Innovative
Builders · Erectors · Developers

REQUEST FOR PROPOSAL

March 18, 2025

PROJECT: Park & 3rd Lofts, Alexandria, MN (New Apartment Building)

BID DATE: Tuesday, April 15, 2025 @ 2:00pm

PROJECT SCOPE: Park & 3rd Lofts is a new 86,444sf wood frame apartment building with tuck under garages, and detached garages. There is a large site work package including removing contaminated soil, soil corrections, building demolition, and all other site grading including foundation excavation and backfill. Fire protection, Plumbing, HVAC and Electrical are design build.

ACCEPTING BIDS FOR: All sections of work.

The anticipated start date for this project is June 2, 2025, with May 29, 2026, completion.

Subcontractors and suppliers are invited to send bids (using your own bid forms) to Innovative Builders, Inc. until **Tuesday, April 15, 2025 @ 2:00 PM**. All proposals shall be presented to Innovative Builders, Inc., located at 221 30th Avenue West, Alexandria, MN 56308. Bids can also be faxed to Innovative at (320) 763-8905 or emailed to bids@innovativecompaniesinc.com. **The Bids email address is for bids only**. DO NOT SEND INQUIRES TO THE BIDS EMAIL AS THEY WILL NOT BE RESPONDED TO. Any project inquires can be directed to the Project Manager Scott Kluver at 320-808-9637 or emailed to scott@innovativecompaniesinc.com.

Plans will be available for viewing at Innovative Builders office located at 221 30th Avenue West in Alexandria. Plans are also available at the plan rooms, exchanges and on-line from our web site (see instructions below).

Innovative's web site plan download instructions:
Go to www.innovativecompaniesinc.com. Click on the words "plan room" in the upper right hand portion of the page. Enter **"park@innovative.com"** as the user name and "**In2plans**" as the password, and then click on login. Next, the window will update showing the file directory, just click on the file to enter the directory. Once in the directory, click in the box to the left of the files you wish to download, and then click on the Red download button on the right hand side. After a short period (depending on your internet speed), another window will open asking if you want to open, save or save as (this may vary depending on your web browser type and version). Please save or save as to your local computer.

No bidder may withdraw his bid within 60 days after the set bid date.

Item	Selection
	Units
Millwork Color	Benjamin moore simply white - 0c-117, Breakfast bar color color TBD
Casing	2 1/4" flat
Base	2 3/4" flat
Base Shoe	Flat
Passage Doors	1-Panel flat, depending on pricing the firerated door can be flat panel
Door Hardware	Schlage - Latitude, matte black, key fob at unit entry, deadbolt. Open to alternatives
Cabinet Color	Natural Cream - OC-14
Cabinet Hardware	Allowance
Kitchen Counter Top	New Carrara Marmi or similar
Wall Color	Benjamin moore - soft chamois OC-13
Closet Color	WHITE
Closet system	Allowance
Mirrors	Polished edge
Shower Door	Bypass door w/black trim - chrome if upcharge for black is too much
Tub Curtain	No curtain provided, rod by contractor
bathroom cabinet door	
shelving	Allowance
Bath Vanities tops	#145 pure white by central marble Products
Window Sill	Corian - Glacier White
Blinds	Allowance
Towel Bars	Use Kingston Brass Continental 5 piece - Bahk8212478 or allowance
Toilet paper holder	Allowance
hand towl bar	Allowance
Shower rod	Allowance
Appliances	stainless for all kitchen appliances - white for laundry, top load washer. Provide a few different packages to owner
Light Fixtures - Bedroom	LED disk lights
Light Fixtures - Bathrooms	MAXIM, Spec Vanity Light -
Sound mat/ Gypcrete	Add alternate 1/4" mat
LVP	LVP: Elegance Plyquet - Luxe, EPSH8017, 60" x 7"
LVP - Locations	Kitchen, Living Room,
Carpet	Shaw natures mark - 115 Sculpture
Carpet - Locations	Bedrooms
	Public Bathrooms
Tile - Floor	Anatolia, Soho, Halo Grey, Unglazed, 2x2 Mosaic MN Tile & Stone
Tile - Wall	Florida Tile, Canal Street, 12x24, Levee White
Grout	CUSTOM, #386, Oyster Gray
Metal Profile	ProfileTEC or Schluter, Cove Base and Wall Profile in Natural or Brushed Aluminum
Wall Mount Sink	allowance
Mirror	allowance
Paper towel dispensor	ULINE MODEL H-7556 STAINLESS STEEL
TP Holder	allowance
Lighting	disc light in both public restrooms
	Club Room
Fireplace	Dimplex x - ALF60 with driftwood log kit and river rock - open to alternates
Fireplace Surround	Stone: Hedberg, Newport Natural Stone Veneer with White Grout- or similar
TV	Allowance
Light Fixtures	Allowance
Flooring	LVP: Elegance Plyquet - Luxe, EPSH8017, 60" x 7"
Millwork/Shiplap	PREFINISHED BENJAMIN MOORE OC-25 CLOUD COVER- 4'-6" high,
Cabinets Back wall	painted - color tbd
Ceramic tile backsplash	allowance
Countertop Back wall	Quartz, MN Tile, NEW CARRARA MARMI - open to alternates
Cabinets Island	painted - color tbd
Countertop Island	Quartz, MN Tile, Fossil Gray Matte
Appliances	Gas stove - all stainless appliances
Beams	Distress city Millwork - WWLD, color blond - allowance for 4 beams on ceiling,
Blinds	allowance
	Fitness
Equipment	Supplied by owners
Flooring	Everlast Grippin Grey 3/8"- alternates ok
Rubber base	Black 4"
Mirrors	see drawings
TV	Allowance
Blinds	Allowance
	Lobby
Coffee Equipment	Allowance for water and drain in lobby
Cabinets	Allowance
Countertop	Quartz, MN Tile & Stone, Mystic Gray
Flooring	LVP: Elegance Plyquet - Luxe, EPSH8017, 60" x 7"
TV's	Allowance
	Main Vestibule
walk off matts	following the entry to hallway - price as an allowance
Floor	LVP: Elegance Plyquet - Luxe, EPSH8017, 60" x 7"
	Elevator vestibule
signage	allowance
	Hallway/Stairs

Carpet	Shaw18X36 Carpet Tile, Pattern: CIPHER 54925, Color: 00210 CYPER, 18x36
Stair Carpet	Shaw Multiplicity Broadloom Color: 00505 Cluster
Rubber Base	Black 4" - would like alternate pricing for thicker vinyl base
lights	LED disk lights
hallway paint	see below common area paint colors
accent paint for entrys	see below common area paint colors
Ceiling Tile	Armstrong #1911 ultima 2x2 tile, Armstrong Prelude 15/16" grid
	Trash rooms
Flooring	VCT, Armstrong Imperial Texture Std Excelon, 51908 Pewter, 12x12
Rubber Base	Black 4"
Walls	FRP to 4'
Trash room **1st floor**	Epoxy quartz color: Quicksand
	Podcast room
desk	laminate top
onair light - above door outside room	sescom - fsl-1 triple sided light - linked to interior room light switch.
light	one disk light
accoustical wall panels	allowance for acoustical panels on ceiling
Door hardware	rubber gaskets, drop sweep
	Common Area Paint Colors
Main common area color	Benjamin Moore OC-24 Wind's Breath
1st floor accent	SW9168 Elephant Ear
2nd floor accent	SW6247 Krypton
3rd floor accent	SW2819 Downing Slate
4th floor accent	SW7058 Magnetic Gray
Club room walls	Benjamin Moore OC-25 Cloud Cover
	Signage
Unit #	allowance
ADA signage	allowance
Address #'s	allowance

3.15.25

Park & 3rd Lofts

Owner: Park & 3rd Alexandria, LLC

Contact: Tim Lundgren – 612.804.3327, Tim.lundgren@Duininck.com

BID SCOPE

- VOLUNTARY ALTERNATES ARE WELCOME

General Notes:

- Public sidewalks on Fourth Avenue and Park streets – Duininck Concrete can not be used for this work due to Redevelopment Grant requirements. **All other concrete can be provided by Duininck Concrete.**
- **Duininck companies can not be used for any Grant Related scopes of work.**
- See Exhibit A for owner finishes
- See Exhibit B for Contaminated soil Management Scope of work.
- See Exhibit C – for soil correction assumptions

Demolition

- Demolition of all above and below grade materials, hauled off site and disposed of.
- No abatement needed by owner, buildings have been inspected and tested.
- Exterior hard surfaces to be
- All concrete
- Utilities removed and capped and needed
- Include all disposal fees
- Include crushing of demolition concrete(building and Site concrete)into usable fill/base for parking lot and other exterior hard surfaces see geotechnical report page 5 (last paragraph) and 12- table 3- note 1 provide itemized pricing
- Include all required permits for this scope of work

Sitework

- Per plans, specs see geotechnical report – revised 3.4.25
- Pond liner specification – see drawings
- Alternate – geotextile fabric at asphalt
- Alternate – see contamination scope below for Hawick crushed concrete

Alternates for Sitework:

Exterior Hard surfaces

- Stoops to have void forms
- Provide itemized pricing for the Public sidewalks on Fourth Ave and Park Streets -

Gypcrete

- Bid per plans
- Alternate – ¼ sound mat

Vapor Mitigation below SOG

- Vapor Mitigation below apartment Slab on Grade – Specification forthcoming – itemize this cost

Insulation

- Bid per plans and specifications

Aluminum windows and glass handrail

- All aluminum windows and glass per plans and specifications

Appliances

- Bid mid range appliance package
- Assume all top load washer and dryers except in the handicap unit
- Option upper range appliance package in clubroom

Elevator

- Design build per plans

HVAC/Plumbing

- Include installation of dishwasher, washer and dryer venting
- Alternate domestic water booster pump if pressure is inadequate
- water softener adequate – verify water quality
- Alternate ice make lines
- Alternate - garbage disposals supply and install
- Alternate - gas line to amenity deck for grill and firepit

Fire Sprinkler

- Option fire pump

Electrical

- Verify with fire department if booster system is required
- Include intercom security system
- Design build exterior parking lot, dog area, and pickleball lighting
- Include wiring for 5 wireless access points
- Include wiring for camera system-8 locations wiring only
- Include TV/Telephone wiring-each unit to have 1 CAT5E and 1 RG6 homerun to living room, 1 TV/phone location per bed and living room and conduits from D-mark to control room.
- Alternate - wiring fire pump
- Alternate - wiring domestic booster pump
- Alternate - providing conduits/panel space for 2-30 amp car chargers at Garage 037 and 036
- Alternate - providing conduit/panel space for 3 – 30 amp car chargers parallel to detached garages.

MN Deed Grant requirements:

Minnesota statute 116j.871 for reimbursement for work performed for grant related items

If awared the General Contractor of this project, you are required to comply with **Minnesota Statute 116J.871**, which mandates adherence to prevailing wage laws due to the receipt of financial assistance exceeding $200,000 from the Minnesota Department of Employment and Economic Development (DEED) under the Contamination and Redevelopment Grant programs. This includes ensuring that all laborers and mechanics employed on-site for construction, installation, remodeling, or repairs are compensated at or above the prevailing wage rates as established by the Minnesota Department of Labor and Industry. You must certify compliance with these requirements and maintain accurate payroll records as prescribed by **Minnesota Statutes 177.27, 177.30, 177.32, 177.41 to 177.435, and 177.45**. Additionally, you are responsible for ensuring that all subcontractors engaged on this project are informed of and adhere to these prevailing wage requirements. It is imperative that you include appropriate documentation and certification of compliance in all pay applications submitted for this project.

Provide itemized pricing for each grant line item

Items that are included in MN DEED grants:

Redevelopment Grant

- All demo – buildings, silos, hard surfaces
- Crushing of concrete
- Soil improvements/corrections per Exhibit C – assume 3140 cy
- Storm water connections(and associated pavement demo and replacement) –
- Storm water discharge to city storm
- Public sidewalks
- Regional pond construction
- Regional pond seeding and stabilization

Contamination grant – see Exhibit B and soil contamination documents

- Excavation of Contaminated soils
- Transportation of Contaminated soils **
- Disposal of Contaminated soils
- Clean soil back-Fill
- Regional pond Liner and sand buffer below liner
- Building Soil Vapor Mitigation system – Design, installation, testing

** It is our understanding DemCon in Hawick will take the contaminated material(contractor to verify) Assume haul back of crushed concrete that is at the same location 6,000 to 8,000 tons available. contact Tim Lundgren for specifics and do not mention this to DemCon at this time. Owner will supply loading of crushed concrete in Hawick. If there is additional cost for the haul back do not include in contamination scope, itemize the price and include in base excavation contract.

Environmental Scientist Contact: Eric Stommes – eric.stommes@stantec.com 763.479.5142

MINNESOTA POLLUTION CONTROL AGENCY

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity Employer

October 31, 2024

VIA EMAIL

Tim Lundgren
Park and 3rd Alexandria, LLC
PO Box 208
Prinsburg, MN 56281-0208

RE: Approval of Response Action Plan/Construction Contingency Plan
Park and 3rd Lofts, 901 and 924 4th Ave E, 923 3rd Ave E, Alexandria
MPCA Site ID: BF0002862
Billing ID: 260900
PINs: 63-2357-500, 63-2374-500, 63-2496-000, 63-2498-000, 63-2508-000, 63-2509-000, 63-2510-000, 63-2511-000

Dear Tim Lundgren:

The Minnesota Pollution Control Agency (MPCA) staff in the Petroleum Brownfield (PB) and Voluntary Investigation and Cleanup (VIC) Programs has reviewed the Response Action Plan/ Construction Contingency Plan (RAP/CCP) submitted for the Park and 3rd Lofts site, located at the address referenced above (the Site). The RAP/CCP dated August 30, 2024, was submitted on your behalf by Stantec.

The approximately 4.6-acre Site is made of eight non-contiguous parcels. By 1938, the eastern portion of the Site was developed with residential dwellings. The western portion of the Site was used as a concrete ready-mix plant from at least 1951. The residential dwellings were razed between 1997 and 2002, and the entire parcel was then occupied by the ready-mix plant. In 2016 the Site became solely a concrete block plant with no ready-mix operations. The former concrete block plant is associated with MPCA Petroleum Leak Site identification number LS00021454, which was closed by the MPCA on March 3, 2022. Park and 3rd Alexandria plan to raze the current Site buildings and redevelop the Site with a residential apartment building with at-grade tuck under garages, paved parking, stormwater pond, and various outdoor recreational amenities and greenspace.

Several environmental investigations were completed at the Site between October 2020 and July 2024. A total of 24 soil borings were advanced at the Site and identified fill to depths up to nine feet below ground surface (bgs). A total of 29 soil samples were analyzed for different combinations of analytes. In total, 26 soil samples were analyzed for volatile organic compounds (VOCs), diesel range organics (DRO), and gasoline range organics (GRO), 18 soil samples were analyzed for polynuclear aromatic hydrocarbons (PAHs) and Resource Conservation and Recovery Act (RCRA) metals, and 4 soil samples were analyzed for polychlorinated biphenyls (PCBs). Petroleum compounds (VOCs, DRO, GRO) were detected in the soil samples. The concentrations of PAHs, expressed as the benzo(a)pyrene equivalent, were within the range of typical background concentrations. Mercury was detected above typical background concentrations in one sample but less than its residential SRV.

Groundwater was encountered at the Site at depths ranging approximately 3 to 24 feet bgs. Fourteen groundwater samples were collected at the Site from temporary monitoring wells and analyzed for VOCs, DRO, and GRO. Only petroleum-related contaminants were detected in the groundwater samples.

Seven soil vapor samples were collected within the footprint of the proposed building in July 2024 (non-heating season). One sample exceeded the MPCA's vapor mitigation action level for benzene of 33-times (33X) its residential intrusion screening value (ISV). 1,3-Butadiene was also detected in soil vapor at a concentration greater than its action level. 1,3-butadiene is commonly found in soil vapor in urban environments due to its association with petroleum products, vehicle exhaust, and asphalt. It is unlikely that the 1,3-butadiene stems from a release of hazardous substances at the Site. Low concentrations of tetrachloroethene (PCE) were detected in several samples but at levels less than 33x ISV. Based on the available data, a partial building vapor mitigation system is required for the proposed apartment building. A second round of soil vapor data collected during the heating season would be necessary to make a risk-based vapor mitigation decision for the entire building footprint.

Seven soil vapor samples were collected during the non-heating season (October 2020 and July 2021) in the western portion of the Site and again during the heating season (November 2023). Benzene, 1,3-butadiene, and PCE were detected in some samples at concentrations above 33x their respective residential ISVs. These samples are in future greenspace area, which includes a proposed stormwater pond and dog park.

The RAP/CCP proposes removal of impacted soils during site grading, disposal of impacted soils at an MPCA-permitted landfill, installation of a vapor mitigation system in the proposed apartment building, and the recording of an environmental covenant.

The RAP/CCP is approved, subject to the following conditions/clarifications:

1. Based on information available to date, no soil response actions are necessary for non-petroleum contaminants. The VIC staff has reviewed the document solely as a CCP.
2. A risk-based vapor mitigation decision for the majority of the building footprint would require a heating season soil vapor sampling event within the footprint of the proposed building. In lieu of the second seasonal soil vapor sampling event to confirm or negate the need for a building-wide vapor mitigation system, the RAP/CCP proposes installation of an active vapor mitigation system throughout the entire building footprint. An environmental covenant will be required to document the affirmative obligation to operate and maintain the vapor mitigation system.
3. The MPCA's review of the RAP/CCP does not include a detailed review of the proposed engineering design for the vapor mitigation system. The MPCA relies on post-installation measurement of pressure field extension (PFE) and confirmation sample results to document that the vapor mitigation system has achieved the performance criteria outlined in MPCA guidance. The vapor mitigation system should include permanent sub-slab sampling points and diagnostic PFE testing points through the concrete slab to allow for evaluation of sub-slab vapor conditions and system diagnostics. Please refer to the MPCA's Vapor Intrusion Best Management Practices for guidance on diagnostic testing, system installation and confirmation sampling. An environmental covenant will be required to document the affirmative obligation to operate and maintain the vapor mitigation system.
4. Backfill within utility trenches at the Site shall be free of VOCs/elevated organic vapors and meet MPCA's residential SRVs.

5. As per Brownfields Response Action Plans guidance document, soil shall be screened at least every 10 cubic yards during excavation.
6. Petroleum-contaminated soils encountered at the site, at or greater than 200 parts per million (PPM) as measured by a photoionization detector (PID), should be excavated and properly managed at an MPCA approved off-site treatment/disposal facility.
7. Petroleum-contaminated soils less than 200 PPM (PID) may be thin spread on-site under paved surfaces.
8. Petroleum-contaminated soils less than 100 PPM (PID) may be used to construct on-site landscape berms. Soils must be mixed 50/50 with clean soils and covered with two feet of clean cover soils, along with a vegetative cover.
9. Petroleum-contaminated soils at or greater than 10 PPM (PID) encountered during the installation of underground utilities should be removed and properly managed as part of the RAP/CCP. If contamination remains at or above 10 PPM a vapor barrier is required.
10. Imported soil and excess fill targeted for off-site reuse shall be from a native source and/or meet the MPCA's criteria for unregulated fill. Soils that do not meet unregulated fill criteria may not be used at the discretion of the contractor or other project personnel.
11. Any contaminated soils removed from the Site must be treated or disposed of in a method approved by the MPCA. Contaminated soils transported to an approved landfill must comply with all state and local permits. Please include all transportation and handling manifests for such soils in the final implementation report.
12. This RAP/CCP approval is contingent on the applicant obtaining all other required state, federal, and local government permits.
13. MPCA Brownfield Program staff does not review or approve dewatering actions, including the testing, discharge and/or treatment of groundwater, stormwater, or any other dewatering action.
14. Park and 3rd Alexandria, LLC shall record, at its own expense, in the office of the County Recorder or Registrar of Titles, whichever is appropriate, in and for Douglas County, an Environmental Covenant approved by the MPCA as provided in the Uniform Environmental Covenants Act, Minn. Stat. ch. 114E (Supp. 2007) (UECA). Directions and a template for the *Environmental Covenant and Easement* can be found on the MPCA's webpage. A copy of the proposed Environmental Covenant language shall be submitted to the MPCA staff for review and approval along with the pending Implementation Report and Park and 3rd Alexandria, LLC shall file the Environmental Covenant within thirty (30) days after receipt of MPCA approval. Park and 3rd Alexandria, LLC shall submit a copy of the Environmental Covenant as recorded to the MPCA within thirty (30) days after the Environmental Covenant is officially recorded. Park and 3rd Alexandria, LLC shall provide notice of the Environmental Covenant to those parties to whom notice is required under UECA.

An implementation report describing the completed response actions, sampling results, soil management and disposal, and imported soils shall be prepared and submitted to the MPCA. If the implementation report will not be submitted within one year of the date of this letter, please notify the MPCA project staff of the status of the project.

Approval of this plan does not suggest that any of the costs incurred will be eligible for reimbursement from the Petro Board.

This letter is subject to the disclaimers found in Attachment A. If you have any questions about this letter, please contact Holly E Johnson, Project Manager, at 651-757-2124 or by email at holly.e.johnson@state.mn.us or Youmi (Elisa) Hong, Project Manager, at phone 651-757-2597 or by email at elisa.hong@state.mn.us.

Sincerely,

Holly E. Johnson

This document has been electronically signed.

Holly E Johnson
Project Manager
Remediation Division

Youmi K. Hong

This document has been electronically signed.

Youmi K. Hong
Hydrogeologist
Remediation Division

HJ/YH:akh

Enclosure

cc: Martin Schultz, Alexandria City Administrator (electronic)
Dave Rush, Douglas County Land & Resource Management (electronic)
Eric P. Stommes, Stantec Consulting Services, Inc. (electronic)

Attachment A

Disclaimers

Former Alexandria Block Plant - Park and 3rd Lofts

MPCA Site ID: BF0002682

1. Reservation of authorities

   The Minnesota Pollution Control Agency (MPCA) Commissioner reserves the authority to take any appropriate actions with respect to any release, threatened release, or other conditions at the Site. The MPCA Commissioner also reserves the authority to take such actions if the voluntary party does not proceed in the manner described in this letter or if actions taken or omitted by the voluntary party with respect to the Site contribute to any release or threatened release or create an imminent and substantial danger to public health and welfare.

2. No MPCA assumption of liability

   The MPCA, its Commissioner, and staff do not assume any liability for any release, threatened release or other conditions at the Site or for any actions taken or omitted by the voluntary party with regard to the release, threatened release, or other conditions at the Site, whether the actions taken or omitted are in accordance with this letter or otherwise.

3. Letter based on current information

   All statements, conclusions, and representations in this letter are based upon information known to the MPCA Commissioner and staff at the time this letter was issued. The MPCA Commissioner and staff reserve the authority to modify or rescind any such statement, conclusion, or representation and to take any appropriate action under the Commissioner's authority if the MPCA Commissioner or staff acquires information after issuance of this letter that provides a basis for such modification or action.

4. Disclaimer regarding use or development of the property

   The MPCA, its Commissioner, and staff do not warrant that the Site is suitable or appropriate for any particular use.

5. Disclaimer regarding investigative or response action at the property

   Nothing in this letter is intended to authorize any response action under Minn. Stat. § 115B.17, subd. 12.

6. This approval does not supplant any applicable state or local stormwater permits, ordinances, or other regulatory documents.

Park and 3rd Lofts Alexandria - Contaminated Soil Management

Description

Excavation work on this redevelopment site will consist of handling/managing contaminated soil as described in Response Action Plan/Construction Contingency Plan (RAP/CCP) prepared by Stantec Consulting Services, Inc. (Stantec) dated August 30, 2024. This RAP/CCP was reviewed and approved by the Minnesota Pollution Control Agency (MPCA) Voluntary Brownfield Programs by letter dated October 31, 2024. The MPCA approved RAP/CCP should be followed during the excavation activities on the Site. Also note that the project received brownfield grant funding for portions of the redevelopment. The granting agencies require certain cost break outs and documentation as noted below as well as ensuring contractors meet Minnesota prevailing wage rates.

Contaminated Soil Management

The Owner and their General Contractor (GC) will be notified no less than three working days prior to beginning the excavation activities to allow the Owner's consultant time to coordinate field staff to be at the site to observe and document the excavation, handling, segregation, and disposal of the contaminated materials. The Owner's Consultant must be present before excavation of contaminated materials take place. The Owner's Consultant will determine which materials are to be considered contaminated based on the MPCA approved RAP/CCP.

The Owner's GC should manage open excavation areas to prevent, to the extent possible, the flow of rainwater runoff into the excavation. Rainwater that comes into contact with contaminated soil is considered contaminated. The GC shall use the following runoff management methods: minimize the drainage area around the excavation, place berms up gradient of the excavation to divert runoff, and/or cover the excavation. If rainwater needs to be removed from the excavation, use procedures described within the Site's Construction Stormwater Permit prepared by others.

Contaminated materials excavated from areas described in the MPCA approved RAP/CCP will be evaluated by the Owner's Consultant, those determined to be contaminated will be hauled to a Minnesota permitted solid waste or industrial landfill facility for disposal, under an approved waste profile. Daily cover rates are preferred over in-cell rates, if applicable.

(1) Provide the landfill-required waste profile form(s) to the Owner for review and comment upon a minimum of two weeks prior to beginning excavation. The Owner can approve an alternate deadline.

(2) Obtain landfill acceptance of the contaminated materials. This typically includes submittal of waste profile forms and analytical laboratory reports.

(3) Determine if the existing analytical data are sufficient for the landfill to accept the contaminated material.

- (i) Immediately inform the Owner if additional soil analytical data are required by the landfill.
- (ii) If required, excavate test pits for the Owner's Consultant to access contaminated material to collect samples for additional analyses required by the landfill (provide add alternate for this work, Hourly rate for equipment needed).
- (iii) Sample analytical turnaround time is typically 5 to 10 working days (Monday through Friday).
- (iv) The Owner is responsible for additional sample laboratory analyses required by the landfill with areas described above.
- (v) If the Contractor changes the landfill disposal location after the Owner has completed additional analytical, costs associated with collecting additional samples and analyses will be the responsibility of the Contractor.

(4) The Owner and Consultant must receive documented approval from the landfill accepting the contaminated material for daily cover/disposal at the landfill facility before contaminated material can be hauled to the landfill

facility.

(5) Loads are required to be covered (tarped) while in transit at no cost to the Owner.

Complete shipping papers (manifests) and provide copies of shipping papers and landfill scale tickets for each load to the owner weekly while material is being hauled to the landfill. The Owner can approve an alternate deadline. If signature is needed on manifests, the Owner or owner's consultant, on behalf of the Owner, will provide.

Temporary Stockpile of Contaminated Materials

If contaminated materials cannot be directly loaded into trucks, the location of the stockpile will be designated within the construction limits of the Project as approved by GC.

Place contaminated material from each contaminated area into separate stockpiles. Stockpile the contaminated soil on minimum 10 mil plastic, cover the stockpile (minimum at end of each workday) with minimum 10 mil reinforced plastic, and securely anchor stockpile cover. Surround stockpile by temporary fencing if GC determines that additional security measures are necessary. Maintain of the stockpile cover (and fencing if installed) for the duration of the Contract or until contaminated materials are removed. Inspect the stockpile and cover a minimum of once per week.

If Contractor chooses to temporarily stockpile soil described above before hauling it to the landfill, costs incurred for temporarily stockpiling the contaminated soil are not reimbursable. If Contractor chooses to move a secured stockpile to a new location because the stockpile is in the way of construction, the cost of moving and re-stockpiling the soils are incidental and not eligible for reimbursement from the grantor.

Import of Unregulated Soil

Prior to importing clean fill to the Site, Contractor will identify source of fill at least two weeks prior to import. In general, if the imported soil consists of native material from a previously undeveloped property or a dedicated gravel pit, then no soil samples will be collected for laboratory analysis. If imported fill originates from a developed property, soil samples may be required for confirmation of unregulated fill criteria. If testing is required, Owner's Consultant will collect the number of samples and analysis per the MPCA approved RAP/CCP. Contractor will provide access to fill source and will wait until fill material is cleared by Owner's Consultant. GC will also confirm fill meets structural requirements as noted in geotechnical report. Price will include fill import, placement and compaction and truck tickets will be provided with either cubic yards or tons noted.

Basis of Payment

The Contract Unit Price for Contaminated Soil is compensation in full for Equipment, Materials and labor required to complete the Work. For purposes of unit conversion, one cubic yard (CV) will equal 1.5 tons. Excavation Special will be payment in full for work required to excavate and segregate materials. Haul and Dispose of Contaminated Material will be payment in full for all permits, disposal fees, loading, tarping, and hauling of material, and all costs relative thereto.

Brownfield grant funding will require unit pricing for the following. Owner will only pay for unit cost noted below.

Task	Estimated Quantity	Price per Unit
Excavation of Contaminated Soils	7,565 cyds	____ cys
Transport of Contaminated Soil to MPCA Approved Landfill	11,350 tons	____ tons
Disposal of Contaminated Soil at MPCA Approved Landfill	11,350 tons	____ tons
Import/placement of Unregulated/structurally appropriate fill	7,565 cyds	____ cys

Exhibit C-4 - Geotechnical Soil Corrections

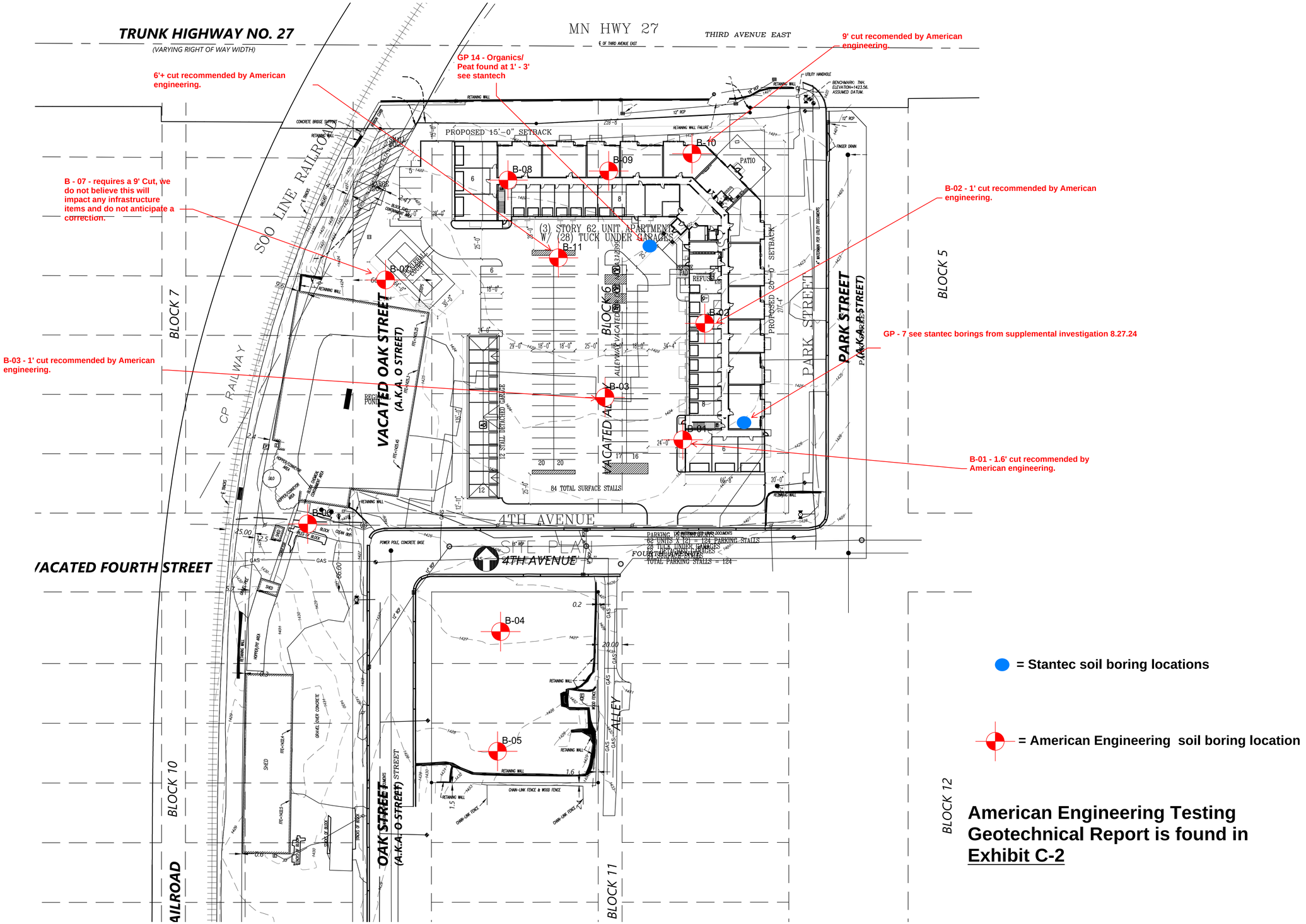
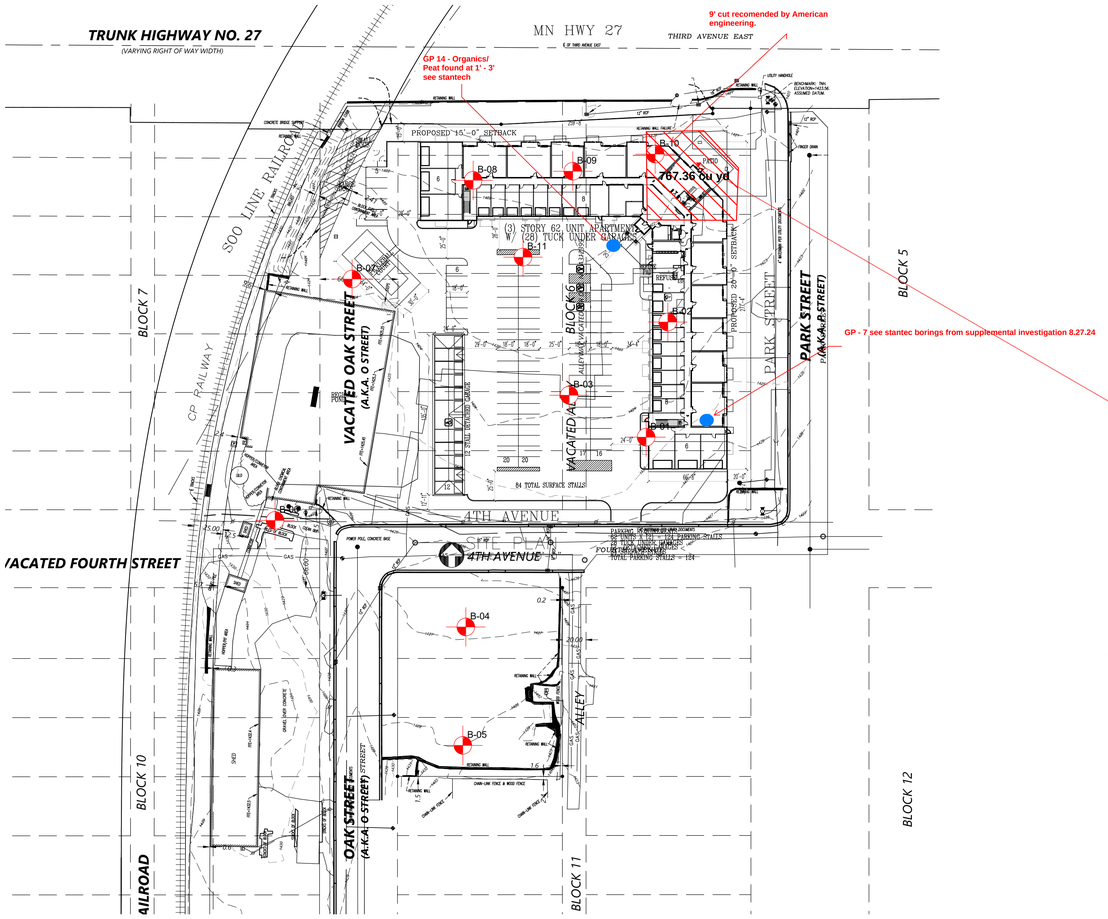


Exhibit C-4 - Soil Correction at B-10



Park and 3rd Alexandria, LLC

Notes:

1. 805 cubic yards are the quantities in the historical photo are based on a 1' x 1' slope required for excavations by OSHA.

2. 767 cubic yards are the updated quantities, represent the limits of construction and where the correction is required

3. The entire Geotechnical investigation is provided, this sheet we provided the specific sheet that represents the depth of excavation the is recommended based on the soil boring.

4. This boring was a surprise and I had a hard time understanding where this came from, I reviewed our phase 1 and the DNR's historical photos and found this building along with others(that are found on the following pages of this document.

5. Through discussions with neighbors and city officials the previous owner of the property(Alexandria Concrete/Jay morrell enterprises) would demo residential homes/small commercial buildings(as we see above in B-10) overnight and without a permit.

Alexandria Apartments
Alexandria, Minnesota
April 18, 2024
AET Report No. P-0030207

6.0 RECOMMENDATIONS

6.1 Building Grading

6.1.1 Excavation

To prepare the building area for foundation and slab support, we recommend complete removal of existing concrete, apparent aggregate base, buried topsoil, and fill, thereby exposing the underlying native clay subgrade. This would result in excavation depths at the boring locations as shown in Table 1.

The depth/elevation indicated in Table 1 is based on the soil condition at the specific boring location. Since conditions will vary away from the boring location, it is recommended that AET geotechnical personnel observe and confirm the competency of the soils in the entire excavation bottom prior to new fill or footing placement.

Table 1: Recommended Excavation Depths Note 1

Boring Number	Existing Ground Elevation (feet, AET Datum)	Removal of Unsuitable Materials: Depth of Materials (feet)		Excavation Elevation (feet)
SB-1	201.3	1.6	Agg Base (3") & Fill	199.7
SB-2	199.5	1	Agg Base (3") & Fill	198.5
SB-3	200.3	1	Agg Base (4") & Fill	199.3
SB-4	203.3	1	Concrete (7") & Agg Base	202.3
SB-5	204.5	0.8	Concrete (8") & Agg Base	203.7
SB-6	206.0	0.8	Concrete (7") & Agg Base	205.2
SB-7	200.2	9	Concrete (6"), Agg Base, Buried Topsoil, & Fill	191.2
SB-8	198.0	1.4	Concrete (3") & Agg Base	196.6
SB-9	198.1	1.1	Concrete (4.5") & Agg Base	197.0
SB-10	198.1	9	Concrete (4.75"), Agg Base, & Fill	189.1
SB-11	199.0	6+	Concrete (6"), Agg Base, & Fill	Below 193.0

Note 1 Refer to report recommendations associated with excavation at, and within the vicinity of the soil borings.

Rev-March 2022

Page 4 of 17

AMERICAN ENGINEERING TESTING

SUBSURFACE BORING LOG

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-10 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

DEPTH IN FEET	SURFACE ELEVATION: 198.1 MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN	FIELD & LABORATORY TESTS: qp	WC	DEN %	=#200	qu
1	4.75" of CONCRETE		M		AS					
2	AGGREGATE BASE, fine to coarse grained, brown									
	FILL/TOPSOIL, CLAY, trace sand, black to brown	6	M		SS	16				
5		9	M		SS	6		13		
7	FILL, SAND, fine to coarse grained, gray to brown	6	M		SS	12		10		
10	LEAN CLAY, trace sand, brown to gray, soft, (CL)	2	M		SS	18	1.1	23	112	
13			M		TW					
14	LEAN CLAY, brown, firm, (CL)									
15		5	M		SS	18	1.3	14	142	
18		7	M		SS	20	1.6	12	142	
19	LEAN CLAY, trace sand, dark gray, firm, (CL)									
20		6	M		SS	22	2.4	13	130	
24		7	M		SS	22	2.2	13	126	
	END OF BORING - 24.9'									

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-23½' 3.25" HSA	**3/19/24**	--	**24.9**	**23.5**	--	--	**None**
BORING COMPLETED: **3/19/24**							
DR: **MJ** LG: **BA** Rig: **108**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

Historical Photo from 1951 representing a building at the location of Boring 10

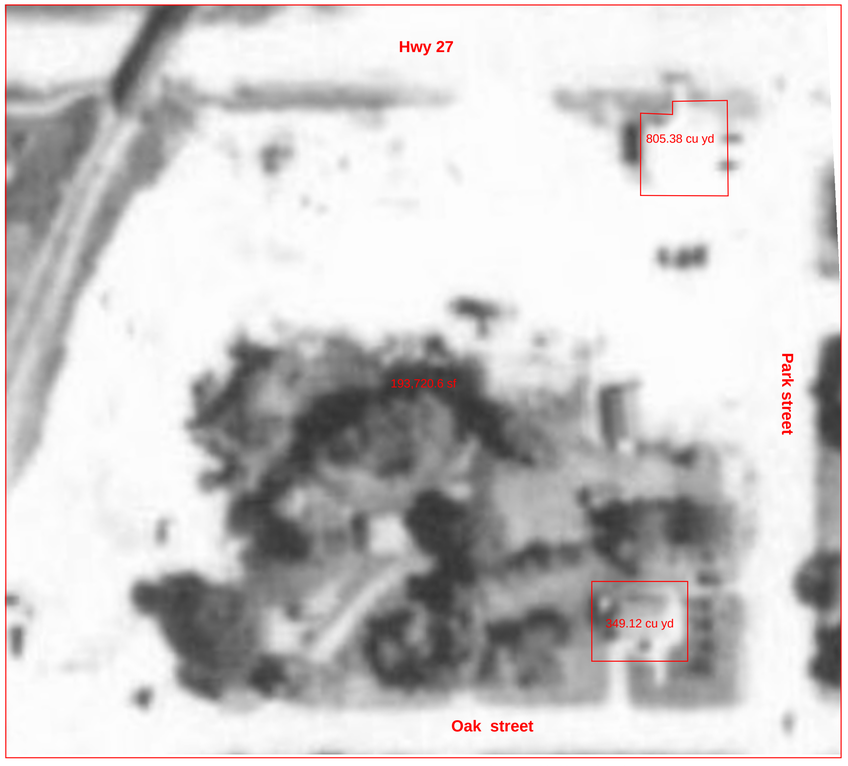
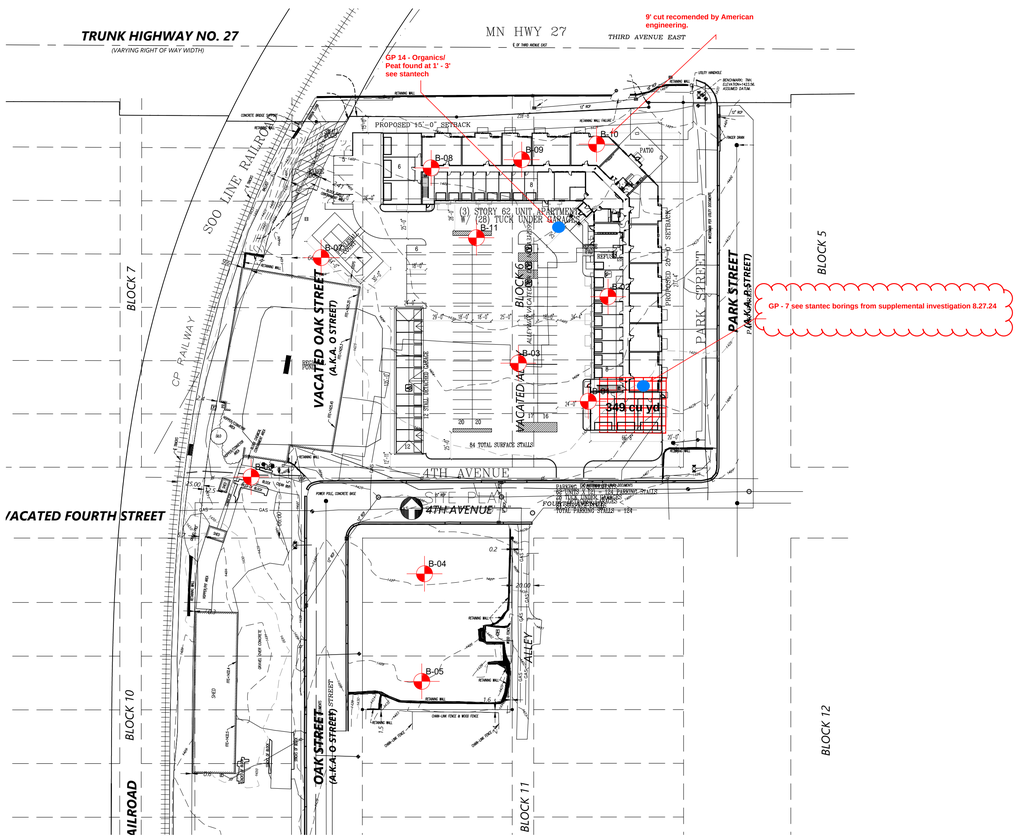


photo provided by HIG and part of our phase 1

Exhibit C-4 -Soil Correction at GP-7



Park and 3rd Alexandria, LLC

Supplemental Investigation by Stantec

SUPPLEMENTAL INVESTIGATION
PARK AND 3RD LOFTS REDEVELOPMENT
AUGUST 2024

6.0 DISCUSSION

6.1 SOIL

In the interior block plant soil borings, Stantec generally encountered a layer of concrete at the surface underlain by fill consisting of a mix of brown to gray gravelly sand and dark brown silty sand to depths ranging from 2.5 to 5 feet bgs. The fill layer was underlain by a mix of sand and clay to the boring termination depths of 10 feet bgs. Analytical results revealed DRO impacts which exceed the unregulated fill criteria of 100 mg/kg in three of the four interior borings.

