F.
U.L.	UNDERWRITERS LABORATORY TESTED AND APPROVED	
PROVIDE	FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR	
GFI	DENOTES GROUND FAULT INTERRUPTING DEVICE OR BREAKER	
WP	DENOTES WEATHERPROOF DEVICE OR EQUIPMENT	

NOTE:
MOUNTING HEIGHTS ARE TO CENTERLINE OF EQUIPMENT OR DEVICE EXCEPT AS OTHERWISE INDICATED.
REFER TO SPECIFICATIONS AND DRAWING FOR MORE INFORMATION.

SALT STORAGE BUILDING ELECTRICAL PLAN

1/8" = 1'-0"

N

one-eighth inch = one foot

-4 -2 0 4 8 16

LIGHTING FIXTURE SCHEDULE

SYMBOL & TYPE	MANUFACTURER AND CATALOG NUMBER	WATTAGE	LOCATION	MOUNTING	SHIELDING	REMARKS
F1 □	LED HI-BAY FIXTURE LDP1 #X-LE302-L4-V-V104-XX-F DAY-BRITE #HBX-17L-L-40-UNV-W-XX-XTM-HA LUX DYNAMICS #IK10-4-S-H02-840-2-U10-CA2-MFG/WHS-DIR-BOT-SPM-STND-OCC	LED LAMPS 100 WATTS 4000'K	INTERIOR	PENDANT FROM ROOF TRUSSES WITH STAINLESS STEEL RODS OR SURFACE	TEMPERED GLASS	120 LED DRIVER. COLOR/FINISH BY ARCHITECT MOUNT FIXTURE TO TRUSSES. MARINE RATED. WEATHERPROOF, CORROSION, IP65 TYPE ENCLOSURE.
F2	EXTERIOR WALL PACK FIXTURE HUBBELL #LNC3-2L4K-105 LDPI #LE300-P11-V1-X1-T3-4K NEPTUN #LED-21-080-FCT-UNV-0-10VDIM-841	LED LAMPS 107 WATTS 4000'K	EXTERIOR	BRACKET (VERIFY EXACT MOUNTING HEIGHT WITH ARCHITECT)	IMPACT RESISTANT GLASS LENS	120 LED DRIVER. -20'F WET LABEL (PHOTOCELL CONTROL) COLOR/FINISH BY ARCHITECT. MARINE RATED.
F3	COMBO EXIT SIGN/EMERGENCY BATTERY LIGHT UNIT CHLORIDE #HZ-6-18-R-2-ZY-IC ISOLITE #RWL-C-R-U-WH EVENLITE #NEX-EM-R	WARM WHITE LED LAMPS	SEE PLAN	WALL MOUNTED	POLYCARBONATE LENS	QUANTITIES OF EMB/EX UNITS SHALL BE PROVIDED AS PER CODE AUTHORITY. SUITABLE FOR CORROSIVE ENVIRONMENT. NEMA 4X HOUSING

NOTE: CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

REVISIONS			DRAWN	PREPARED
NO.	DATE	REMARKS		OFF.
			TRACED	APPROVED
			CHECKED	APPROVED

MELVIN COHEN AND ASSOCIATES
CONSULTING ENGINEERS
223 W. JACKSON, SUITE 820, CHICAGO, IL 60606
PH: 312-663-3700
FAX: 312-663-4161
E-MAIL: melcohen@vnet.com

Larson Engineering Inc
118 S. Clinton St. #250
CHICAGO, IL 60661
T.312.345.0540 F.312.332.0540

ARCHITECT OF RECORD
MoDE architects, p.c.
213 W. Institute Pl. Suite 712
CHICAGO, IL 60610
T.312.475.9918 F.312.262.2516
Design Firm Registration No.: 184.004451