In the exterior soil borings, Stantec generally encountered a layer of concrete or gravelly sand at the surface underlain by fill consisting of a mix of silty and gravelly sand. Wood and plastic fragments were observed within the fill in boring GP-7 at 2 feet bg; however, analytical testing from the fill layer did not reveal impacts associated with debris. In borings GP-5 through GP-7, the fill layer was underlain by intermixing layers of native sand and clay to the boring termination depths of 25 feet bgs. In borings GP-12, GP-13, and GP-15, the fill layer was generally underlain by native clay or a mix of sand and clay to the boring termination depths of 10 feet bgs. An elevated vapor headspace reading of 46.4 ppm was measured within a layer of peat that was observed in boring GP-14 from 1 to 3 feet bgs. Due to the organics noted in the peat, a soil sample was collected from the interval and analyzed for DRO with silica gel cleanup. Analytical data did not reveal impacts within the peat layer; therefore, the elevated vapor headspace reading can be attributed to the organic material within the peat. The peat layer was underlain by native clay to the boring termination depth of 10 feet bgs. A faint petroleum odor was noted in boring GP-6 at 11 to 14 feet bgs; however, vapor headspace readings from this interval were observed to be less than 10 ppm and analytical results did not reveal impact.

In 2012, the MPCA published a guidance document called "Best Management Practices for the Off-Site Reuse of Unregulated Fill" to assist in making soil management decisions. The document defines unregulated fill as excess soil in which a release of contaminants has been identified at concentrations less than the MPCA's most conservative risk-based values. Soil not meeting that definition is called regulated fill. Soil management and the associated cost implications on development sites is commonly driven by the presence of unregulated versus regulated fill. The criterion for unregulated fill is as follows:

- Soil free from solid waste, debris, asbestos containing material, visual staining, and chemical odor;
- Organic vapors less than 10 ppm as measured by a PID;
- For petroleum impacted soil, less than 100 mg/kg DRO/GRO;
- For contaminants detected in soil, less than the MPCA's Residential SRVs and MPCA Screening SLVs.

Project Number: 227707105

6.1

Stantec

WELL NUMBER GP-7
PAGE 1 OF 1

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Dual-Tube
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES Temp well installed and left overnight. Temp well dry when first installed **24hrs AFTER DRILLING** 7.0 ft / Elev 1423.0 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0	GB 1	GP-7 (1-3') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis		FILL		0.5 Gravelly Sand (Class 5) 1429.5	0.6	
				FILL		1.0 Silty sand, dense, dark brown, fine grained 1429.0		
	GB 2		48	FILL		Silty sand, medium dense, brown, fine to medium grained, some gravel, trace clay, wood and plastic fragments at 2' bg	0.9	
						3.0 Sandy clay, medium stiff, brown, fine to medium grained, some gravel after 5' 1427.0		
	GB 3						0.4	
5	GB 4		60				1.4	
	GB 5						2.6	
10	GB 6		58	CL			1.2	
	GB 7						0.9	
15	GB 8		54				0.6	
	GB 9						0.8	
				SP		19.5 1410.5		
20						20.0 Sand, poorly graded, medium dense, light brown, fine to medium grained 1410.0		
	GB 10		60	CL		Clay, medium stiff to stiff, brown, some gravel	0.2	Groundwater sample GP-7 collected 7/16/24 for DRO, GRO, and VOCs analysis
	GB 11					24.0 1406.0	0.2	
25				SC		Clayey sand, medium dense to dense, brown, fine to medium grained, some gravel 25.0 1405.0		

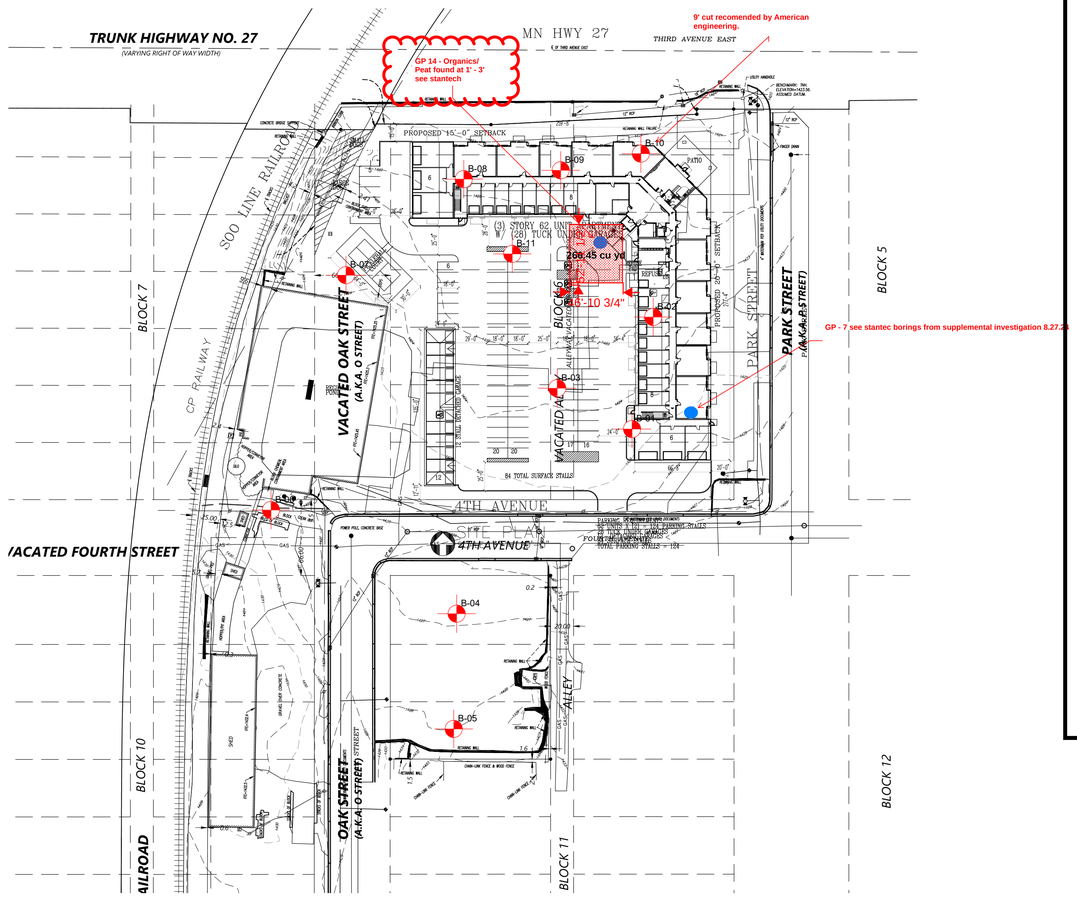
E.O.B. @ 25.0 ' BGS.

GENERAL BH / TP / WELL - BORING LOGS GPJ WENCK-STANTEC MASTER SOIL BORINGS.GDT 7/30/24

Historical Photo from 1951 representing a building at the location of GP - 7

Notes:
1. 349 cubic yards are the quantities in the historical photo are based on a 1' x 1' slope required for excavations by OSHA.
2. 349 cubic yards are the correct quantities, represent the limits of construction and where the correction is required
3. The entire Geotechnical investigation is provided, this sheet we provided the specific sheet that represents the depth of excavation the is recommended based on the soil boring.
4. Again this boring was a surprise and I had a hard time understanding where this came from, I reviewed our phase 1 and the DNR's historical photos
5. Through discussions with neighbors and city officials the previous owner of the property(Alexandria Concrete/Jay morrell enterprises) would demo residential homes/small commercial buildings(as we see above in B-10) overnight and without a permit.

Exhibit C-4 - Soil Correction at GP-14



Park and 3rd Alexandria, LLC

Notes:
1. 260 cubic yards are estimated of peat and black organics

2. roughly 52' x 47' x 3' is the area estimated, no historical historical pictures to clearly identify why it is there other than a farm in the provided 1938 photo

Supplemental Investigation by Stantec

SUPPLEMENTAL INVESTIGATION
PARK AND 3RD LOFTS REDEVELOPMENT
AUGUST 2024

6.0 DISCUSSION

6.1 SOIL

In the interior block plant soil borings, Stantec generally encountered a layer of concrete at the surface underlain by fill consisting of a mix of brown to gray gravelly sand and dark brown silty sand to depths ranging from 2.5 to 5 feet bgs. The fill layer was underlain by a mix of sand and clay to the boring termination depths of 10 feet bgs. Analytical results revealed DRO impacts which exceed the unregulated fill criteria of 100 mg/kg in three of the four interior borings.

In the exterior soil borings, Stantec generally encountered a layer of concrete or gravelly sand at the surface underlain by fill consisting of a mix of silty and gravelly sand. Wood and plastic fragments were observed within the fill in boring GP-7 at 2 feet bg; however, analytical testing from the fill layer did not reveal impacts associated with debris. In borings GP-5 through GP-7, the fill layer was underlain by intermixing layers of native sand and clay to the boring termination depths of 25 feet bgs. In borings GP-12, GP-13, and GP-15, the fill layer was generally underlain by native clay or a mix of sand and clay to the boring termination depths of 10 feet bgs. An elevated vapor headspace reading of 46.4 ppm was measured within a layer of peat that was observed in boring GP-14 from 1 to 3 feet bgs. Due to the organics noted in the peat, a soil sample was collected from the interval and analyzed for DRO with silica gel cleanup. Analytical data did not reveal impacts within the peat layer; therefore, the elevated vapor headspace reading can be attributed to the organic material within the peat. The peat layer was underlain by native clay to the boring termination depth of 10 feet bgs. A faint petroleum odor was noted in boring GP-6 at 11 to 14 feet bgs; however, vapor headspace readings from this interval were observed to be less than 10 ppm and analytical results did not reveal impact.

In 2012, the MPCA published a guidance document called "Best Management Practices for the Off-Site Reuse of Unregulated Fill" to assist in making soil management decisions. The document defines unregulated fill as excess soil in which a release of contaminants has been identified at concentrations less than the MPCA's most conservative risk-based values. Soil not meeting that definition is called regulated fill. Soil management and the associated cost implications on development sites is commonly driven by the presence of unregulated versus regulated fill. The criterion for unregulated fill is as follows:

- Soil free from solid waste, debris, asbestos containing material, visual staining, and chemical odor;
- Organic vapors less than 10 ppm as measured by a PID;
- For petroleum impacted soil, less than 100 mg/kg DRO/GRO;
- For contaminants detected in soil, less than the MPCA's Residential SRVs and MPCA Screening SLVs.

Project Number: 227707105 6.1

Stantec

BORING NUMBER GP-14
PAGE 1 OF 1

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0						Concrete 1.0 1429.0	
				FILL			
	GB 1	GP-14 (1-3') collected for DRO with silica gel cleanup, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis	36	PT		Peat, medium dense, black, fine, trace organics 3.0 1427.0	46.4
	GB 2					Clay, medium stiff, dark gray transitioning to light brown near 10', fine grained, trace gravel	2.3
5							
	GB 3		48	CL			5.1
	GB 4						2.8
10						10.0 1420.0 E.O.B. @ 10.0' BGS.	

Exhibit C-4 - Stantec sample location map - GP 14 and GP 7

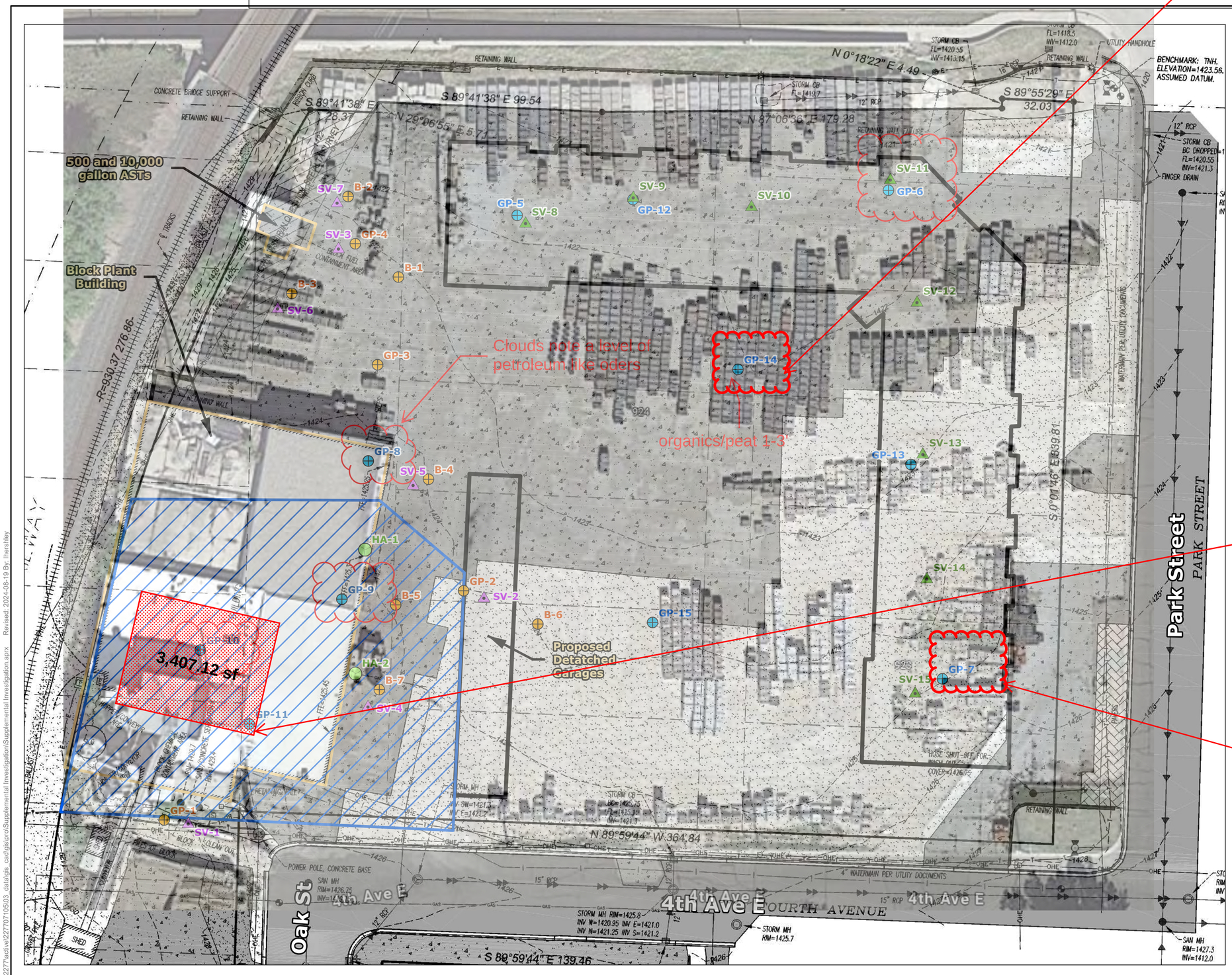


Figure No.
3

Title
Sample Location Map

Client/Project
Park and 3rd Alexandria, LLC
Supplemental Investigation

227707105

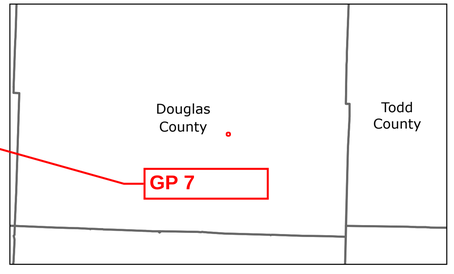
Project Location
T128N, R37W, S20
Alexandria, Douglas Co., MN

Prepared by TAW on 2024-08-19

N

0 22.5 45 Feet
(At original document size of 11x17)
1:540

Legend
- Site Feature
- Proposed Stormwater Pond
- Proposed Building Footprint
- Boring Location
- Soil Vapor Sample Location
- Previous Interior Hand Auger Location
- Previous Soil Vapor Sample Location
- Previous Soil Boring Locations



Notes
1. Coordinate System: NAD 1983 UTM Zone 15N
2. Data Sources: Stoeckel-Jahner
3. Background: Stoeckel-Jahner

Stantec

Page 1 of 1

V:\227\active\227707105\03_data\gis_cad\gis\pro\Supplemental Investigation\Supplemental Investigation.aprx Revised: 2024-08-19 By: lhershley

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

Exhibit C-4 - American Engineering and Testing response to - GP 14 and GP 7

Outlook

RE: Alexandria Geotechnical - Stantec findings during environmental assessment

From Holmes, Joshua <jholmes@teamAET.com>
Date Wed 1/8/2025 4:50 PM
To Tim Lundgren <Tim.Lundgren@Duininck.Com>

Hi Tim,

I looked at the document you provided. Here is my answer. Please let me know if you are looking for anything more or different.

Our geotechnical recommendations include the removal of all undocumented fill from below building foundations and floor slabs. This includes the removal of debris material and Peat. While it is stated as a "recommendation", we would not approve of construction upon existing undocumented fill or organic soils. We agree with Stantec on removal of these soils / materials at GP-7.

The pavement section from our geotechnical report implies that the removal of undocumented fill below 3 feet of top of pavement is typically not feasible. As a result, we recommend removing any concrete, aggregate base, topsoil, and organic clay within 3 feet of top of pavement elevation at a minimum. We would consider the peat soils identified by Stantec in GP-14 as non-suitable soil and therefore agree with the recommendation of full depth removal of the near surface peat soils.

I would need to take a deep dive, but the geotechnical report likely classified the Peat as buried topsoil given the depth and proximity to fill soils. Likewise, we only note debris materials if encountered within the sampler or auger cuttings. While not noted in our boring logs, I expect the presence of plastic, wood, or other debris materials may be present within existing fill.

Thanks!

Josh Holmes, P.E. (ND,MN,SD)
Senior Engineer
Direct: 701.551.2070 I **Cell**: 218.849.4350

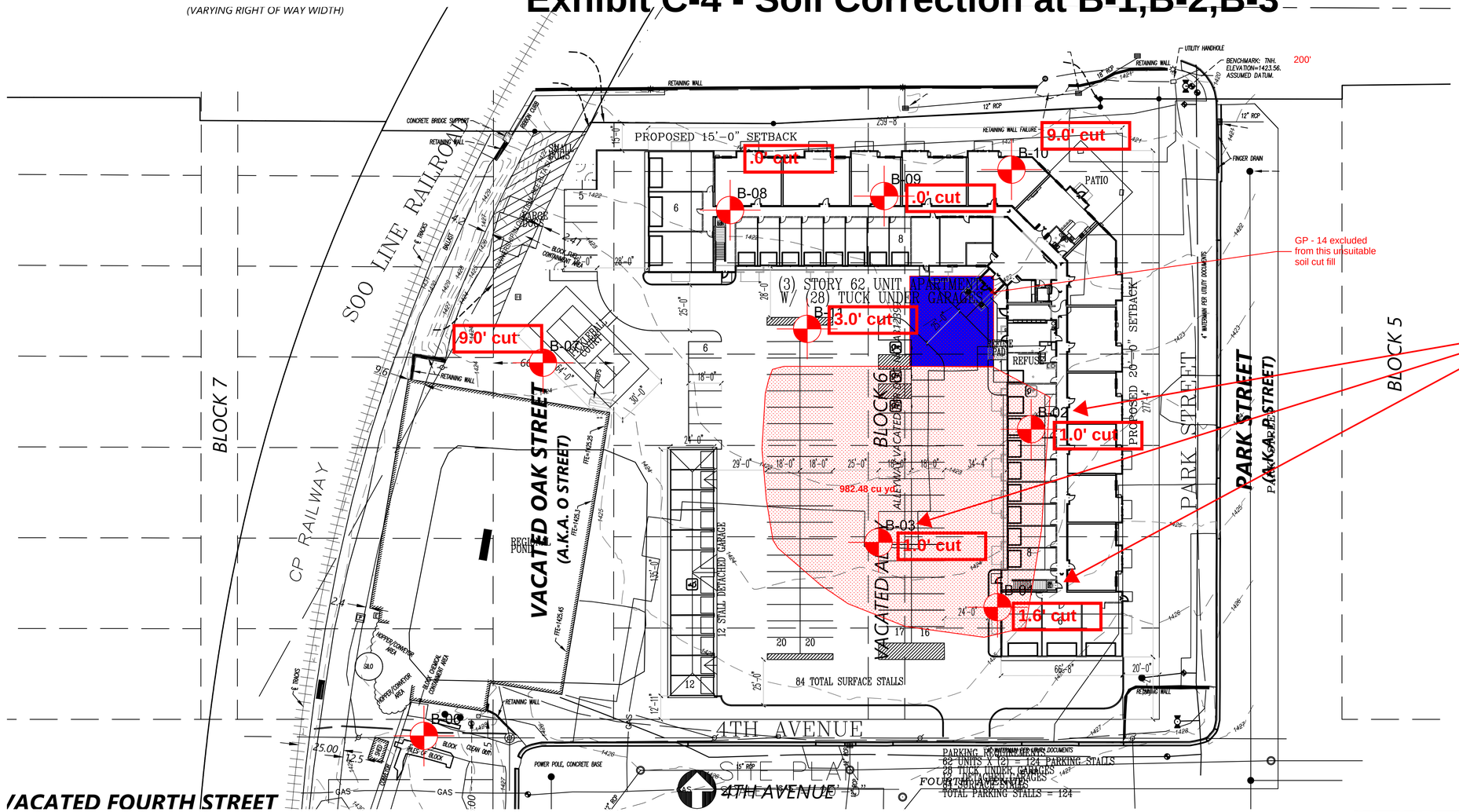
AMERICAN

American Engineering Testing, Inc.
3095 42nd Street N.
Fargo, ND, 58102

www.teamAET.com

From: Tim Lundgren <Tim.Lundgren@Duininck.Com>

Exhibit C-4 - Soil Correction at B-1,B-2,B-3



Alexandria Apartments
Alexandria, Minnesota
April 18, 2024
AET Report No. P-0030207

6.0 RECOMMENDATIONS

6.1 Building Grading

6.1.1 Excavation

To prepare the building area for foundation and slab support, we recommend complete removal of existing concrete, apparent aggregate base, buried topsoil, and fill, thereby exposing the underlying native clay subgrade. This would result in excavation depths at the boring locations as shown in Table 1.

The depth/elevation indicated in Table 1 is based on the soil condition at the specific boring location. Since conditions will vary away from the boring location, it is recommended that AET geotechnical personnel observe and confirm the competency of the soils in the entire excavation bottom prior to new fill or footing placement.

Table 1: Recommended Excavation Depths [Note 1]

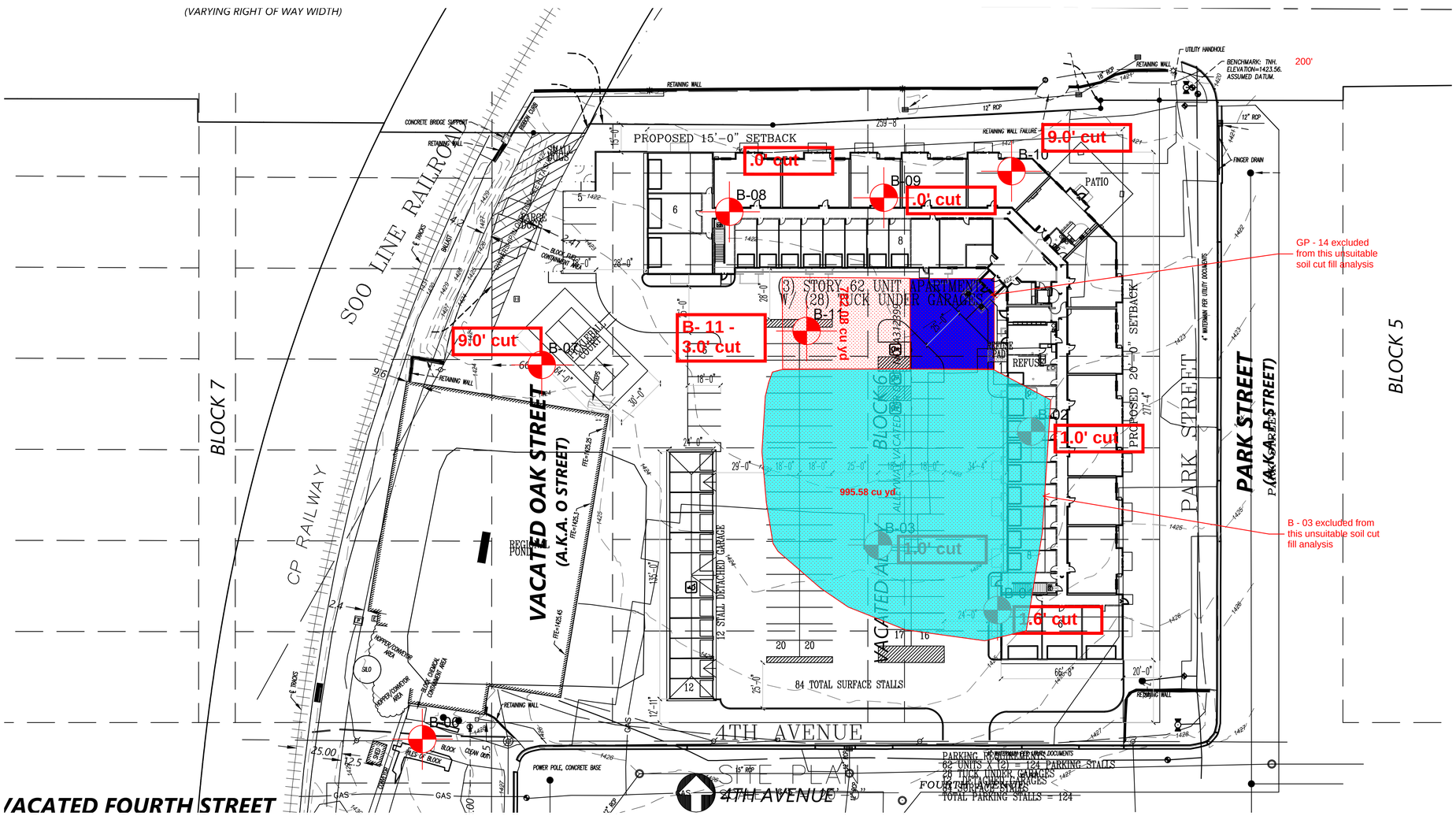
Boring Number	Existing Ground Elevation (feet, AET Datum)	Removal of Unsuitable Materials: Depth of Materials (feet)		Excavation Elevation (feet)
SB-1	201.3	1.6	Agg Base (3") & Fill	199.7
SB-2	199.5	1	Agg Base (3") & Fill	198.5
SB-3	200.3	1	Agg Base (4") & Fill	199.3
SB-4	203.3	1	Concrete (7") & Agg Base	202.3
SB-5	204.5	0.8	Concrete (8") & Agg Base	203.7
SB-6	206.0	0.8	Concrete (7") & Agg Base	205.2
SB-7	200.2	9	Concrete (6"), Agg Base, Buried Topsoil, & Fill	191.2
SB-8	198.0	1.4	Concrete (3") & Agg Base	196.6
SB-9	198.1	1.1	Concrete (4.5") & Agg Base	197.0
SB-10	198.1	9	Concrete (4.75"), Agg Base, & Fill	189.1
SB-11	199.0	6+	Concrete (6"), Agg Base, & Fill	Below 193.0

Note 1 Refer to report recommendations associated with excavation at, and within the vicinity of the soil borings.

Notes:
1. 982 cubic yards are the quantities in the take off is 19, 724 sqft with an average cut of 1.4'
2. similar to GP-14 I believe this is a direct result of the historical photo that represents a farm field
3. The entire Geotechnical investigation is provided Exhibit C-2 , this sheet we provided the specific sheet that represents the depth of excavation the is recommended based on the soil boring and the soil boring

4. The Geotechnical letter on page 5 of this exhibit recommends removal of the top 3' at a pavement section where fill or undocumented soils are found, therefore my cut calculation based on 1.4' based on the grouping of borings with variable cut amounts

Exhibit C-4 - Soil Correction at B-11



Notes:

1. 782 cubic yards are the quantities in the take off. 70' x 50' x 6'

2. unsettling when there is three borings in a line with cuts from 9' to 6'. B-10, GP - 14, and B-11. this is why my dimensions abutted the unsuitable soil at GP-14(highlighted in blue)

3. The entire Geotechnical investigation is provided Exhibit C-2 , this sheet we provided the specific sheet that represents the depth of excavation the is recommended based on the soil boring and the soil boring

4. The Geotechnical letter on page 5 of this exhibit recommends removal of the top 3' of a pavement section where fill or undocumented soils are found, unfortunately when topsoil/peat or organic material are found they all must be evacuated, so our excavation will need to be 6' as noted on the attached recommended excavation depth

6.0 RECOMMENDATIONS

6.1 Building Grading

6.1.1 Excavation

To prepare the building area for foundation and slab support, we recommend complete removal of existing concrete, apparent aggregate base, buried topsoil, and fill, thereby exposing the underlying native clay subgrade. This would result in excavation depths at the boring locations as shown in Table 1.

The depth/elevation indicated in Table 1 is based on the soil condition at the specific boring location. Since conditions will vary away from the boring location, it is recommended that AET geotechnical personnel observe and confirm the competency of the soils in the entire excavation bottom prior to new fill or footing placement.

Table 1: Recommended Excavation Depths [Note 1]

Boring Number	Existing Ground Elevation (feet, AET Datum)	Removal of Unsuitable Materials: Depth of Materials (feet)		Excavation Elevation (feet)
SB-1	201.3	1.6	Agg Base (3") & Fill	199.7
SB-2	199.5	1	Agg Base (3") & Fill	198.5
SB-3	200.3	1	Agg Base (4") & Fill	199.3
SB-4	203.3	1	Concrete (7") & Agg Base	202.3
SB-5	204.5	0.8	Concrete (8") & Agg Base	203.7
SB-6	206.0	0.8	Concrete (7") & Agg Base	205.2
SB-7	200.2	9	Concrete (6"), Agg Base, Buried Topsoil, & Fill	191.2
SB-8	198.0	1.4	Concrete (3") & Agg Base	196.6
SB-9	198.1	1.1	Concrete (4.5") & Agg Base	197.0
SB-10	198.1	9	Concrete (4.75"), Agg Base, & Fill	189.1
SB-11	199.0	6+	Concrete (6"), Agg Base, & Fill	Below 193.0

Note 1 – Refer to report recommendations associated with excavation at, and within the vicinity of the soil borings.

AMERICAN ENGINEERING TESTING

SUBSURFACE BORING LOG

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-10 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **198.1**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS: qp	WC	DEN	%-#200	qu
	4.75" of CONCRETE		M	AS						
1	AGGREGATE BASE, fine to coarse grained, brown									
2	FILL/TOPSOIL, CLAY, trace sand, black to brown									
3		6	M	SS	16					
4										
5		9	M	SS	6		13			
6										
7	FILL, SAND, fine to coarse grained, gray to brown									
8		6	M	SS	12		10			
9										
10	LEAN CLAY, trace sand, brown to gray, soft, (CL)	2	M	SS	18	1.1	23	112		
11										
12										
13			M	TW						
14	LEAN CLAY, brown, firm, (CL)									
15		5	M	SS	18	1.3	14	142		
16										
17										
18		7	M	SS	20	1.6	12	142		
19										
20	LEAN CLAY, trace sand, dark gray, firm, (CL)									
21		6	M	SS	22	2.4	13	130		
22										
23										
24		7	M	SS	22	2.2	13	126		
	END OF BORING - 24.9'									

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS: DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-23½'	**3.25" HSA**	**3/19/24**	**--**	**24.9**	**23.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

Project Manual

Park & 3rd Lofts
Alexandria, MN

Prepared for

Cole Group Architects

Larson Project No. 12246070
Issue Date: March 12, 2025

Larson Engineering
816 W. St. Germain St.
Suite 308
St. Cloud, MN 56301

© 2025 Larson Engineering, Inc.

SECTION 00 01 05

CERTIFICATION PAGE

Project:
Park & 3rd Lofts
Alexandria, MN

Architect:
Cole Group Architects
David Majchrzak
216 Park Avenue South, Suite 102
St. Cloud, Minnesota 56301
320.654.6570

Civil Engineer:
Larson Engineering, Inc.
Tom Herkenhoff
816 W. St. Germain St.
Suite 308
St. Cloud, MN 56301
320.428.5824 Fax: 651.481.9201

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

	March 12, 2025	25520
Thomas J. Herkenhoff, P.E.	Date	Registration No.

This document is proprietary and only for the use of Larson Engineering, Inc. Reproduction or use of this document in whole or in part for other than Larson Engineering, Inc., violates both company policy and law including contractual law, copyright law, and licensing. Written authorization from the above mentioned project owner or design engineer is necessary for any re-use of these documents

SECTION 00 01 10

TABLE OF CONTENTS

DOCUMENT/ SECTION	TITLE
00 01 01	Title Page
00 01 05	Certification Page
00 01 10	Table of Contents and List of Plans
00 31 32	Geotechnical Baseline Report (04.18.2024)
DIVISION 01 GENERAL REQUIREMENTS	
01 11 00	Summary of Work
01 40 00	Quality Control
01 50 00	Temporary Facilities and Controls
01 60 00	Protection, Repair and Cleaning
DIVISION 02 EXISTING CONDITIONS	
02 10 00	Selective Demolition
DIVISION 31 EARTHWORK	
31 10 00	Site Clearing
31 20 00	Excavation
31 20 00	Earthwork
31 25 00	Temporary Erosion Control
DIVISION 32 EXTERIOR IMPROVEMENTS	
32 05 00	Aggregates
32 10 00	Plant Mix Bituminous Pavement
32 20 00	Concrete Pavement

32 58 00	Landscaping

DIVISION 33 UTILITIES

33 10 00	Water Distribution
33 30 00	Sanitary Sewer
33 40 00	Storm Drainage System
33 42 00	Drain Tile
33 48 00	Insulation Over Utilities

DOCUMENT 00 31 32

GEOTECHNICAL BASELINE REPORT

1. GENERAL

A. Subsurface exploration, evaluation and recommendations have been performed at this site to assist in the design process.

2. REPORT

A. A copy of the report is included in this Section hereby referenced as Geotechnical Baseline Report (GBR). The report is described as follows:

TITLE:	**Report of Geotechnical Evaluation, Alexandria Apartments**
DATE:	**April 18, 2024**
PREPARED BY:	**American Engineering Testing**

B. The GBR is incorporated as a Contract Document.

3. TECHNICAL DATA

A. The GBR contains Technical Data as defined by Article 1 of the General Conditions.

B. Contractor may rely upon the accuracy of the Technical Data included in the GBR in accordance with the Supplementary Conditions and the terms of the GBR.

4. DIFFERING SUBSURFACE CONDITIONS

A. Differences between encountered conditions and conditions indicated in the GBR shall be reported to the Owner and Engineer in accordance with the General and Supplementary Conditions.

B. Possible adjustment to the Contract Time or Contract Price, or both, shall be in accordance with the General and Supplementary Conditions.

5. RELATIONSHIP

A. The Contractor shall be responsible for verifying and correlating relationships of report elevations to the plan and site elevations.

END OF DOCUMENT

REPORT OF GEOTECHNICAL EXPLORATION

Alexandria Apartments
Alexandria, Minnesota

AET Project No.
P-0030207

Date:
April 18, 2024

Prepared for:

Duininck

Geotechnical • Materials
Forensic • Environmental
Building Technology
Petrography/Chemistry

American Engineering Testing
3905 42nd Street North
Fargo, ND 58102
TeamAET.com • 701.232.1822

April 18, 2024 [Revised: March 5, 2025]

Duininck
408 6th Street
Prinsburg, MN 56281

Attn: Jason Ver Steeg, P.E.

RE: Alexandria Apartments
Alexandria, Minnesota
AET Report No. P-0030207

Mr. Ver Steeg:

American Engineering Testing, Inc. (AET) is pleased to present the results of our subsurface exploration program and geotechnical engineering review for your Alexandria Apartments project in Alexandria, Minnesota. These services were performed according to our proposal to you dated January 24, 2024.

We are submitting one copy of the report to you. Additional copies are being sent on your behalf as noted below.

Please contact us at (701) 232-1822 if you have any questions about the report. We can also be contacted for arranging construction observation and testing services during the earthwork phase.

Sincerely,
American Engineering Testing, Inc.

Josh Holmes, P.E.
Senior Engineer
jholmes@teamaet.com

Mark Blixt, P.E.
Engineer II
Mblixt@teamaet.com

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a Duly Licensed Professional Engineer under the Laws of the State of Minnesota.

Joshua A. Holmes, P.E.
Date: 3/5/25 Reg. No. 53424

This document shall not be reproduced, except in full, without written approval from American Engineering Testing, Inc.

TABLE OF CONTENTS

Page
TRANSMITTAL LETTER i
TABLE OF CONTENTS ii
1.0 INTRODUCTION 1
2.0 SCOPE OF SERVICES 1
3.0 PROJECT INFORMATION 1
4.0 SUBSURFACE EXPLORATION AND TESTING 2
4.1 Field Exploration Program 2
4.2 Laboratory Testing 2
5.0 SITE CONDITIONS 2
5.1 Surface Observations 2
5.2 Subsurface Soils/Geology 3
5.3 Groundwater 3
5.4 Review of Soil Properties 3
6.0 RECOMMENDATIONS 4
6.1 Building Grading 4
6.2 Foundation Design 6
6.3 Floor Slab Design 7
6.4 Exterior Backfill & Subsurface Drainage 8
6.5 Surface Drainage 9
6.6 Utilities 9
6.7 Pavements 10
7.0 CONSTRUCTION CONSIDERATIONS 13
7.1 Potential Difficulties 13
7.2 Excavation Backsloping 13
7.3 Observation and Testing 14
8.0 TEST STANDARDS 14
9.0 LIMITATIONS 14

STANDARD SHEETS
Floor Slab Moisture/Vapor Protection
Freezing Weather Effects on Building Construction

APPENDIX A – Geotechnical Field Exploration and Testing
Boring Log Notes
Unified Soil Classification System
Figure 1 - Boring Locations
Subsurface Boring Logs

APPENDIX B – Geotechnical Report Limitations and Guidelines for Use

1.0 INTRODUCTION

The proposed project will include construction of an apartment building, five townhouses, and two, 22-unit storage buildings within the properties of 924 3rd Ave E. and 401-405 Oak Street in Alexandria, Minnesota. To assist planning and design, you have authorized American Engineering Testing, Inc. (AET) to conduct a subsurface exploration program at the site, conduct soil laboratory testing, and perform a geotechnical engineering review for the project. This report presents the results of the above services and provides our engineering recommendations based on this data.

2.0 SCOPE OF SERVICES

AET's services were performed according to our proposal to you dated January 24, 2024, which you authorized on March 12, 2024. The authorized scope consists of the following.

- Eleven (11) standard penetration test borings to maximum depth of 24.5 feet.
- Soil laboratory testing
- Geotechnical engineering review based on the data and preparation of this report

These services are intended for geotechnical purposes only. The scope is not intended to explore for the presence or extent of environmental contamination in the soil or groundwater.

3.0 PROJECT INFORMATION

We understand the proposed apartment building will include an at grade parking level with three levels of wood framing above. The town houses are anticipated to be two story, slab on grade, wood framed structures. The storage buildings are anticipated to utilize traditional wood framing and siding or post framing with metal siding. Unless otherwise noted, the structures will be supported on standard shallow foundations.

Based on similar projects, we estimate column loads will not exceed 200 kips and wall loads will not exceed 8 kips per lineal foot. We assume the project will include cuts and fills on the order of 1.5 to 2 feet increase in grade to established finished floor elevation for individual structures.

Our foundation design assumptions include a minimum factor of safety of 3 with respect to the ultimate bearing capacity. We assume the structure will be able to tolerate total settlements of up to 1 inch, and differential settlements over a 30-foot distance of up to ¾ inch.

The above stated information represents our understanding of the proposed construction. This information is an integral part of our engineering review. It is important that you contact us if there are changes from that described so that we can evaluate whether modifications to our recommendations are appropriate.

4.0 SUBSURFACE EXPLORATION AND TESTING

4.1 Field Exploration Program

The subsurface exploration program conducted for the project consisted of eleven (11) standard penetration test borings. Please note that a 14.5 foot boring was eliminated from the planned scope. Number of borings, boring depths, and boring locations were discussed with the client. The logs of the borings and details of the methods used appear in Appendix A. The logs contain information concerning soil layering, soil classification, geologic origins, and moisture condition. A density description or consistency is also noted for the natural soils, which is based on the standard penetration resistance (N-value).

The boring locations are shown on Figure 1 in Appendix A. The borings were located relative to existing site features by AET personnel. The benchmark reference was the top nut of the fire hydrant located at the northeast corner of the site (reference boring diagram). The elevation of the temporary benchmark, as assigned by AET, is 200 feet.

4.2 Laboratory Testing

The laboratory test program included moisture-densities of native clay soils and #200 wash sieve analysis of native silt and granular soils. The test results appear in Appendix A on the individual boring logs adjacent to the samples upon which they were performed, or on the data sheets following the logs.

5.0 SITE CONDITIONS

5.1 Surface Observations

The site for the proposed structures was previously occupied by a ready-mix concrete batch plant. The majority of the site has concrete or gravel surfacing that was used for storage of products. Apparent aggregate base on the order of 3 to 4 inches was observed at borings B-1 to B-3. Concrete on the order of 3 to 8 inches was observed at remaining the boring locations.

The western portion of the site near the location of the proposed storage sheds was previously occupied by the batch plant structures. We otherwise assume the site has not been previously developed and does not include demolition material from prior occupancy or from other off-site locations. Surface drainage appears to flow north towards the municipal stormwater collection system. The elevation change between borings is approximately 8 feet.

5.2 Subsurface Soils/Geology

The overall subsurface soil profile at the borings generally consists of approximately 0.8 to 9 feet of apparent aggregate base (0.1 to 1.3 feet), buried topsoil, and/or fill overlying soft to stiff Collapsed Glacial Sediment (CGS) soils that extend to termination of borings. CGS soils primarily consist of lean clay and sandy lean clay having varying color, sand and gravel content, moisture content, and unit weight. Additional comment on the evaluation of recovered soil samples is presented within the report appendices.

5.3 Groundwater

While we did not encounter m groundwater during or at completion of drilling operations, select samples recovered during our exploration program were moist. The moisture content of lens soils and host clays can vary annually and per recent precipitation. Such soils and other regional dependent conditions may produce groundwater entry of project excavations. We direct your attention to other report sections and appendices concerning groundwater issues and subsurface drainage.

5.4 Review of Soil Properties

Through material composition, clay soils tend to swell with absorption of moisture. Site clays are primarily lean clay (CL) soils with relatively low swell potential. We do caution that saturated lean clay soils are susceptible to frost related movement.

6.0 RECOMMENDATIONS

6.1 Building Grading

6.1.1 Excavation

To prepare the building area for foundation and slab support, we recommend complete removal of existing concrete, apparent aggregate base, buried topsoil, and fill, thereby exposing the underlying native clay subgrade. This would result in excavation depths at the boring locations as shown in Table 1.

The depth/elevation indicated in Table 1 is based on the soil condition at the specific boring location. Since conditions will vary away from the boring location, it is recommended that AET geotechnical personnel observe and confirm the competency of the soils in the entire excavation bottom prior to new fill or footing placement.

Table 1: Recommended Excavation Depths Note 1

Boring Number	Existing Ground Elevation (feet, AET Datum)	Removal of Unsuitable Materials		
		Depth of Materials (feet)		Excavation Elevation (feet)
SB-1	201.3	1.6	Agg Base (3”) & Fill	199.7
SB-2	199.5	1	Agg Base (3”) & Fill	198.5
SB-3	200.3	1	Agg Base (4”) & Fill	199.3
SB-4	203.3	1	Concrete (7”) & Agg Base	202.3
SB-5	204.5	0.8	Concrete (8”) & Agg Base	203.7
SB-6	206.0	0.8	Concrete (7”) & Agg Base	205.2
SB-7	200.2	9	Concrete (6”), Agg Base, Buried Topsoil, & Fill	191.2
SB-8	198.0	1.4	Concrete (3”) & Agg Base	196.6
SB-9	198.1	1.1	Concrete (4.5”) & Agg Base	197.0
SB-10	198.1	9	Concrete (4.75”), Agg Base, & Fill	189.1
SB-11	199.0	6+	Concrete (6”), Agg Base, & Fill	Below 193.0

Note 1 Refer to report recommendations associated with excavation at, and within the vicinity of the soil borings.

Where the excavation extends below foundation grade, the excavation bottom and resultant engineered fill system must be oversized laterally beyond the planned outside edges of the foundations to properly support the loads exerted by that foundation. This excavation/engineered fill lateral extension should at least be equal to the vertical depth of fill needed to attain foundation grade at that location (i.e., 1:1 lateral oversize).

Select borings encountered significant fill depth that needs to be removed and replaced for support of project structures. In addition to the previously mentioned oversize below foundations, we recommend a minimum 2 horizontal to 1 vertical transition between native clay and engineered fill below floor slabs to minimize the potential for abrupt differential settlement.

6.1.2 Fill Placement and Compaction

Engineered fill for overall corrective earthwork and for support of project perimeter footings should consist of native, non-organic clay. Engineered fill placed interior to and above the base of perimeter frost footings should consist of granular soils which comply with the material properties listed for granular fill placement below floor slab construction. Clay fill may be used in lieu of granular fill below floor slab provided it is placed and compacted prior to foundation construction.

Unless otherwise directed by the report, you should temper engineered fill for correct moisture content and then place and compact individual lifts of engineered fill to 95% relative compaction to a standard Proctor. Clay fill should be moisture conditioned such that it is no less than 3 percent below and no more than 3 percent above optimum.

We understand the existing building will be demolished and materials will be crushed on site for reuse as engineered fill for support of building foundations, floor slabs, and pavements. Crushed fill material supporting floor slabs should meet the Section 6.3 graduation requirements. Additionally, crushed fill material supporting foundations and pavements should conform to Minnesota Department of Transportation (MnDOT) Specification Section 3138-2, Recycled Class 5 materials. We assume percentage crushed will be between 25 and 75 percent, with percent passing detailed within MnDOT Section 3138-4. Crushed fill supporting foundations should be compacted to no less than 98 percent of the standard Proctor dry density.

6.2 Foundation Design

The structure can be supported on conventional spread foundations placed on native non-organic soil or engineered fill. We recommend perimeter foundations for heated building space is placed such that the bottom is a minimum of 5 feet below exterior grade. We recommend foundations for unheated building space (such as canopy foundations) be extended to a minimum of 7 feet below exterior grade.

Based on the conditions encountered, it is our opinion frost-depth exterior strip and column footings can be designed based on a net maximum allowable soil bearing pressure of **2,000 psf.** Isolated interior column footings may be designed based on a net maximum allowable soil bearing pressure of **2,500 psf**. It is our judgment these design pressures will have a factor of safety of at least 3 against the ultimate bearing capacity.

Foundations designed for this report's pressure recommendations and loaded per report assumptions may experience long term, total settlement of approximately ½ to 1 inch with the upper estimate more probable. Likewise, project footings may experience differential settlement on the order of ½ inch with greatest movement occurring between adjacent footings of greatest load variation.

The proposed structure will include three levels of wood framing. It has historically been assumed that framing shortening can be as much as ¼" per floor. We note that this potential movement would be in addition to the foundation settlement estimates noted above. While we understand newer code allow for 6 levels of wood framing, we recommend you discuss such with the structural engineer to confirm it has been considered within the design.

We assume the finished floor for the proposed apartments will be established at or near 199 feet. Therefore, we estimate perimeter frost footings will be constructed at or near 194 feet. Similarly, we anticipate interior footings will be established at or near elevation 196 feet. This should result in the founding of project footings on native soils or engineered fill.

Retaining walls or foundation walls with unbalanced earthen fill will experience lateral loading from retained soils. You may model this lateral loading as an equivalent earth pressure applied to the foundation wall providing site geometric and related conditions complies with the parameters supporting such modeling. We recommend use of Table 2 "at-rest" equivalent fluid earth pressures for establishing lateral loading of foundations walls with unbalanced earthen fill.

Table 2: Retained Soil - Equivalent Fluid Weight / Coefficient of Friction

Soil Type	***"At Rest" Condition*** (pcf) [1]	***"Active" Condition*** (pcf) [1]	***"Passive Condition*** (pcf) [1]	***Coefficient of Friction*** [2]
Lean Clay (CL)	90	80	140	0.30
Sand (SP, SP-SM)	65	45	250	0.45

1 The recommendations for equivalent fluid weight based solely on assumed conditions with respect to sloping ground and/or presence of surcharge load. We caution design professional that actual loads imparted to the foundation will be dependent on soil conditions, site geometric considerations and surcharge loads imparted to the structure.

2 The determination of resistance to sliding determined based on multiplication of the respective coefficient of friction by the effective vertical stress occurring at the elevation of interest.

6.3 Floor Slab Design

For concrete slab design, we estimate the native clay subgrade should provide a Modulus of Subgrade Reaction (k-value) of at least 75 pci. This modulus can be increased to 150 pci providing a minimum of 24 inches of granular fill supports floor construction.

Fill placement for the floor slab should consist of granular fill or crushed concrete, providing such fill has 100 percent material passing the 1-inch sieve opening, no more than 50 percent materials passing the No. 40 U.S. Sieve opening, and no more than 12 percent material passing the No. 200 U.S. Sieve opening.

The final 6 inches of fill below the concrete floor slab should consist of a "pit run" or processed sand (sand cushion) with 100 percent material passing the 1-inch sieve opening, no more than 50 percent material passing the No. 40 U.S. Sieve opening, and no more than 5 percent material passing the No. 200 U.S. Sieve opening. The moisture content of the sand cushion should be tempered to the same limiting values as for the interior granular fill. As placed, the sand cushion should be compacted until there is no more visually discernable settlement. We anticipate such compaction will be on the order or greater than 95 percent of the standard Proctor maximum dry density.

You should isolate floor slabs from other building components. It is our opinion such isolation should include installation of a ½ inch thick expansion joint between the floor and walls, and/or columns to minimize binding between construction materials. This construction should also include application of a compatible sealant after curing of the floor slab to reduce moisture penetration though the expansion joint. As a minimum, you should install bond breaker to isolate and reduce binding between building components.

For recommendations pertaining to moisture and vapor protection of interior floor slabs, we refer you to the attached standard sheet entitled “Floor Slab Moisture/Vapor Protection.”

6.4 Exterior Backfill & Subsurface Drainage

Many of the on-site soils are at least moderately frost susceptible. Because of this, certain design considerations are needed to mitigate these frost effects. For details, we refer you to the attached sheet entitled “Freezing Weather Effects on Building Construction.”

Exterior fill placement around the foundation and associated final grading adjacent to the building can significantly impact the performance of a structure. We understand the project ***will not*** include a basement level or foundation walls retaining soils.

While not anticipated for this project, basement construction should include subsurface drainage at the base of foundation walls to limit moisture accumulation within granular soils placed below interior floors. As a general guideline, such drainage consists of a geotextile and coarse drainage encased slotted or perforated pipe extending to sump basin(s). We recommend that exterior drainage (if any) be separated from interior drainage to reduce risk of cross flow and moisture infiltration below structure interior. The project Architect and/or Structural Engineer of Record should determine the actual need for subsurface drainage.

Exterior backfill of at-grade foundations walls should consist of native, non-organic soils for at-grade construction. Placement of exterior backfill against at-grade foundation walls should be performed concurrent with interior backfill to minimize differential loading, rotation and/or movement of the wall system.

Exterior backfill for any retaining walls should consist of a native, coarse alluvium or “pit run” granular soil with a fine content equal to or less than 12 percent passing the No. 200 US Sieve opening (i.e. fill extending to within 2 feet of final grade). The final one and one half to two feet of exterior backfill within lawn areas should consist of clay and topsoil. Exterior backfill below sidewalks and pavements should consist of a free draining aggregate base as recommended for the respective construction.

Unless otherwise directed by the report, you should temper engineered fill for correct moisture content and then place and compact individual lifts of engineered fill to 95% relative compaction to a standard Proctor. Clay fill should be moisture conditioned such that it is no less than 3 percent below and no more than 3 percent above optimum.

You should limit placement of exterior backfill against below grade foundations until lateral restraint of the foundation walls has been installed to the satisfaction of the Structural Engineer. Final grading of exterior backfill should provide sufficient grade for positive drainage from structure. We presented within other report section recommendations for final grading.

6.5 Surface Drainage

You should maintain positive drainage during and after construction of project and eliminate ponding of water on site soils. We recommend you include provisions within construction documents for positive drainage of site. You should install sumps at critical areas around project to assist in removal of seepage and runoff from site.

You should maintain the moisture content of site clays as close to optimum as possible as excessive changes can cause shrinkage or expansion of the soil, and lead to distress of construction.

We understand sidewalks, curbing, pavements, and lawn will direct drainage from structure. You should grade exterior to slope from building(s). We recommend that you provide a 5 percent gradient within 10 feet of building for drainage from lawn, and 2 percent minimum gradient from building for drainage of sidewalks / pavements. All pavements should drain to on-site storm collection, municipal collection system, or roadside ditching.

You should direct roof runoff from building by a system of interior roof and scupper drains, or rain gutters, down spouts and splash pads. It is our opinion interior roof drains plumbed directly to the storm water piping system provide the most favorable method of conveying drainage from the roof as interior drains do not freeze or discharge runoff onto exterior sidewalks and pavements.

6.6 Utilities

Placement of underground utilities typically includes granular bedding for support of piped systems. Placement of granular soils within underground utility construction promotes migration of subsurface moisture towards and below the bearing stratum of footing construction. This, in turn, can lead to moisture uptake by native clays producing heave of construction, loss of shear strength and/or differential settlement of footing and floors.

Therefore, we recommend that you eliminate placement of all granular bedding soils within 10 feet of project excavations creating a zone where cohesive soils or lean concrete (i.e. controlled density fill) is used for all soil replacement within utility trenches. This “zone of control” should significantly reduce moisture migration below the project foundations. All clay bedding fill within this zone should be placed and compacted as recommended for utility trench backfill.

In lieu of placing clay soils within the above referenced “zone of control”, alternate means of interception and blockage of drainage along site utilities may be provided to minimize moisture migration into and below structure foundation and floors.

Wetter soils from depth should be placed in the lower portion of utility trench construction while dryer soils from near ground surface should be placed in upper most portion of trench fill. You should temper the utility trench fill for correct moisture content and then place and compact individual lifts of trench fill to criteria established within the report appendices.
While it is our opinion small pumps should handle seepage resulting from utility construction, we caution that interception of a major water bearing stratum may result in significantly greater seepage into utility excavations. Therefore, we recommend that you include provisions within construction document for pumping of seepage from utility excavations.

6.7 Pavements

We assume project traffic will be separated into two distinct classes; heavy duty traffic comprised of buses, delivery trucks, refuse trucks, and light duty traffic comprised of passenger vehicles. Our pavement recommendations are predicated on separation of this traffic.

We understand project grading will include mass earthwork activities to establish the final grade of site and expect preparation of the pavement subgrade will occur with corrective earthwork for site. In our opinion, you should remove all existing concrete, aggregate base, topsoil, and fill from below sidewalk and pavement construction. We anticipate such removal from the pavements below is not feasible for this project. Therefore we recommend removing concrete, aggregate base, topsoil and organic clay within 3 feet of top of pavement elevation.

Subgrade preparation will need to establish a stable base for construction of project sidewalks and pavements. The cohesive soils underlying the topsoil can lose structural capacity with uptake of moisture, are easily disturbed, and may rut with excessive movement of construction equipment across bare ground. We recommend you scarify, moisture temper, and recompact no less than 8 inches of exposed subgrade prior to placement of engineered fill or aggregate base.

Clay engineered fill should be tempered for moisture and compacted as described in Section 6.1.2 of this report. Aggregate base should be compacted in maximum 6 inch lifts to no less than 98 percent of the standard Proctor dry density. We understand concrete from demolished site structures will be crushed for use as aggregate base below pavements. It is our opinion that crushed material confirm to Minnesota Department of Transportation (MnDOT) Specification Section 3138-2, Recycled Class 5 materials. We assume percentage crushed will be between 25 and 75 percent, with percent passing detailed within MnDOT Section 3138-4.

You should install geotextile separation fabric between the exposed cohesive soils and aggregate base section to limit this displacement / distress. It is our opinion this geotextile should consist of a fabric with a machine and cross direction wide width tensile strength equal to or greater than 110 lbs/in minimum average roll value (MARV).

The pavement contractor should provide you with a detailed layout diagram showing how they intend to place the geotextile. Geotextile panels should be oriented parallel with aggregate placement and occur in such a manner that the overall number of individual panels are kept to a minimum. As placed, individual panels of geotextile should have a width equal to or greater than 12 feet. The paving contractor should overlap longitudinal and butt seams of adjacent panels a minimum of 18 inches with such joints oriented to follow traffic movement (shingled profile with traffic). We recommend anchoring individual panels of geotextile to ground with systems designed to maintain position of placement panels.

Design must consider load and movement of traffic across pavement subgrade structure. With moving traffic, design must provide sufficient paving materials to resist deflection and reflective loading imparted by vehicle wheels. Static vehicles convey loads downward into the lower section of the pavement and subgrade soils. Pavement design for parked vehicles must also consider and provide adequate bearing strength to resist soil compression/displacement.

As your facility includes both types of traffic, we conclude project pavement section must provide sufficient section capacity for moving traffic while minimizing the loads transferred by static vehicles parked on site. We present with Table 3 our estimate of pavement structure necessary to support the assumed traffic loads and distribution as noted within this report.

All pavement recommendations assume the subgrade soils and aggregate section below paved surfaces, if any, drain to subsurface piping for eventual discharge into storm sewer, above grade to ditching, or similar acceptable systems. Lack of drainage from both the surface of the pavement and subsurface will significantly reduce the capacity and longevity of the pavements.

We recommend pavements receive annual maintenance, as a minimum, to correct damages to the pavement structure, clean and infill cracks which develop, and repair or resurface areas which exhibit reduced subgrade performance. The lack of maintenance can lead to moisture infiltration of the pavement structure and softening of the subgrade soils. This, in turn, can degrade and result in poorly performing pavements with shortened life expectancy.

Table 3: Recommended Pavements *

Parameter	Light Duty Pavement Note A	Heavy Duty Pavement Note B	Concrete Pavement
Estimated Subgrade CBR (Yearly/Spring)	6/3	6/3	6/3
Subgrade Scarification (in)	8	8	8
Place Geotextile Separation Fabric	Yes	Yes	Yes
Untreated Aggregate Base Note 1 (in)	6	10	6
Asphalt Concrete Base Note 2	One - 2 inch lift	Two - 2 inch lifts, 4 inches total	NA
Asphalt Concrete Wear Note 2	One 2 inch lift	One 2 inch lift	NA
Est. Subgrade Support *k*	NA	NA	150 psi
Est. Maximum Stress from Rear Tandem Axle	NA	NA	280 psi
Stress Ratio (*based on 600 psi flexural*)	NA	NA	0.47
Heavy Duty Concrete Pavement (in)	NA	NA	Min. 7
Light Duty Concrete Pavement (in)	NA	NA	Min. 5

Note A Pavement construction for light duty passenger vehicles equal to or less than 10,000 lbs total gross weight.
Note B Pavement construction for heavy duty vehicles. No distinction between drive lanes and parking areas.
Note 1 Aggregate base shall conform to Minnesota Department of Transportation (MnDOT) Specification Section 3138-2 and Table 3138-4, Recycled Class 5 materials.
Note 2 Asphalt Concrete Base and Wear shall conform to MnDOT Specification Section 2360.
Note 3 Portland cement concrete pavement proportioned such that the 28 day flexural strength is equal to or greater than 600 pounds per square inch (psi).
* All pavement construction shall be completed using NAPA or ACI approved methods to optimize the performance of in-place construction. We recommend that the construction specifications include necessary controls to eliminate practices which lead to poorly performing pavements.

7.0 CONSTRUCTION CONSIDERATIONS

7.1 Potential Difficulties

7.1.1 Runoff Water in Excavation

Water can be expected to collect in the excavation bottom during times of inclement weather or snow melt. To allow observation of the excavation bottom, to reduce the potential for soil disturbance, and to facilitate filling operations, we recommend water be removed from within the excavation during construction. Based on the soils encountered, we anticipate the groundwater can be handled with conventional sump pumping.

7.1.2 Disturbance of Soils

The on-site soils can be disturbed under construction traffic, especially if the soils are wet. If soils become disturbed, they should be subcut to the underlying undisturbed soils. The subcut soils can then be dried and recompacted back into place, or they should be removed and replaced with drier imported fill.

Native soils and any fill placed for support of footings (if required) can weaken and be displaced by construction operations. ***You should consider and, where necessary, place a lean concrete "mud slab" below project footing and floor slab construction if site conditions are / become disturbed, or if supporting soils are wet and easily compromised by site activities. This placement will reduce loss of foundation support and minimize future soil removal due to continued disturbance.***

The lean concrete for the "mud slab" should consist of a cementitious sand slurry mixture designed to provide a 28 day compressive strength on the order or slightly in excess of 300 pounds per square inch (psi). Compressive strengths below this threshold can result in premature failure of the protective system. Compressive strengths significantly in excess of this threshold make installation of staking and plumbing / electrical systems difficult. You should place the lean concrete mixture with a slump of between 5 and 7 inches.

7.2 Excavation Backsloping

If excavation faces are not retained, the excavations should maintain maximum allowable slopes in accordance with *OSHA Regulations (Standards 29 CFR), Part 1926, Subpart P, "Excavations"* (can be found on www.osha.gov). Even with the required OSHA sloping, water seepage or surface runoff can potentially induce side slope erosion or sloughing which could require slope maintenance.

7.3 Observation and Testing

The recommendations in this report are based on the subsurface conditions found at our test boring locations. Since the soil conditions can be expected to vary away from the soil boring locations, we recommend on-site observation by a geotechnical engineer/technician during construction to evaluate these potential changes. Soil density testing should also be performed on new fill placed in order to document that project specifications for compaction have been satisfied.

8.0 TEST STANDARDS

When we refer to an ASTM Standard in this report, we mean that our services were performed in general accordance with that standard. Compliance with any other standards referenced within the specified standard is neither inferred nor implied.

9.0 LIMITATIONS

Within the limitations of scope, budget, and schedule, we have endeavored to provide our services according to generally accepted geotechnical engineering practices at this time and location. Other than this, no warranty, express or implied, is intended.

Important information regarding risk management and proper use of this report is given in Appendix B entitled “Geotechnical Report Limitations and Guidelines for Use.”

Standard Sheets

FLOOR SLAB MOISTURE / VAPOR PROTECTION

GENERAL

Floor slab design relative to moisture / vapor protection should consider the type and location of two elements, a granular layer and a vapor membrane (vapor retarder, water resistant barrier or vapor barrier). In the following sections, the pros and cons of the possible options regarding these elements will be presented, such that you and your specifier can make an engineering decision based on the benefits and costs of the choices.

GRANULAR LAYER

In American Concrete Institute (ACI) 302.1R-04, a "base material" is recommended over the vapor membrane, rather than the conventional clean "sand cushion" material. The base layer should be a minimum of 4 inches (100 mm) thick, trimmable, compactable, granular fill (not sand), a so-called crusher-run material. Usually graded from 1½ inches to 2 inches (38 to 50 mm) down to rock dust is suitable. Following compaction, the surface can be choked off with a fine-grade material. We refer you to ACI 302.1R-04 for additional details regarding the requirements for the base material.

In cases where potential static water levels or significant perched water sources appear near or above the floor slab, an under-floor drainage system may be needed wherein a draintile system is placed within a thicker clean sand or gravel layer. Such a system should be properly engineered depending on subgrade soil types and rate/head of water inflow.

VAPOR MEMBRANE

The need for a vapor membrane depends on whether the floor slab will have a vapor sensitive covering, will have vapor sensitive items stored on the slab, or if the space above the slab will be a humidity-controlled area. If the project does not have this vapor sensitivity or moisture control need, placement of a vapor membrane may not be necessary. Your decision will then relate to whether to use the ACI base material or a conventional sand cushion layer. However, if any of the above sensitivity issues apply, placement of a vapor membrane is recommended. Some floor covering systems (adhesives and flooring materials) require installation of a vapor membrane to limit the slab moisture content as a condition of their warranty.

VAPOR MEMBRANE / GRANULAR LAYER PLACEMENT

A number of issues should be considered when deciding whether to place the vapor membrane above or below the granular layer. The benefits of placing the slab on a granular layer, with the vapor membrane placed **below** the granular layer, include **reduction** of the following:

- Slab curling during the curing and drying process.
- Time of bleeding, which allows for quicker finishing.
- Vapor membrane puncturing.
- Surface blistering or delamination caused by an extended bleeding period.
- Cracking caused by plastic or drying shrinkage.

The benefits of placing the vapor membrane over the granular layer include the following:

- A lower moisture emission rate is achieved faster.
- Eliminates a potential water reservoir within the granular layer above the membrane.
- Provides a "slip surface", thereby reducing slab restraint and the associated random cracking.

If a membrane is to be used in conjunction with a granular layer, the approach recommended depends on slab usage and the construction schedule. The vapor membrane should be placed above the granular layer when:

- Vapor sensitive floor covering systems are used or vapor sensitive items will be directly placed on the slab.
- The area will be humidity controlled, but the slab will be placed before the building is enclosed and sealed from rain.
- Required by a floor covering manufacturer's system warranty.

The vapor membrane should be placed below the granular layer when:

- Used in humidity-controlled areas (without vapor sensitive coverings/stored items), with the roof membrane in place, and the building enclosed to the point where precipitation will not intrude into the slab area. Consideration should be given to slight sloping of the membrane to edges where draintile or other disposal methods can alleviate potential water sources, such as pipe or roof leaks, foundation wall damp proofing failure, fire sprinkler system activation, etc.

There may be cases where membrane placement may have a detrimental effect on the subgrade support system (e.g., expansive soils). In these cases, your decision will need to weigh the cost of subgrade options & the performance risks.

FREEZING WEATHER EFFECTS ON BUILDING CONSTRUCTION

GENERAL

Because water expands upon freezing and soils contain water, soils which are allowed to freeze will heave and lose density. Upon thawing, these soils will not regain their original strength and density. The extent of heave and density/strength loss depends on the soil type and moisture condition. Heave is greater in soils with higher percentages of fines (silts/clays). High silt content soils are most susceptible, due to their high capillary rise potential which can create ice lenses. Fine grained soils generally heave about 1/4" to 3/8" for each foot of frost penetration. This can translate to 1" to 2" of total frost heave. This total amount can be significantly greater if ice lensing occurs.

DESIGN CONSIDERATIONS

Clayey and silty soils can be used as perimeter backfill, although the effect of their poor drainage and frost properties should be considered. Basement areas will have special drainage and lateral load requirements which are not discussed here. Frost heave may be critical in doorway areas. Stoops or sidewalks adjacent to doorways could be designed as structural slabs supported on frost footings with void spaces below. With this design, movements may then occur between the structural slab and the adjacent on-grade slabs. Non-frost susceptible sands (with less than 5% passing a #200 sieve) can be used below such areas. Depending on the function of surrounding areas, the sand layer may need a thickness transition away from the area where movement is critical. With sand placement over slower draining soils, subsurface drainage would be needed for the sand layer. High density extruded insulation could be used within the sand to reduce frost penetration, thereby reducing the sand thickness needed. We caution that insulation placed near the surface can increase the potential for ice glazing of the surface.

The possible effects of adfreezing should be considered if clayey or silty soils are used as backfill. Adfreezing occurs when backfill adheres to rough surfaced foundation walls and lifts the wall as it freezes and heaves. This occurrence is most common with masonry block walls, unheated or poorly heated building situations and clay backfill. The potential is also increased where backfill soils are poorly compacted and become saturated. The risk of adfreezing can be decreased by placing a low friction separating layer between the wall and backfill.

Adfreezing can occur on exterior piers (such as deck, fence or other similar pier footings), even if a smooth surface is provided. This is more likely in poor drainage situations where soils become saturated. Additional footing embedment and/or widened footings below the frost zones (which include tensile reinforcement) can be used to resist uplift forces. Specific designs would require individual analysis.

CONSTRUCTION CONSIDERATIONS

Foundations, slabs and other improvements which may be affected by frost movements should be insulated from frost penetration during freezing weather. If filling takes place during freezing weather, all frozen soils, snow and ice should be stripped from areas to be filled prior to new fill placement. The new fill should not be allowed to freeze during transit, placement or compaction. This should be considered in the project scheduling, budgeting and quantity estimating. It is usually beneficial to perform cold weather earthwork operations in small areas where grade can be attained quickly rather than working larger areas where a greater amount of frost stripping may be needed. If slab subgrade areas freeze, we recommend the subgrade be thawed prior to floor slab placement. The frost action may also require reworking and recompaction of the thawed subgrade.

Appendix A

Geotechnical Field Exploration and Testing
Boring Log Notes
Unified Soil Classification System
Figure 1 – Boring Locations
Subsurface Boring Logs

Appendix A
Geotechnical Field Exploration and Testing
Report No. P-0030207

A.1 FIELD EXPLORATION

The subsurface conditions at the site were explored by drilling and sampling eleven (11) standard penetration test borings. The locations of the borings appear on Figure 1, preceding the Subsurface Boring Logs in this appendix.

A.2 SAMPLING METHODS

A.2.1 Split-Spoon Samples (SS) - Calibrated to N_{60} Values

Standard penetration (split-spoon) samples were collected in general accordance with ASTM: D1586 with one primary modification. The ASTM test method consists of driving a 2-inch O.D. split-barrel sampler into the in-situ soil with a 140-pound hammer dropped from a height of 30 inches. The sampler is driven a total of 18 inches into the soil. After an initial set of 6 inches, the number of hammer blows to drive the sampler the final 12 inches is known as the standard penetration resistance or N-value. Our method uses a modified hammer weight, which is determined by measuring the system energy using a Pile Driving Analyzer (PDA) and an instrumented rod.

In the past, standard penetration N-value tests were performed using a rope and cathead for the lift and drop system. The energy transferred to the split-spoon sampler was typically limited to about 60% of its potential energy due to the friction inherent in this system. This converted energy then provides what is known as an N_{60} blow count.

Most drill rigs today incorporate an automatic hammer lift and drop system, which has higher energy efficiency and subsequently results in lower N-values than the traditional N_{60} values. We use a Pile Driving Analyzer (PDA) and an instrumented rod to measure the actual energy generated by the automatic hammer system. The drill rig (AET rig number 108) we used for this project has a measured energy transfer ratio of 76%. The N-values reported on the boring logs and the corresponding relative densities and consistencies are from the field blow counts and have not been adjusted to N_{60} values.

A.2.2 Disturbed Samples (DS)/Spin-up Samples (SU)

Sample types described as “DS” or “SU” on the boring logs are disturbed samples, which are taken from the flights of the auger. Because the auger disturbs the samples, possible soil layering and contact depths should be considered approximate.

A.2.3 Sampling Limitations

Unless actually observed in a sample, contacts between soil layers are estimated based on the spacing of samples and the action of drilling tools. Cobbles, boulders, and other large objects generally cannot be recovered from test borings, and they may be present in the ground even if they are not noted on the boring logs.

Determining the thickness of “topsoil” layers is usually limited, due to variations in topsoil definition, sample recovery, and other factors. Visual-manual description often relies on color for determination, and transitioning changes can account for significant variation in thickness judgment. Accordingly, the topsoil thickness presented on the logs should not be the sole basis for calculating topsoil stripping depths and volumes. If more accurate information is needed relating to thickness and topsoil quality definition, alternate methods of sample retrieval and testing should be employed.

A.3 CLASSIFICATION METHODS

Soil descriptions shown on the boring logs are based on the Unified Soil Classification (USC) system. The USC system is described in ASTM: D2487 and D2488. Where laboratory classification tests (sieve analysis or Atterberg Limits) have been performed, accurate classifications per ASTM: D2487 are possible. Otherwise, soil descriptions shown on the boring logs are visual-manual judgments. Charts are attached which provide information on the USC system, the descriptive terminology, and the symbols used on the boring logs.

The boring logs include descriptions of apparent geology. The geologic depositional origin of each soil layer is interpreted primarily by observation of the soil samples, which can be limited. Observations of the surrounding topography, vegetation, and development can sometimes aid this judgment.

A.4 WATER LEVEL MEASUREMENTS

The groundwater level measurements are shown at the bottom of the boring logs. The following information appears under "Water Level Measurements" on the logs:

- Date and Time of measurement
- Sampled Depth: lowest depth of soil sampling at the time of measurement
- Casing Depth: depth to bottom of casing or hollow-stem auger at time of measurement
- Cave-in Depth: depth at which measuring tape stops in the borehole
- Water Level: depth in the borehole where free water is encountered
- Drilling Fluid Level: same as Water Level, except that the liquid in the borehole is drilling fluid

The true location of the water table at the boring locations may be different than the water levels measured in the boreholes. This is possible because there are several factors that can affect the water level measurements in the borehole. Some of these factors include: permeability of each soil layer in profile, presence of perched water, amount of time between water level readings, presence of drilling fluid, weather conditions, and use of borehole casing.

A.5 LABORATORY TEST METHODS

A.5.1 Water Content Tests

Conducted per AET Procedure 01-LAB-010, which is performed in general accordance with ASTM: D2216 and AASHTO: T265.

A.5.2 Sieve Analysis of Soils (thru #200 Sieve)

Conducted per AET Procedure 01-LAB-040, which is performed in general conformance with ASTM: D6913, Method A.

A.6 TEST STANDARD LIMITATIONS

Field and laboratory testing is done in general conformance with the described procedures. Compliance with any other standards referenced within the specified standard is neither inferred nor implied.

A.7 SAMPLE STORAGE

Unless notified to do otherwise, we routinely retain representative samples of the soils recovered from the borings for a period of 30 days.

BORING LOG NOTES

DRILLING AND SAMPLING SYMBOLS

Symbol	Definition
B,H,N:	Size of flush-joint casing
CA:	Crew Assistant (initials)
CAS:	Pipe casing, number indicates nominal diameter in inches
CC:	Crew Chief (initials)
COT:	Clean-out tube
DC:	Drive casing; number indicates diameter in inches
DM:	Drilling mud or bentonite slurry
DR:	Driller (initials)
DS:	Disturbed sample from auger flights
FA:	Flight auger; number indicates outside diameter in inches
HA:	Hand auger; number indicates outside diameter
HSA:	Hollow stem auger; number indicates inside diameter in inches
LG:	Field logger (initials)
MC:	Column used to describe moisture condition of samples and for the ground water level symbols
N (BPF):	Standard penetration resistance (N-value) in blows per foot (see notes)
NQ:	NQ wireline core barrel
PQ:	PQ wireline core barrel
RD:	Rotary drilling with fluid and roller or drag bit
REC:	In split-spoon (see notes) and thin-walled tube sampling, the recovered length (in inches) of sample. In rock coring, the length of core recovered (expressed as percent of the total core run). Zero indicates no sample recovered.
REV:	Revert drilling fluid
SS:	Standard split-spoon sampler (steel; 1d" is inside diameter; 2" outside diameter); unless indicated otherwise
SU	Spin-up sample from hollow stem auger
TW:	Thin-walled tube; number indicates inside diameter in inches
WASH:	Sample of material obtained by screening returning rotary drilling fluid or by which has collected inside the borehole after Afalling@ through drilling fluid
WH:	Sampler advanced by static weight of drill rod and 140-pound hammer
WR:	Sampler advanced by static weight of drill rod
94mm:	94 millimeter wireline core barrel
▼:	Water level directly measured in boring
▽:	Estimated water level based solely on sample appearance

TEST SYMBOLS

Symbol	Definition
CONS:	One-dimensional consolidation test
DEN:	Dry density, pcf
DST:	Direct shear test
E:	Pressuremeter Modulus, tsf
HYD:	Hydrometer analysis
LL:	Liquid Limit, %
LP:	Pressuremeter Limit Pressure, tsf
OC:	Organic Content, %
PERM:	Coefficient of permeability (K) test; F - Field; L - Laboratory
PL:	Plastic Limit, %
q_p:	Pocket Penetrometer strength, tsf (approximate)
q_c:	Static cone bearing pressure, tsf
q_u:	Unconfined compressive strength, psf
R:	Electrical Resistivity, ohm-cms
RQD:	Rock Quality Designator in percent (aggregate length of core pieces 4" or more in length as a percent of total core run)
SA:	Sieve analysis
TRX:	Triaxial compression test
VSR:	Vane shear strength, remoulded (field), psf
VSU:	Vane shear strength, undisturbed (field), psf
WC:	Water content, as percent of dry weight
%-200:	Percent of material finer than #200 sieve

STANDARD PENETRATION TEST NOTES

The standard penetration test consists of driving the sampler with a 140 pound hammer and counting the number of blows applied in each of three 6" increments of penetration. If the sampler is driven less than 18" (usually in highly resistant material), permitted in ASTM:D1586, the blows for each complete 6" increment and for each partial increment is on the boring log. For partial increments, the number of blows is shown to the nearest 0.1' below the slash.

The length of sample recovered, as shown on the "REC" column, may be greater than the distance indicated in the N column. The disparity is because the N-value is recorded below the initial 6" set (unless partial penetration defined in ASTM:D1586 is encountered) whereas the length of sample recovered is for the entire sampler drive (which may even extend more than 18").

UNIFIED SOIL CLASSIFICATION SYSTEM
ASTM Designations: D 2487, D2488

AMERICAN ENGINEERING TESTING, INC.

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification: Group Symbol	Soil Classification: Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	Cu≥4 and 1≤Cc≤3[E]	GW	Well graded gravel[F]
			Cu<4 and/or 1>Cc>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]	Cu≥6 and 1≤Cc≤3[E]	SW	Well-graded sand[I]
			Cu<6 and/or 1>Cc>3[E]	SP	Poorly-graded sand[I]
		Sands with Fines more than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines classify as CL or CH	SC	Clayey sand[G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve (see Plasticity Chart below)	Silts and Clays Liquid limit less than 50	inorganic	PI>7 and 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	Liquid limit–oven dried / Liquid limit – not dried <0.75	OL	Organic clay[K,L,M,N] Organic silt[K,L,M,O]
	Silts and 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	Liquid limit–oven dried / Liquid limit – not dried <0.75	OH	Organic clay[K,L,M,P] Organic silt[K,L,M,Q]
Highly organic soil			Primarily organic matter, dark in color, and organic in odor	PT	Peat[R]

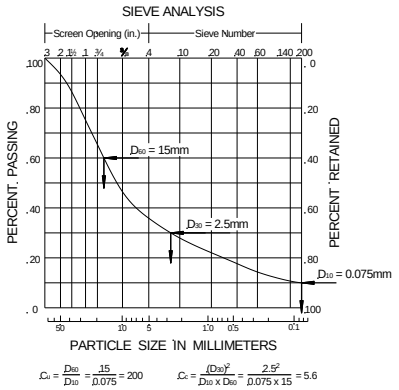
Notes

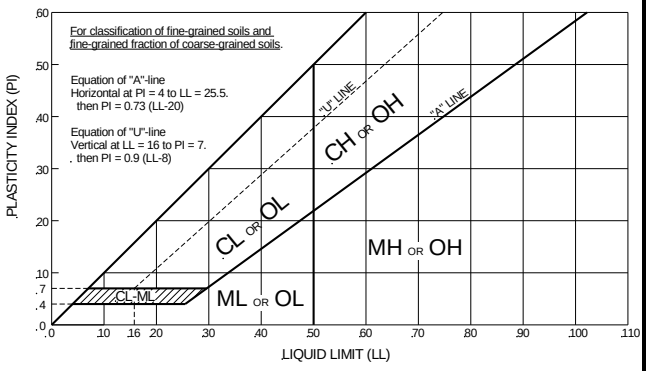
[A]Based on the material passing the 3-in (75-mm) sieve.
[B]If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C]Gravels with 5 to 12% fines require dual symbols:
- GW-GM well-graded gravel with silt
- GW-GC well-graded gravel with clay
- GP-GM 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]$Cu = D_{60} / D_{10}$, $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F]If soil contains ≥15% sand, add "with sand" to group name.
[G]If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H]If fines are organic, add "with organic fines" to group name.
[I]If soil contains ≥15% gravel, add "with gravel" to group name.
[J]If Atterberg limits plot is hatched area, soil is a CL-ML silty clay.
[K]If soil 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 soil 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 or plots below "A" line.
[P]PI plots on or above "A" line.
[Q]PI plots below "A" line.
[R]Fiber Content description shown below.





Plasticity Chart

ADDITIONAL TERMINOLOGY NOTES USED BY AET FOR SOIL IDENTIFICATION AND DESCRIPTION

Grain Size

Term	Particle Size
Boulders	Over 12"
Cobbles	3" to 12"
Gravel	#4 sieve to 3"
Sand	#200 to #4 sieve
Fines (silt & clay)	Pass #200 sieve

Gravel Percentages

Term	Percent
A Little Gravel	3% - 14%
With Gravel	15% - 29%
Gravelly	30% - 50%

Consistency of Plastic Soils

Term	N-Value, BPF
Very Soft	less than 2
Soft	2 - 4
Firm	5 - 8
Stiff	9 - 15
Very Stiff	16 - 30
Hard	Greater than 30

Relative Density of Non-Plastic Soils

Term	N-Value, BPF
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	Greater than 50

Moisture/Frost Condition (MC Column)

- D (Dry): Absence of moisture, dusty, dry to touch.
- M (Moist): Damp, although free water not visible. Soil may still have a high water content (over "optimum").
- W (Wet/ Waterbearing): Free water visible, intended to describe non-plastic soils. Waterbearing usually relates to sands and sand with silt.
- F (Frozen): Soil frozen

Layering Notes

- Laminations: Layers less than ½" thick of differing material or color.
- Lenses: Pockets or layers greater than ½" thick of differing material or color.

Peat Description

Term	Fiber Content (Visual Estimate)
Fibric Peat:	Greater than 67%
Hemic Peat:	33 – 67%
Sapric Peat:	Less than 33%

Organic Description (if no lab tests)

Soils are described as *organic*, if soil is not peat and is judged to have sufficient organic fines content to influence the Liquid Limit properties. *Slightly organic* used for borderline cases.

Root Inclusions

- With roots: Judged to have sufficient quantity of roots to influence the soil properties.
- Trace roots: Small roots present, but not judged to be in sufficient quantity to significantly affect soil properties.