Capital Development Board
Building a Better Illinois

State of Illinois
JB PRITZKER, GOVERNOR
Illinois Capital Development Board

SALT STORAGE BUILDING ELECTRICAL PLAN

CONSTRUCT SALT STORAGE BUILDING
IDOT DISTRICT - 1 GRAYSLAKE YARD

219 BARRON BLVD., GRAYSLAKE, ILLINOIS

PROJECT NO. 630-012-004
DATE 01/09/20
SHEET NO. – OF –
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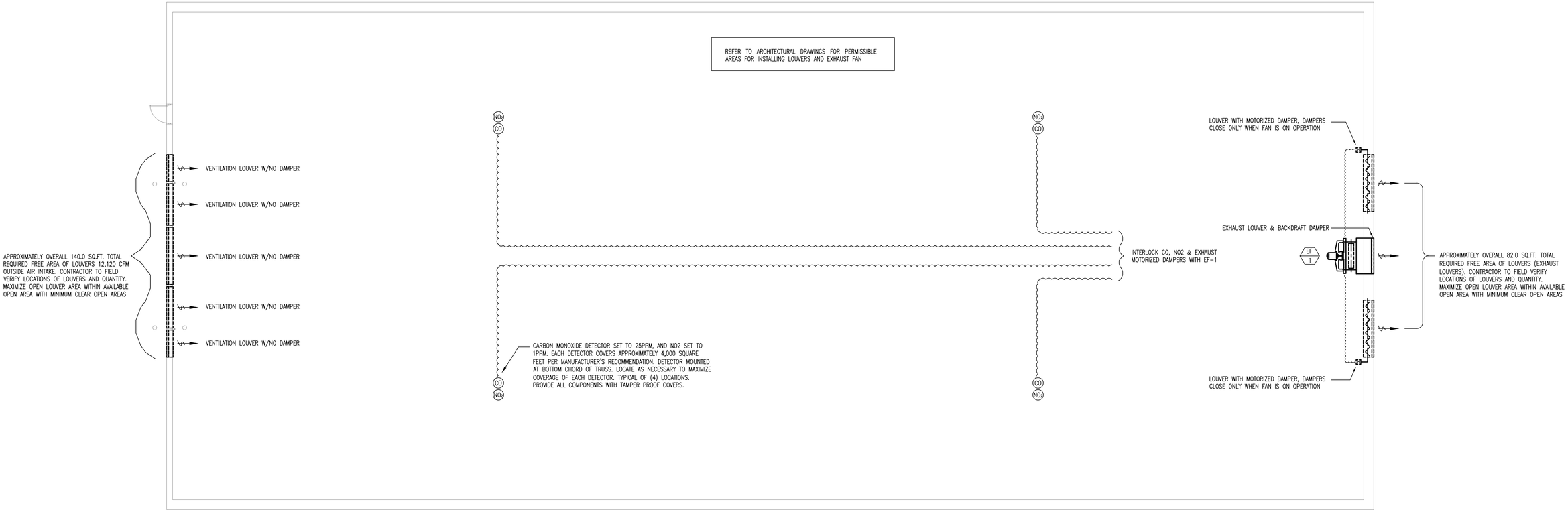

1 SALT STORAGE BUILDING VENTILATION PLAN

1/8" = 1'-0"

N

one-eighth inch=one foot

−4 −2 0 4 8 16

SALT STORAGE VENTILATION CONTROL SEQUENCE OF OPERATION

1. DURING NORMAL OPERATION, THE EXHAUST FAN (EF-1) SHALL BEE OFF AND THE ADJACENT NORTH LOUVER MOTORIZED DAMPERS SHALL BE OPEN, THE OPEN LOUVERS ALLOW FREE AIR MOVEMENT THROUGH BUILDING AT ALL TIMES.
2. UPON DETECTION OF HIGH CO OR HIGH NO2 LEVELS AT STORAGE SENSORS, THE NORTH LOUVER MOTORIZED DAMPERS SHALL BE CLOSE AND THE EXHAUST FAN SHALL OPERATE AND CYCLES TO KEEP CO/NO2 LEVEL FROM EXCEEDING 25 PPM/1 PPM PER CITY CODE.
3. UPON THE LOWERING OF CO/NO2 LEVELS, THE EXHAUST FAN SHALL BE OFF AND NORTH LOUVER MOTORIZED DAMPERS SHALL BE OPEN.

EXHAUST FAN SCHEDULE

UNIT NO.	SERVICE	CFM	S.P. IN.WG	FAN TYPE	FAN RPM	DRIVE	MOTOR SIZE (BHP)	V/PH/Hz	SONES	BASED ON GREENECK MODEL	WEIGHTS LBS	LOCATION
EF-1	SALT STOR.	12,120	0.25	PROPELLER	447	DIRECT	1.06	240/3/60	17.6	AER-E48C-1215-C-VGD	205	SIDE-WALL

REMARKS:

1. PROVIDE WITH INTEGRAL DISCONNECT SWITCH.
2. PROVIDE WITH BACK DRAFT DAMPER.
3. INTERLOCK W/CO&NO2 MONITOR CONTROLLER.
4. 53-1/2 x 53-1/2 WALL OPENING.
5. SIDE WALL FAN WITH ALUMINUM PROP AND COATED HOUSING (CORROSION RESISTANT MATERIALS).

NOTE: CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

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NO.	DATE	REMARKS		OFF.
			TRACED	APPROVED
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MELVIN COHEN AND ASSOCIATES
CONSULTING ENGINEERS
223 W. JACKSON, SUITE 820, CHICAGO, IL 60606
PH: 312-663-3700
FAX: 312-663-4161
E-MAIL: melcohen@xnet.com

Larson Engineering Inc
118 S. Clinton St. #250
CHICAGO, IL 60661
T.312.345.0540 F.312.332.0540

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VENTILATION PLAN, NOTES, AND SCHEDULES

CONSTRUCT SALT STORAGE BUILDING
IDOT DISTRICT - 1 GRAYSLAKE YARD

219 BARRON BLVD., GRAYSLAKE, ILLINOIS

PROJECT NO. 630-012-004

DATE 01/09/20

SHEET NO. V-1