Alexandria Apartments

AET Project #P-0030207

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-01 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **201.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
1	3" - SILTY SAND WITH GRAVEL, fine to coarse grained, brown		M	AS						
2	FILL/TOPSOIL, SANDY CLAY, dark brown									
	LEAN CLAY, trace sand, brown, firm to stiff, (CL)									
3		9	M	SS	18	3.3	14	122		
4										
5		11	M	SS	20	3.0	13	123		
6										
7										
8		7	M	SS	20	1.1	13	144		
9										
10		11	M	SS	22	2.0	13	132		
11										
12										
13		13	M	SS	20	3.5	12	145		
14										
15		9	M	SS	20	3.3	11	134		
16										
17										
18		12	M	SS	22	3.1	11	140		
19										
20		12	M	SS	20	2.2	11	137		
21										
22										
23										
24		8	M	SS	22	2.2	12	134		
	END OF BORING - 24.9'									

DEPTH:	DRILLING METHOD
0-23½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/18/24	**--**	**24.9**	**23.5**	**--**	**--**	**None**

BORING COMPLETED: **3/18/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-02 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **199.5**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
1	3" - SILTY SAND WITH GRAVEL, fine to coarse grained, brown		M	AS						
2	1' - FILL/TOPSOIL, SANDY CLAY, black to dark brown									
3	LEAN CLAY, trace sand, brown, firm to stiff, (CL)	9	M	SS	16	4.6				
4										
5		8	M	SS	20	2.3				
6										
7										
8		5	M	SS	22	1.1				
9										
10		5	M	SS	20	0.9				
11										
12										
13		5	M	SS	18	1.3				
14										
15			M	TW						
16										
17										
18		8	M	SS	20	2.3				
19										
20	4" lens of sand at 20'	13	M	SS	22	2.5				
21										
22										
23										
24		9	M	SS	20	2.5				
	END OF BORING - 24.9'									

DEPTH:	DRILLING METHOD
0-23½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/18/24	**--**	**24.9**	**23.5**	**--**	**--**	**None**

BORING COMPLETED: **3/18/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-03 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **200.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	4" - SILTY SAND WITH GRAVEL, fine to coarse grained, brown		M	AS						
1	1" - FILL/TOPSOIL, SANDY CLAY, black to brown									
2	LEAN CLAY, trace sand, brown to gray, stiff, (CL)									
3		9	M	SS	18	3.3				
4										
5		9	M	SS	20	1.9				
6	**END OF BORING - 6.0'**									

DEPTH:	DRILLING METHOD
0-4½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/18/24	**--**	**6.0**	**4.5**	**--**	**--**	**None**

BORING COMPLETED: **3/18/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-04 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **203.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	7" of CONCRETE		M	AS						
1	AGGREGATE BASE, fine to coarse grained, dark brown to black									
2										
	LEAN CLAY, trace sand, dark brown, firm, (CL)									
3		8	M	SS	16	3.6				
4	LEAN CLAY, trace sand, brown, firm to stiff, (CL)									
5		9	M	SS	16	2.3				
6										
7										
8		12	M	SS	20	2.4				
9										
10		11	M	SS	18	2.6				
11										
12										
13		13	M	SS	20	4.7				
14										
15		8	M	SS	18	1.8				
16	**END OF BORING - 16.0'**									

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS						
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-14½'	**3.25" HSA**	**3/19/24**	**--**	**16.0**	**14.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-05 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **204.5**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	8" of CONCRETE		M	AS						
1	AGGREGATE BASE, fine to coarse grained, dark brown									
2	LEAN CLAY, brown, firm, (CL)									
3		14	M	SS	8	1.7	8	135		
4										
5		20	M	SS	8	2.5	14	120		
6										
7										
8		20	M	SS	7	1.4	13	145		
9										
10		22	M	SS	8	3.6	10	147		
11										
12	SANDY LEAN CLAY, brown, stiff, (CL)									
13		18	M	SS	10	5.0	11	147		
14										
15		20	M	SS	9	3.6	11	155		
16	**END OF BORING - 16.0'**									

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS						
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-14½'	**3.25" HSA**	**3/19/24**	**--**	**16.0**	**14.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-06 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **206.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	7" of CONCRETE		M	AS						
1	AGGREGATE BASE, fine to coarse grained, dark brown									
2	SANDY LEAN CLAY, dark brown, stiff, (CL)									
3		13	M	SS	18	3.8				
4	LEAN CLAY, trace sand, brown, firm to stiff, (CL)									
5		6	M	SS	12	3.0				
6										
7										
8		10	M	SS	20	2.7				
9										
10		10	M	SS	20	2.9				
11										
12										
13		11	M	SS	18	4.5				
14										
15		9	M	SS	20	2.1				
16	**END OF BORING - 16.0'**									

DEPTH:	DRILLING METHOD
0-14½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**16.0**	**14.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-07 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **200.2**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	6" of CONCRETE		M	AS						
1	AGGREGATE BASE, fine to coarse grained, brown to gray									
2	FILL, CLAY, trace sand, brown to black									
3		13	M	SS	18					
4										
5		4	M	SS	18					
6	BURIED TOPSOIL, ORGANIC CLAY, trace sand, black									
7	FILL, CLAY, trace sand, brown to black									
8		8	M	SS	16	3.1				
9	LEAN CLAY, trace sand, brown to gray, soft to stiff, (CL)									
10		4	M	SS	20	0.6				
11										
12										
13		6	M	SS	18	1.7				
14										
15		11	M	SS	18	4.8				
16	**END OF BORING - 16.0'**									

DEPTH:	DRILLING METHOD
0-14½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**16.0**	**14.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-08 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **198.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	3" of CONCRETE		M	AS						
1	AGGREGATE BASE, fine to coarse grained, dark brown									
2	LEAN CLAY, trace sand, brown to gray, firm to stiff, (CL)									
3		6	M	SS	16	3.8	15	118		
4										
5		6	M	SS	20	3.7	13	121		
6										
7										
8		9	M	SS	22	2.5	11	135		
9										
10	Rock	14	M	SS	3		10			
11										
12										
13		9	M	SS	16	2.3	13	129		
14										
15		8	M	SS	18	2.9	12	137		
16										
17										
18		8	M	SS	16	4.9	11	146		
19	SANDY LEAN CLAY, brown, stiff, (CL)									
20		12	M	SS	20	1.2	11	146		
21										
22										
23										
24		10	M	SS	20	1.0	11	139		
	END OF BORING - 24.9'									

DEPTH:	DRILLING METHOD
0-23½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**24.9**	**23.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-09 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **198.1**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	4.5" of CONCRETE									
1	AGGREGATE BASE, fine to coarse grained, gray to brown		M	AS						
2	SANDY LEAN CLAY, light brown to light gray, firm to stiff, (CL)									
3		6	M	SS	18	6.0				
4										
5		9	M	SS	20	3.5				
6										
7	LEAN CLAY, trace sand, brown, stiff, (CL)									
8		9	M	SS	16	1.1				
9										
10		12	M	SS	12					
11										
12	SANDY LEAN CLAY, brown, very stiff to stiff, (CL)									
13		16	M	SS	18	4.7				
14										
15		13	M	SS	18	5.1				
16										
17										
18		9	M	SS	16	3.6				
19										
20		10	M	SS	18	4.9				
21										
22										
23	LEAN CLAY, trace sand, gray to brown, firm, (CL)									
24		7	M	SS	22	3.8				
	END OF BORING - 24.9'									

DEPTH:	DRILLING METHOD
0-23½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**24.9**	**23.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-10 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **198.1**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	4.75" of CONCRETE									
1	AGGREGATE BASE, fine to coarse grained, brown		M	AS						
2	FILL/TOPSOIL, CLAY, trace sand, black to brown									
3		6	M	SS	16					
4										
5		9	M	SS	6		13			
6										
7	FILL, SAND, fine to coarse grained, gray to brown									
8		6	M	SS	12		10			
9										
10	LEAN CLAY, trace sand, brown to gray, soft, (CL)	2	M	SS	18	1.1	23	112		
11										
12										
13			M	TW						
14	LEAN CLAY, brown, firm, (CL)									
15		5	M	SS	18	1.3	14	142		
16										
17										
18		7	M	SS	20	1.6	12	142		
19	LEAN CLAY, trace sand, dark gray, firm, (CL)									
20		6	M	SS	22	2.4	13	130		
21										
22										
23										
24		7	M	SS	22	2.2	13	126		
	END OF BORING - 24.9'									

DEPTH:	DRILLING METHOD
0-23½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**24.9**	**23.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-11 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **199.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	6" of CONCRETE		M	AS						
1	AGGREGATE BASE, GRAVEL, dark brown									
2	FILL, CLAY, trace sand, brown to dark brown									
3		5	M	SS	12					
4										
5	FILL, SAND, fine grained, brown	11	M	SS	20					
6	**END OF BORING - 6.0'**									

DEPTH:	DRILLING METHOD
0-4½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**6.0**	**4.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

WELL SEALING NOTIFICATION-WELL SEALING NOTIFICATION IS VALID FOR 18 MONTHS
Send notification form and payment (check, money order, or credit card information) to:
Minnesota Department of Health, Well Management Section, P.O. Box 64502, St. Paul, Minnesota 55164-0502.

Minnesota Unique Well No. or W-series No. (Leave blank if not known)

Minnesota Well and Boring Sealing No. H 401057

Well Management Section Fax Number: 651-201-4599.

Exempt from paying fee? ☐ Yes ☑ No

☑ $75 Well Sealing Notification

Check Well Type:
☐ Water-Supply Well (269) ☐ Environmental Well (269)
☑ Temp. Boring (367) ☐ Other

Check Box If:
☐ Well is Multiple Cased
☐ Larger than 8-inch Inside Diameter

2.15% fee for credit cards Card Type: ☐ Visa ☐ Mastercard ☐ Discover Exp. Date

Print Cardholder Name

Card Number 3-Digit Security Code (Printed on back side of card.)

Authorized Signature

WELL LOCATION	County: Douglas	Township Name: Alexandria	Township No.: 128N	Range No.: 37W	Section No.: 20	Fraction (sm. → lg.): NE ¼ NW ¼ NW ¼
	Well Location Address: 924 3rd Ave E	City: Alexandria	State: MN	Zip Code: 56308	Est. Depth: 24'1/2'	Casing Diameter: 7'
WELL OWNER	Well Owner Name (Print): Duininck			Daytime Telephone Number: (320) 978-6011		
	Well Owner Street Address: 408 6th St.	City: Prinsburg	State: MN	Zip Code: 56281		
	Well Owner Signature			Date		
WELL CONTRACTOR	Well Contractor Company Name (Print)	Certified Rep. Signature	Date	Company License No.		

Minnesota Well and Boring Sealing No.
H 401057

Failure to provide proper identification and fee prior to the beginning of well sealing is a violation of Minnesota Statutes, chapter 103I, and may result in the assessment of an administrative penalty. Notification is not required to seal a bored geothermal heat exchanger or an elevator boring.

AET #P-0030207

WELL SEALING NOTIFICATION-WELL SEALING NOTIFICATION IS VALID FOR 18 MONTHS
Send notification form and payment (check, money order, or credit card information) to:
Minnesota Department of Health, Well Management Section, P.O. Box 64502, St. Paul, Minnesota 55164-0502.

Well Management Section Fax Number: 651-201-4599.

Exempt from paying fee? ☐ Yes ☑ No

☑ $75 Well Sealing Notification

Check Well Type:
☐ Water-Supply Well (269) ☐ Environmental Well (269)
☑ Temp. Boring (367) ☐ Other

Check Box If:
☐ Well is Multiple Cased
☐ Larger than 8-inch Inside Diameter

Minnesota Unique Well No. or W-series No. (Leave blank if not known):

Minnesota Well and Boring Sealing No.: H 401057

2.15% fee for credit cards — Card Type: ☒ Visa ☐ Mastercard ☐ Discover — Exp. Date 6-25

Print Cardholder Name: Corrine Schwartz

Card Number: XXXX XXXX XXXX 9426 — 3-Digit Security Code (Printed on back side of card.): 981

Authorized Signature: Corrine Schwartz

WELL LOCATION	County: Douglas	Township Name: Alexandria	Township No.: 128N	Range No.: 37W	Section No.: 20	Fraction (sm. → lg.): NE ¼ NW ¼ NW ¼	
	Well Location Address: 924 3rd Ave E		City: Alexandria	State: MN	Zip Code: 56308	Est. Depth: 24'/2'	Casing Diameter: 7'
WELL OWNER	Well Owner Name (Print): Duininck				Daytime Telephone Number: (320) 978-6011		
	Well Owner Street Address: 408 6th St.		City: Prinsburg		State: MN	Zip Code: 56281	
	Well Owner Signature				Date		
WELL CONTRACTOR	Well Contractor Company Name (Print): American Engineering Testing	Certified Rep. Signature		Date	Company License No.: 1795		

Minnesota Well and Boring Sealing No.: H 401057

Failure to provide proper identification and fee prior to the beginning of well sealing is a violation of Minnesota Statutes, chapter 103I, and may result in the assessment of an administrative penalty. Notification is not required to seal a bored geothermal heat exchanger or an elevator boring.

Amanda S. 3-13-24

AET #P-0030207

Appendix B

Geotechnical Report Limitations and Guidelines for Use

Appendix B
Geotechnical Report Limitations and Guidelines for Use
Report No. P-0030207

B.1 REFERENCE

This appendix provides information to help you manage your risks relating to subsurface problems which are caused by construction delays, cost overruns, claims, and disputes. This information was developed and provided by GBA[1], of which, we are a member firm.

B.2 RISK MANAGEMENT INFORMATION

B.2.1 Understand the Geotechnical Engineering Services Provided for this Report

Geotechnical engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical engineering services is typically a geotechnical engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

B.2.2 Geotechnical Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared solely for the client.

Likewise, geotechnical engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do <u>not</u> rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. If you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

1 Geoprofessional Business Association, 1300 Piccard Drive, LL14, Rockville, MD 20850
Telephone: 301/565-2733: www.geoprofessional.org, 2019

B.2.3 Read the Full Report

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. Read and refer to the report in full.

B.2.4 You Need to Inform Your Geotechnical Engineer About Change
Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, always inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

B.2.5 Most of the "Findings" Related in This Report Are Professional Opinions
Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

B.2.6 This Report's Recommendations Are Confirmation-Dependent
The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations only after observing actual subsurface conditions exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.

B.2.7 This Report Could Be Misinterpreted
Other design professionals' misinterpretation of geotechnical engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

B.2.8 Give Constructors a Complete Report and Guidance
Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical engineering report, along with any attachments or appendices, with your contract documents, but be certain to note conspicuously that you've included the material for information purposes only. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected

from the report, only from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and be sure to allow enough time to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

B.2.9 Read Responsibility Provisions Closely
Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled “limitations,” many of these provisions indicate where geotechnical engineers’ responsibilities begin and end, to help others recognize their own responsibilities and risks. Read these provisions closely. Ask questions. Your geotechnical engineer should respond fully and frankly.

B.2.10 Geoenvironmental Concerns Are Not Covered
The personnel, equipment, and techniques used to perform an environmental study – e.g., a “phase-one” or “phase-two” environmental site assessment – differ significantly from those used to perform a geotechnical engineering study. For that reason, a geotechnical engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Unanticipated subsurface environmental problems have led to project failures. If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

B.2.11 Obtain Professional Assistance to Deal with Moisture Infiltration and Mold
While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer’s services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, proper implementation of the geotechnical engineer’s recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. Geotechnical engineers are not building-envelope or mold specialists.

SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. Supply all labor, transportation, materials, apparatus, and tools necessary for the entire proper completion of this Work. Install, maintain, and remove all equipment for the proper execution of this Contract. Be responsible for the safe, proper, and lawful performance of equipment, maintenance and use of the same and perform in the best manner and everything properly incidental thereto, as stated on the Contract Documents or reasonably implied therein.

1.02 EXISTING CONSTRUCTION - VERIFICATION

A. The existing construction may not be as shown on the plans and some modifications of the details may be required to accomplish the intent of the documents. The details shown and the information provided may have been taken from the original plans for the site, but are not represented or guaranteed by the Owner and Engineer as being accurate as to the actual "as built" and present conditions. Verify all conditions at the site and perform all work to complete the project under this Contract, regardless of variations that may be found, without additional cost to the Owner. All modifications or adjustments are to be approved in advance by the Engineer.

B. Contact Gopher State One Call (800-521-0579) to locate underground utilities prior to performing any excavation or demolition work at the site. The owner should also be consulted as to the presence of any "private" utilities within the work areas. Where utility locations are in question, the contractor shall retain the services of a private utility locator to determine the location of the underground utilities. The contractor will be responsible to repair any utilities damaged as part of the contractor's work for this project.

1.03 DEFINITIONS

A. The words install, provide, furnish, include, supply, apply, place, or any combination thereof, are intended to be synonymous and to indicate that the material and/or work specifically mentioned is to be furnished and installed by this Contractor and/or this Contractor's Subcontractors.

1.04 PERMITS

A. Prior to beginning any construction or demolition, obtain all required permits from the City, State, County and Watershed District where work is taking place.

1.05 SEDIMENT CONTROL

A. Install silt fence and catch basin inlet protection, as required to prevent runoff sediment from the construction area from washing into the adjacent catch basins, streets and properties.

1.06 SITE RESTORATION

A. The contractor is responsible for any damage due to the contractor's construction activity to existing lawn areas, bituminous drives and parking lots, concrete curb and gutter, concrete sidewalks, valley gutter, etc., and underground utilities, including irrigation systems adjacent to and within the project site. The contractor shall repair all damaged items and areas to their original condition or better, at the contractor's expense.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 01 40 00

QUALITY CONTROL

PART 1 GENERAL

1.01 GENERAL

A. All materials, systems, or assemblies shall be installed or applied in accordance with these specifications and, where not specifically designated otherwise, in accordance with the State Department of Transportation "Standard Specifications for Construction", current edition. If, in the opinion of the Contractor, any work is indicated on the plans or specified in such manner as to make it impossible to produce work of the highest quality, or should discrepancies appear between plans, or plans and specifications, the Contractor shall advise the Engineer before proceeding.

B. References: Without limiting the generality of other requirements of the specifications, all work specified shall conform to, or exceed the applicable requirements of the documents referenced in each section of the specifications to the extent that the provisions of such documents are not in conflict with the requirements of that section.

1.02 SURVEYING, STAKING AND SITE LAYOUT

A. The Contractor is responsible for performing all construction staking and site layout. If a topographic survey is required to construct the project in accordance with the specifications, the Contractor shall provide the survey from an Independent licensed, bonded and insured land surveyor. The Engineer will verify the construction staking, site layout and topographic survey only for quality assurance purposes.

1.03 INSPECTIONS AND TESTS

A. The Contractor shall retain and pay an independent testing agency for all construction materials testing. The testing laboratory shall submit test reports to the Engineer and Contractor within 48 hours after test has been performed.

B. The Engineer may request tests of any materials in addition to the tests specified. The Contractor shall pay for the additional tests if the test results show the material not in conformance with the specifications.

C. Repeat tests required because test results show materials not in conformance with the specifications, shall be paid for by the Contractor.

D. Notify the Engineer not less than 24 hours in advance whenever work is to be performed. Failure to notify the Engineer at least 24 hours in advance shall be reasonable cause for the Engineer to order a sufficient delay in the Contractor's schedule to allow time for inspections and any remedial or corrective work required. All costs of such delays, including its effects upon other portions of the work, shall be borne by the Contractor and no time extension will be permitted.

E. When notification has been given to the Engineer by the Contractor to be present on the job site to perform inspections and the Contractor fails to show up or arrives more than two hours later than the scheduled time, all costs incurred by the Engineer shall be charged to the Contractor. The costs shall be deducted from the Contract in the form of a change order.

F. During the construction of a project, if it is determined the Work does not conform to the requirements of the plans and specifications; the Contractor shall repair, replace or correct the Work to meet the intent of the plans and specifications. All costs incurred by the corrective work shall be borne by the Contractor. Engineering fees for inspections and tests shall also be the responsibility of the Contractor. Such fees shall be paid directly by the Contractor or be deducted from the Contract in the form of a change order.

G. Provide documentation for all unit price items. Contractor's foreman and Engineer will confirm daily.

H. Test samples of materials and completed work at the project site will be taken in the presence of the Engineer.

I. Cooperate by furnishing materials required for testing, access to the Work, and space for necessary storage.

J. Properly repair sample/test location openings made in the work required for testing and inspections to the satisfaction of the Engineer.

K. The Manufacturer of all products used must have source quality control capabilities to show conformance of the products to the specification requirements prior to shipment to the Owner.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 USE OF EXISTING FACILITIES

A. The Contractor may use utilities, i.e. water, electricity, etc. owned by the Owner only if approved in advance. Coordinate the use of utilities with the Owner. At no time shall utilities be wasted.

B. The Contractor shall not interrupt the utility service for the site in any way unless agreed upon by the Owner.

C. The Contractor shall make arrangements for portable sanitary facilities, as necessary. The Contractor shall be responsible for maintaining the cleanliness of any facility used.

D. The Owner's telephone and restroom will not be available for Contractor use.

1.02 CONTROLS OF PUBLIC AGENCIES

A. All Federal, State, County, City, or any other governing agency permits, licenses and fees associated with the Work shall be obtained and paid for by the Contractor. Copies of all required permits must be submitted to the Engineer prior to the start of construction. If the permits have not been obtained in advance of the start construction and such non-conformance to the regulations requires a change in the scope of work, all such costs associated with the change in scope of work shall be borne by the Contractor. The Contractor shall repair, replace or correct the Work to meet the requirements of the regulating/governing body. Engineering fees for inspections and tests shall also be the responsibility of the Contractor. Such fees shall be paid directly by the Contractor or be deducted from the Contract in the form of a change order.

B. The Work shall meet the requirements of all governing codes, ordinances, laws, regulations, safety orders, and directives relating to the Work, including any specific requirements of the city and state of jurisdiction.

C. The Work on, adjacent to, or over public land, streets, alleys, or other public facilities, shall be approved by the proper authorities. Make arrangements with such authorities regarding all details, timing, materials, methods, protection, and similar items in connection with the Work, including street use, work on streets, or blocking of streets. Make repairs, file bonds, conform to directions, and such other requirements that may be necessary.

1.03 REFERENCE STANDARDS

A. Publications in effect on the date of issue of these Contract Documents shall apply to the work performed under this Contract, except when a specific date is specified.

1.04 SPECIAL CONTROLS

A. Disturbing or disruptive noise that interferes with the normal site occupancy will not be permitted. Operations creating noise of this type must be scheduled in advance with the Owner.

B. The Contractor shall discharge any worker creating a nuisance on the premises.

C. Protect the building, site and adjoining property from objectionable dust and wind-blown debris.

D. Provide necessary controls to prevent pollution of the air by odors or particulate matter.

E. Exercise reasonable precautions to prevent vandalism and to safeguard the public at the existing building and site.

F. Disposal of Materials:

1. Load disposal materials directly into trucks by means that will prevent damage to the existing or new surfaces and to control pollution.
2. No accumulation of disposal materials will be permitted at any time, except as otherwise specified. The Contractor is responsible for prompt removal from the site and disposal in a manner approved by the local authorities.
3. Transport and legally dispose of materials off-site.

G. When earth materials are exposed, the Contractor shall install adequate erosion control measures, such as silt fences, hay bales, riprap, erosion control blankets, etc., to prevent soils from exiting the site.

H. Utilities within the project site shall be protected from receiving soils or other types of debris when extensive or copious amounts of rainfall or wind occur.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 60 00

PROTECTION, REPAIR AND CLEANING

PART 1 GENERAL

1.01 PROTECTION OF EXISTING PROPERTY

A. The construction site must be protected from unauthorized personnel at all times. The installation of a semi-permanent construction fence may be required on projects that will be prolonged over a period of time. The installation of temporary fences, barricades, cones and signs may also be required. No additional compensation will be made to the Contractor for construction site protection.

B. Provide protective materials and methods, as required, to protect existing buildings and adjacent surfaces, features, and property. The Contractor is responsible for any damage resulting from work under this Contract.

C. Take precautions to protect the building grounds from damage due to necessary construction traffic.

D. Existing materials that are to be salvaged for reuse, or given to the Owner, shall be removed carefully and stored in a manner and location to prevent damage until utilized.

E. Prevent access by the public to materials, tools, or equipment.

1.02 REPAIRS OF EXISTING PROPERTY

A. Access to the construction site will be the responsibility of the Contractor. Property that is traveled over to gain access to the construction site will be properly repaired to the existing conditions or better, at the Contractor's expense, to the satisfaction of the Owner. This includes all bituminous, concrete, grass or other types of surfacing materials.

B. When it is required to remove or alter the existing property, all affected areas shall be properly repaired to the existing conditions or better, at the Contractor's expense, to the satisfaction of the Owner.

C. Existing materials designated to remain, which are damaged or defaced as a result of the Work and are unsuitable for the use intended, shall be replaced at the Contractor's expense to the satisfaction of the Owner.

D. Use approved procedures and materials to repair defective or incomplete surfaces caused or exposed by work at the project.

E. Repairs required by the Contract, or necessary because of damage from this Work, shall use products equivalent to, and compatible with, the existing materials.

1.03 CLEANING

A. Refer to the General Conditions for requirements pertaining to the removal of waste materials or rubbish caused by the Work, and the restoration of existing areas affected by the Work. In case of undue delay or dispute, the Owner may remove rubbish, materials, and equipment and charge the costs to Contractor. These actions are permissible by the Owner 48 hours after a written notice has been transmitted to the Contractor.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 02 10 00

SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. Removal and disposal of vegetation and topsoil.
2. Removal and disposal of existing concrete construction.
3. Removal and disposal of existing bituminous pavement.
4. Removal of existing fence construction.

1.02 PROTECTION OF EXISTING CONDITIONS

A. Provide protection necessary to prevent damage to existing conditions indicated to remain in place and offsite property.

B. Restore all damaged areas to their original condition, as acceptable to the Owner.

1.03 SUBMITTALS REGARDING EXISTING CONDITIONS

A. Provide pre-demolition photographs of the existing conditions prior to beginning any work at the site.

B. Bring to the attention of the Engineer in writing within 48 hours any items damaged during the demolition process that are to be salvaged for re-use. If it is determined that the damage to the item(s) could have been prevented by the Contractor taking reasonable measures or precautions, the damaged item(s) will be replaced or repaired at the Contractor's expense.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 SITE ACCESS

A. Demolition and removal operations shall be performed to ensure minimum interference with roads, parking lots, sidewalks and pathways.

B. Erect temporary fencing as necessary to keep people out of the work area.

3.02 DEMOLITION

A. Remove vegetation, improvements, or obstructions interfering with installation of new construction. Remove such items elsewhere on site or premises as specifically indicated.

B. Store salvaged materials on-site in a location where they will not be damaged or interfere with the use of the facilities.

C. Promptly dispose of demolished materials off-site. Do not allow demolition materials and debris to accumulate on-site.

D. Restore all damaged underground piping and utilities, including irrigation.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. Removal and disposal of vegetation and topsoil.
2. Clearing and grubbing.
3. Removal and disposal of pavements.
4. Removal and disposal of miscellaneous construction.

1.02 PROTECTION OF EXISTING CONDITIONS

A. Provide protection necessary to prevent damage to the existing conditions indicated to remain in place.

B. Restore damaged areas to their original condition, as acceptable to the parties having jurisdiction.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 SITE CLEARING

A. Remove vegetation, improvements, or obstructions interfering with the installation of new construction. Remove such items elsewhere on the site or premises as specifically indicated.

B. Mark trees to be removed and notify Engineer/Landscape Architect for review prior to removal.

C. Clear the site of trees, stumps, roots, shrubs, or other vegetation, except for those indicated to remain standing.

D. Completely remove stumps, roots, and other debris protruding through the ground surface or to the depths indicated. Stumps located in areas to be landscaped can be ground down to 18” below finished grade.

E. Abandonment or removal of certain underground pipes or conduits as shown on the Plans is also included in this section.

F. Remove and dispose of pavements identified on the plans. Sawcut all edges of pavements to remain.

END OF SECTION

SECTION 31 20 00

EARTH WORK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Preparing subgrades for structures and concrete/bituminous pavements.
2. Fill material as required to construct grades as shown.
3. Building and foundation excavation and backfilling.
4. Stormwater basin excavating.
5. Rough and final grading.
6. As-built grading plan for all stormwater basin construction.

1.02 DEFINITIONS

A. Backfill: Material meeting the requirements of Section 32 05 00 and as recommended in the geotechnical evaluation report.

B. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

C. Drainage Aggregate: Backfill materials located directly within a drainage trench to provide drainage to the drain tile.

D. Engineered Fill: Soil materials used to raise existing grades within building and pavement areas.

E. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material ¾ cubic yards or more in volume that exceed standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency, per ASTM D1586.

F. Structures: Buildings, footings, foundations, retaining walls, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

G. Subgrade: Surface or elevation remaining after completing excavation, or top surface of fill or backfill immediately below subbase, drainage fill, or topsoil materials.

H. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

I. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Geotechnical Engineer.

1.03 SUBMITTALS

A. Product Data: For the following:
  1. Controlled low-strength material, including design mixture.

B. Material Test Reports: From qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
  1. Classification per ASTM D2487of each soil material proposed for fill and backfill.
  2. Laboratory compaction curve per ASTM D698 for each soil material proposed for fill and backfill.

C. Pre-excavation/demolition photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit photographs to Owner/Construction Manager before earthwork begins.

D. As- Built grading plan:
  1. Provide an as built topographic survey of the excavation bottom for all storm water ponding areas prior to final seeding and restoration to verify correct slopes and depths. Final restoration (seeding, planting, etc.) shall not be performed until topographic survey is reviewed and approved by the Engineer.

1.04 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified per ASTM E329 to conduct soil materials and rock-definition testing, as documented per ASTM D3740 and ASTM E548.

1.05 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Owner or Architect and then only after arranging to provide temporary utility services per requirements indicated.
  1. Notify Construction Manager/Engineer not less than 2 days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Construction Manager's written permission.
  3. Contact Gopher State One Call before excavating.
  4. Retain the services of a private utility locating company to locate utilities not covered by the Gopher State One Call system.
  5. The utilities shown on the Plans are approximate only. Provide adequate means of protection during excavation operations. Properly cap, raise, or lower to grade existing valve covers, cleanouts, manholes, drop inlets, or other utilities as shown on the Plans.
  6. Consult utility owner immediately for directions if uncharted or incorrectly charted piping or other utilities are encountered during the excavation. Cooperate with the Owner and utility companies in keeping respective services and facilities in operation.

The Contractor shall repair damaged utilities to the satisfaction of the utility owner at no expense to the Owner.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

C. Data from, Geotechnical Evaluation Report, if included in this project manual was used for basis of design. This information is not intended as representations or warranties of accuracy or continuity between soils information. It is expressly understood that Owner will not be responsible for interpretations drawn there from Contractor. Data is made available for convenience of Contractor.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

A. General: Provide imported soil materials when sufficient satisfactory soil materials are not available from excavations. All excess materials shall be removed from the site and properly disposed of.

B. Satisfactory Soils: ASTM D2487 Soil Classification Groups GW, GP, SW, and SP, or combination of these groups; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT per ASTM D2487, or combination of these groups, unless approved by Geotechnical Consultant.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Borrow and backfill: Naturally or artificially graded mixture of natural or crushed gravel, stone, and/or sand. See Aggregates Section for additional information and requirements. All fill materials shall also be approved by Project Geotechnical Engineer.

E. Topsoil: Topsoil salvaged from on-site can be re-used. If additional materials are required, the topsoil shall be new and imported material. The topsoil, whether it is new or salvaged, should be screened and pulverized. The topsoil should be dry and ready to be fine graded.

Topsoil shall consist of sandy loam soil, reasonably free of clay lumps, stones, and other objects over 1 inch in diameter, without weeds, roots and other objectionable material and shall meet the requirements of MN/DOT Section 3877 for Select Topsoil materials.

	Minimum	Maximum
Material passing #10 sieve	90%	---
Clay	5%	30%
Silt	10%	70%
Sand and gravel	20%	70%
Organic matter	3%	20%
pH	6.1	7.5

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, stone, and/or sand; ASTM D2940; with 100 percent passing 2 inch sieve, less than 40% passing the No. 40 sieve, and not more than 12 percent passing No. 200 sieve. Engineered fill shall also be approved by Project Geotechnical Engineer.

PART 3 EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other potential hazards created by earthwork operations.

B. Prepare subgrade for earthwork operations, including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface.

C. Protect and maintain all erosion and sedimentation controls.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.02 EXCAVATION

A. Excavation is Unclassified, and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

1. Earth Excavation includes removal and disposal of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.

3.03 STABILITY OF EXCAVATIONS

A. General: Comply with local codes, ordinances and requirements of agencies having jurisdiction.

B. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

3.04 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install dewatering system as required to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required. Refer to Project geotechnical report and addenda for information related to ground water elevations.
3. Dewatering systems to include measures to prevent sediment transport in accordance with MPCA regulations.

C. All dewatering required to complete the work under this contract is considered incidental.

3.05 EXPLOSIVES

A. The use of explosives is not permitted.

3.06 STORAGE OF EXCAVATED MATERIALS

A. Stockpile satisfactory excavated materials until required for backfill or fill. Place, grade and shape stockpiles for proper drainage. Provide erosion and sediment control measures in accordance with MPCA guidelines.

B. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

C. Dispose of excess soil material and waste materials off site.

3.07 EXCAVATION OF PAVEMENTS

A. Saw cut pavements and excavate underlying materials to comply with cross-sections, elevations and grades as shown.

3.08 COLD WEATHER PROTECTION

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.09 BACKFILL AND FILL

A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below (see geotechnical evaluation report for additional information) using materials specified in Part 2 of this Section and/or the Aggregates specification section.
1. Under grassed areas, use satisfactory excavated or borrow material.
2. Under pavements, use satisfactory excavated or granular borrow materials in the upper 3 feet of the subgrade as shown on the plans and details. Materials are to be placed up to the bottom of the aggregate base in pavement areas.
3. Under the structures, use satisfactory excavated, structural fill or combination. Refer to the geotechnical report for specific requirements.

4. When backfilling is performed during freezing conditions (winter construction) non-frost susceptible granular backfill should be used. Frost should not be allowed to penetrate below footings and frozen soils should not be used for backfill.
5. Under piping and conduit, use granular borrow for bedding and for correction of unauthorized excavation. Shape excavation bottom to fit bottom 90 degrees of cylinder.
6. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete level to bottom of adjacent footing.
7. Do not backfill trenches until tests and inspections have been made and backfilling is authorized by Owner's Geotechnical Consultant. Use care in backfilling to avoid damage or displacement of pipe systems.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, damp-proofing, waterproofing, and perimeter insulation.
2. Approval of exposed subgrade materials by Geotechnical consultant.
3. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.
4. Removal of concrete formwork.
5. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
6. Removal of trash and debris from excavation.
7. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

3.10 PLACEMENT AND COMPACTION

A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills.

B. Inspection: Prior to placement of fill, excavations shall be inspected by the Geotechnical Engineer to verify that all unsuitable materials have been properly removed. Where the soil borings of the geotechnical consultant indicates that organic, soft or otherwise unsuitable soils are present, test pits will be required to determine the suitability of the existing soils.

1. Exposed soils at the bottom of the excavation shall be compacted with a large vibratory roller to not less than 98% standard proctor density (ASTM D698).
2. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

C. Place backfill and fill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

D. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

E. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

F. Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts as directed by Geotechnical Engineer if soil density tests indicate inadequate compaction.

G. Compact soil to not less than the percentages of maximum density, in accordance with ASTM D698 (see geotechnical report for additional requirements):

1. Under structures, slabs, steps, and pavements, compact top 12 inches of subgrade and each layer of backfill or fill material at 98 percent maximum density.
2. Under exterior slabs, sidewalks and parking lot pavement areas, compact the top 12 inches of subgrade and each layer of backfill or fill material at 95 percent maximum density, except in the upper 3 feet beneath the pavement where the compaction shall be 100 percent.
3. Under areas to be landscaped, soils shall be loosened to a minimum depth of 12 inches below grades. It will be assumed that all areas to be landscaped exceed specified compaction unless the Contractor demonstrates otherwise with compaction test results. The soils shall be loosened using ripping teeth mounted on a bulldozer or other approved methods. The space between ripping teeth shall be 12” to 18”. If a single tooth is used, passes shall be 12” to 18” apart. The area shall be tilled in two directions that are perpendicular to each other. The loose soils shall then be re-compacted to 92% of Standard Proctor Density. If topsoil is present, the topsoil shall be stripped, prior to ripping, and re-spread.

H. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.

1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
2. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.11 ROUGH GRADING

A. Remove topsoil from areas to be excavated, re-landscaped, or re-graded, without mixing with foreign materials. Stockpile on-site for re-use upon completion of grading operations.

B. Do not remove topsoil when wet.

C. Make soil corrections defined in the Geotechnical Report; follow procedures and use materials defined in the Report. Generally:

1. For building and structure foundations, including isolated column footings, excavate full depth to remove topsoil and organic soils and surface soils and expose natural glacial soils. Exposed subgrade soils should be evaluated by the project geotechnical engineer to determine their suitability for support of foundation and slab loads.
    - **a.** If excavation extends below required footing bearing elevation, oversize laterally beyond the outside edges of the foundations at a ratio of 1:1 lateral oversize.
    - **b.** Where excavations are adjacent to existing foundations, excavations should not extend within a zone extending outward a distance of 5 feet from the existing slab or footing and then down and outward at a slope of 1:1. The geotechnical consultant should evaluate the suitability of the remaining soils for foundation and slab support. If excavations are required within these limits, ground improvement, retention or underpinning may be required, as directed by the geotechnical consultant.
    - **c.** Obtain approval of on-site geotechnical consultant before proceeding with compaction and fill work.
    - **d.** Surface compact exposed natural soil surface.
    - **e.** Place and compact backfill soils; see Geotechnical evaluation report, along with structural plan notes and Section 32 05 00 for additional requirements.
2. For floor slabs, strip topsoil and underlying soil material to a depth required for the new slab and sand cushion materials. The suitability of the exposed soils will be evaluated for slab support by the geotechnical consultant.
3. For pavement surfaces, subcut the existing soil to allow the new pavement section. Obtain approval of on-site Geotechnical consultant before proceeding with surface compaction of the exposed, existing soil surface.
4. For Infiltration Basins, subcut the existing soil to allow for the new planting medium. Disc the upper 12 inches of the exposed subgrade soils to loosen prior to placing planting medium.

D. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

E. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.

F. When excavations extend below footing and slab bearing elevations, oversize the excavation horizontally 1 foot for every foot of excavation depth below the indicated bearing elevation.

G. When excavating through roots, perform work by hand and cut roots with sharp axe.

H. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.

I. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

3.12 FINISH GRADING

A. Before Finish Grading:
  1. Verify building and trench backfilling have been inspected and tested.
  2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

C. Where topsoil is to be placed, scarify surface to depth of 3 inches.

D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 6 inches.

E. Place topsoil in areas where seeding, sodding, and planting are indicated.

F. Place topsoil where required to level finish grade.

G. Place topsoil to the following compacted thicknesses:
  1. Areas where seed is installed: 4 inches.
  2. Areas where sod is installed: 4 inches.

H. Place topsoil during dry weather.

I. Remove roots, weeds, rocks, and foreign material while spreading.

J. Near plants spread topsoil manually to prevent damage.

K. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

L. Lightly compact placed topsoil.

3.13 TOLERANCES

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10-foot above or below required subgrade elevations.
2. Walks: Shape surface of areas under walks to line, grade, and cross-section, with finish surface not more than 0.10-foot above or below required subgrade elevation.

3. Pavements: Shape surface or areas under pavement to line, grade, and cross-section, with finish surface not more than 0.5-inch above or below required subgrade elevation. Subgrade shall be graded to drain to drain tile locations.

C. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.14 TRENCHING

A. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Cut trenches wide enough to allow inspection of installed utilities.

E. Hand trim excavations. Remove loose matter.

F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

G. Remove excavated material that is unsuitable for re-use from site.

H. Remove excess excavated material from site.

I. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

J. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

K. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.15 FIELD QUALITY CONTROL

A. Quality assurance testing is the responsibility of the Owner. The Owner shall employ the services of an independent materials testing firm to provide the final test information. The Contractor may use their own personnel to provide tests of the materials during the placement and compaction operations; however, an independent testing firm must take the final tests. The testing firm shall test the materials as construction work is performed.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed Work comply with requirements.

C. Testing agency will test compaction of soils in place per ASTM D1556, ASTM D2167, ASTM D2922, and ASTM D2937, as applicable. Perform tests at the following locations and frequencies:

Description	Minimum % Standard Proctor	Minimum Tests/ Unit Area/Lift
Natural sub-grade	92%	1/250 sq. yds.
Below pavements and structures	100% (top 3') 95% (below 3')	1/250 sq. yds.
Base aggregate	100%	1/250 sq. yds.
Landscape fill areas	92%	1/250 sq. yds.
Utility trenches (except under slabs and pavements)	95%	1/100 ln. ft.

D. Field Density Test Report shall clearly identify the following information for each test:

1. Horizontal and vertical location of test.
2. Material type being tested.
3. Proctor test method.
4. Maximum proctor density.
5. Specified density.
6. Optimum moisture density.
7. Field test method.
8. Actual moisture content.
9. Actual dry density.
10. Pass/fail indication.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; re-compact and retest until specified compaction is obtained. Consult Project Geotechnical Engineer for additional or supplemental recommendations.

F. After all grading, backfilling and planting is completed within the infiltration basins, these areas shall be flood tested by the contractor to verify that the required volume of infiltration water for the simulated 1 inch rain fall event draws down within 48 hours. If the flood testing indicates that it requires more than 48 hours for the water to draw down, corrections to the infiltration basin will be required to bring the draw down time to less than 48 hours. These corrections will be made at no additional cost to the Owner.

3.16 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Where non frost susceptible soils and drainage aggregate have been installed, protect these areas from settlement during construction. This may require the installation of additional erosion control measures.

C. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and re-compact.

D. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent Work, and eliminate evidence of restoration to greatest extent possible.

3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

SECTION 31 20 00

EXCAVATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
  1. Excavation.

1.02 REFERENCES

A. ASTM D2487, Standard Test Method for Classification of Soils for Engineering Purposes.

PART 2 EXECUTION

2.01 UTILITIES

A. Locate existing underground utilities in areas of Work. The utilities shown on the Plans are approximate locations only. Provide adequate means of protection during excavation operations. Properly cap, raise, or lower to grade existing valve covers, cleanouts, manholes, drop inlets, or other utilities as shown on the Plans.

Contact Gopher State One Call (800-521-0579) to locate underground utilities prior to performing any excavation or demolition work at the site. The owner should also be consulted as to the presence of any "private" utilities within the work areas. Where utility locations are in question, the contractor shall retain the services of a private utility locator to determine the location of the underground utilities. The contractor will be responsible to repair any utilities damaged as part of the contractor's work for this project.

B. Consult utility owner immediately for directions if uncharted or incorrectly charted piping or other utilities are encountered during the excavation. Cooperate with the Owner and utility companies in keeping respective services and facilities in operation. The Contractor shall repair damaged utilities to the satisfaction of the utility owner at no expense to the Owner.

C. Do not interrupt existing utilities serving facilities occupied and used by the Owner or others, except when permitted in writing by the Engineer.

2.02 USE OF EXPLOSIVES

A. The use of explosives is not permitted.

2.03 EXCAVATION

A. Remove topsoil, sod, grass, organic materials, or other unsuitable soil from areas to receive new materials.

B. Sawcut the existing bituminous pavement to be removed to form a smooth vertical edge. Chiseling, jackhammering or blade ripping of the existing bituminous will not be permitted except if approved in advance by the Engineer. Remove the bituminous where indicated on the Plans or as marked in the field by the Engineer.

C. Excavate repair areas as indicated by the Geotechnical Report. After the required excavation has been completed, thoroughly clean the exposed vertical and bottom surfaces of all loose materials. The excavation bottom shall be firm and dry.

D. Do not allow water to accumulate in the excavations. Remove water to prevent softening of subgrade or foundation soils or to eliminate other changes detrimental to the stability of the subgrade. Provide and maintain surface drainage and other dewatering system components necessary to convey water away from the excavations.

E. For the excavation of the subgrade, conform to the elevations and dimensions shown within a tolerance of plus or minus 0.10 feet.

F. Notify the Engineer at least 3 days in advance of any excavation so the Engineer can examine and evaluate the subsoils before placement of the new materials.

G. All work specified in this section shall be performed by the Contractor at his own expense in accordance with the Contract. If additional excavations are required, the Contractor shall not proceed until given notice by the Engineer. Additional payment will be made under separate unit prices for additional excavation if such unit prices have been established; otherwise payment will be made in accordance with a negotiated price.

H. Use all means necessary to prevent operations from producing dust. The Contractor shall be responsible for damage resulting from dust originating from their operations.

2.04 OVER-EXCAVATION NOT ORDERED, SPECIFIED OR SHOWN

A. Excavations carried below the elevations or depths specified shall be backfilled to the required grade with the specified materials and compaction percentages. The Contractor shall perform such work at his own expense.

2.05 DISPOSAL OF EXCESS EXCAVATED MATERIAL

A. The Contractor shall remove and dispose of excess excavated material at his own expense.

2.06 FIELD QUALITY CONTROL

A. Inspections will be performed during the excavation for the following.

1. Review of the excavation cross-section.
2. Evaluation of natural subgrade materials.

END OF SECTION

SECTION 31 25 00

TEMPORARY EROSION CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
  1. Temporary Erosion Prevention and Sediment Control.

PART 2 PRODUCTS

2.01 CATCH BASIN INLET PROTECTION

A. Prefabricated sediment control devices designed for use in catch basin structures in the size and shape for proper installation. Devices installed on curb inlets shall protect the curb opening.
  1. InfraSafe Debris Collection Device
  2. Wimco Road Drain
  3. Dandy (Curb) Sack
  4. Approved equal on Mn/DOT's approved product list.

B. In grass areas, silt fence backed by wire mesh reinforcing installed in a 4' by 4' square may be used.

2.02 SILT FENCE FABRIC

A. Ten Cate Mirafi 100X or approved equal woven fabric of polypropylene fibers treated to resist degradation caused by exposure to sunlight, resistant to soil chemicals, mildew, and insects. The fabric shall be non-biodegradable with the following properties:

Apparent Opening Size, ASTM D4751	USS #30 maximum
Minimum Weight	2.5 oz/sq. yd.
Tearing Strength, ASTM D4533	65 lb. minimum
Sediment Retention Efficiency	80% minimum
Flow Rate, ASTM D4491	10 gal/min/ft² Minimum
UV Resistance at 500 hours, ASTM 4355,%	70 minimum

B. The silt fence shall be ultraviolet stable and have high tear resistance and low permeability.

2.03 ROCK CONSTRUCTION ENTRANCE

A. Washed aggregate with a nominal size of 1.5".

2.04 EROSION CONTROL FABRIC

A. North American Green SC150BN. (Extended Term Erosion Control, 18 months; 2:1 to 1:1 slopes)

1. Material Data Requirements:

Top net:	Woven, 100% biodegradable, natural organic fiber, 9.3 lbs./ 1,000 square feet
Bottom net:	Woven, 100% biodegradable, natural organic fiber, 9.3 lbs./ 1,000 square feet
Matrix:	70% Straw at 0.35 lbs./ square yard 30% coconut at 0.15 lbs./ square yard
Thread:	Biodegradable

B. Approved equal.

2.05 SEDIMENT LOGS

A. Straw, wood fiber, compost, or rock filter log meeting Mn/DOT 3897, size as indicated on the plans.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Installation techniques shall be in accordance with the Minnesota Construction Site Erosion and Sediment Control Planning Handbook and Minnesota Pollution Control Agency Best Management Practices.

B. Perimeter and down gradient sediment control measures shall be installed prior to land disturbing activity. Install intermediate and temporary measures as construction progresses.

C. Contractor personnel overseeing the SWPPP and installing and maintaining of BMPs shall be in compliance with the training requirements of the MPCA Stormwater Permit for Construction Activity.

D. Infiltration areas shall be protected from sediment of ongoing construction activities.

3.02 INLET PROTECTION

A. Install in accordance with manufacturer's instructions.

3.03 SILT FENCE FABRIC

A. Erect posts to support the silt fence fabric with post spacing maximum of 8 feet on-center.

B. Install the fabric and firmly attach to the posts. Dig a trench along the intended face line and cover the fabric, or lay the bottom 6 inches on the ground and backfill over the fabric to create a good seal.

3.04 ROCK CONSTRUCTION ENTRANCE

A. Construct the rock construction entrance a minimum of 20 feet wide and 50 feet in length, over soil separation fabric.

3.05 EROSION CONTROL FABRIC

A. The installation of the erosion control fabric shall be in strict compliance with the manufacturer's installation instructions.

B. Prepare the soil before installing the blankets, including the application of fertilizer and seed.

C. Staple the fabric onto the slopes as recommended by the manufacturer.

3.06 SEDIMENT LOGS

A. Install in accordance with manufacturer's instructions.

3.07 INSPECTION

A. The Contractor shall inspect the entire site immediately after each rainfall event greater than 0.5 inches in 24 hours, daily during prolonged rainfall, and at least every 7 days. Inspections must include surface waters including drainage ditches and conveyance systems, for evidence of erosion and sediment deposit.

B. The Contractor shall inspect adjacent streets for vehicle tracking of sediment daily.

3.08 MAINTENANCE

A. Remove sediment when it reaches 1/3 the capacity of the BMP.

B. BMPs shall be repaired or replaced when they become damaged, clogged, or otherwise ineffective.

C. Maintenance and repairs shall be performed within 24 hours of discovery or as soon as field conditions allow access.

D. Sweeping of tracked sediments on pavements shall be performed daily.

E. Removal and stabilization of sediment deposited in surface waters shall be performed within 7 days of discovery.

F. BMPs shall remain in place and be maintained until final stabilization is established.

3.09 RECORD KEEPING

A. The SWPPP shall be kept onsite at all times.

B. All inspections, maintenance, and changes shall be recorded in the SWPPP.

3.10 CLEANUP

A. BMPs shall be removed when the up gradient areas have been permanently revegetated or paved.

END OF SECTION

SECTION 32 05 00

AGGREGATES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Aggregate base
2. Engineered fill
3. General backfill
4. Unsuitable material
5. Stabilizing aggregate
6. Fine filter aggregate (non-frost susceptible fill)
7. Coarse filter aggregate
8. Riprap
9. Washed rock
10. Modified select granular borrow (sand section)

1.02 SUBMITTALS

A. Submit laboratory test reports indicating the proposed aggregate grading meets the requirements specified herein.

B. Submit laboratory test results indicating the proposed aggregate base material meets the Los Angeles Abrasion requirements, and minimum percent crushed as specified herein.

C. The information must be current and represent the material to be supplied to the project site. If test information is not available from the supplier, the Contractor shall make arrangements and pay for required tests.

1.03 REFERENCES

A. Minnesota Department of Transportation (Mn/DOT) Standard Specifications for Construction, Current Edition

1. Section 3601 - Riprap Material

B. Minnesota Department of Transportation (Mn/DOT) Materials Lab Supplemental Specifications for Construction, Current Edition

1. Section 3138 - Aggregate for Surface and Base Courses
2. Section 3149 - Granular Material

C. ASTM C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

D. ASTM C127, Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Course Aggregate

E. ASTM C131, Standard Test Method for Resistance to Degradation of Small-Sized Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

F. ASTM D698, Standard Test Method for Moisture Density Relations of Soils and Soil- Aggregate Mixtures, using a 5.5 pound Rammer and 12-inch Drop.

G. ASTM D1557, Standard Test Method for Moisture Density Relations of Soils and Soil-Aggregate Mixtures, using a 10.0 pound Rammer and 18-inch Drop.

H. ASTM D2487, Standard Test Method for Classification of Soils for Engineering Purposes.

I. ASTM D2922, Standard Test Method for Density of Soils and Soil-Aggregate In- Place by Nuclear Method (Shallow Depth).

J. ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils

1.04 QUALITY ASSURANCE

A. In-place field density tests will be performed in accordance with ASTM D2922.

B. The testing laboratory shall submit test reports to the Engineer and Contractor within 48 hours after the test has been performed.

PART 2 PRODUCTS

2.01 AGGREGATE BASE

A. Class 5 Aggregate Base.

1. Crushed rock graded according to Mn/DOT 3138 Class 5 Gradation as follows:

Percent Passing by Weight						
Sieve Size	< 25% Recycled Aggregate		≥ 25% Recycled Aggregate < 75% Recycled Concrete		> 75% Recycled Concrete	
	Class 5	Class 5Q	Class 5	Class 5Q	Class 5	Class 5Q
2 inch	-	100	-	100	-	100
1-1/2 inch	-	-	100	-	100	-
1 inch	100	65 - 95	-	65 - 95	-	65 - 95
3/4 inch	90 - 100	45 - 85	90 - 100	45 - 85	90 - 100	45 - 85
3/8 inch	50 - 90	35 - 70	50 - 90	35 - 70	50 - 90	35 - 70
No. 4	35 - 80	15 - 45	35 - 80	15 - 45	35 - 80	15 - 45
No. 10	20 - 65	10 - 30	20 - 65	10 - 30	20 - 65	10 - 30
No. 40	10 - 35	5 - 25	10 - 35	5 - 25	0 - 8	0 - 8
No. 200	3 - 10	3 - 10	0 - 10	0 - 10	0 - 3	0 - 3

2. The coarse aggregate (that portion retained on the No. 4 sieve) shall have a percent of wear of not more than 40 at 500 revolutions as determined by ASTM C131.

3. Class 5 aggregate shall contain not more than 10 percent shale in the total sample except that when the part passing a No. 200 sieve exceeds 7 percent, the percentage of shale in the sample shall not exceed 7 percent.

B. Recycled Content

1. Recycled aggregates composed only of recycled asphalt pavement (RAP), recycled concrete materials, recycled aggregate materials, or certified recycled glass, may be substituted for virgin aggregates.
2. Recycled aggregates must meet the requirements of the following table:

Requirement	**Classes 1, 3, 4, 5, 5Q, and 6**
Maximum Bitumen Content of Composite	3.50%
Maximum Masonry Block %	10%
Maximum Percentage of Glass [1]	10%
Maximum Size of Glass [1]	3/4" [19 mm]
Crushing (Class 5, 5Q and 6) [2]	10% for Class 5 and 5Q [3] 15% for Class 6 [3]
1 Glass must meet the requirements on the grading and base website. Combine glass with other aggregates during the crushing operation.	
2 Material crushed from quarries is considered crushed material	
3 If material is ≥ 20% (RAP + Concrete), Class 5 and 5Q crushing requirements are met	
3 If material is ≥ 30% (RAP + Concrete), Class 6 crushing requirement is met	

2.02 ENGINEERED FILL

A. Granular material graded according to Mn/DOT 3149.2E as follows:

Sieve Size	Percent Passing By Weight
2 inch	100
No. 4	35 - 100
No. 10	20 - 70
No. 40	10 - 35
No. 200	3.0 - 10.5

2.03 GENERAL BACKFILL

A. Clean, fine earth, sand, free from organic material, rocks, roots, brush, stumps or other large objects.

B. The largest particle size shall be less than 2 inches in diameter.

C. The backfill shall be brought up to within the specified elevation less the depth of topsoil required for the project.

2.04 UNSUITABLE MATERIALS

A. Unsuitable soils include soils classified under ASTM D2487, which fall in the classifications of PT, OH, CH, MH, OL, CL, or ML.

2.05 STABILIZING AGGREGATE

A. Granular material graded according to Mn/DOT 3149.2C as follows:

Sieve Size	Percent Passing By Weight
1 inch	100
3/4 inch	90 - 100
3/8 inch	50 - 95
No. 4	35 - 85
No. 10	20 - 70
No. 40	10 - 45
No. 200	7 - 15.5

2.06 FINE FILTER AGGREGATE (NON-FROST SUSCEPTIBLE GRANULAR FILL)

A. Clean, free draining material graded according to Mn/DOT 3149.2J as follows:

Sieve Size	Percent Passing By Weight
3/8 inch	100
No. 4	90 - 100
No. 10	45 - 90
No. 40	5 - 35
No. 200	0 - 3.5

2.07 COARSE FILTER AGGREGATE

A. Clean, free draining aggregate excluding crushed carbonate quarry rock, crushed concrete and salvaged bituminous mixtures, meeting the following gradation requirements according to MnDOT 3149.2H):

Sieve Size	Percent Passing By Weight
1 inch	100
3/4 inch	85-100
3/8 inch	30-60
No. 4	0-10

2.08 RIPRAP MATERIAL

A. The Contractor shall furnish only durable, field quarry, stone of the quality approved by the Engineer meeting the following gradation requirements for (Class I, II, III, IV, V) per MnDOT 3601,Table 3601-1:

	Approximate % of Total Mass				
	Class of Riprap				
Sieve Size (inches)	**I**	**II**	**III**	**IV**	**V**
30	--	--	--	--	100
24	--	--	--	100	--
21	--	--	--	--	75
18	--	--	100	--	--
15	--	--	--	75	50
12	--	100	75	50	--
9	--	75	50	--	--
6	100	50	--	--	10
4	--	--	--	10	--
3	50	--	10	--	--
2	--	10	--	--	--
1	10	--	--	--	--

2.09 WASHED ROCK

A. Clean, washed, free draining aggregate excluding crushed carbonate quarry rock, crushed concrete and salvaged bituminous mixtures, meeting the following general gradation requirements.

Sieve Size	Percent Passing By Weight
2 inch	100
1 inch	50 - 80
1/2 inch	20 - 60
No. 4	0- 5

2.10 MODIFIED SELECT GRANULAR BORROW (SAND SECTION)

A. Clean, free draining material graded according to Mn/DOT 3149.B2 as modified below:

Sieve Size	Percent Passing By Weight
1 inch	100
No. 4	90 - 100
No. 10	45 - 90
No. 40	5 – 40
No. 200	0 - 5

PART 3 EXECUTION

3.01 AGGREGATE BASE, ENGINEERED FILL, GENERAL BACKFILL, STABILIZING AGGREGATE, FINE FILTER AGGREGATE AND MODIFIED GRANULAR BORROW PLACEMENT

A. Deposit and spread in uniform 6-inch maximum thickness layers (after compaction) without segregation of size.

B. Compact each layer of material until there is no further evidence of consolidation using a sheeps foot roller, pneumatic tired roller, or vibratory steel roller as approved by the Engineer.

C. Compact each layer of material to at least (100% of maximum dry density as determined in accordance with ASTM D698, the Standard Proctor Method) OR (95% of maximum dry density as determined in accordance with ASTM D1557, the Modified Proctor). Use equipment that is consistently capable of achieving the required degree of compaction. Compact each layer over its entire area while the material is at the required moisture content.

D. Apply water to the material if the moisture content is below optimum during the mixing, spreading and compacting operations, when and in the amounts directed by the Engineer, as considered necessary for proper compaction.

E. Flooding, ponding, or jetting shall not be used for compaction.

3.02 BACKFILL AND COARSE FILTER AGGREGATE PLACEMENT

A. Deposit and spread in uniform 8-inch minimum thick layers as shown on the Plans.

B. Compact each layer until there is no further evidence of consolidation using hand or machine operated compaction equipment.

3.03 RIPRAP MATERIAL PLACEMENT

A. Deposit and spread in uniform layers as shown on the Plans. The placement of the riprap shall be performed in a manner to not break any of the rocks into smaller pieces.

B. The riprap material shall be placed over soil separation fabric, unless otherwise specified.

3.04 FIELD QUALITY CONTROL

A. Quality assurance testing is the responsibility of the Contractor/Owner. The Contractor/Owner shall employ the services of an independent materials testing firm to provide the final test information. The Contractor may use their own personnel to provide tests of the materials during the placement and compaction operations; however, an independent testing firm must take the final tests. The testing firm shall test the materials as construction work is performed.

1. The Contractor shall arrange for the laboratory to perform field density tests in accordance with ASTM D2922 (nuclear densometer method).
2. Laboratory shall make at least one random field density test of new materials for every 250 square yards of area for each 12 inch depth of material, but in no case less than one test per 12 inch depth.

B. Provide additional density testing if the test results are below the specified density until passing test results are achieved. The additional tests shall be performed at the Contractor's expense.

C. Inspections will be performed during the excavation for the following.

1. Examination of fill soil, including the thickness and compaction of fill layers.

END OF SECTION

SECTION 32 10 00

PLANT MIX BITUMINOUS PAVEMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
  1. Plant mix bituminous pavement

1.02 REFERENCES

A. Minnesota Department of Transportation (MNDOT) Materials Supplemental Specifications for Construction, Current Edition
  1. Section 2360, Plant Mixed Asphalt Pavement.
  2. Section 2357, Bituminous Tack Coat.
  3. Section 3139, Graded Aggregate for Bituminous Mixtures.

B. AASHTO M226, Viscosity Graded Asphalt Cement.
AASHTO T304, Uncompacted Void Content of Fine Aggregate.
AASHTO T176, Test Method for Plastic Fines in Graded Aggregates and Soil by use of the Sand Equivalent.

C. ASTM C131, Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

D. ASTM D1559, Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.

E. ASTM D2041, Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.

F. ASTM D3203, Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.

G. ASTM D4791, Test Method for Flat or Elongated Particles in Course Aggregate.

H. ASTM D5821, Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.

I. International Building Code, Chapter 11.

J. International Code Council A117.1, Accessible and Usable Buildings and Facilities.

K. Minnesota Accessibility Code, Minnesota Rules Chapter 1341.

1.03 QUALITY ASSURANCE

A. Compaction shall be by the Ordinary Compaction Method, unless stated otherwise.

1.04 WARRANTY

A. Provide a warranty for the paving work against failure of defects for a period of one year after the final acceptance of the project by the Owner. Repair or replace, to the satisfaction of the Owner and Engineer, failed or defective work that occurs during the warranty period at no cost to the Owner.

PART 2 PRODUCTS

2.01 PLANT MIXED ASPHALT PAVEMENTS AGGREGATE GRADATIONS

Broad Band Aggregate Gradation for Asphalt Mixtures
(% passing of total washed aggregate)

Sieve Size	A	B	C	D
1”			100	
3/4”		100[1]	85-100	
1/2”	100[1]	85-100	45-90	
3/8”	85-100	35-90	-	100
No. 4	60-90	30-80	30-75	65-95
No. 8	45-70	25-65	25-60	45-80
No. 200	2.0-7.0	2.0-7.0	2.0-7.0	3.0-8.0

[1]With the approval of the Engineer, the gradation broadband for the maximum aggregate size may be reduced to 97% passing for mixtures containing RAP, when the oversize material comes from the RAP source. The virgin material must remain 100% passing the maximum aggregate sieve size.

2.02 MIXTURE AGGREGATE REQUIREMENTS

Aggregate Blend Property	Traffic Level 2	Traffic Level 3	Traffic Level 4	Traffic Level 5
20-year Design ESAL’s	<1 million	1-3 million	3-10 million	10-30 million
Min. Coarse Aggregate Angularity (ASTM D5821) (one face / two face), %-Wear (one face / two face), %-Non-Wear	 30/- 30/-	 55/- 55/-	 85/80 60/ -	 95/90 80/75
Min. Fine Aggregate Angularity (FAA) (AASHTO T304, Method A) %-Wear %-Non-Wear	 40 40	 42 40	 44 40	 45 40
Flat and Elongated Particles, Max % by weight, (ASTM D4791)	-	10 (5:1 ratio)	10 (5:1 ratio)	10 (5:1 ratio)
Min. Sand Equivalent (AASHTO T 176)	-	-	45	45

Max. Total Spall in fraction retained on the #4 sieve – Wear Non-Wear	5.0 5.0	2.5 5.0	1.0 2.5	1.0 2.5
Maximum Spall Content in Total Sample – Wear Non-Wear	5.0 5.0	5.0 5.0	1.0 2.5	1.0 2.5
Maximum Percent Lumps in fraction retained on the #4 sieve	0.5	0.5	0.5	0.5
Class B Carbonate Restrictions				
Maximum % -#4 Final Lift/All Other Lifts	100/100	100/100	80/80	50/80
Maximum % +#4 Final Lift/All Other Lifts	100/100	100/100	50/100	0/100
Max. allowable scrap shingles – MWSS (1) Wear/Non-Wear	5/5	5/5	5/5	5/5
Max. allowable scrap shingles – TOSS (1) Final Lift/All other Lifts	5/5	5/5	0/5	0/0

(1) MWSS is manufactured waste scrap shingle and TOSS is tear-off scrap shingle

2.03 MIXTURE REQUIREMENTS

	Traffic Level 2	Traffic Level 3	Traffic Level 4	Traffic Level 5
20-year Design ESAL's	<1 million	1-3 million	3-10 million	10-30 million
Gyratory Mixture Requirements				
Gyrations for N_{design}	40	60	90	100
% Air voids at N_{design}, wear	4.0	4.0	4.0	4.0
% Air voids at N_{design}, Non-wear and all shoulder	3.0	3.0	3.0	3.0
Adjusted Asphalt Film Thickness, minimum µ	8.5	8.5	8.5	8.5
TSR*, *minimum %*	75 (1)	75 (1)	85 (2)	85 (2)
Fines / effective asphalt	0.6 – 1.2	0.6 – 1.2	0.6 – 1.2	0.6 – 1.2

* Use 6 inch [150 mm] specimens in accordance with 2360.2.I, "Field Tensile Strength Ratio (TSR)."

(1) MNDOT Min = 65, (2) MNDOT Min = 70

2.04 REQUIREMENTS FOR RECYCLED MATERIALS

A. Control recycled materials used in mixture by evaluating the ratio of new added asphalt binder to total asphalt binder in accordance with Mn/DOT 2360.E.7, and as shown in the following table.

Requirements for Ratio of Added Asphalt Binder to Total Asphalt Binder, min %			
Specified Asphalt Grade	Recycled Material		
	RAS Only	RAS + RAP	RAP Only
PG XX-28, PG 52-34, PG 49-34, PG 64-22			
Wear	70	70	70
Non-Wear	70	70	70
PG 58-34, PG 64-34, PG 70-34			
Wear & Non-wear	80	80	80

2.05 PLANT-MIXED BITUMINOUS SURFACE / WEAR COURSE MNDOT 2360

A. The bituminous mix designs for the surface or wear course shall be as follows:
  1. Parking lots and drives: SP 9.5 with 30% maximum RAP (SPWEA340B).

2.06 PLANT-MIXED BITUMINOUS BASE / NON-WEAR COURSE MNDOT 2360

A. The bituminous mix designs for the base or non-wear courses shall be as follows:
  1. Parking lots and drives: SP 12.5 with no restrictions (SPNWB330B).

2.07 PERFORMANCE GRADE ASPHALT BINDER

A. Only Performance Grade (PG) Asphalt Binder is approved for use. The inspection, sampling and testing of PG Asphalt Binder shall conform to the Schedule of Materials Control and the Combined State Binder Group Method of Acceptance for Asphalt Binders.
  1. Parking Lots and Drives: Grade B Binder = PG 58-28 [PG 58S-28].

2.08 TACK COAT

A. Tack coat to be used where plant mix pavement will be in contact with previously constructed asphalt or Portland cement concrete shall be CSS-1, CSS-1H, or CRS-2 Cationic Emulsified Asphalt. Dilution of the emulsion to 7 parts emulsion to 3 parts water is only allowed by the supplier. No field dilution is allowed. Residual asphalt content must meet the requirements as set forth in MNDOT 2357.

Residual Asphalt Content		
	Minimum Residual Asphalt Content	
Emulsion	Undiluted	Diluted (7:3)
CSS-1 or CSS-1h	57%	40%

PART 3 EXECUTION

3.01 SURFACE PREPARATION

A. Do not begin paving until deficient areas have been corrected and are ready to receive paving.

B. Pavement surfaces must be dry and completely free of dust, dirt, debris, and all loose materials and vegetation.

C. Apply a tack coat to the vertical surface of previously constructed bituminous or concrete that will be in contact with the plant mix bituminous. Distribute the tack coat at a rate between 0.05 and 0.07 gallons per square yard of surface for undiluted asphalt emulsion.

D. When a successive lift of plant mix bituminous is to be placed, the existing surface shall receive a tack coat if the previous layer is dirty or over 48 hours old.

E. Complete all reconstruction repairs in accordance with the specifications.

3.02 PLANT MIX BITUMINOUS

A. Plant Mix Bituminous: The aggregate grading shall conform to the specification limits. Asphalt cement content shall be within 0.3 percent of the job mix formula optimum asphalt content.

B. The trucks for hauling bituminous mixtures shall have tight, clean and smooth beds that have been sprayed with a minimum amount of approved anti-adhesive agent to prevent the mixture from adherence to the beds. Provide each truck with a cover of suitable material and size to protect the mixture from the weather.

3.03 PLANT MIX BITUMINOUS TEMPERATURE CONTROL

A. The minimum laydown temperature in all courses (as measured behind the paver of spreading machine) of the bituminous mixture shall be in accordance with the temperature requirements specified herein:

	Compacted Lift Thickness			
Air Temp	**1 inch**	**1 ½ inch**	**2 inch**	**3 inch or more**
32 - 40	-	265	255	250
41 - 50	270	260	250	245
51 - 60	260	255	245	240
61 - 70	250	245	240	235
71 - 80	245	240	235	235
81 - 90	235	230	230	230
91 - up	230	230	230	225

B. The plant mix bituminous mixture shall not exceed 310 degrees F. or the load will be rejected at Contractor's expense.

3.04 PLANT MIX BITUMINOUS PLACEMENT

A. General: Place the plant mix bituminous on a prepared surface with a paver. Place inaccessible and small areas by hand. Place each course to the required elevation, cross-section, and compacted thickness. The in-place compacted thickness shall be plus or minus 1/4 inch of the planned thickness. Any area, which is constructed to less than the required minimum thickness,

may be removed and replaced by the Contractor at the discretion of the Engineer, and at the Contractor's expense.

B. Equipment: All equipment furnished by the Contractor shall be maintained and in sound mechanical condition capable of performing the work.

C. Placement: The mixture shall be delivered to, and spread by, the plant mix bituminous paver. The mixture shall be laid in strips to minimize the number of longitudinal joints required.

D. Paver:

1. The paver shall be a self-contained, power-propelled unit provided with adjustable activated screed or strike-off assembly, heated, and capable of spreading and finishing courses of plant mix bituminous material. The paver must be capable of laying the plant mixed bituminous in widths applicable to the typical section and thickness shown on the Plans.
2. Equip the paver with a control system capable of automatically maintaining elevations as specified. The control system shall be automatically actuated from either a reference line or surface through which a system of mechanical sensors will maintain the paver screed at a predetermined slope at the proper elevation to obtain the required surface. When directed, the transfer slope control system shall be made inoperative and the screed shall be controlled by sensor directed automatic mechanisms, which will independently control the screed elevation from the reference line or surface.

E. Joints: Make joints between old and new pavements, or between a successive day's work, to ensure a continuous bond between the adjoining work. Construction joints shall be vertical and have the same texture, density, and smoothness as other sections of the bituminous course. Contact surfaces shall be clean and a tack coat applied.

F. Wear Course: Place the surface wear course in maximum 2-inch lifts unless otherwise specified by the Engineer.

G. Restrictions: No MNDOT bituminous mixtures shall be placed after November 1.

H. ADA Compliance: Paved slopes in handicap accessible parking stalls and access aisles shall not exceed 2% in any direction.

3.05 COMPACTION/ROLLING

A. Compact the plant mix bituminous mixture as quickly as possible after placement. Breakdown rolling shall immediately follow the paver. Intermediate rolling shall follow behind the breakdown rolling. Compaction of the pavement shall continue until in-place air voids are within the specified range. Finish rolling shall be performed at as high a temperature as practical and shall eliminate all the marks left from breakdown and intermediate rolling. All rolling must be completed before the bituminous mixture cools below 180 degrees F.

B. Rollers:

1. Steel-wheeled: Self-propelled and capable of reversing without backlash, weighing not less than 8 tons, and exerting a pressure on the rear drum of not less than 250 pounds

per linear inch. When vibratory rollers are used, they shall operate at a frequency of 8 to 10 impacts per foot.

2. Pneumatic-tired: Self-propelled, with a minimum of 7 tires, and exerting a pressure of not less than 200 pounds per inch of rolling width.
3. Trench: Self-propelled, exerting a pressure of not less than 250 pounds per linear inch of rear roll.

C. Rolling:

1. Unless otherwise directed, begin rolling at the side and proceed longitudinally parallel to the paving lane centerline, overlapping each trip half the roller width, and gradually progressing to the crown of the parking lot or roadway.
2. When the pavement abuts a previously placed lift, roll the longitudinal joint first followed by regular rolling procedures.
3. On sloped sections, begin rolling at the low side and progress to the high side, by overlapping the longitudinal trips parallel to the paving lane centerline.
4. Along forms, curbs, headers, walls, and other places not accessible to rollers, thoroughly compact the mixture with hot hand tampers or with mechanical tampers.
5. The pavement shall be rolled so that no roller marks, ridges, porous spots or impressions are visible and the resulting surface has the required elevation and surface smoothness requirements.

D. Compaction shall be obtained by the Ordinary Compaction Method. Uniformly compact each course until there is no further evidence of consolidation and all roller marks are eliminated. A minimum of two rollers shall be on the site at all times. A vibratory steel roller shall be used for breakdown and finish rolling and a pneumatic roller shall be used after breakdown, unless directed otherwise by the Engineer.

E. Protection: Erect barricades to prohibit vehicular traffic from the pavement after final rolling until it has fully hardened and cooled to the same temperature as the surrounding soil or original asphalt pavement.

3.06 FIELD QUALITY CONTROL

A. The plant mix bituminous pavement will be tested for compliance with the following project requirements. The tests and all costs shall be provided by the Contractor/Owner.

1. Asphalt Cement Content.
2. Plant mix bituminous density requirements, if necessary.
3. Thickness requirements, as specified, +/- ¼ inch.
4. Surface Smoothness, +/- 1/8 inch in 10 feet measured in any direction.

B. Test Frequency: the plant mix bituminous pavement shall be tested for mat thickness and surface smoothness during laydown.

C. The surface of the pavement when finished shall be of uniform texture, smooth, true to crown and elevation and free from defects to the satisfaction of the Engineer. When tested with a 10-foot straight edge in any direction, the maximum deviation of the surface shall not exceed 1/8 inch. Unsatisfactory joints, as determined by the Engineer, will be rejected and replaced at the

Contractor's expense. Areas showing deviations greater than 1/8 inch or where surface water ponding will result, shall be milled, tack coated and repaved with bituminous.

D. Remove and replace areas mixed with foreign materials or defective areas as directed by the Engineer. Sawcut the areas, remove the existing bituminous and replace with new, hot plant mix bituminous. Compact the area by rolling to the air voids and smoothness specified. The removal and replacement of contaminated plant mix bituminous shall be done at no cost to the Owner.

END OF SECTION

SECTION 32 20 00

CONCRETE PAVEMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. Portland cement concrete.
2. Expansion joint material.
3. Truncated domes.

1.02 SUBMITTALS

A. Submit at least 7 days in advance of placement, a Portland cement concrete and grout mix design, meeting the requirements of MN/DOT specifications. The mix design shall show the source and type of aggregate and cement; scale weight of each aggregate, cement, and water; and volume and type of admixtures per cubic yard.

B. Coarse and fine aggregate reports indicating the source, grading, specific gravity, absorption, and fineness modulus shall be submitted along with the concrete mix design at least 7 days prior to placement.

1.03 REFERENCES

A. Minnesota Department of Transportation (MN/DOT) Materials Lab Supplemental Specifications for Construction, Current Edition and subsequent revisions.
1. Section 2301, Concrete Pavement.
2. Section 2461, Structural Concrete.
3. Section 3101, Portland Cement.
4. Section 3126, Fine Aggregate for Portland Cement Concrete.
5. Section 3137, Coarse Aggregate for Portland Cement Concrete.

B. ACI 214, Recommended Practice for Evaluation of Strength Test Results of Concrete.

C. ACI 318, Building Code Requirements for Reinforced Concrete.

D. ACI 304.2R-96, Placing Concrete by Pumping Methods.

E. ACI 305, Hot Weather Concreting.

F. ACI 309, Cold Weather Concreting.

G. ACI 347, Guide to Formwork for Concrete.

H. ASTM C31, Test Methods for Making and Curing Concrete Test Specimens in the Field.

I. ASTM C33, Specification for Concrete Aggregates.

J. ASTM C39, Test Method for Compressive Strength of Cylindrical concrete Specimens.

K. ASTM C40, Test Method for Organic Impurities in Sand for Concrete.

L. ASTM C42, Methods of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

M. ASTM C88, Test Method for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate.

N. ASTM C131, Test Method for Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine.

O. ASTM C143, Test Method for Slump of Portland Cement Concrete.

P. ASTM C150, Specification for Portland Cement.

Q. ASTM C231, Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.

R. ASTM C260, Specification for Air-Entraining Admixtures for Concrete.

S. ASTM C309, Specification for Liquid Membrane-Forming Compounds for curing Concrete.

T. ASTM C494, Specification for Chemical Admixtures for Concrete.

U. International Building Code, Chapter 11.

V. International Code Council A117.1, Accessible and Usable Buildings and Facilities.

W. Minnesota Accessibility Code, Minnesota Rules Chapter 1341.

1.04 QUALITY ASSURANCE

A. Quality assurance personnel shall perform a complete set of tests (Slump, Air Content and Cast 4” by 8” or 6” by 12” Test Cylinders) each day concrete is placed.

1.05 WARRANTY

A. Provide a warranty for the concrete work against failure of defects for a period of one year after the final acceptance of the project by the Owner. Repair or replace, to the satisfaction of the Owner and Engineer, failed or defective work that occurs during the warranty period at no cost to the Owner. Excessive concrete pop-outs, greater than 5 per square yard, shall be deemed defective.

PART 2 PRODUCTS

2.01 PORTLAND CEMENT

A. ASTM C150, for Type I, II, III.

2.02 FINE AGGREGATE

A. Fine aggregate shall be well graded from coarse to fine; and, when tested by means of laboratory sieves, shall conform to MN/DOT 3126 as listed below:

Sieve Size	Percent Passing by Weight
3/8 inch	100
No. 4	95 - 100
No. 8	80 - 100
No. 16	55 - 85
No. 30	30 - 60
No. 50*	5 - 30
No. 100	0 - 10
No. 200	0 – 2.5

B. When tested in accordance with ASTM C40, the fine aggregate shall produce a color in the supernatant liquid no darker than the reference standard color solution.

C. Deleterious materials shall not exceed the following cumulative totals:
1. Shale, Alkali, Mika, Soft/Flaky Materials = 2.5% by weight.
2. Coal and Lignite = 0.3% by weight.

2.03 COARSE AGGREGATE

A. Aggregate shall comply with MN/DOT 3137 specifications for coarse aggregate. Class A aggregates consisting of crushed quarry rock including quartzite, granite, gneiss, traprock and other igneous rock types, with no more than 4% non-Class A aggregate.

B. Clean, washed, hard, durable aggregates conforming to MN/DOT 3137 specifications for coarse aggregate and one of the following MN/DOT gradations.

	Percent Passing by Weight		
Sieve Size	**CA 45**	**CA 50**	**CA 60**
1-1/4 inch	100	-	-
1 inch	95 - 100	100	-
¾ inch	65 - 95	85 - 100	100
5/8 inch	-	-	85 - 100
3/8 inch	25 - 55	30 - 60	40 - 70
No. 4	0 - 7	0 - 12	0 – 12

C. Aggregate quality tests shall meet the following criteria.
1. When tested in accordance with ASTM C131, the coarse aggregate shall show a loss not exceeding 40% after 500 revolutions.

2. When tested in accordance with ASTM C88, the loss resulting after five cycles shall not exceed 15% for coarse aggregate when using magnesium sulfate.
3. Coarse aggregate shall also meet the quality requirements of MN/DOT 3137.

2.04 WATER

A. Potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts, and other impurities.

2.05 AIR-ENTRAINING AGENT

A. ASTM C260. Use sufficient air-entraining agent to provide a total air content of 5.5% to 7.5%, add to the batch in a portion of the mixing water. Batch by means of a mechanical batcher capable of accurate measurement.

2.06 ADMIXTURES

A. Admixtures will be required at the Engineer's discretion or, if not required, may be added at the Contractor's option to control the set, effect water reduction, and increase workability. In either case, the addition of an admixture shall be at the Contractor's expense. The use of an admixture shall be subject to acceptance by the Engineer. Concrete containing an admixture shall be first placed at a location determined by the Engineer. If the use of an admixture is producing an inferior end result, the Contractor shall discontinue use of the admixture. Admixtures specified herein shall conform to the requirement of ASTM C494. The required quantity of cement shall be used in the mix regardless of whether or not an admixture is used.

2.07 CONCRETE MIX DESIGN

A. The mix design shall be composed of Portland cement, coarse and fine aggregate, water, and an air-entraining admixture, and shall be proportioned to meet the MN/DOT 2461, designation 3F52 design, or 3F32 for mechanically placed concrete for curb and gutter.

B. Design mix shall be normal weight air-entrained concrete meeting the following criteria:

Ingredient	**Range of Acceptable Values**
Portland Cement	Type I, II, III,
Maximum Cementitious Content	750 lbs. per cubic yard
Max. Fly Ash Content (3F32)	30%
Max. Fly Ash Content (3F52)	25%
Max. Water/Cement Ratio (3F32)	0.42
Max. Water/Cement Ratio (3F52)	0.45
Minimum 28 Compressive Strength	4500 psi
Target Air Content	6.5% (+2.0% and -1.5%)
Slump (3F32)	1/2 to 3 inches
Slump (3F52)	2 to 5 inches

C. For High-Early concrete mixes to achieve minimum strength for opening to traffic in 48 hours, the mix design shall be composed of Portland cement, coarse and fine aggregate, water, and an air-entraining admixture, and shall be proportioned to meet the MN/DOT 2461, designation 3HE52 design, or 3HE32 for mechanically placed concrete for curb and gutter. Design mix shall be normal weight air-entrained concrete meeting the following criteria:

Ingredient	**Range of Acceptable Values**
Portland Cement	Type I, II, III,
Maximum Cementitious Content	750 lbs. per cubic yard **(1)**
Max. Fly Ash Content (3HE32)	0%
Max. Fly Ash Content (3HE52)	0%
Max. Water/Cement Ratio (3HE32)	0.42
Max. Water/Cement Ratio (3HE52)	0.42
Minimum 48-hr. Compressive Strength	3000 psi
Minimum 28-day Compressive Strength	4500 psi
Entrained Air Content	6.5% +/- 1.0%
Slump (3HE32)	1/2 to 3 inches
Slump (3HE52)	2 to 5 inches

Note (1) Additional cementitious materials may be required to achieve early strength.

2.08 READY-MIXED CONCRETE

A. When the concrete is mixed in a ready-mix truck, the number of revolution of the drum at mixing speed shall not be less than 50 or more than 150. All revolutions over 150 shall be at agitating speed.

B. Type I concrete shall be discharged within 90 minutes of the time the air entraining agent is added at the plant.

C. Type III concrete shall be discharged within 60 minutes of the time the air entraining agent is added at the plant.

D. In hot weather, or under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85 degrees F. or above, the time between the introduction of the cement to the aggregate and discharge shall not exceed 45 minutes.

2.09 EXPANSION JOINT MATERIAL

A. The expansion joint material shall consist of 1/2” fiberboard or Deck-O-Foam polyethylene closed cell expansion joint filler.

2.10 TRUNCATED DOMES

A. Powder coated, cast-iron truncated dome plates, 24”x24”, manufactured by Neenah Foundry Co.

B. Approved equal.

PART 3 EXECUTION

3.01 PREPARATION OF SURFACES

A. Prior to placing concrete, thoroughly wet surfaces by sprinkling. Keep surfaces moist by frequent sprinkling up to the time of concrete placement. The surface shall be free from standing water, mud and debris at the time of concrete placement.

B. Forms

1. Forms shall be of wood, metal, or other suitable material and shall extend for the full depth of the concrete. Forms shall be straight, free from warp, and of sufficient strength to resist the pressure of the concrete without displacement. Bracing and staking of forms shall be such that the forms do not move when the plastic concrete is placed. Forms shall be covered with an approved form release agent before concrete placement.
2. The top surface of the forms shall show no deviations over 1/8" for the length of the form. The face of the form shall show no deviation over ½" from a 10-foot straight edge.

C. Hot weather concreting conditions shall have additional surface preparations and curing provisions as specified by ACI 305.

D. Cold weather concrete conditions shall have additional surface preparations and curing provisions as specified by ACI 306.

3.02 PLACING CONCRETE

A. The proportioning, mixing, and placing of the concrete shall be in accordance with the requirements for the concrete specified herein. Deposit concrete in one course to prevent segregation.

B. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

C. Finish surface with a wooden float and light brooming. No plastering of the surface will be permitted.

D. Outside edges of the slab and all trowelled joints shall be edged with a 1/4 inch radius-edging tool.

E. ADA Compliance:

1. Sidewalk cross slopes shall not exceed 2%.
2. Curb ramp shall not have a slope greater than 8.33% (1:12) or height greater than 6".
3. The maximum allowable vertical change is ¼".
4. Vertical changes between ¼" and ½" shall be beveled at 1:2.
5. Vertical changes over ½" shall be sloped no greater than 1:12.

F. Pumping of concrete shall be in accordance with ACI 304.2R.

3.03 CONTRACTION JOINTS

A. Slabs: The joint spacing shall not exceed 2 times (in feet) the slab thickness (in inches) i.e. a 4" thick slab shall not have joints spaced more than 8' by 8'. Where applicable, the joint spacing shall match the existing joint spacing.

B. Sidewalks: The joint spacing shall not exceed the width of the sidewalk or 2 times (in feet) the slab thickness (in inches) i.e. a 5' wide sidewalk shall have perpendicular joints every 5' or a 4" thick slab shall not have joints spaced more than 8' by 8'. Where applicable, the joint spacing shall match the existing joint spacing.

C. Curb and Gutter: The perpendicular joint spacing shall not exceed 10'. Where applicable, the joint spacing shall match the existing joint spacing.

D. All the joints shall be hand troweled or sawcut to a depth of 1/3 the depth of the concrete section. Sawcutting shall occur within 4 to 12 hours after concrete has hardened.

3.04 EXPANSION JOINTS

A. The expansion joint material shall go the full depth of the slab or curb and gutter.

B. Slabs: place the expansion material against buildings or previously placed concrete. Construction joints or designed expansion joints with steel reinforcing dowels shall be placed as shown on the plans or at a maximum interval of 80 feet in either direction of a continuous slab.

C. Sidewalks: place the expansion material against buildings or previously placed concrete. The expansion material shall be placed the full depth of the concrete thickness at a maximum distance of every 200 lineal feet.

D. Curb and Gutter: place the expansion material 3 feet on either side of any catch basin or manhole structure. The expansion material shall be placed the full depth of the curb and gutter cross section at a maximum distance of every 200 lineal feet.

3.05 CURING

A. Cure concrete using a liquid membrane-forming compound complying with ASTM C309, Type 2. The white-pigmented compound shall be applied at a rate of coverage not more than 150 square feet per gallon, providing a uniform white appearance.

B. Prohibit traffic, both pedestrian and vehicular, from freshly placed concrete for a period of not less than 72 hours. Vehicular traffic shall be excluded for such additional time as the Engineer may direct.

3.06 TRUNCATED DOMES

A. Install truncated domes in accordance with manufacturer's instructions.

3.07 SEALING

A. Concrete sidewalks and slabs-on-grade placed after September 15 shall be sealed with two (2) applications of concrete sealer.

B. Install each coat at a rate of 300 s.f./gal in accordance with manufacturer's recommendations.

3.08 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Contractor shall remove and dispose of excess materials at its own expense.

B. Liquid and solid wastes shall be contained in a leak-proof containment facility or impermeable liner in accordance with state and federal regulations.

3.09 FIELD QUALITY CONTROL

A. Sampling and testing for quality control during placement of concrete shall be arranged and paid for by the Contractor and shall include the following, as directed by the Engineer.

1. Slump: ASTM C143; one test for each set of compressive strength test specimens.
2. Entrained Air: ASTM C231; one test for each set of compressive strength specimens.
3. Casting and Curing Concrete Test Specimens: ASTM C31; cast one set of four standard test cylinders for each 100 cubic yards or fraction thereof, of concrete placed in any one day or for each 5,000 square feet of surface area placed.
4. Compression Strength Test Specimens: ASTM C39; per set of four standard cylinders, test one specimen at 7 days, two specimens at 28 days, and one specimen held in reserve for later testing, if required.
5. When total quantity of a given class of concrete is less than 50 cubic yards, the Engineer may waive strength test if, in his judgment, adequate evidence of satisfactory strength is provided.
6. Slump (ASTM C143) and Air Control (ASTM C231): One sample shall be taken from each of the first three trucks in each separate placement operation. After three acceptable tests without failure, the frequency shall be one test for every 100 cubic yards of concrete placed.

B. Test results will be reported in writing to the Engineer and Contractor on the same day that tests are made. Reports of compressive strength tests shall contain the project identification and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportion and materials; compressive breaking strength, and type of break for both 7-day and 28-day tests.

C. Additional Tests: The testing service will make additional tests of in-place concrete when compressive strength test results indicate specified concrete strengths have not been attained. The hardened concrete will be cored as specified with ASTM C42, or by other

methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required when unacceptable concrete is verified.

D. Irregularities, abrupt or gradual, in the finished concrete surface in excess of 1/8" (Class A) as measured with a 5-foot straightedge, in accordance with ACI 347, shall be corrected. The corrective action and resulting product shall be approved by the Owner and Engineer prior to execution.

END OF SECTION

SECTION 32 58 00

LANDSCAPING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. Topsoil
2. Fertilizer
3. Sod
4. Seed
5. Mulch
6. Hydromulch
7. Plants
8. Trees
9. Erosion Control Blankets
10. Planting Soil

1.02 SUBMITTALS

A. Furnish the Engineer with the Supplier's or Manufacturer's product specification data or testing results stating the materials furnished meet the requirements of the specifications.

B. Furnish the Engineer with a certificate of compliance stating the species, sizes, quantities furnished, and nursery supplier.

1.03 REFERENCES

A. Minnesota Department of Transportation (MN/DOT) Standard and Specifications for Construction, Current Edition
1. Section 2571, Plant Installation and Establishment
2. Section 2575, Establishing Turf and Controlling Erosion
3. Section 3876, Seed
4. Section 3877, Topsoil Material
5. Section 3878, Sod
6. Section 3881, Fertilizer
7. Section 3882, Mulch Material
8. Section 3884, Hydraulic Erosion Control Products

B. Minnesota Department of Transportation (MN/DOT) Current Seeding Manual.

C. ANSI Z60, American Standard for Nursery Stock

1.04 WARRANTY

A. All material shall be guaranteed by the Contractor to be in good, healthy, and vigorous conditions of active growth typical of the species for a period of one full year following the date of the final inspection.

B. Material that at any time during the guarantee period dies or is in obviously declining condition shall be removed immediately and replaced as soon as favorable conditions exist.

C. At the end of the guarantee period, replace material that, in the opinion of the Engineer or Owner, is in an unhealthy or unsightly condition. Remove rejected materials from the site and replace as originally specified.

PART 2 PRODUCTS

2.01 TOPSOIL

A. All topsoil shall be new and imported material. Topsoil found on the site may be used only if approved in advance by the Engineer and Owner. The topsoil, whether it is new or salvaged, should be screened and pulverized. The topsoil should be dry and ready to be fine graded.

B. Sandy loam soil, reasonable free of clay lumps, stones, and other objects over 1 inch in diameter, without weeds, roots, and other objectionable material.

2.02 FERTILIZER

A. Fertilizers shall be applied at a rate determined by the seed or sod supplier. The type of fertilizer shall be determined based on the type and properties of the topsoil, seed or sod.

B. The Contractor shall apply the fertilizers until the turf has been established, i.e. until all seeded areas have developed into turf or all new sod areas have developed a sound root structure.

C. Once the turf has been established and accepted by the Engineer and Owner, the Owner will be responsible for further fertilizing of the landscaped areas.

2.03 SOD

A. Lawn and boulevard mineral sod shall consist of densely rooted Kentucky bluegrass. The sod shall have a minimum of 3 varieties of Kentucky Bluegrasses. The sod shall have a lush appearance, uniform texture, and bright color throughout, weed free, containing no more than 1/4 inch of thatch over the base soil. At least two thirds (2/3) of the grasses, as determined by initial seeding proportions, shall be of acceptable improved type Kentucky bluegrass varieties. Acceptable varieties include Adelphi, Monopoly, Aspen, American Baron, Glade, Columbia, Eclipse, Fylking, Touchtown, Merit, Nassau, Midnite, and Victa.

B. Sod furnished shall be in acceptable condition upon delivery to the site. Sod strips shall not have dry or dead edges and shall not be cut more than 24 hours in advance of delivery. The

grass height of the delivered sod shall not exceed 2 inches. Deliver and unload sod the same day it is loaded on the delivery unit.

2.04 SEED

A. State-certified seed of the latest season's crop. Deliver in original sealed packages bearing the producer's guaranteed analysis for percentages of mixtures, purity, germination, weed and seed content, and inert material. Label the packages in conformance with the U.S. Department of Agriculture rules and regulations under the Federal Seed Act and applicable state seed laws. On-site seed mixing shall be done only in the presence of the Engineer.

B. The origin shall be clearly identified on the seed label for all seed types, including native forbs.

C. The seed mix or species to be furnished and used shall be a uniform blend as stated in MN/DOT Section 3876 and the 2014 Seeding Manual. Seed mixture 22-111 can be used for temporary stabilization of slopes and grading areas during construction. Seed mixtures 25-131 (Commercial Turf) or 25-151 (Residential Turf) can be used in lawn areas. Seed mixture 25-141 should be used for general roadside applications. Seed mixtures 33-261 or 33-361 should be used in areas of the detention basin located between the normal water level and the crest.

Mixture No.	Category	Name
22-111	Mid-Term Stabilization	Two-year Stabilization
25-131 (Commercial)	Non-Native Grassland	Low Maintenance Turf
25-141	Non-Native Grassland	Mesic General Roadside
25-151 (Residential)	Non-Native Grassland	High Maintenance Turf
33-261	Stormwater Facilities	Stormwater South and West
33-361	Stormwater Facilities	Stormwater Northeast

D. Protect the seed from moisture from the time of delivery until the time it is used. Wet or moldy seed shall not be used.

2.05 MULCH

A. MN/DOT 3882 Type 3 Mulch: Clean grain straw (i.e. oats, wheat) that is certified by the Minnesota Crop Improvement Association (MCIA) to be weed free. All mulch bales shall be in air-dried condition at the time of delivery and shall have an MCIA inspection tag attached indicating that the mulch has passed inspection.

2.06 HYDROMULCH

A. MN/DOT 3884 Type - Hydraulic Mulch: Shall consist of wood cellulose fibers that shall contain no germination or growth inhibiting factors. It shall not contain sawdust or pulverized newspaper. It shall be dyed a color that allows for visual monitoring of its application. It shall contain 2.5 to 5.0 percent tackifiers (Type I) by weight. The moisture content shall not exceed 15% at the time of delivery. When washed on a #20 sieve at least 50 percent shall be retained.

2.07 PLANT STOCK

A. Plants furnished shall be Minnesota, North Dakota or South Dakota, Wisconsin, Iowa, or Michigan nursery grown stock, and shall have been growing in a nursery for at least two years. The term plant shall mean any or all trees, bushes, shrubs, vines, annuals or perennials.

B. Plants to be of size and type as indicated on plans.

2.08 TREES

A. Straight trunks with leader intact, undamaged, and uncut. Old abrasions and cuts shall be completely callused over. Measure when branches are in their normal position. Height and spread dimensions specified refer to the main body of the tree and not from branch or root tip to tip.

B. The determining measurement for trees shall be the caliber, which shall be taken 6 inches above the ground for trees up to 4-inch caliber, and 12 inches above the ground for larger sizes. Trees to be of size and type as indicated in the plans.

C. Tree wrapping material shall be standard burlap, heavy crepe paper, or other suitable material in strips 4 to 10 inches wide and shall be specifically designed and manufactured for horticultural use and have insect resistant qualities.

2.09 EROSION CONTROL FABRIC

A. Erosion control fabric shall be in accordance with MN/DOT 3885.
1. Category 3, Type Straw 2S (3-12 months)
2. Category 4, Type Straw/Coconut 2S (24-36 months)
3. Category 7, Type Coconut 3S (Greater than 36 months)

2.10 PLANTING SOIL

A. Highly organic blend of 1/3 peat, 1/3 black dirt, and 1/3 compost for use in ornamental planting areas.

2.10 WATER

A. Potable (or as otherwise approved) and suitable for plant growth.

2.11 MISCELLANEOUS LANDSCAPE MATERIALS

A. Stakes and deadmen: Sound new hardwood, treated softwood, or redwood, free of knotholes and other defects.

B. Wire ties and guys: Two-strand, twisted, pliable galvanized iron wire not lighter than 10 gauge with zinc-coated turnbuckles. Protect tree trunks from damage by wires.

C. Wood chip mulch shall be a mixture of even consistency, 1/8" thick by 3/4" to 1-1/2" square shaven solid stumpwood; free from soil, twigs, leaves, rock, rubble, weeds, or synthetic matter.

D. Wood chip mulch shall be double-shredded for even consistency; free from soil, twigs, leaves, rock, rubble, weeds, or synthetic matter.

E. Edging: Commercial grade, black PVC edging.

PART 3 EXECUTION

3.01 SOIL PREPARATION

A. Immediately prior to placing the topsoil, scarify the existing soils to a minimum depth of 3 inches for all areas on slopes shallower than 2 horizontal to 1 vertical.

B. Perform soil preparation immediately prior to seeding or placing sod to prevent undesirable weed growth or soil erosion.

C. Place the topsoil and spread uniformly over lawn areas to a minimum depth of 4 inches. Firm and smooth the topsoil after working the soil.

D. Apply a starter fertilizer at the Manufacturer's or Supplier's recommended rates and work into the topsoil. The lag time between seeding or placing sod and fertilizing shall not exceed 48 hours.

E. Rake the surface until it is smooth and of uniform fine texture immediately prior to seeding or placing sod.

3.02 SOD PLACEMENT

A. Carefully place the sod strips beginning at the bottom of the slope and progressing upward. Place the sod strips with staggered end joints without stretching. Tightly abut the joints between the sod strips.

B. Immediately after completing the sod placement, water and compress the sod into the underlying soil by rolling or tamping. The initial watering and rolling or tamping shall be sufficient to provide a firm contact and bond between the sod and the underlying soil. The sod surface shall be level and smooth, free of humps and depressions.

C. Remove and dispose of waste sod, stones or other debris removed from the sodded area(s), at completion of the sod placement.

D. Sod placed under the Contract shall be fertilized and maintained by the Contractor until the sod has uniformly rooted over the landscaped areas.

3.03 SEEDING

A. The seed mixture shall be placed with a seed drill that will accurately meter the types of seed to be planted and keep all seeds uniformly mixed during drilling. The application rate for all seed mixes can be found in the MnDOT Seeding Manual, 2014 Edition. The drill shall be equipped with disk furrow openers and packer assembly to compact the soil directly over the drill row. Seeding shall be done at a right angle to the surface drainage. The seeding shall be done with two passes over the entire area, with the second pass in a direction at a right angle to the first pass.

B. Seeded areas shall have the seedbed firmed after seeding and prior to mulching. Soil firming shall be done with a drag cultipacker or other approved soil firming equipment. On slopes too steep to operate mechanical equipment, the seed shall be covered by hand raking or other approved means, wherever feasible, prior to mulching. Accomplish the soil firming or seed covering immediately after seeding.

C. The mulch shall be spread by mechanical means to provide a uniform distribution at an application rate of 2.0 tons/acre of MN/DOT Type 3 Mulch.

D. Seed placed under the Contract shall be fertilized and maintained by the Contractor until the seed has developed into a lush turf over the landscaped areas.

3.04 HYDROSEEDING

A. Mix the seed, fertilizer, and mulch material in the required amount of water to produce a slurry mixture.

B. Type 5 Hydromulch

1.	Seed mixture	100 lbs/acre
2.	Mulch	2,100 lbs/acre or 100% coverage

C. Incorporate the mulch into the slurry mix after the seed and fertilizer have been thoroughly mixed.

D. Direct the spray during the application to obtain a uniform material distribution.

E. Empty the slurry mixture within one hour after the seed is added to the tank.

F. Hydroseed placed under the Contract shall be fertilized and maintained by the Contractor until the seed has developed into a lush turf over the landscaped areas.

3.05 PLANTING TREES AND SHRUBS

A. Excavate pits, beds, and trenches with vertical sides and with the bottom of the excavation slightly raised at the center to provide proper drainage. Loosen hard subsoils in the bottom of the excavation.

B. For balled and burlapped trees and shrubs, make excavations at least half again as wide as the ball diameter and equal to the ball depth. Allow for setting the ball on a 3 inch layer of good quality topsoil.

C. For container grown stock, excavate as specified for balled and burlapped stock, adjusted to the size of the container width and depth. Cut into the sides of the root ball, approximately 1/3 through the ball to loosen the root mass prior to planting.

D. Retain a portion of the existing subsoils and thoroughly mix approximately 25% with 75% new topsoil. Place the soil mixture under and around the new plantings.

E. Set the balled and burlapped stock on a layer of good quality topsoil and subsoil mixture, plumb and in the center of the pit or trench with the top of the ball 3" higher than the adjacent finished landscape elevations. Remove the burlap from the top and 1/3 the depth of the sides of balls. Retain the burlap on the remaining 2/3 of the sides and bottom. When the planting is set, place additional backfill around the base and sides of ball, and work each layer to settle the backfill and eliminate voids and air pockets.

F. Fill approximately 1/2 of the excavations with the topsoil and subsoil mixture, then water thoroughly and allow it to percolate out before placing additional backfill. Once the backfill operations are complete, thoroughly water the plants again.

G. Set container grown stock as specified for balled and burlapped stock. Remove and dispose of all containers.

H. Place mulch pits around all trees and plantings and within all landscaped planting beds as required. Provide not less than a 6-inch depth of mulch and finish level with the adjacent finished elevations.

I. Stake trees and plantings in place, as required, immediately after planting.

3.07 EROSION CONTROL FABRIC INSTALLATION

A. The installation of the erosion control fabric shall be on all slopes greater than 1:4, on all drainage swale areas, and at all locations where drain tile lines or culverts empty water out on to the surface of seeded areas. The placement of the fabric is not dependent on strict slope requirements, rather on retaining the topsoil and seed for the site.

B. The installation of the erosion control fabric shall be in strict compliance with the manufacturer's installation instructions.

C. Staple the fabric onto the slopes as recommended by the manufacturer.

D. Prepare the soil before installing the blankets, including the application of fertilizer and seed.

3.08 PROTECTION AND CLEANING

A. Keep the pavements clean and the work area in an orderly condition during landscaping work.

B. Protect the landscape work and materials from damage due to landscape operations or by other Contractors and trades, and trespassers. Maintain the protection measures during the installation and maintenance periods.

END OF SECTION

SECTION 33 10 00

WATER DISTRIBUTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
  1. Underground water service piping, watermains and appurtenances.

1.02 CODES

A. All work shall comply with the most current requirements of the Minnesota Department of Health, the Minnesota Plumbing Code and all applicable codes and ordinances.

1.03 REFERENCES

A. AWWA B300, Hypochlorites.

B. AWWA B301, Liquid Chlorine.

C. AWWA C100, Thickness Design of Cast-Iron Pipe.

D. AWWA C151, Ductile Iron Pipe Centrifugally Cast in Metal Moulds or Sand-Lined Molds.

E. AWWA C500, Gate Valves for Ordinary Water Works Services.

F. AWWA C502, Fire Hydrants for Ordinary Water Works Services.

G. AWWA C600, Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances

H. AWWA C800, Threads for Underground Service Line Fittings.

I. AWWA C900, Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4” through 12” for Water.

J. ANSI A21.4, American National Standard for Cement-Mortar Lining for Cast Iron and Ductile-Iron Pipe and Fittings for Water.

K. ANSI A21.10, American National Standard for Gray-Iron and Ductile-Iron Fittings, 2” through 48”, for Water and Other Liquids.

L. ANSI A21.11, American National Standard for Rubber-Gasket Joints for Cast-Iron and Ductile-Iron Pressure Pipe and Fittings.

M. ASTM B88, Standard Specifications for Seamless Copper Water Tube.

N. ASTM D429, Standard Test Methods for Rubber Property Adhesion to Rigid Substrates.

O. ASTM D1784, Standard Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds (Type 1, Grade 1).

P. ASTM D1785, Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe Schedules 40, 80 and 120.

Q. ASTM D2239 Standard Specifications for Polyethylene (PE) Plastic Pipe.

R. ASTM D2241, Standard Specifications for Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR and Class T).

S. ASTM D2609, Standard Specifications for Plastic Insert Fittings for Polyethylene Plastic Pipe.

T. ASTM D3139, Standard Specifications for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

U. ASTM F477, Standard Specifications for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

V. Ten States Recommended Standards for Water Works, Most Current Edition.

1.04 SUBMITTALS

A. The Contractor shall submit for approval, complete shop drawings and details for all couplings, valves, operators, and other special appurtenances. This required submission for approval shall include all the manufacturer's product data, dimensions, sizes, types, maximum loading, and thrust anchorages.

B. The manufacturer shall furnish an affidavit stating that the valves and all materials conform to the applicable requirements and all tests specified under the respective standard have been performed and requirements have been met.

1.05 SITE CONDITIONS

A. The existing underground utilities, as shown on the plans, are located in accordance with available data, but the locations may vary and cannot be guaranteed. The exact locations shall be determined by the Contractor as the work proceeds. The excavation work shall be done carefully so as to avoid damaging the existing utilities.

B. The Contractor shall provide for the protection, temporary removal and replacement, or relocation of said obstructions as required for the performance of the work required in these contract documents. No extra payment will be made for this work.

PART 2 PRODUCTS

2.01 POLYVINYL CHLORIDE PIPE

A. ASTM D1784, Type 1, Grade 1 PVC pressure pipe shall be manufactured in accordance with the latest revision of AWWA Standard C900. The pipe shall be Class 150, SDR 18. The outside diameters shall conform to the outside diameters of ductile iron pipe for the various sizes.

B. ASTM D1785, Schedule 40 PVC pressure pipe shall be manufactured in accordance with the latest codes. The outside diameters shall conform to the outside diameters of ductile iron pipe for the various sizes.

C. Trace wire shall be #12 AWG Copper Clad Steel, High Strength with minimum 450 lb. break load, with minimum 30 mil HDPE insulation thickness.

2.02 PVC PRESSURE PIPE JOINTS

A. The joints shall be rubber gasketed conforming to ASTM D3139.

B. The lubrication material shall be water soluble, non-objectionable in taste and odor imparted to the water, non-supporting of bacterial growth, with no deteriorating effects on the PVC or rubber gaskets.

2.03 DUCTILE IRON PIPE, SPECIALS, AND FITTINGS

A. All pipe, specials, and fittings shall be ductile iron conforming to ANSI A21.10. The joints shall conform to the requirements of ANSI A21.11. The fittings shall all have bell connections of standard AWWA dimensions or special dimensions as required, or shall be equipped with adapters of the proper class for the size of the pipe as required by the manufacturer. Specials and fittings shall have a pressure rating of 250 psi. Where mechanical joints are utilized, all bolts shall be Cor-Blue T-bolts.

B. The ductile iron pipe shall be Class 52 unless otherwise noted on the plans and shall be provided with a Portland cement lining conforming to the requirements of AWWA C151/ANSI A21.4 for standard thickness of lining. The thickness of any cement mortar pipe lining furnished shall not be less than the minimum thickness specified for the applicable pipe size in the following table:

Size of Pipe	Minimum Lining Thickness
12 inches or smaller	1/16 inch
16 inches	3/32 inch

C. All exterior surfaces of the pipe and fittings shall have a tar or bituminous seal coating at least one mil thick. Spotty or thin seal coating, or poor coating adhesion, shall be cause for rejection.

D. All joint fittings and valves shall be fastened with Cor-Blue T-bolts, as manufactured by NSS Industries, Plymouth, Michigan, or approved equal.

E. Conductive gaskets with approved copper inserts equal to American Fastite or copper straps shall be welded to the pipe and connected with a silicone bronze bolt. Conductors shall be rated at 600 amps sustained current.

F. Wrap the ductile iron pipe and cast iron fittings with polyethylene plastic film having a minimum thickness of 0.008 inches.

2.04 CONNECTIONS TO DUCTILE-IRON FITTINGS

A. Connections between ductile-iron and polyvinyl chloride pipe and cast-iron fittings or gate valves shall be made with jointing materials recommended by the pipe manufacturer and approved by the Engineer.

2.05 GATE VALVES

A. The gate valves shall conform to AWWA C500, designed for a minimum working pressure of 150 psi. All gate valves shall be resilient seated gate valves. The mechanical joints shall conform to AWWA C111/ANSI A21.11-85. The gate valves furnished shall comply with the following supplementary requirements.

1. Resilient wedge gate valves shall conform to ANSI/AWWA C509. The valves shall be R/W resilient wedge gate valves as manufactured by Clow Corporation, or approved equal.
2. The gate valves shall have joints as specified for the piping in which they are installed. Stems for non-rising stem assemblies shall be cast bronze with integral collars. The non-rising stem stuffing box shall be the O-ring seal type with two rings located above the thrust collar. The rings shall be replaceable with the valve fully open at the full rated working pressure.
3. The gate valves shall have a clear waterway equal to the full nominal diameter of the valve, and shall be opened by turning counterclockwise. There shall be two low torque thrust bearings located above and below the stem collar. The stem nut shall be separate from the wedge and shall be of solid bronze.
4. Each valve shall have an open indicating arrow, the manufacturer's name, pressure rating, and year of manufacture cast on the body.
5. The gate valves shall be two-faced, double disc type, with parallel seats and a 2" operating nut opening counterclockwise.
6. The wedge shall be cast iron completely encapsulated with polyurethane rubber (except for guide and stem area). The polyurethane rubber shall be permanently bonded to the cast iron wedge to meet ASTM tests for rubber to metal bond (ASTM D-429).
7. All gears on the gate valves shall be cut tooth steel gears, housed in heavy cast iron extended type grease cases of approved design.
8. All gate valves shall have mechanical joint ends.
9. Both the interior and exterior of the body and bonnet shall be coated with fusion bonded epoxy.

B. All the valves shall be provided with valve boxes. All valve boxes shall be of cast iron, buffalo-type adjustable. The valve boxes shall be provided for 7.5 feet of cover, except where greater depths are indicated on the profiles of the plans. The valve boxes shall not be less than 5" in diameter, shall have a minimum thickness at any point of 3/16", and shall be provided with suitable cast iron bases and covers. The covers shall have the word "water" cast on them.

2.06 TAPPING SLEEVE AND TAPPING VALVE

A. Tapping Sleeve and Tapping Valve: Complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. Use sleeve and valve compatible with tapping machine.

1. Tapping Sleeve: Stainless steel 2-piece bolted sleeve with flanged outlet for new branch connection. Sleeve may have mechanical joint ends with rubber gaskets or sealing rings in sleeve body. Use sleeve that mates with size and type pipe material being tapped. Outlet flange shall be size required for branch connection.

2.07 FIRE HYDRANTS

A. The fire hydrants shall be Waterous Model WB-67 pacer type with traffic flange or approved equal, conforming to AWWA C-502.

B. Traffic Flange Type to be supplied with a 16" break-off section.

C. AWWA C502.64 Standard Specifications for Fire Hydrants for Ordinary Water Works Service shall govern the design, construction and manufacture of fire hydrants unless as added to or modified herein.

1. Hydrants shall be the City standard.
2. Operating nut and nozzle caps shall be the standard pentagon nut type of the dimension, which currently exists in the City.
3. Main Valve Opening: 5
4. The hydrant barrels shall be two-piece, non-jacket type, with flanged joints above the finished elevation line and with mechanical joint connections at the hub end.
5. Type of Shut-Off: Compression, unless otherwise approved by the Engineer.
6. Bury Length: 7 .5' from the ground surface to the top of the connecting pipe.
7. The hydrants shall have two outlet nozzles for 2-1/2" (I.D.) hose connection and one outlet nozzle for 4" (I.D.) steamer connection. All outlet nozzle threads shall be National Standard threads, equal to those presently in use by the Owner. The Contractor shall obtain the necessary thread information.
8. Operating Nut: One 1-1/2" National Standard Pentagonal operating nut.
9. The hydrant operating mechanisms shall be provided with "O" ring seals preventing entrance of moisture and shall be lubricated through an opening in the operating nut or bonnet.
10. The hydrants shall include stainless steel clips for the two upper bolts on the water pipe side of the elbow.
11. Direction to Open: To the left (counterclockwise).
12. Finish Paint above the Ground Line: standard red.

PART 3 EXECUTION

3.01 PIPE INSTALLATION

A. Handling

1. Thoroughly clean the interior of the pipe of all foreign materials before lowering it into the trench.
2. Perform pipe cutting in a neat and workmanlike manner without damage to the pipe. The cutting methods used shall conform to the manufacturer's recommendations.

B. Granular Pipe Bedding

1. The bedding material shall be a clean pit-run sand or fine gravel, free from deleterious matter and rocks over 1" in diameter. Place the bedding material uniformly over the trench bottom to a minimum depth of 3". Shape the material to give uniform support to the lower fourth of the pipe for its entire length. Make depressions in the bedding to accommodate the joints. Carry bedding material to 6" above the top of the pipe.

C. Pipe Laying

1. Do not lay the pipe in water or when the trench or weather conditions are not suitable for the work except by permission of the Engineer. When the work is not in progress, securely close open ends of the pipe and fittings so that no water or other foreign matter enters the pipe or fittings.
2. Unless shown otherwise on the plans, the pipe shall have a minimum of 7.5' of cover below all finished elevations and shall not be laid closer horizontally than 10' to a sanitary sewer line. Deflections from a straight line or grade as required by horizontal or vertical curves shall not exceed 5 degrees (a 5-degree deflection is equivalent to an offset of approximately 1" per lineal foot of pipe). If the alignment required deflects in excess of this limit, provide bends and fittings or shorter lengths of pipe until these conditions are met. Brace bends and fittings in the pipe with concrete thrust blocks poured in place against undisturbed earth.

D. Gate Valves and Valve Boxes

1. Install where shown on the plans or as directed by the Engineer.
2. Set the gate valves and valve boxes plumb and center the valve boxes on the valves. Carefully place and compact fill materials around the valve box for a distance of 4' on all sides of the box, or to the undisturbed trench face, whichever is less. Set the top of the valve box at the elevation of the existing ground or as shown on the plans.
3. Post indicator valves shall be maintained in a plumb position with 36" between the finish ground elevation and the top of the valve.

E. Fire Hydrants

1. Set the fire hydrants at such an elevation that the specified minimum pipe cover is provided throughout the length of the branch supply line and that the nozzles are 24" above the proposed ground elevation. Set the hydrants plumb and place on a concrete pad not less than 4" deep and 15" square. Firmly block the back of the hydrants, opposite the pipe connections, against the vertical face of the trench with a concrete thrust block poured in place against undisturbed earth with minimum dimensions of 12" each way. If, in the opinion of the Engineer, the soil is unstable

and will not support the thrust block, use bridle rods to secure the hydrant. The rods shall be a minimum of 3/4" in diameter and shall be covered with an acid resistant coating.

2. Place a minimum of 9 cubic feet of crushed rock or coarse gravel at the base of each hydrant for drainage.
3. Place and compact fill around the hydrant to a minimum distance of 4' on all sides of the hydrant or to the undisturbed sides of the trench, whichever is less.

3.02 SANITARY SEWER, STORM SEWER, AND WATER CROSSINGS

A. Water pipe crossing sewers shall be laid to provide a separation of at least 18" between the bottom of the water pipe and the top of the sewer. When local conditions prevent a vertical separation as described, the following construction shall be used.

1. Construct the sewers of materials equal to water service piping standards of construction.
2. Protect the water pipes passing under sewers by providing a vertical separation of at least 18" between the bottom of the sewer and the top of the water pipe.
3. Provide adequate structural support for the sewers to prevent excessive deflection of the joints and settling on and breaking the water pipe. The length of water piping shall be centered at the point of crossing the sewer pipe so that the joints will be equidistant from the crossing.

3.03 STERILIZATION

A. Sterilize each completed portion of the water pipe installation with chlorine before use for domestic purposes.

B. The materials used may be either liquid chlorine conforming to AWWA B301 or hypochlorites conforming to AWWA B300.

C. The amount of dosage shall provide a minimum of 50 parts per million of chlorine. The chlorine solution shall remain in the pipe for a maximum of 24 hours before the system is flushed. Open and close the valves in the mains being sterilized a minimum of three times during the contact period.

D. After the contact period is over, thoroughly flush the pipe with clean water until the residual chlorine content is less than one part per million.

E. Extreme care shall be taken during the sterilizing operation to ensure that a strong chlorine solution does not enter the existing water supply.

3.04 HYDROSTATIC TESTING OF WATER MAINS

A. After the pipe has been laid, including fittings, valves and blocking, all newly-laid pipe or any valved section thereof, unless directed otherwise by the Engineer, shall be subject to hydrostatic pressure of 150 pounds per square inch. The duration of each such test shall be at least two hours.

B. Each section of pipe to be tested shall be filled with water and all air expelled at the highest point. The required taps to expel air or to fill the water main shall be supplied and installed by the Contractor and shall be ¾ inch and shall include an approved service saddle when required.

The test apparatus shall be applied at the lowest elevation on the section to be tested. The apparatus shall be connected to the pipe at a service tap or special tap location.

The pressure gauge shall be a standard pressure gauge. The dial shall register from 0 – 200 psi and have a dial size of 4 ½ inches with 1 psi increments.

The hydrostatic test, pressure requirement for an acceptable test shall be a maximum pressure drop of 0 psi during the two hour pressure test.

If this test requirement cannot be met, the Contractor shall investigate the cause, make corrections, and retest until the pressure drop requirement can be met.

Only if several consecutive tests indicate a consistent pressure drop and only after the Contractor has made numerous attempts to resolve the problem, acceptable to the Engineer, may the Contractor request in writing and the Engineer consider the use of the leakage test. The leakage test may be performed by the Contractor to determine the magnitude of the leak. However, meeting the leakage allowance shall not automatically be considered acceptance, in lieu of the pressure test, for the section being tested. Final acceptance shall be at the discretion of the Engineer.

When allowed, the leakage test shall be performed in accordance with AWWA C-600, Section 4.1.5, 4.1.6 and the line will be accepted as per Section 4.1.7.

3.05 ELECTRICAL CONDUCTIVITY TESTS

A. The contractor shall perform a conductivity test within one week upon completion of pressure testing on the pipe to establish that electrical thawing may be carried out in the future. Conductivity testing must be carried out in the Engineer's presence and be approved before acceptance.

B. The system (pipeline, valves, fittings and hydrants) shall be tested for electrical continuity and current capacity. The electrical test shall be made after the hydrostatic pressure test and while the line is at normal operation pressure. Backfilling shall have been completed. The line may be tested in sections of convenient length as approved by the Engineer.

C. A direct current of 350 amperes +/- 10% shall be passed through the pipeline for five minutes. The current flow through the pipe shall be measured continuously on an ammeter and shall remain steady without interruption or excessive fluctuation throughout the five-minute test period.

D. Insufficient current or intermittent current or arcing, indicated by large fluctuations of the ammeter needle, shall be evidence of defective contact in the pipeline. The cause shall be

isolated and corrected. Thereafter, the section in which the defective test occurred shall be re-tested as a unit and shall meet the requirements.

E. After the test, the hydrant shall be shut off and a cap loosened to allow the hydrant to drain. Tighten the cap after drainage is complete.

3.06 CLEANING

A. Upon completion of the installation of the water piping and appurtenances, remove excess materials, equipment, temporary structures, and debris resulting from the construction work.

END OF SECTION

SECTION 33 30 00

SANITARY SEWER

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
  1. Sanitary sewer pipe.
  2. Televising.

1.02 CODES

A. All work shall comply with the most current requirements of the Minnesota Department of Health, the Minnesota Plumbing Code published by the Minnesota Department of Labor and Industry Codes Division, latest edition.

1.03 REFERENCES

A. Minnesota Plumbing Code published by the Minnesota Department of Health, latest edition.

B. ASTM A48, Specification for Gray Iron Castings.

C. ASTM C443, Standard Specifications for Joints for Concrete Pipe and Manholes.

D. ASTM C478, Specification for Pre-cast Reinforced Concrete Manhole Sections.

E. ASTM C923; Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.

F. ASTM D3034, Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.

G. ASTM D3212, Specification for Joints for Drains and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

H. ASTM F477, Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

I. ASTM F949, Specification for Polyvinyl Chloride (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings.

1.04 DELIVERY, STORAGE AND HANDLING

A. Inspect the materials delivered to the site for damage and store the materials with a minimum of handling. The materials shall be kept under cover and out of the direct sunlight. Do not store the materials directly on the ground. Keep the inside of the pipes and fittings free from dirt and debris.

1.05 QUALITY ASSURANCE

A. Quality assurance personnel shall be at the project site on an intermittent basis during the storm sanitary sewer system placement.

1.06 SUBMITTALS

A. The Contractor shall submit for approval complete shop drawings and details for all structures, pipes, castings, fittings, and accessories. Submittal shall include all the manufacturer's product data, certifications, dimensions, sizes, types, and installation requirements.

1.07 SITE CONDITIONS

A. The existing underground utilities, as shown on the plans, are located in accordance with available data, but the locations may vary and cannot be guaranteed. The exact locations shall be determined by the Contractor as the work proceeds. The excavation work shall be done carefully so as to avoid damaging the existing utilities.

B. The Contractor shall provide for the protection, temporary removal and replacement, or relocation of said obstructions as required for the performance of the work required in these contract documents. No extra payment will be made for this work.

PART 2 PRODUCTS

2.01 SANITARY SEWER PIPE

A. All pipe shall be new and unused.

B. Polyvinyl chloride (PVC) pipe, ASTM D1785 Schedule 40.

2.05 PIPE BEDDING MATERIAL

A. The pipe bedding shall consist of clean pit-run sand or fine gravel, free from deleterious matter and rocks over 1 inch in diameter.

PART 3 EXECUTION

3.01 PIPE INSTALLATION

A. Shape the bottom of the trench to give substantially uniform circumferential support to the lower fourth of each pipe allowing for pipe bedding material. Pipe laying shall proceed up-grade with the groove (bell) ends in the up-grade direction. Adjust the tongues in grooves to produce a uniform space. Lay each pipe true to line and grade to form a close concentric joint with the adjoining pipe. Blocking or wedging between tongues and grooves will not be permitted. As the work progresses, clean the interior of the pipe free of dirt and extraneous materials.

B. Keep the trenches free from water until the pipe jointing is completed. Do not lay the pipe when conditions of the trench or the weather are unsuitable for such work. Keep the open ends of the pipe and fittings securely closed at all times when the work is not in progress.

C. The bedding material shall be placed uniformly over the trench bottom to a depth of not less than 3 inches. The bedding shall be shaped to provide uniform support to the lower fourth of the pipe for its entire length. Depressions shall be made in the bedding material to accommodate the joints. The pipe bedding material shall be carried to 6 inches above the tip of the pipe. The remaining trench backfill material shall be on-site material similar in composition to the surrounding subsoils.

3.02 JOINT CONSTRUCTION

A. Make joints with rubber gaskets. Clean and dry the surfaces to receive lubricants, cements, or adhesives. Affix gaskets to the pipe not more than 24 hours prior to the installation of the pipe. Protect the gaskets from sun, wind, dust or other deleterious agents at all times.

B. Before the installation of the pipe, inspect gaskets and remove and replace loose or improperly attached gaskets. Align each pipe section with the previously installed pipe section and pull the joint together.

C. If the gasket becomes loose while pulling the joint, and can be seen through the exterior joints, recessed to within one inch of closure, remove the pipe, and remake the joint.

3.04 FIELD QUALITY CONTROL

A. Check each straight run of pipe for gross deficiencies by holding a light in the manholes. The light shall show a practically full circle through the pipe when viewed from the adjoining end of the line.

B. Leakage testing shall be performed on sewer lines and service connections by the Contractor at his own expense. Testing may be either Hydrostatic or Air Test Method in accordance with the City Engineers Association of Minnesota standard specifications and the Minnesota Plumbing Code.

END OF SECTION

SECTION 33 40 00

STORM DRAINAGE SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. Storm sewer pipe.
2. Precast concrete manhole sections.
3. Castings.
4. Adjusting rings.
5. Flared end sections.
6. Chimney Seals
7. Draintile

1.02 REFERENCES

A. Minnesota Plumbing Code published by the Minnesota Department of Labor and Industry Codes Division, latest edition.

B. ASTM A48; Specification for Gray Iron Castings.

C. ASTM A929; Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dipped Process for Corrugated Steel Pipe

D. ASTM A536; Standard Specification for Ductile Iron Castings

E. ASTM C76; Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.

F. ASTM C443; Specification for Joints for Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets.

G. ASTM C478; Specification for Pre-cast Reinforced Concrete Manhole Sections.

H. ASTM C923; Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.

I. ASTM D3034; Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.

J. ASTM D3212; Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

K. ASTM F1336; Standard Specification for Poly (Vinyl Chloride) (PVC) Gasketed Sewer Fittings

L. AASHTO M294; Specification for Corrugated Polyethylene Pipe (12” to 48”).

M. AASHTO M36; Corrugated Steel Pipe, Metallic Coated, for Sewers and Drains

N. AASHTO MP7; Specification for Corrugated Polyethylene Pipe (54" to 60").

1.03 QUALITY ASSURANCE

A. Quality assurance personnel shall be at the project site on an intermittent basis during the storm drainage system placement.

1.04 DELIVERY, STORAGE AND HANDLING

A. Inspect the materials delivered to the site for damage and store the materials with a minimum of handling. The materials shall be kept under cover and out of the direct sunlight. Do not store the materials directly on the ground. Keep the inside of the pipes and fittings free from dirt and debris.

1.05 SUBMITTALS

A. The Contractor shall submit for approval complete shop drawings and details for all structures, pipes, castings, fittings, and accessories. Submittal shall include all the manufacturer's product data, certifications, dimensions, sizes, types, and installation requirements.

1.06 SITE CONDITIONS

A. The existing underground utilities, as shown on the plans, are located in accordance with available data, but the locations may vary and cannot be guaranteed. The exact locations shall be determined by the Contractor as the work proceeds. The excavation work shall be done carefully so as to avoid damaging the existing utilities.

B. The Contractor shall provide for the protection, temporary removal and replacement, or relocation of said obstructions as required for the performance of the work required in these contract documents. No extra payment will be made for this work.

PART 2 PRODUCTS

2.01 STORM SEWER PIPE

A. All pipe shall be new and unused.

B. Reinforced concrete pipe: ASTM C76, Class III

C. Polyvinyl chloride (PVC) pipe: ASTM D1785 Schedule 40

D. High density polyethylene (HDPE) pipe: ASTM F2306.

2.02 PRECAST CONCRETE MANHOLE SECTIONS

A. Precast concrete manhole risers, base sections, and tops: ASTM C478.

B. Waterstop grout ring connections: ASTM C923.

C. Boot connections: ASTM C923.

D. Reinforced Plastic Steps: MnDOT STD Plate 4180J.

2.03 GASKETS

A. Gaskets and pipe ends for rubber gasket joints: ASTM C443.

B. Elastomeric seals (gaskets) for joining plastic pipe: ASTM D3212.

C. Rubber gaskets for joints between manhole sections: ASTM C443.

D. Gaskets for PVC sewer fittings: ASTM F1336.

E. Rubber gaskets for structure to pipe connections: ASTM C923.

2.04 CASTINGS – PRECAST CONCRETE SECTIONS

A. Precast concrete manhole covers, grates, and boxes: Cast iron, ASTM A48, Class 35B.

B. Uniform quality, free of blowholes, shrinkage, distortion, and other defects.

C. The product numbers are as manufactured by Neenah Foundry Company and are shown on the Plans. Standard castings differing in non-essential details may be acceptable if approved by the Engineer.

2.05 ADJUSTING RINGS

A. Precast concrete adjusting rings; MnDOT STD Plate 4010H.

B. High Density Polyethylene (HDPE) adjusting rings; MnDOT TM 02-21-TS-06.

2.06 FLARED END SECTIONS

A. Flared end material shall match joining pipe material.

B. Precast concrete apron; MnDOT STD Plate 3100G and 3110G.

C. High density polyethylene (HDPE); ASTM D3350-213320C, Hancor Hi-Q or equal.

D. All flared end sections shall have galvanized steel trash guards, unless noted otherwise.

2.09 CHIMNEY SEAL

A. Infi-shield Uni-band external sealing system or approved equal.

2.11 PIPE BEDDING MATERIAL

A. The pipe bedding shall consist of clean pit-run sand or fine gravel, free from deleterious matter and rocks over 1 inch in diameter.

2.12 DRAINTILE

A. Polyvinyl Chloride (PVC) Pipe, ASTM 2729.

PART 3 EXECUTION

3.01 PIPE INSTALLATION

A. Shape the bottom of the trench to give substantially uniform circumferential support to the lower fourth of each pipe allowing for pipe bedding material. Pipe laying shall proceed up-grade with the groove (bell) ends in the up-grade direction. Adjust the tongues in grooves to produce a uniform space. Lay each pipe true to line and grade to form a close concentric joint with the adjoining pipe. Blocking or wedging between tongues and grooves will not be permitted. As the work progresses, clean the interior of the pipe free of dirt and extraneous materials.

A. Keep the trenches free from water until the pipe jointing is completed. Do not lay the pipe when conditions of the trench or the weather are unsuitable for such work. Keep the open ends of the pipe and fittings securely closed at all times when the work is not in progress.

B. The bedding material shall be placed uniformly over the trench bottom to a depth of not less than 3 inches. The bedding shall be shaped to provide uniform support to the lower fourth of the pipe for its entire length. Depressions shall be made in the bedding material to accommodate the joints. The pipe bedding material shall be carried to 6 inches above the top of the pipe. The remaining trench backfill material shall be on-site material similar in composition to the surrounding subsoils.

C. The last three sections of pipe not entering a manhole are to be fastened together with an anchor bolt system. Install a flared end section matching the pipe material. Provide temporary or permanent energy dissipation with 24-hours.

3.02 JOINT CONSTRUCTION

A. Make joints with rubber gaskets or approved primer and glue. Clean and dry the surfaces to receive lubricants, cements, or adhesives. Prepare joints not more than 24 hours prior to the installation of the pipe. Protect the joints from sun, wind, dust or other deleterious agents at all times.

B. Before the installation of the pipe, inspect joints and remove and replace loose or improperly attached joints and fittings.

C. If the joints becomes loose while installing or backfilling the pipe, remove the pipe, and remake the joint.

3.03 MANHOLE CONSTRUCTION – PRECAST CONCRETE

A. For pre-cast concrete construction provide a smooth finish to the inside joints of pre-cast concrete manholes and catch basins.

B. Provide a hole greater in diameter than the pipe at pipe entrances to the pre-cast concrete structures. Install watertight connector in the annular space between the pipe and pre-cast concrete manhole.

C. Lay sections of the structures in a full mortar bed. Keep the masonry materials and mortar at a temperature above freezing until the mortar has set up sufficiently to prevent damage by freezing.

D. The mortar shall be composed of 1 part Portland cement and 3 parts of washed and screened sand with sufficient water to make a workable mix.

E. The top 8 inches of the structures shall be made of concrete rings 2 inches thick. Lay the concrete adjusting rings in a full bed of mortar 1/4 inch to 3/4 inch thick.

F. Set the manhole or catch basin frames and lids / grates flush with the existing elevations shown on the Plans. Place the frames upon a full bed of mortar and shim to the correct elevation with suitable concrete wedges and mortar. Install external chimney seal.

3.05 FIELD QUALITY CONTROL

A. Type of pipe and size will be verified during installation.

B. Installation methods and techniques will be reviewed, to ensure pipe is not damaged during placement.

C. Check each straight run of pipe for gross deficiencies by holding a light in the manhole or catch basin. The light shall show a practically full circle through the pipe when viewed from the adjoining end of the line.

D. Leakage testing shall be performed on new lines within 10 feet of buildings and water lines by the Contractor at his own expense. Testing may be by Air Test Method in accordance with the Minnesota Plumbing Code or the Hydrostatic Test Method in accordance with the City Engineers Association of Minnesota standard specifications

END OF SECTION

SECTION 33 42 00

DRAIN TILE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
  1. Drain tile systems.

1.02 REFERENCES

A. ASTM D3212, Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

B. ASTM F405, Specification for Corrugated Polyethylene (PE) Tubing and Fittings.

C. ASTM F449, Practice for Subsurface Installation of Corrugated Thermoplastic Tubing for Agricultural Drainage of Water Table Control.

D. ASTM F477, Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

E. ASTM F667, Specification for Large Diameter Corrugated Polyethylene Tubing and Fittings.

F. ASTM F794, Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Ribbed Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.

1.03 DELIVERY, STORAGE AND HANDLING

A. Inspect the materials delivered to the site for damage. Store the materials with a minimum of handling. Store the materials under cover and out of direct sunlight. Do not store the materials directly on the ground. Keep the inside of the pipes and fittings free from dirt and debris.

1.04 QUALITY ASSURANCE

A. Quality assurance personnel shall be at the project site on an intermittent basis during the drain tile system placement.

1.05 SUBMITTALS

A. The Contractor shall submit for approval complete shop drawings and details for all structures, pipes, castings, fittings, and accessories. Submittal shall include all the manufacturer's product data, certifications, dimensions, sizes, types, and installation requirements.

B.

1.06 SITE CONDITIONS

A. The existing underground utilities, as shown on the plans, are located in accordance with available data, but the locations may vary and cannot be guaranteed. The exact locations shall be determined by the Contractor as the work proceeds. The excavation work shall be done carefully so as to avoid damaging the existing utilities.

B. The Contractor shall provide for the protection, temporary removal and replacement, or relocation of said obstructions as required for the performance of the work required in these contract documents. No extra payment will be made for this work.

PART 2 PRODUCTS

2.02 POLYVINYL CHLORIDE (PVC) PLASTIC PIPING

A. PVC plastic pipe and fittings, ASTM D2729 without a filter fabric wrap.

B. Joints and jointing material: ASTM D3212.

C. Gaskets: ASTM F477.

PART 3 EXECUTION

3.02 PIPE BENEATH PAVED SURFACE INSTALLATION

A. Before the installation of the pipe, inspect gaskets, and remove and replace loose or improperly attached gaskets. As the work progresses, clear the interior of the pipe free from dirt and extraneous materials.

B. Place soil separation fabric on subgrade prior to the placement of the pipe.

C. Pipe laying shall proceed up-grade. Lay each pipe true to line and elevation to form a close concentric joint with the adjoining pipe. Align each pipe section with the previously installed pipe section and pull the joint together.

D. If the gasket becomes loose while pulling the joint, and can be seen through the exterior joints, recessed to within one inch of closure, remove the pipe, and remake the joint.

E. Place the sand subbase / drainage rock over the soil separation fabric and draintile pipe. Compact the sand / rock until there is no further evidence of consolidation. Compaction should be performed with equipment that will not crush the drain tile pipe.

3.03 MANHOLE AND CATCH BASIN CONNECTION

A. Provide resilient rubber watertight boot connectors at pipe entrances to pre-cast concrete structures.

3.04 DRAINTILE OUTLET

A. Provide Mitered Drain Grate (www.mitereddrain.com) at draintile outlet.

3.05 FIELD QUALITY CONTROL

A. Type of pipe and size will be verified during installation.

B. Installation methods and techniques will be reviewed, to ensure pipe is not damaged during placement.

END OF SECTION

SECTION 33 48 00

INSULATION OVER UTILITIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
  1. Pavement rigid insulation.

1.02 SUBMITTALS

A. Submit to the engineer, certification from the insulation manufacturer that insulation used in the Work meets the requirements of this Section.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Provide continuous protection of materials against damage and moisture absorption.

PART 2 PRODUCTS

2.01 INSULATION

A. Extruded polystyrene: ASTM C578, Type lV, minimum 25 psi, 2” thickness, 4’ by 8’ sheets.

PART 3 EXECUTION

3.01 PREPARATION OF SURFACES

A. Surfaces shall be fine graded, planar, and free of voids or depressions prior to placement of insulation. Surfaces shall be free of moisture in any form.

B. All underground utilities shall be installed and properly backfilled prior to installing insulation.

C. Place a 6” thick sand cushion immediately below the insulation location.

3.02 INSTALLATION

A. Maximum moisture content of insulation at time of application to be 4 percent of dry weight.

B. Install insulation with boards tightly butted together. Seal joints with duct tape to help hold insulation in place.

C. Joints of the installation sheets shall be perpendicular with the utility pipe, with the long direction of the insulation perpendicular with and centered over the pipe.

D. For 4” thickness, install 2 layers of 2” thick insulation with joints staggered a minimum of 2 feet.

3.03 FIELD QUALITY CONTROL

A. Field tests may be performed by Engineer to evaluate moisture content of installed materials.

B. Application of insulation system may be checked by Engineer.

END OF SECTION

PARK & 3RD LOFTS

STORMWATER CALCULATIONS

BY

LARSON ENGINEERING

MARCH 12, 2025

CONTENTS:

1. **Stormwater Runoff Summary**
2. **Existing Drainage Map**
3. **HydroCAD Report for Existing Conditions (1-yr, 2-yr, 10-yr, and 100-yr events)**
4. **Proposed Drainage Map**
5. **HydroCAD Report for Proposed Conditions (1-yr, 2-yr, 10-yr, and 100-yr events)**

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

T.J. Rose	March 12, 2025	53681
T.J. Rose, P.E.	Date	Registration No.

Park & 3rd Lofts

SUMMARY OF STORMWATER RUNOFF

Introduction:
The project will consist of the construction of a new apartment building, parking lot, and associated stormwater and utilities. Two additional outlots are included in the project and will be cleared for future development. The apartment site and the two outlots, as well as a portion of Oak Street and Fourth Ave, will drain to a regional pond on the apartment property.

Stormwater calculations were modeled using HydroCAD with Atlas 14 24-hour rainfall data.

Curve Numbers used in the stormwater models:
74 – >75% Grass Cover, Good (Type C Soils)
98 – Buildings
98 – Pavement
100 – Pond Surface

Existing Conditions:
The existing site is a majority impervious surface. Drainage from the northern lot is generally from south to north. Runoff will drain into existing catch basins on the north side of the lot and into the storm sewer in Third Ave East.

The outlots are also majority impervious. Both outlots surface drain into the storm sewer in Oak Street and Fouth Ave. This storm sewer continues east under Fourth Ave.

Proposed Conditions:
Runoff from the new impervious surfaces will be routed to a proposed regional pond on the apartment site. The back side of the apartment is unable to be routed to the regional pond and will surface drain into the storm sewer in Park Street and Third Ave East.

Regional Pond:
The city has expressed concerns with flooding in Fourth Ave. A regional pond is proposed on the apartment site to alleviate some of this flooding. The regional pond is designed to take runoff from the apartment site, the 2 outlots, and portions of Oak Street and Fourth Ave. The regional pond will outlet into the storm sewer on the north side of the apartment site.

Stormwater Runoff Rate:
Per City of Alexandria requirements, proposed runoff rates leaving the site must not exceed existing runoff rates. The existing and proposed peak runoff rates and volumes are listed in the table below.

Peak Runoff RATES (in cubic feet per second):

	Existing	Proposed
1-year event		
Offsite North	9.76	2.64
To 4th Ave Sewer	6.34	0.00
2-year event		
Offsite North	11.32	3.27
To 4th Ave Sewer	7.46	0.00
10-year event		
Offsite North	16.65	10.05
To 4th Ave Sewer	11.34	0.00
100-year event		
Offsite North	27.09	14.44
To 4th Ave Sewer	19.15	0.00

Water Quality:
The regional pond will be sized to treat all impervious surfaces that drain to it, including existing impervious. A water quality volume (WQV) equivalent to 1-inch over the impervious surface draining to the pond will be provided.

Existing Roadway	=	15,703 SF
Existing Residential Lots	=	2,095 SF
Proposed Pavement	=	46,731 SF
Proposed Building	=	16,439 SF
Future Impervious	=	54,329 SF
Total Impervious Area	**=**	**135,297 SF**

The wet pond will be designed in accordance with the MN Construction Stormwater Permit.

Drainage Area	= 4.335 acres (188,835 square feet)
New Impervious Area	= 135,297 square feet

	Design
Basin Bottom	1416.00
Normal Water Level	1419.00
Basin Outlet (culvert)	1419.00

Below is our analysis of the proposed wet stormwater pond. Our analysis is shown in *italics.*

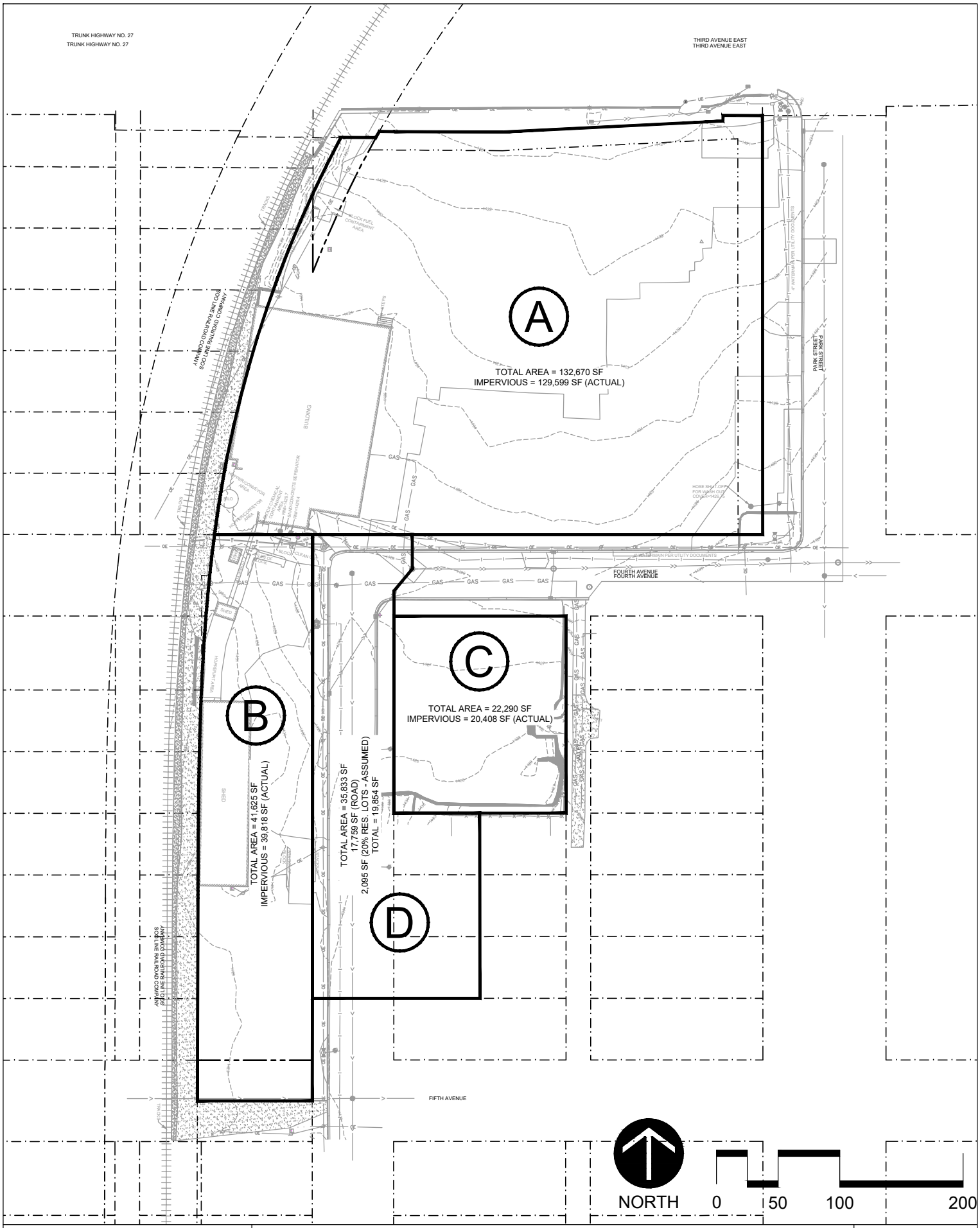
- Dead (or permanent) storage of at least 1,800 cubic feet per acre that drains to the pond
  Total Drainage Area = 4.335 acres
  1,800 CF/acre x 4.335 acres = 7,803 CF
  Provided Dead Storage (below 898.00') = ***13,701 CF (OK)***

- The pond's permanent storage volume must reach a minimum depth of at least 3 feet and must have no depth greater than 10 feet. The basin must be configured such that scour or resuspension of solids is minimized.
  Dead storage reaches a depth of ***3' (OK)***

- Water quality volume (flood pool volume) = 1 inch over impervious area
  Impervious Area = 135,297 SF
  Req'd WQV = 135,297 SF x 1" = 11,275 CF
  WQV Elevation = 1420.36' (where total vol. of 24,976 CF occurs)
  WQV Area = 9,252 SF = 0.212 acres

- Discharge rate of water quality volume does not exceed 5.66 cubic feet per second per acre of surface area of the pond.
  Allowable Discharge = 0.212 ac x 5.66 cfs/ac = 1.19 cfs
  Actual Discharge (from HydroCAD model) = ***1.00 cfs (OK)***

Wetland Impacts
No wetland impacts are anticipated as part of this project.

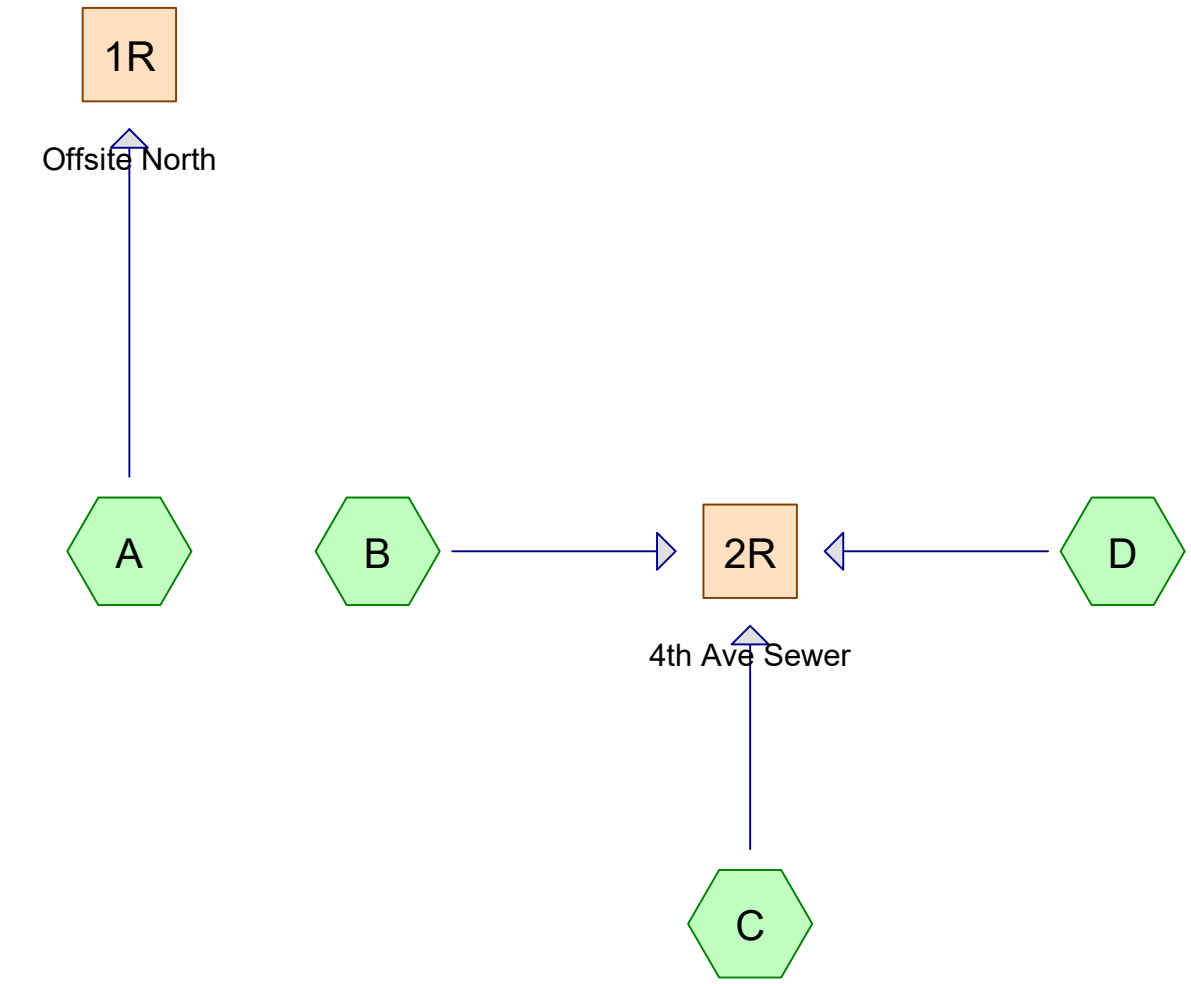


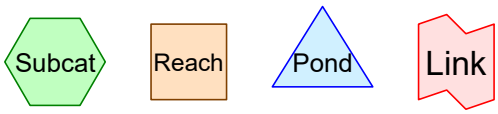
Larson Engineering, Inc.

EXISTING DRAINAGE MAP

7/19/2024

© 2024 Larson Engineering, Inc. All rights reserved.





Routing Diagram for Alexandria Apartments - Existing
Prepared by Larson Engineering Inc, Printed 7/19/2024
HydroCAD® 10.20-4b s/n 01934 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	MSE 24-hr	3	Default	24.00	1	2.23	2
2	2-Year	MSE 24-hr	3	Default	24.00	1	2.57	2
3	10-Year	MSE 24-hr	3	Default	24.00	1	3.73	2
4	100-Year	MSE 24-hr	3	Default	24.00	1	6.01	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
22,739	74	>75% Grass cover, Good, HSG C (A, B, C, D)
189,825	98	Existing Impervious (A, B, C)
17,759	98	Existing Road and ROW (D)
2,095	98	Residential Lots (D)
232,418	**96**	**TOTAL AREA**

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: Runoff Area=132,670 sf 97.69% Impervious Runoff Depth=1.97"
Tc=6.0 min CN=74/98 Runoff=9.76 cfs 21,745 cf

Subcatchment B: Runoff Area=41,625 sf 95.66% Impervious Runoff Depth=1.94"
Tc=6.0 min CN=74/98 Runoff=3.01 cfs 6,714 cf

Subcatchment C: Runoff Area=22,290 sf 91.56% Impervious Runoff Depth=1.87"
Tc=6.0 min CN=74/98 Runoff=1.56 cfs 3,478 cf

Subcatchment D: Runoff Area=35,833 sf 55.41% Impervious Runoff Depth=1.32"
Tc=6.0 min CN=74/98 Runoff=1.77 cfs 3,929 cf

Reach 1R: Offsite North Inflow=9.76 cfs 21,745 cf
Outflow=9.76 cfs 21,745 cf

Reach 2R: 4th Ave Sewer Inflow=6.34 cfs 14,122 cf
Outflow=6.34 cfs 14,122 cf

Total Runoff Area = 232,418 sf Runoff Volume = 35,867 cf Average Runoff Depth = 1.85"
9.78% Pervious = 22,739 sf 90.22% Impervious = 209,679 sf

Summary for Subcatchment A:

Runoff = 9.76 cfs @ 12.13 hrs, Volume= 21,745 cf, Depth= 1.97"
Routed to Reach 1R : Offsite North

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
	3,071	74	>75% Grass cover, Good, HSG C
*	129,599	98	Existing Impervious
	132,670	97	Weighted Average
	3,071	74	2.31% Pervious Area
	129,599	98	97.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment B:

Runoff = 3.01 cfs @ 12.13 hrs, Volume= 6,714 cf, Depth= 1.94"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
	1,807	74	>75% Grass cover, Good, HSG C
*	39,818	98	Existing Impervious
	41,625	97	Weighted Average
	1,807	74	4.34% Pervious Area
	39,818	98	95.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment C:

Runoff = 1.56 cfs @ 12.13 hrs, Volume= 3,478 cf, Depth= 1.87"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
	1,882	74	>75% Grass cover, Good, HSG C
*	20,408	98	Existing Impervious
	22,290	96	Weighted Average
	1,882	74	8.44% Pervious Area
	20,408	98	91.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D:

Runoff = 1.77 cfs @ 12.13 hrs, Volume= 3,929 cf, Depth= 1.32"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
	15,979	74	>75% Grass cover, Good, HSG C
*	17,759	98	Existing Road and ROW
*	2,095	98	Residential Lots
	35,833	87	Weighted Average
	15,979	74	44.59% Pervious Area
	19,854	98	55.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 1R: Offsite North

Inflow Area = 132,670 sf, 97.69% Impervious, Inflow Depth = 1.97" for 1-Year event
Inflow = 9.76 cfs @ 12.13 hrs, Volume= 21,745 cf
Outflow = 9.76 cfs @ 12.13 hrs, Volume= 21,745 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: 4th Ave Sewer

Inflow Area = 99,748 sf, 80.28% Impervious, Inflow Depth = 1.70" for 1-Year event
Inflow = 6.34 cfs @ 12.13 hrs, Volume= 14,122 cf
Outflow = 6.34 cfs @ 12.13 hrs, Volume= 14,122 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: Runoff Area=132,670 sf 97.69% Impervious Runoff Depth=2.30"
Tc=6.0 min CN=74/98 Runoff=11.32 cfs 25,441 cf

Subcatchment B: Runoff Area=41,625 sf 95.66% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=74/98 Runoff=3.50 cfs 7,863 cf

Subcatchment C: Runoff Area=22,290 sf 91.56% Impervious Runoff Depth=2.20"
Tc=6.0 min CN=74/98 Runoff=1.82 cfs 4,082 cf

Subcatchment D: Runoff Area=35,833 sf 55.41% Impervious Runoff Depth=1.59"
Tc=6.0 min CN=74/98 Runoff=2.14 cfs 4,735 cf

Reach 1R: Offsite North Inflow=11.32 cfs 25,441 cf
Outflow=11.32 cfs 25,441 cf

Reach 2R: 4th Ave Sewer Inflow=7.46 cfs 16,680 cf
Outflow=7.46 cfs 16,680 cf

Total Runoff Area = 232,418 sf Runoff Volume = 42,121 cf Average Runoff Depth = 2.17"
9.78% Pervious = 22,739 sf 90.22% Impervious = 209,679 sf

Summary for Subcatchment A:

Runoff = 11.32 cfs @ 12.13 hrs, Volume= 25,441 cf, Depth= 2.30"
Routed to Reach 1R : Offsite North

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.57"

	Area (sf)	CN	Description
	3,071	74	>75% Grass cover, Good, HSG C
*	129,599	98	Existing Impervious
	132,670	97	Weighted Average
	3,071	74	2.31% Pervious Area
	129,599	98	97.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment B:

Runoff = 3.50 cfs @ 12.13 hrs, Volume= 7,863 cf, Depth= 2.27"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.57"

	Area (sf)	CN	Description
	1,807	74	>75% Grass cover, Good, HSG C
*	39,818	98	Existing Impervious
	41,625	97	Weighted Average
	1,807	74	4.34% Pervious Area
	39,818	98	95.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment C:

Runoff = 1.82 cfs @ 12.13 hrs, Volume= 4,082 cf, Depth= 2.20"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.57"

	Area (sf)	CN	Description
	1,882	74	>75% Grass cover, Good, HSG C
*	20,408	98	Existing Impervious
	22,290	96	Weighted Average
	1,882	74	8.44% Pervious Area
	20,408	98	91.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D:

Runoff = 2.14 cfs @ 12.13 hrs, Volume= 4,735 cf, Depth= 1.59"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.57"

	Area (sf)	CN	Description
	15,979	74	>75% Grass cover, Good, HSG C
*	17,759	98	Existing Road and ROW
*	2,095	98	Residential Lots
	35,833	87	Weighted Average
	15,979	74	44.59% Pervious Area
	19,854	98	55.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 1R: Offsite North

Inflow Area = 132,670 sf, 97.69% Impervious, Inflow Depth = 2.30" for 2-Year event
Inflow = 11.32 cfs @ 12.13 hrs, Volume= 25,441 cf
Outflow = 11.32 cfs @ 12.13 hrs, Volume= 25,441 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: 4th Ave Sewer

Inflow Area = 99,748 sf, 80.28% Impervious, Inflow Depth = 2.01" for 2-Year event
Inflow = 7.46 cfs @ 12.13 hrs, Volume= 16,680 cf
Outflow = 7.46 cfs @ 12.13 hrs, Volume= 16,680 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: Runoff Area=132,670 sf 97.69% Impervious Runoff Depth=3.45"
Tc=6.0 min CN=74/98 Runoff=16.65 cfs 38,113 cf

Subcatchment B: Runoff Area=41,625 sf 95.66% Impervious Runoff Depth=3.40"
Tc=6.0 min CN=74/98 Runoff=5.17 cfs 11,811 cf

Subcatchment C: Runoff Area=22,290 sf 91.56% Impervious Runoff Depth=3.32"
Tc=6.0 min CN=74/98 Runoff=2.70 cfs 6,165 cf

Subcatchment D: Runoff Area=35,833 sf 55.41% Impervious Runoff Depth=2.56"
Tc=6.0 min CN=74/98 Runoff=3.47 cfs 7,650 cf

Reach 1R: Offsite North Inflow=16.65 cfs 38,113 cf
Outflow=16.65 cfs 38,113 cf

Reach 2R: 4th Ave Sewer Inflow=11.34 cfs 25,625 cf
Outflow=11.34 cfs 25,625 cf

Total Runoff Area = 232,418 sf Runoff Volume = 63,738 cf Average Runoff Depth = 3.29"
9.78% Pervious = 22,739 sf 90.22% Impervious = 209,679 sf

Summary for Subcatchment A:

Runoff = 16.65 cfs @ 12.13 hrs, Volume= 38,113 cf, Depth= 3.45"
Routed to Reach 1R : Offsite North

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.73"

	Area (sf)	CN	Description
	3,071	74	>75% Grass cover, Good, HSG C
*	129,599	98	Existing Impervious
	132,670	97	Weighted Average
	3,071	74	2.31% Pervious Area
	129,599	98	97.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment B:

Runoff = 5.17 cfs @ 12.13 hrs, Volume= 11,811 cf, Depth= 3.40"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.73"

	Area (sf)	CN	Description
	1,807	74	>75% Grass cover, Good, HSG C
*	39,818	98	Existing Impervious
	41,625	97	Weighted Average
	1,807	74	4.34% Pervious Area
	39,818	98	95.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment C:

Runoff = 2.70 cfs @ 12.13 hrs, Volume= 6,165 cf, Depth= 3.32"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.73"

	Area (sf)	CN	Description
	1,882	74	>75% Grass cover, Good, HSG C
*	20,408	98	Existing Impervious
	22,290	96	Weighted Average
	1,882	74	8.44% Pervious Area
	20,408	98	91.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D:

Runoff = 3.47 cfs @ 12.13 hrs, Volume= 7,650 cf, Depth= 2.56"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.73"

	Area (sf)	CN	Description
	15,979	74	>75% Grass cover, Good, HSG C
*	17,759	98	Existing Road and ROW
*	2,095	98	Residential Lots
	35,833	87	Weighted Average
	15,979	74	44.59% Pervious Area
	19,854	98	55.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 1R: Offsite North

Inflow Area = 132,670 sf, 97.69% Impervious, Inflow Depth = 3.45" for 10-Year event
Inflow = 16.65 cfs @ 12.13 hrs, Volume= 38,113 cf
Outflow = 16.65 cfs @ 12.13 hrs, Volume= 38,113 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: 4th Ave Sewer

Inflow Area = 99,748 sf, 80.28% Impervious, Inflow Depth = 3.08" for 10-Year event
Inflow = 11.34 cfs @ 12.13 hrs, Volume= 25,625 cf
Outflow = 11.34 cfs @ 12.13 hrs, Volume= 25,625 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: Runoff Area=132,670 sf 97.69% Impervious Runoff Depth=5.71"
Tc=6.0 min CN=74/98 Runoff=27.09 cfs 63,153 cf

Subcatchment B: Runoff Area=41,625 sf 95.66% Impervious Runoff Depth=5.66"
Tc=6.0 min CN=74/98 Runoff=8.44 cfs 19,633 cf

Subcatchment C: Runoff Area=22,290 sf 91.56% Impervious Runoff Depth=5.55"
Tc=6.0 min CN=74/98 Runoff=4.46 cfs 10,317 cf

Subcatchment D: Runoff Area=35,833 sf 55.41% Impervious Runoff Depth=4.62"
Tc=6.0 min CN=74/98 Runoff=6.26 cfs 13,802 cf

Reach 1R: Offsite North Inflow=27.09 cfs 63,153 cf
Outflow=27.09 cfs 63,153 cf

Reach 2R: 4th Ave Sewer Inflow=19.15 cfs 43,751 cf
Outflow=19.15 cfs 43,751 cf

Total Runoff Area = 232,418 sf Runoff Volume = 106,904 cf Average Runoff Depth = 5.52"
9.78% Pervious = 22,739 sf 90.22% Impervious = 209,679 sf

Summary for Subcatchment A:

Runoff = 27.09 cfs @ 12.13 hrs, Volume= 63,153 cf, Depth= 5.71"
Routed to Reach 1R : Offsite North

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.01"

	Area (sf)	CN	Description
	3,071	74	>75% Grass cover, Good, HSG C
*	129,599	98	Existing Impervious
	132,670	97	Weighted Average
	3,071	74	2.31% Pervious Area
	129,599	98	97.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment B:

Runoff = 8.44 cfs @ 12.13 hrs, Volume= 19,633 cf, Depth= 5.66"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.01"

	Area (sf)	CN	Description
	1,807	74	>75% Grass cover, Good, HSG C
*	39,818	98	Existing Impervious
	41,625	97	Weighted Average
	1,807	74	4.34% Pervious Area
	39,818	98	95.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment C:

Runoff = 4.46 cfs @ 12.13 hrs, Volume= 10,317 cf, Depth= 5.55"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.01"

	Area (sf)	CN	Description
	1,882	74	>75% Grass cover, Good, HSG C
*	20,408	98	Existing Impervious
	22,290	96	Weighted Average
	1,882	74	8.44% Pervious Area
	20,408	98	91.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D:

Runoff = 6.26 cfs @ 12.13 hrs, Volume= 13,802 cf, Depth= 4.62"
Routed to Reach 2R : 4th Ave Sewer

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.01"

	Area (sf)	CN	Description
	15,979	74	>75% Grass cover, Good, HSG C
*	17,759	98	Existing Road and ROW
*	2,095	98	Residential Lots
	35,833	87	Weighted Average
	15,979	74	44.59% Pervious Area
	19,854	98	55.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 1R: Offsite North

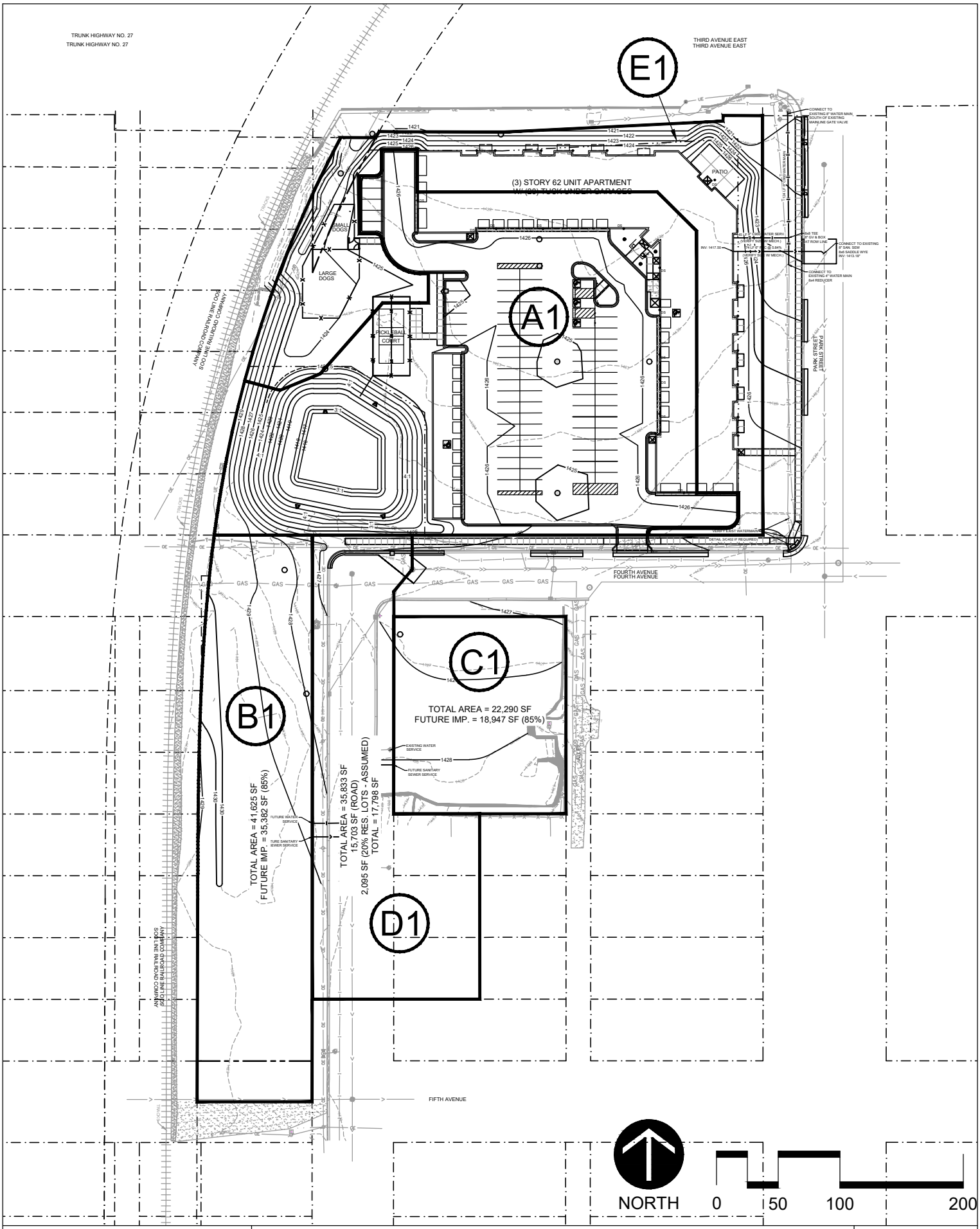
Inflow Area = 132,670 sf, 97.69% Impervious, Inflow Depth = 5.71" for 100-Year event
Inflow = 27.09 cfs @ 12.13 hrs, Volume= 63,153 cf
Outflow = 27.09 cfs @ 12.13 hrs, Volume= 63,153 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: 4th Ave Sewer

Inflow Area = 99,748 sf, 80.28% Impervious, Inflow Depth = 5.26" for 100-Year event
Inflow = 19.15 cfs @ 12.13 hrs, Volume= 43,751 cf
Outflow = 19.15 cfs @ 12.13 hrs, Volume= 43,751 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

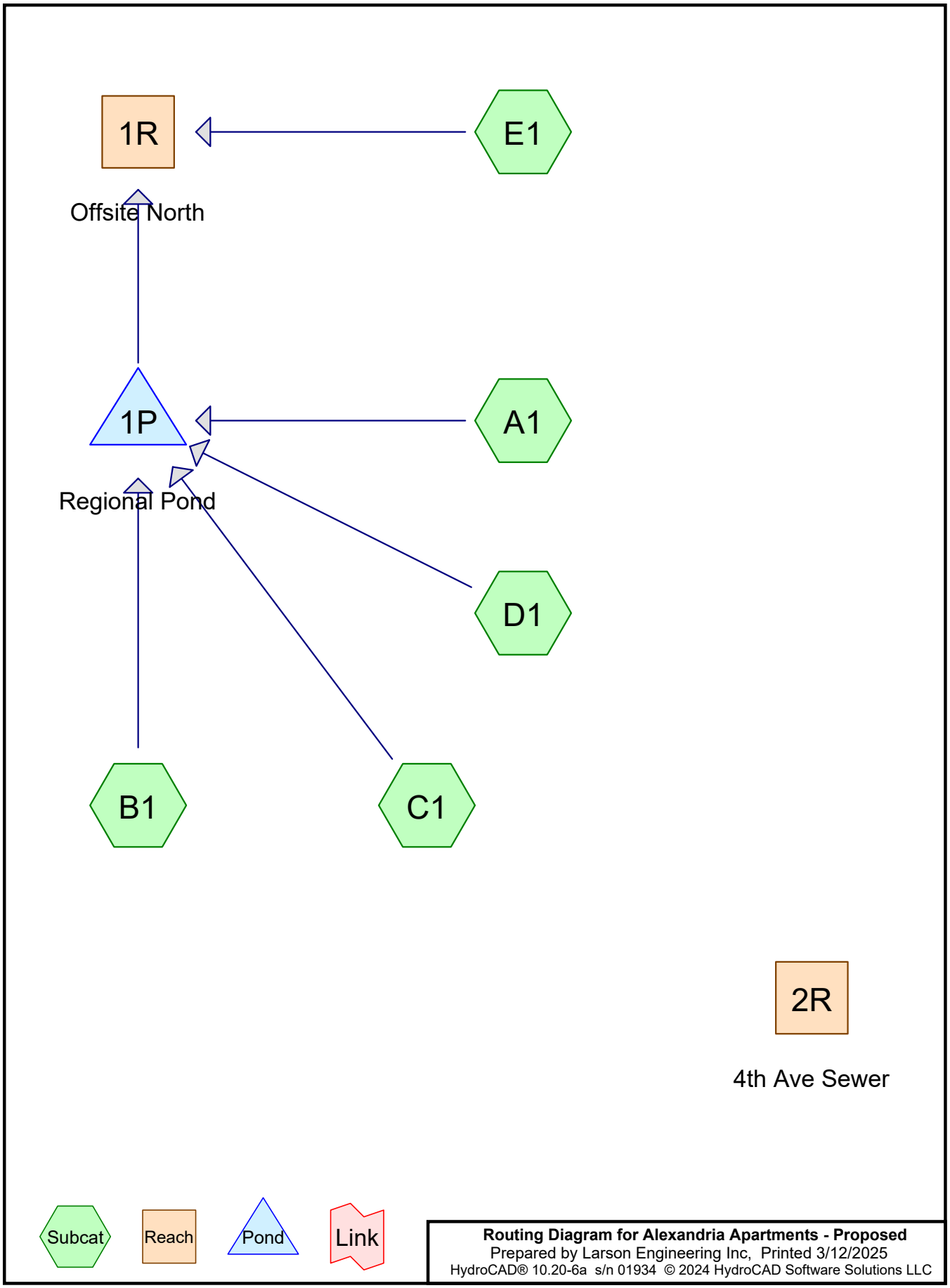


Larson Engineering, Inc.

PROPOSED DRAINAGE MAP

3/12/2025

© 2025 Larson Engineering, Inc. All rights reserved.



Routing Diagram for Alexandria Apartments - Proposed
Prepared by Larson Engineering Inc, Printed 3/12/2025
HydroCAD® 10.20-6a s/n 01934 © 2024 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	MSE 24-hr	3	Default	24.00	1	2.23	2
2	2-Year	MSE 24-hr	3	Default	24.00	1	2.57	2
3	10-Year	MSE 24-hr	3	Default	24.00	1	3.73	2
4	100-Year	MSE 24-hr	3	Default	24.00	1	6.01	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
72,721	74	>75% Grass cover, Good, HSG C (A1, B1, C1, D1, E1)
15,703	98	Existing Road and ROW (D1)
54,329	98	Future Impervious (B1, C1)
7,459	100	Pond Surface (A1)
31,761	98	Proposed Building (A1, E1)
48,350	98	Proposed Impervious (A1, E1)
2,095	98	Residential Lots (D1)
232,418	**91**	**TOTAL AREA**

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: Runoff Area=89,087 sf 79.28% Impervious Runoff Depth=1.68"
Tc=6.0 min CN=74/98 Runoff=5.61 cfs 12,498 cf

SubcatchmentB1: Runoff Area=41,625 sf 85.00% Impervious Runoff Depth=1.77"
Tc=6.0 min CN=74/98 Runoff=2.76 cfs 6,145 cf

SubcatchmentC1: Runoff Area=22,290 sf 85.00% Impervious Runoff Depth=1.77"
Tc=6.0 min CN=74/98 Runoff=1.48 cfs 3,291 cf

SubcatchmentD1: Runoff Area=35,833 sf 49.67% Impervious Runoff Depth=1.23"
Tc=6.0 min CN=74/98 Runoff=1.65 cfs 3,666 cf

SubcatchmentE1: Runoff Area=43,583 sf 38.87% Impervious Runoff Depth=1.06"
Tc=6.0 min CN=74/98 Runoff=1.74 cfs 3,854 cf

Reach 1R: Offsite North Inflow=2.64 cfs 29,390 cf
Outflow=2.64 cfs 29,390 cf

Reach 2R: 4th Ave Sewer
Outflow=0.00 cfs 0 cf

Pond 1P: Regional Pond Peak Elev=1,420.60' Storage=27,294 cf Inflow=11.50 cfs 25,599 cf
Outflow=1.50 cfs 25,535 cf

Total Runoff Area = 232,418 sf Runoff Volume = 29,454 cf Average Runoff Depth = 1.52"
31.29% Pervious = 72,721 sf 68.71% Impervious = 159,697 sf

Summary for Subcatchment A1:

Runoff = 5.61 cfs @ 12.13 hrs, Volume= 12,498 cf, Depth= 1.68"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
	18,458	74	>75% Grass cover, Good, HSG C
*	16,439	98	Proposed Building
*	46,731	98	Proposed Impervious
*	7,459	100	Pond Surface
	89,087	93	Weighted Average
	18,458	74	20.72% Pervious Area
	70,629	98	79.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment B1:

Runoff = 2.76 cfs @ 12.13 hrs, Volume= 6,145 cf, Depth= 1.77"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
	6,243	74	>75% Grass cover, Good, HSG C
*	35,382	98	Future Impervious
	41,625	94	Weighted Average
	6,243	74	15.00% Pervious Area
	35,382	98	85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment C1:

Runoff = 1.48 cfs @ 12.13 hrs, Volume= 3,291 cf, Depth= 1.77"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
	3,343	74	>75% Grass cover, Good, HSG C
*	18,947	98	Future Impervious
	22,290	94	Weighted Average
	3,343	74	15.00% Pervious Area
	18,947	98	85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D1:

Runoff = 1.65 cfs @ 12.13 hrs, Volume= 3,666 cf, Depth= 1.23"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
	18,035	74	>75% Grass cover, Good, HSG C
*	15,703	98	Existing Road and ROW
*	2,095	98	Residential Lots
	35,833	86	Weighted Average
	18,035	74	50.33% Pervious Area
	17,798	98	49.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment E1:

Runoff = 1.74 cfs @ 12.13 hrs, Volume= 3,854 cf, Depth= 1.06"
Routed to Reach 1R : Offsite North

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
	26,642	74	>75% Grass cover, Good, HSG C
*	15,322	98	Proposed Building
*	1,619	98	Proposed Impervious
	43,583	83	Weighted Average
	26,642	74	61.13% Pervious Area
	16,941	98	38.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 1R: Offsite North

Inflow Area = 232,418 sf, 68.71% Impervious, Inflow Depth = 1.52" for 1-Year event
Inflow = 2.64 cfs @ 12.14 hrs, Volume= 29,390 cf
Outflow = 2.64 cfs @ 12.14 hrs, Volume= 29,390 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: 4th Ave Sewer

Summary for Pond 1P: Regional Pond

Inflow Area = 188,835 sf, 75.60% Impervious, Inflow Depth = 1.63" for 1-Year event
Inflow = 11.50 cfs @ 12.13 hrs, Volume= 25,599 cf
Outflow = 1.50 cfs @ 12.55 hrs, Volume= 25,535 cf, Atten= 87%, Lag= 25.0 min
Primary = 1.50 cfs @ 12.55 hrs, Volume= 25,535 cf
Routed to Reach 1R : Offsite North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Starting Elev= 1,419.00' Surf.Area= 7,459 sf Storage= 13,701 cf
Peak Elev= 1,420.60' @ 12.55 hrs Surf.Area= 9,583 sf Storage= 27,294 cf (13,594 cf above start)

Plug-Flow detention time= 479.1 min calculated for 11,835 cf (46% of inflow)
Center-of-Mass det. time= 188.7 min (953.3 - 764.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,416.00'	88,617 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,416.00	3,146	0	0
1,417.00	3,829	3,488	3,488
1,418.00	4,569	4,199	7,687
1,419.00	7,459	6,014	13,701
1,420.00	8,752	8,106	21,806
1,421.00	10,140	9,446	31,252
1,422.00	11,617	10,879	42,131
1,423.00	13,179	12,398	54,529
1,424.00	14,999	14,089	68,618
1,425.00	25,000	20,000	88,617

Device	Routing	Invert	Outlet Devices
#1	Primary	1,419.00'	**15.0" Round Culvert** L= 378.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,419.00' / 1,414.88' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	1,420.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	1,419.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.50 cfs @ 12.55 hrs HW=1,420.60' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.50 cfs of 5.83 cfs potential flow)
  ├─**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.40 cfs @ 1.03 fps)
  └─**3=Orifice/Grate** (Orifice Controls 1.10 cfs @ 5.59 fps)

Stage-Area-Storage for Pond 1P: Regional Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,416.00	3,146	0
1,416.10	3,214	318
1,416.20	3,283	643
1,416.30	3,351	975
1,416.40	3,419	1,313
1,416.50	3,488	1,658
1,416.60	3,556	2,011
1,416.70	3,624	2,370
1,416.80	3,692	2,735
1,416.90	3,761	3,108
1,417.00	3,829	3,488
1,417.10	3,903	3,874
1,417.20	3,977	4,268
1,417.30	4,051	4,669
1,417.40	4,125	5,078
1,417.50	4,199	5,495
1,417.60	4,273	5,918
1,417.70	4,347	6,349
1,417.80	4,421	6,787
1,417.90	4,495	7,233
1,418.00	4,569	7,687
1,418.10	4,858	8,158
1,418.20	5,147	8,658
1,418.30	5,436	9,187
1,418.40	5,725	9,745
1,418.50	6,014	10,332
1,418.60	6,303	10,948
1,418.70	6,592	11,593
1,418.80	6,881	12,266
1,418.90	7,170	12,969
1,419.00	7,459	13,701
1,419.10	7,588	14,453
1,419.20	7,718	15,218
1,419.30	7,847	15,996
1,419.40	7,976	16,788
1,419.50	8,106	17,592
1,419.60	8,235	18,409
1,419.70	8,364	19,239
1,419.80	8,493	20,081
1,419.90	8,623	20,937
1,420.00	8,752	21,806
1,420.10	8,891	22,688
1,420.20	9,030	23,584
1,420.30	9,168	24,494
1,420.40	9,307	25,418
1,420.50	9,446	26,356
1,420.60	9,585	27,307
1,420.70	9,724	28,272
1,420.80	9,862	29,252
1,420.90	10,001	30,245
1,421.00	10,140	31,252
1,421.10	10,288	32,273
1,421.20	10,435	33,310
1,421.30	10,583	34,360
1,421.40	10,731	35,426
1,421.50	10,879	36,507
1,421.60	11,026	37,602
1,421.70	11,174	38,712
1,421.80	11,322	39,837
1,421.90	11,469	40,976
1,422.00	11,617	42,131
1,422.10	11,773	43,300
1,422.20	11,929	44,485
1,422.30	12,086	45,686
1,422.40	12,242	46,902
1,422.50	12,398	48,134
1,422.60	12,554	49,382
1,422.70	12,710	50,645
1,422.80	12,867	51,924
1,422.90	13,023	53,218
1,423.00	13,179	54,529
1,423.10	13,361	55,855
1,423.20	13,543	57,201
1,423.30	13,725	58,564
1,423.40	13,907	59,946
1,423.50	14,089	61,346
1,423.60	14,271	62,763
1,423.70	14,453	64,200
1,423.80	14,635	65,654
1,423.90	14,817	67,127
1,424.00	14,999	68,618
1,424.10	15,999	70,167
1,424.20	16,999	71,817
1,424.30	17,999	73,567
1,424.40	18,999	75,417
1,424.50	20,000	77,367
1,424.60	21,000	79,417
1,424.70	22,000	81,567
1,424.80	23,000	83,817
1,424.90	24,000	86,167
1,425.00	**25,000**	**88,617**

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: Runoff Area=89,087 sf 79.28% Impervious Runoff Depth=1.99"
Tc=6.0 min CN=74/98 Runoff=6.61 cfs 14,771 cf

SubcatchmentB1: Runoff Area=41,625 sf 85.00% Impervious Runoff Depth=2.09"
Tc=6.0 min CN=74/98 Runoff=3.23 cfs 7,238 cf

SubcatchmentC1: Runoff Area=22,290 sf 85.00% Impervious Runoff Depth=2.09"
Tc=6.0 min CN=74/98 Runoff=1.73 cfs 3,876 cf

SubcatchmentD1: Runoff Area=35,833 sf 49.67% Impervious Runoff Depth=1.49"
Tc=6.0 min CN=74/98 Runoff=2.01 cfs 4,445 cf

SubcatchmentE1: Runoff Area=43,583 sf 38.87% Impervious Runoff Depth=1.31"
Tc=6.0 min CN=74/98 Runoff=2.16 cfs 4,743 cf

Reach 1R: Offsite North Inflow=3.27 cfs 35,008 cf
Outflow=3.27 cfs 35,008 cf

Reach 2R: 4th Ave Sewer
Outflow=0.00 cfs 0 cf

Pond 1P: Regional Pond Peak Elev=1,420.75' Storage=28,731 cf Inflow=13.58 cfs 30,330 cf
Outflow=2.74 cfs 30,266 cf

Total Runoff Area = 232,418 sf Runoff Volume = 35,072 cf Average Runoff Depth = 1.81"
31.29% Pervious = 72,721 sf 68.71% Impervious = 159,697 sf

Summary for Subcatchment A1:

Runoff = 6.61 cfs @ 12.13 hrs, Volume= 14,771 cf, Depth= 1.99"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.57"

	Area (sf)	CN	Description
	18,458	74	>75% Grass cover, Good, HSG C
*	16,439	98	Proposed Building
*	46,731	98	Proposed Impervious
*	7,459	100	Pond Surface
	89,087	93	Weighted Average
	18,458	74	20.72% Pervious Area
	70,629	98	79.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment B1:

Runoff = 3.23 cfs @ 12.13 hrs, Volume= 7,238 cf, Depth= 2.09"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.57"

	Area (sf)	CN	Description
	6,243	74	>75% Grass cover, Good, HSG C
*	35,382	98	Future Impervious
	41,625	94	Weighted Average
	6,243	74	15.00% Pervious Area
	35,382	98	85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment C1:

Runoff = 1.73 cfs @ 12.13 hrs, Volume= 3,876 cf, Depth= 2.09"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.57"

	Area (sf)	CN	Description
	3,343	74	>75% Grass cover, Good, HSG C
*	18,947	98	Future Impervious
	22,290	94	Weighted Average
	3,343	74	15.00% Pervious Area
	18,947	98	85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D1:

Runoff = 2.01 cfs @ 12.13 hrs, Volume= 4,445 cf, Depth= 1.49"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.57"

	Area (sf)	CN	Description
	18,035	74	>75% Grass cover, Good, HSG C
*	15,703	98	Existing Road and ROW
*	2,095	98	Residential Lots
	35,833	86	Weighted Average
	18,035	74	50.33% Pervious Area
	17,798	98	49.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment E1:

Runoff = 2.16 cfs @ 12.13 hrs, Volume= 4,743 cf, Depth= 1.31"
Routed to Reach 1R : Offsite North

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.57"

	Area (sf)	CN	Description
	26,642	74	>75% Grass cover, Good, HSG C
*	15,322	98	Proposed Building
*	1,619	98	Proposed Impervious
	43,583	83	Weighted Average
	26,642	74	61.13% Pervious Area
	16,941	98	38.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 1R: Offsite North

Inflow Area = 232,418 sf, 68.71% Impervious, Inflow Depth = 1.81" for 2-Year event
Inflow = 3.27 cfs @ 12.35 hrs, Volume= 35,008 cf
Outflow = 3.27 cfs @ 12.35 hrs, Volume= 35,008 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: 4th Ave Sewer

Summary for Pond 1P: Regional Pond

Inflow Area = 188,835 sf, 75.60% Impervious, Inflow Depth = 1.93" for 2-Year event
Inflow = 13.58 cfs @ 12.13 hrs, Volume= 30,330 cf
Outflow = 2.74 cfs @ 12.40 hrs, Volume= 30,266 cf, Atten= 80%, Lag= 15.9 min
Primary = 2.74 cfs @ 12.40 hrs, Volume= 30,266 cf
Routed to Reach 1R : Offsite North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Starting Elev= 1,419.00' Surf.Area= 7,459 sf Storage= 13,701 cf
Peak Elev= 1,420.75' @ 12.40 hrs Surf.Area= 9,789 sf Storage= 28,731 cf (15,031 cf above start)

Plug-Flow detention time= 412.9 min calculated for 16,565 cf (55% of inflow)
Center-of-Mass det. time= 172.9 min (935.4 - 762.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,416.00'	88,617 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,416.00	3,146	0	0
1,417.00	3,829	3,488	3,488
1,418.00	4,569	4,199	7,687
1,419.00	7,459	6,014	13,701
1,420.00	8,752	8,106	21,806
1,421.00	10,140	9,446	31,252
1,422.00	11,617	10,879	42,131
1,423.00	13,179	12,398	54,529
1,424.00	14,999	14,089	68,618
1,425.00	25,000	20,000	88,617

Device	Routing	Invert	Outlet Devices
#1	Primary	1,419.00'	**15.0" Round Culvert** L= 378.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,419.00' / 1,414.88' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	1,420.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	1,419.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.74 cfs @ 12.40 hrs HW=1,420.75' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.74 cfs of 6.26 cfs potential flow)
  ├─**2=Sharp-Crested Rectangular Weir** (Weir Controls 1.59 cfs @ 1.63 fps)
  └─**3=Orifice/Grate** (Orifice Controls 1.16 cfs @ 5.89 fps)

Stage-Area-Storage for Pond 1P: Regional Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,416.00	3,146	0
1,416.10	3,214	318
1,416.20	3,283	643
1,416.30	3,351	975
1,416.40	3,419	1,313
1,416.50	3,488	1,658
1,416.60	3,556	2,011
1,416.70	3,624	2,370
1,416.80	3,692	2,735
1,416.90	3,761	3,108
1,417.00	3,829	3,488
1,417.10	3,903	3,874
1,417.20	3,977	4,268
1,417.30	4,051	4,669
1,417.40	4,125	5,078
1,417.50	4,199	5,495
1,417.60	4,273	5,918
1,417.70	4,347	6,349
1,417.80	4,421	6,787
1,417.90	4,495	7,233
1,418.00	4,569	7,687
1,418.10	4,858	8,158
1,418.20	5,147	8,658
1,418.30	5,436	9,187
1,418.40	5,725	9,745
1,418.50	6,014	10,332
1,418.60	6,303	10,948
1,418.70	6,592	11,593
1,418.80	6,881	12,266
1,418.90	7,170	12,969
1,419.00	7,459	13,701
1,419.10	7,588	14,453
1,419.20	7,718	15,218
1,419.30	7,847	15,996
1,419.40	7,976	16,788
1,419.50	8,106	17,592
1,419.60	8,235	18,409
1,419.70	8,364	19,239
1,419.80	8,493	20,081
1,419.90	8,623	20,937
1,420.00	8,752	21,806
1,420.10	8,891	22,688
1,420.20	9,030	23,584
1,420.30	9,168	24,494
1,420.40	9,307	25,418
1,420.50	9,446	26,356
1,420.60	9,585	27,307
1,420.70	9,724	28,272
1,420.80	9,862	29,252
1,420.90	10,001	30,245
1,421.00	10,140	31,252
1,421.10	10,288	32,273
1,421.20	10,435	33,310
1,421.30	10,583	34,360
1,421.40	10,731	35,426
1,421.50	10,879	36,507
1,421.60	11,026	37,602
1,421.70	11,174	38,712
1,421.80	11,322	39,837
1,421.90	11,469	40,976
1,422.00	11,617	42,131
1,422.10	11,773	43,300
1,422.20	11,929	44,485
1,422.30	12,086	45,686
1,422.40	12,242	46,902
1,422.50	12,398	48,134
1,422.60	12,554	49,382
1,422.70	12,710	50,645
1,422.80	12,867	51,924
1,422.90	13,023	53,218
1,423.00	13,179	54,529
1,423.10	13,361	55,855
1,423.20	13,543	57,201
1,423.30	13,725	58,564
1,423.40	13,907	59,946
1,423.50	14,089	61,346
1,423.60	14,271	62,763
1,423.70	14,453	64,200
1,423.80	14,635	65,654
1,423.90	14,817	67,127
1,424.00	14,999	68,618
1,424.10	15,999	70,167
1,424.20	16,999	71,817
1,424.30	17,999	73,567
1,424.40	18,999	75,417
1,424.50	20,000	77,367
1,424.60	21,000	79,417
1,424.70	22,000	81,567
1,424.80	23,000	83,817
1,424.90	24,000	86,167
1,425.00	**25,000**	**88,617**

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: Runoff Area=89,087 sf 79.28% Impervious Runoff Depth=3.06"
Tc=6.0 min CN=74/98 Runoff=10.07 cfs 22,731 cf

SubcatchmentB1: Runoff Area=41,625 sf 85.00% Impervious Runoff Depth=3.18"
Tc=6.0 min CN=74/98 Runoff=4.87 cfs 11,036 cf

SubcatchmentC1: Runoff Area=22,290 sf 85.00% Impervious Runoff Depth=3.18"
Tc=6.0 min CN=74/98 Runoff=2.61 cfs 5,910 cf

SubcatchmentD1: Runoff Area=35,833 sf 49.67% Impervious Runoff Depth=2.44"
Tc=6.0 min CN=74/98 Runoff=3.33 cfs 7,291 cf

SubcatchmentE1: Runoff Area=43,583 sf 38.87% Impervious Runoff Depth=2.22"
Tc=6.0 min CN=74/98 Runoff=3.74 cfs 8,046 cf

Reach 1R: Offsite North Inflow=10.05 cfs 54,949 cf
Outflow=10.05 cfs 54,949 cf

Reach 2R: 4th Ave Sewer
Outflow=0.00 cfs 0 cf

Pond 1P: Regional Pond Peak Elev=1,421.24' Storage=33,752 cf Inflow=20.87 cfs 46,967 cf
Outflow=6.93 cfs 46,903 cf

Total Runoff Area = 232,418 sf Runoff Volume = 55,013 cf Average Runoff Depth = 2.84"
31.29% Pervious = 72,721 sf 68.71% Impervious = 159,697 sf

Summary for Subcatchment A1:

Runoff = 10.07 cfs @ 12.13 hrs, Volume= 22,731 cf, Depth= 3.06"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.73"

	Area (sf)	CN	Description
	18,458	74	>75% Grass cover, Good, HSG C
*	16,439	98	Proposed Building
*	46,731	98	Proposed Impervious
*	7,459	100	Pond Surface
	89,087	93	Weighted Average
	18,458	74	20.72% Pervious Area
	70,629	98	79.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment B1:

Runoff = 4.87 cfs @ 12.13 hrs, Volume= 11,036 cf, Depth= 3.18"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.73"

	Area (sf)	CN	Description
	6,243	74	>75% Grass cover, Good, HSG C
*	35,382	98	Future Impervious
	41,625	94	Weighted Average
	6,243	74	15.00% Pervious Area
	35,382	98	85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment C1:

Runoff = 2.61 cfs @ 12.13 hrs, Volume= 5,910 cf, Depth= 3.18"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.73"

	Area (sf)	CN	Description
	3,343	74	>75% Grass cover, Good, HSG C
*	18,947	98	Future Impervious
	22,290	94	Weighted Average
	3,343	74	15.00% Pervious Area
	18,947	98	85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D1:

Runoff = 3.33 cfs @ 12.13 hrs, Volume= 7,291 cf, Depth= 2.44"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.73"

	Area (sf)	CN	Description
	18,035	74	>75% Grass cover, Good, HSG C
*	15,703	98	Existing Road and ROW
*	2,095	98	Residential Lots
	35,833	86	Weighted Average
	18,035	74	50.33% Pervious Area
	17,798	98	49.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment E1:

Runoff = 3.74 cfs @ 12.13 hrs, Volume= 8,046 cf, Depth= 2.22"
Routed to Reach 1R : Offsite North

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.73"

	Area (sf)	CN	Description
	26,642	74	>75% Grass cover, Good, HSG C
*	15,322	98	Proposed Building
*	1,619	98	Proposed Impervious
	43,583	83	Weighted Average
	26,642	74	61.13% Pervious Area
	16,941	98	38.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 1R: Offsite North

Inflow Area = 232,418 sf, 68.71% Impervious, Inflow Depth = 2.84" for 10-Year event
Inflow = 10.05 cfs @ 12.16 hrs, Volume= 54,949 cf
Outflow = 10.05 cfs @ 12.16 hrs, Volume= 54,949 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: 4th Ave Sewer

Summary for Pond 1P: Regional Pond

Inflow Area = 188,835 sf, 75.60% Impervious, Inflow Depth = 2.98" for 10-Year event
Inflow = 20.87 cfs @ 12.13 hrs, Volume= 46,967 cf
Outflow = 6.93 cfs @ 12.28 hrs, Volume= 46,903 cf, Atten= 67%, Lag= 8.8 min
Primary = 6.93 cfs @ 12.28 hrs, Volume= 46,903 cf
Routed to Reach 1R : Offsite North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Starting Elev= 1,419.00' Surf.Area= 7,459 sf Storage= 13,701 cf
Peak Elev= 1,421.24' @ 12.28 hrs Surf.Area= 10,498 sf Storage= 33,752 cf (20,052 cf above start)

Plug-Flow detention time= 287.4 min calculated for 33,199 cf (71% of inflow)
Center-of-Mass det. time= 136.1 min (893.8 - 757.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,416.00'	88,617 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,416.00	3,146	0	0
1,417.00	3,829	3,488	3,488
1,418.00	4,569	4,199	7,687
1,419.00	7,459	6,014	13,701
1,420.00	8,752	8,106	21,806
1,421.00	10,140	9,446	31,252
1,422.00	11,617	10,879	42,131
1,423.00	13,179	12,398	54,529
1,424.00	14,999	14,089	68,618
1,425.00	25,000	20,000	88,617

Device	Routing	Invert	Outlet Devices
#1	Primary	1,419.00'	**15.0" Round Culvert** L= 378.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,419.00' / 1,414.88' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	1,420.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	1,419.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.93 cfs @ 12.28 hrs HW=1,421.24' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 6.93 cfs @ 5.65 fps)
  ├─**2=Sharp-Crested Rectangular Weir** (Passes < 8.05 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 1.33 cfs potential flow)

Stage-Area-Storage for Pond 1P: Regional Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,416.00	3,146	0
1,416.10	3,214	318
1,416.20	3,283	643
1,416.30	3,351	975
1,416.40	3,419	1,313
1,416.50	3,488	1,658
1,416.60	3,556	2,011
1,416.70	3,624	2,370
1,416.80	3,692	2,735
1,416.90	3,761	3,108
1,417.00	3,829	3,488
1,417.10	3,903	3,874
1,417.20	3,977	4,268
1,417.30	4,051	4,669
1,417.40	4,125	5,078
1,417.50	4,199	5,495
1,417.60	4,273	5,918
1,417.70	4,347	6,349
1,417.80	4,421	6,787
1,417.90	4,495	7,233
1,418.00	4,569	7,687
1,418.10	4,858	8,158
1,418.20	5,147	8,658
1,418.30	5,436	9,187
1,418.40	5,725	9,745
1,418.50	6,014	10,332
1,418.60	6,303	10,948
1,418.70	6,592	11,593
1,418.80	6,881	12,266
1,418.90	7,170	12,969
1,419.00	7,459	13,701
1,419.10	7,588	14,453
1,419.20	7,718	15,218
1,419.30	7,847	15,996
1,419.40	7,976	16,788
1,419.50	8,106	17,592
1,419.60	8,235	18,409
1,419.70	8,364	19,239
1,419.80	8,493	20,081
1,419.90	8,623	20,937
1,420.00	8,752	21,806
1,420.10	8,891	22,688
1,420.20	9,030	23,584
1,420.30	9,168	24,494
1,420.40	9,307	25,418
1,420.50	9,446	26,356
1,420.60	9,585	27,307
1,420.70	9,724	28,272
1,420.80	9,862	29,252
1,420.90	10,001	30,245
1,421.00	10,140	31,252
1,421.10	10,288	32,273
1,421.20	10,435	33,310
1,421.30	10,583	34,360
1,421.40	10,731	35,426
1,421.50	10,879	36,507
1,421.60	11,026	37,602
1,421.70	11,174	38,712
1,421.80	11,322	39,837
1,421.90	11,469	40,976
1,422.00	11,617	42,131
1,422.10	11,773	43,300
1,422.20	11,929	44,485
1,422.30	12,086	45,686
1,422.40	12,242	46,902
1,422.50	12,398	48,134
1,422.60	12,554	49,382
1,422.70	12,710	50,645
1,422.80	12,867	51,924
1,422.90	13,023	53,218
1,423.00	13,179	54,529
1,423.10	13,361	55,855
1,423.20	13,543	57,201
1,423.30	13,725	58,564
1,423.40	13,907	59,946
1,423.50	14,089	61,346
1,423.60	14,271	62,763
1,423.70	14,453	64,200
1,423.80	14,635	65,654
1,423.90	14,817	67,127
1,424.00	14,999	68,618
1,424.10	15,999	70,167
1,424.20	16,999	71,817
1,424.30	17,999	73,567
1,424.40	18,999	75,417
1,424.50	20,000	77,367
1,424.60	21,000	79,417
1,424.70	22,000	81,567
1,424.80	23,000	83,817
1,424.90	24,000	86,167
1,425.00	**25,000**	**88,617**

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: Runoff Area=89,087 sf 79.28% Impervious Runoff Depth=5.24"
Tc=6.0 min CN=74/98 Runoff=17.04 cfs 38,883 cf

SubcatchmentB1: Runoff Area=41,625 sf 85.00% Impervious Runoff Depth=5.39"
Tc=6.0 min CN=74/98 Runoff=8.13 cfs 18,680 cf

SubcatchmentC1: Runoff Area=22,290 sf 85.00% Impervious Runoff Depth=5.39"
Tc=6.0 min CN=74/98 Runoff=4.35 cfs 10,003 cf

SubcatchmentD1: Runoff Area=35,833 sf 49.67% Impervious Runoff Depth=4.47"
Tc=6.0 min CN=74/98 Runoff=6.11 cfs 13,360 cf

SubcatchmentE1: Runoff Area=43,583 sf 38.87% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=74/98 Runoff=7.11 cfs 15,238 cf

Reach 1R: Offsite North Inflow=14.44 cfs 96,098 cf
Outflow=14.44 cfs 96,098 cf

Reach 2R: 4th Ave Sewer
Outflow=0.00 cfs 0 cf

Pond 1P: Regional Pond Peak Elev=1,422.53' Storage=48,500 cf Inflow=35.64 cfs 80,926 cf
Outflow=7.76 cfs 80,860 cf

Total Runoff Area = 232,418 sf Runoff Volume = 96,164 cf Average Runoff Depth = 4.97"
31.29% Pervious = 72,721 sf 68.71% Impervious = 159,697 sf

Summary for Subcatchment A1:

Runoff = 17.04 cfs @ 12.13 hrs, Volume= 38,883 cf, Depth= 5.24"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.01"

	Area (sf)	CN	Description
	18,458	74	>75% Grass cover, Good, HSG C
*	16,439	98	Proposed Building
*	46,731	98	Proposed Impervious
*	7,459	100	Pond Surface
	89,087	93	Weighted Average
	18,458	74	20.72% Pervious Area
	70,629	98	79.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment B1:

Runoff = 8.13 cfs @ 12.13 hrs, Volume= 18,680 cf, Depth= 5.39"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.01"

	Area (sf)	CN	Description
	6,243	74	>75% Grass cover, Good, HSG C
*	35,382	98	Future Impervious
	41,625	94	Weighted Average
	6,243	74	15.00% Pervious Area
	35,382	98	85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment C1:

Runoff = 4.35 cfs @ 12.13 hrs, Volume= 10,003 cf, Depth= 5.39"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.01"

	Area (sf)	CN	Description
	3,343	74	>75% Grass cover, Good, HSG C
*	18,947	98	Future Impervious
	22,290	94	Weighted Average
	3,343	74	15.00% Pervious Area
	18,947	98	85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D1:

Runoff = 6.11 cfs @ 12.13 hrs, Volume= 13,360 cf, Depth= 4.47"
Routed to Pond 1P : Regional Pond

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.01"

	Area (sf)	CN	Description
	18,035	74	>75% Grass cover, Good, HSG C
*	15,703	98	Existing Road and ROW
*	2,095	98	Residential Lots
	35,833	86	Weighted Average
	18,035	74	50.33% Pervious Area
	17,798	98	49.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment E1:

Runoff = 7.11 cfs @ 12.13 hrs, Volume= 15,238 cf, Depth= 4.20"
Routed to Reach 1R : Offsite North

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.01"

	Area (sf)	CN	Description
	26,642	74	>75% Grass cover, Good, HSG C
*	15,322	98	Proposed Building
*	1,619	98	Proposed Impervious
	43,583	83	Weighted Average
	26,642	74	61.13% Pervious Area
	16,941	98	38.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 1R: Offsite North

Inflow Area = 232,418 sf, 68.71% Impervious, Inflow Depth = 4.96" for 100-Year event
Inflow = 14.44 cfs @ 12.13 hrs, Volume= 96,098 cf
Outflow = 14.44 cfs @ 12.13 hrs, Volume= 96,098 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: 4th Ave Sewer

Summary for Pond 1P: Regional Pond

Inflow Area = 188,835 sf, 75.60% Impervious, Inflow Depth = 5.14" for 100-Year event
Inflow = 35.64 cfs @ 12.13 hrs, Volume= 80,926 cf
Outflow = 7.76 cfs @ 12.37 hrs, Volume= 80,860 cf, Atten= 78%, Lag= 14.6 min
Primary = 7.76 cfs @ 12.37 hrs, Volume= 80,860 cf
Routed to Reach 1R : Offsite North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Starting Elev= 1,419.00' Surf.Area= 7,459 sf Storage= 13,701 cf
Peak Elev= 1,422.53' @ 12.37 hrs Surf.Area= 12,444 sf Storage= 48,500 cf (34,799 cf above start)

Plug-Flow detention time= 216.0 min calculated for 67,160 cf (83% of inflow)
Center-of-Mass det. time= 113.8 min (866.0 - 752.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,416.00'	88,617 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,416.00	3,146	0	0
1,417.00	3,829	3,488	3,488
1,418.00	4,569	4,199	7,687
1,419.00	7,459	6,014	13,701
1,420.00	8,752	8,106	21,806
1,421.00	10,140	9,446	31,252
1,422.00	11,617	10,879	42,131
1,423.00	13,179	12,398	54,529
1,424.00	14,999	14,089	68,618
1,425.00	25,000	20,000	88,617

Device	Routing	Invert	Outlet Devices
#1	Primary	1,419.00'	**15.0" Round Culvert** L= 378.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,419.00' / 1,414.88' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	1,420.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	1,419.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.76 cfs @ 12.37 hrs HW=1,422.53' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 7.76 cfs @ 6.32 fps)
  ├─**2=Sharp-Crested Rectangular Weir** (Passes < 33.98 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 1.71 cfs potential flow)

Stage-Area-Storage for Pond 1P: Regional Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,416.00	3,146	0
1,416.10	3,214	318
1,416.20	3,283	643
1,416.30	3,351	975
1,416.40	3,419	1,313
1,416.50	3,488	1,658
1,416.60	3,556	2,011
1,416.70	3,624	2,370
1,416.80	3,692	2,735
1,416.90	3,761	3,108
1,417.00	3,829	3,488
1,417.10	3,903	3,874
1,417.20	3,977	4,268
1,417.30	4,051	4,669
1,417.40	4,125	5,078
1,417.50	4,199	5,495
1,417.60	4,273	5,918
1,417.70	4,347	6,349
1,417.80	4,421	6,787
1,417.90	4,495	7,233
1,418.00	4,569	7,687
1,418.10	4,858	8,158
1,418.20	5,147	8,658
1,418.30	5,436	9,187
1,418.40	5,725	9,745
1,418.50	6,014	10,332
1,418.60	6,303	10,948
1,418.70	6,592	11,593
1,418.80	6,881	12,266
1,418.90	7,170	12,969
1,419.00	7,459	13,701
1,419.10	7,588	14,453
1,419.20	7,718	15,218
1,419.30	7,847	15,996
1,419.40	7,976	16,788
1,419.50	8,106	17,592
1,419.60	8,235	18,409
1,419.70	8,364	19,239
1,419.80	8,493	20,081
1,419.90	8,623	20,937
1,420.00	8,752	21,806
1,420.10	8,891	22,688
1,420.20	9,030	23,584
1,420.30	9,168	24,494
1,420.40	9,307	25,418
1,420.50	9,446	26,356
1,420.60	9,585	27,307
1,420.70	9,724	28,272
1,420.80	9,862	29,252
1,420.90	10,001	30,245
1,421.00	10,140	31,252
1,421.10	10,288	32,273
1,421.20	10,435	33,310
1,421.30	10,583	34,360
1,421.40	10,731	35,426
1,421.50	10,879	36,507
1,421.60	11,026	37,602
1,421.70	11,174	38,712
1,421.80	11,322	39,837
1,421.90	11,469	40,976
1,422.00	11,617	42,131
1,422.10	11,773	43,300
1,422.20	11,929	44,485
1,422.30	12,086	45,686
1,422.40	12,242	46,902
1,422.50	12,398	48,134
1,422.60	12,554	49,382
1,422.70	12,710	50,645
1,422.80	12,867	51,924
1,422.90	13,023	53,218
1,423.00	13,179	54,529
1,423.10	13,361	55,855
1,423.20	13,543	57,201
1,423.30	13,725	58,564
1,423.40	13,907	59,946
1,423.50	14,089	61,346
1,423.60	14,271	62,763
1,423.70	14,453	64,200
1,423.80	14,635	65,654
1,423.90	14,817	67,127
1,424.00	14,999	68,618
1,424.10	15,999	70,167
1,424.20	16,999	71,817
1,424.30	17,999	73,567
1,424.40	18,999	75,417
1,424.50	20,000	77,367
1,424.60	21,000	79,417
1,424.70	22,000	81,567
1,424.80	23,000	83,817
1,424.90	24,000	86,167
1,425.00	**25,000**	**88,617**

Response Action Plan and Construction Contingency Plan

Park and 3rd Lofts
Former Alexandria Block Plant
901 and 924 4th Avenue East; 923 3rd Avenue East; and 401, 403, 405, and 412 Oak Street
Alexandria, Minnesota

August 30, 2024

Prepared for:

Park and 3rd Alexandria, LLC
408 6th Street, P.O. Box 208
Prinsburg, Minnesota 56281

Prepared by:

Stantec Consulting Services Inc.
One Carlson Parkway, Suite 100
Plymouth, Minnesota 55447

Project Number 227707105

The conclusions in the Report titled *Response Action Plan and Construction Contingency Plan, Former Alexandria Block Plant, 901 and 924 4th Avenue East; 923 3rd Avenue East; and 401, 403, 405, and 412 Oak Street, Alexandria, Minnesota* are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Park and 3rd Alexandria, LLC (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

Prepared by _____

(signature)

Cory Anderson
Senior Associate – Environmental Scientist

Approved by _____

(signature)

Eric Stommes
Senior Associate - Environmental Scientist

Table of Contents

1.0 INTRODUCTION 1

2.0 SITE DESCRIPTION 1
2.1 CURRENT USE OF ADJOINING PROPERTIES 2

3.0 PREVIOUS ENVIRONMENTAL REPORTS 3
3.1 2020 PHASE I ESA 3
3.2 2020 PHASE II ESA 5
3.3 2022 LSI REPORT 6
3.4 2022 PETROLEUM CLOSURE LETTER 7
3.5 2023 VAPOR MEMO 8
3.6 2024 GEOTECHNICAL REPORT 8
3.7 2024 PHASE I ESA 8
3.8 2024 SUPPLEMENTAL INVESTIGATION 11

4.0 SITE RESPONSIBILITY 14
4.1 FUTURE PROPERTY OWNER AND PLANNED DEVELOPER 14
4.2 ARCHITECT 14
4.3 ENVIRONMENTAL CONSULTANT 14
4.4 REGULATORY AGENCY 14

5.0 RESPONSE ACTION OBJECTIVES 15

6.0 CONCEPTUAL SITE MODEL 16
6.1 PHYSICAL SETTING 16
6.1.1 Topography 16
6.1.2 Geology 16
6.1.3 Hydrogeology 16
6.2 CONTAMINANTS OF CONCERN AND POTENTIAL PATHWAYS OF CONCERN 17
6.2.1 Soil 17
6.2.1.1 Soil Exposure Pathway 17
6.2.1.2 Soil to Groundwater Leaching Pathway 18
6.2.2 Groundwater 18
6.2.2.1 Groundwater Pathway 18
6.2.3 Soil Vapor 19
6.2.3.1 Soil Vapor Pathway 19
6.3 SUSPECTED SOURCE AREA EVALUATIONS 19

7.0 DEVELOPMENT PROJECT DESCRIPTION 20

8.0 PROPOSED RESPONSE ACTIONS 21
8.1 GENERAL SOIL MANAGEMENT GUIDELINES 21
8.1.1 Standard Methodology for Soil Management 22

8.2 ANTICIPATED SITE SOIL CHARACTERISTICS 22
8.3 RESPONSE ACTION DEVELOPMENT UNITS 23
8.3.1 Proposed Building Footprint Area 23
8.3.2 Proposed Surface Parking, Plaza, Sidewalks and Drive Areas 23
8.3.3 Utility Corridors 23
8.3.4 Green Space 23
8.3.5 Proposed Stormwater Management Area 23
8.4 SOIL SAMPLING AND ANALYTICAL TESTING 24
8.5 FIELD SCREENING AND SAMPLING OF CONTAMINATED SOIL 25
8.5.1 Headspace Screening Procedure 25
8.5.2 Soil Segregation and Sampling 25
8.6 GENERAL SOIL SAMPLING PROCEDURES 26
8.6.1 Confirmation Sampling 26
8.6.2 Typical Laboratory Methodologies 27
8.7 GENERAL FIELD DOCUMENTATION PROCEDURES 28
8.8 FILL IMPORTING 28
8.9 VAPOR MITIGATION 28
8.9.1 Sub-Slab Depressurization System 29
8.9.2 Post Construction Sub-Slab Monitoring and Vapor Sampling 29
8.10 WATER PRETREATMENT/DEWATERING 30

9.0 CONSTRUCTION CONTINGENCY PLAN 31
9.1 GENERAL 31
9.2 SITE CONTROL 31
9.3 RECOGNITION OF POTENTIAL WASTE AND/OR CONTAMINATED SOILS 32
9.4 SITE HAZARD EVALUATION ACTIVITIES 32
9.4.1 Chemical Vapor Hazards 32
9.4.2 Particulate Hazards 32
9.5 WASTE EVALUATION 33
9.5.1 Suspect Asbestos Containing Materials 33
9.5.2 Free Product 33
9.5.3 Underground Storage Tanks 33
9.5.4 Barreled Wastes 34
9.5.5 Electrical Transformers 34
9.5.6 Creosote Timbers 34
9.5.7 Batteries 34
9.5.8 Oil Filters 34
9.5.9 Waste Tires 35
9.5.10 Ash or Clinkers 35
9.5.11 Stained Soils or Soils Exhibiting Strong or Unusual Odors 35
9.5.12 Water Wells 35

10.0 IMPLEMENTATION REPORTING 36

11.0 REFERENCES 37

LIST OF FIGURES

Figure 1: Site Location Map
Figure 2: Site Detail Map
Figure 3: Sample Locations Map
Figure 4: Soil Sample Results Map
Figure 5: Groundwater Sample Results Map
Figure 6: Soil Vapor Sample Results Map

LIST OF TABLES

Table 1: Comprehensive Soil Analytical Results Summary
Table 2: Comprehensive Groundwater Analytical Results Summary
Table 3: Comprehensive Soil Vapor Analytical Results Summary

LIST OF APPENDICES

Appendix A: Proposed Development Plans
Appendix B: Previous Environmental Investigations (Boring Logs)
Appendix C: MPCA Guidance Documents

1.0 INTRODUCTION

This Response Action Plan and Construction Contingency Plan (RAP/CCP) was prepared by Stantec Consulting Services, Inc. (Stantec) for Park and 3rd Alexandria, LLC for the proposed Park and 3rd Lofts redevelopment on the properties located at 901 and 924 4th Avenue East; 923 3rd Avenue East; and 401, 403, 405, and 412 Oak Street, Alexandria, Douglas County, Minnesota (the Site).

The Site consists of 4.56 acres of land occupied by an approximate 16,600-square-foot former concrete block plant and approximate 6,000-square-foot storage building surrounded by unpaved storage areas and a paved parking lot. The southeast corner of the Site is not contiguous and is located across Oak Street and 4th Avenue East. Access to the Site is from 4th Avenue East, Park Street, and Oak Street. The Site is owned by Duininck Concrete LLC and is currently vacant. The most recent tenant was Amcon Block who used the facility for concrete block manufacturing and vacated in April 2023. Property uses in the area of the Site are commercial and residential.

Historically, the Site was developed with residential dwellings on the eastern portion by 1938 with the western portion developed as a concrete ready-mix plant by 1951. The residential dwellings were razed between 1997 and 2002, at which point, the entire parcel was occupied by a ready-mix plant until 2016 when the Site became solely a block plant with no ready-mix operations. Duininck Concrete, LLC purchased the Site from JME Companies in December 2020 and then leased the facility to Amcon Block until April 2023, when they vacated. The Site has been vacant since then.

The proposed development will include demolition of the existing structures; construction of a new three-story multifamily residential apartment building with tuck under garages; construction of associated dog parks and pickleball court; construction of a single-story detached parking garage; and installation of paved surface parking and drive areas, surrounding green space, outdoor patios, and associated utilities. A stormwater retention pond is proposed for the southwestern portion of the Site. Proposed Development Plans are included in **Appendix A**.

The Response Actions at the Site will include demolition and removal of existing structures and building slabs; removal of impacted soils during site grading; management of impacted soils at an MPCA-permitted landfill; pretreatment of impacted perched water during temporary dewatering of impacted perched water; installing a liner in the proposed stormwater retention pond; installation of a vapor mitigation system in the proposed multi-family residential apartment building to manage volatile organic compound (VOC) impacts to soil vapor at the Site; and ongoing operation and maintenance of the Site mitigation feature along with filing an Environmental Covenant.

The purpose of this RAP/CCP is to provide a written protocol for the implementation of Response Actions for the project. The primary goal is to provide guidance to Site personnel to evaluate impacted media that will be managed during development activities. The RAP/CCP will detail procedures to be used to determine whether the media can be reused on Site as controlled backfill or requires off-Site disposal at an appropriately permitted facility.

In addition, this document will provide field decision-making guidance to the on-Site Environmental Professional and other Site personnel in the event that unanticipated impacts (petroleum or non-petroleum related) are encountered during implementation of the proposed Site redevelopment activities.

A copy of the RAP/CCP will be kept on Site in the project field superintendent's office to be readily available during construction activities. It should be noted that this RAP/CCP does not intend to be used in the determination of a material's geotechnical suitability for re-use. A geotechnical engineering professional must be retained by the owner to make determinations of whether certain screened media can be appropriately used on the portions of the Site that may support permanent structures, roadways or other construction.

2.0 SITE DESCRIPTION

The Site is located in a commercial and residential area in the City of Alexandria, Minnesota.

Site Address/Location	**Address**: 901 and 924 4th Avenue East; 923 3rd Avenue East; and 401, 403, 405, and 412 Oak Street		**City:** Alexandria
	County: Douglas		**State:** Minnesota
	Township: 128 North	**Range:** 37 West	**Section:** NW ¼ of the NW ¼ of Section 20
Property Information	**Size:** 4.56 acres **Property Identification Numbers:** 63-2357-500, 63-2374-500, 63-2496-000, 63-2498-000, 63-2508-000, 63-2509-000, 63-2510-000, and 63-2511-000		
Improvements	The Site is occupied by a block plant building and storage building surrounded by unpaved storage areas and a paved parking lot.		
Building Information	**Size:** Block Plant: Approximately 16,600 square feet Storage Building: Approximately 6,000 square feet Conveyor and Hopper Buildings (2): Approximately 100 square feet each		**Year of Construction:** 1950 with additions in 1960, 1991, and 1999 Between 1938 and 1951 Unknown
	Description: The block plant building is currently vacant. The building is partitioned into the original building section (south side) occupied by storage rooms with offices above, the boiler/water treatment areas and the batch plant equipment/conveyance equipment above. The northern 2000 addition is occupied by block curing rooms (4) on the west side and maintenance bays on the east side. A canopy is attached to the south side of block building, formerly used to unload concrete additive products. The storage building is used for equipment and dry storage with the southern half rented.		
Use of the Property	**Current Use:** The Site is currently vacant and was formerly used as a batch plant and concrete block manufacturing.		

	Past Use: According to reviewed sources of information, the Site was developed with residential dwellings on the eastern portion by 1938 with the western portion developed as a concrete ready-mix plant by 1951. The residential dwellings were razed between 1997 and 2002, at which point, the entire parcel was occupied by a ready-mix plant until 2016 when the Site became solely a block plant with no ready-mix operations. Duininck Concrete, LLC purchased the Site from JME Companies in December 2020 and then leased the facility to Amcon Block until April 2023, when they vacated.
Ownership and Operation of the Property	**Current Ownership & Operation:** The Site is owned by Duininck Concrete LLC. The facility is currently vacant and was most recently occupied by Amcon Block.

The Site location is depicted in **Figure 1**. A Site Detail Map is provided in **Figure 2**.

2.1 CURRENT USE OF ADJOINING PROPERTIES

The following land uses were noted on adjoining properties:

Direction	Description
North	Tiremaxx Service Center – Alexandria; 801 3rd Ave. East, Alexandria, MN 56308 Northwoods Café; 903 3rd Ave. East, Alexandria, MN 56308
South	Residential dwelling; 402 Park Street, Alexandria, MN 56308 Residential dwelling; 407 Oak Street, Alexandria, MN 56308 Safe Store Mini Storage; 504 Oak Street, Alexandria, MN 56308
East	Winsupply of Alexandria; 311 Park Street, Alexandria, MN 56308
West	Alex Pawn Shop; 423 Nokomis Street, Alexandria, MN 56308 Spark Nutrition and Boba Tea; 409 Nokomis Street, Alexandria, MN 56308 Alex Glass and Glazing; 321 Nokomis Street, Alexandria, MN 56308 Doherty Staffing Solutions; 315 Nokomis Street, Alexandria, MN 56308

3.0 PREVIOUS ENVIRONMENTAL REPORTS

Stantec reviewed or completed the following previous environmental assessments during the preparation of this RAP/CCP:

- Wenck Associates, Inc., *Phase I Environmental Site Assessment, Alexandria Block Plant, 910 4th Avenue East and 412 Oak Street, Alexandria, Minnesota, 56308*, August 31, 2020 (2020 Phase I ESA)
- Wenck Associates, Inc., *Phase II Environmental Site Assessment, Alexandria Block Plant, 910 4th Avenue East and 412 Oak Street, Alexandria, Minnesota, 56308*, November 13, 2020 (2020 Phase II ESA)
- Stantec Consulting Services, Inc., *Investigation Report Petroleum Remediation Program*, January 25, 2022 (2022 LSI Report)
- Minnesota Pollution Control Agency (MPCA), *Petroleum Tank Release Site File Closure Letter*, March 3, 2022 (2022 Petroleum Closure Letter)
- Stantec Consulting Services, Inc., *Soil Vapor Sampling Results Memo, November 2023, Alexandria Block Plant, 910 4th Avenue East, Alexandria, Minnesota, 56308*, December 22, 2023 (2023 Vapor Memo)
- American Engineering Testing, *Report of Geotechnical Exploration, Alexandria Apartments, Alexandria, Minnesota*, April 18, 2024 (2024 Geotechnical Report)
- Stantec Consulting Services, Inc., *Phase I Environmental Site Assessment, Former Alexandria Block Plant, 901 and 924 4th Avenue East; 923 3rd Avenue East; and 401, 403, 405, and 412 Oak Street, Alexandria, Minnesota*, August 2024 (2024 Phase I ESA)
- Stantec Consulting Services, Inc., *Supplemental Investigation, Former Alexandria Block Plant, Park and 3rd Lofts Redevelopment, 901 and 924 4th Avenue East, 923 3rd Avenue East; and 401, 403, 405, and 412 Oak Street, Alexandria, Minnesota 56308*, August 2024 (2024 Supplemental Investigation)

All sample locations are shown on **Figure 3**. Soil sample results from previous investigations are shown on **Figure 4**. Groundwater sample results from previous investigations are shown on **Figure 5**. Soil vapor results from previous investigations are shown on **Figure 6**. A comprehensive summary of Stantec soil sample data is included as **Table 1**, a comprehensive summary of Stantec groundwater data is included as **Table 2**, and a comprehensive summary of Stantec soil vapor data is included as **Tables 3.** Boring logs from previous investigations are included in **Appendix B**.

3.1 2020 PHASE I ESA

The 2020 Phase I ESA was completed for the Site in July of 2020 by Wenck Associates, Inc. (Wenck [now Stantec]). At the time of the 2020 Phase I ESA, the Site was in use as a cement block manufacturing facility. The Site was historically developed with residential buildings on the east portion in the 1930s and the west portion was developed as a concrete ready-mix facility by the early 1950s. After the residential buildings were razed, the ready-mix plant expanded to the east portion of the Site. By 2016, the Site became a block plant with no ready-mix operations.

The 2020 Phase I ESA identified the following RECs relative to the Site:

- "The 1999 used oil spill reportedly involving 1,500-gallons of used oil (PCASPILLS incident #51794), appears to be unresolved from the regulatory perspective. This spill is considered a REC for the Site.

- The stained concrete observed along the west side of the block plant building near used oil storage along is considered REC for the Site. Used oil filters and oil collection containers are set up to drain oil into a container. The staining was also observed along the floor where the floor and wall meet. The spilled oil and historical use of the area for draining oil could potentially impact the soil beneath the facility.

- The Site is associated with a removed 2,000-gallon diesel, 2,000-gallon fuel oil, and 4,000-gallon gasoline USTs. No tank closure assessment data for the UST removals was identified or reviewed. Based on the lack of information regarding the UST's condition and soils beneath, the former USTs are considered RECs for the Site.

- The soil staining observed near the diesel AST fueling area located on the north side of the facility is considered a REC for the Site. Current and historical use of the fueling station could potentially impact the soil/groundwater in the fueling area.

- The staining in the garage area trench drain is considered a REC for the Site. Due to the extended use of petroleum products/hazardous substances and indications of spills during the site reconnaissance, the integrity of the subsurface infrastructure is not known resulting in potential releases to the subsurface."

No CRECs or HRECs were identified in connection with the Site. However, the ESA identified the following BERs relative to the Site:

- "Historical residential dwellings were present on the east-southeastern portion of the Site until the 2000s. The potential for buried debris, and remnant features (e.g., septic systems and wells) associated with the former residences represent a business environmental risk.

- Discarded equipment was observed to the southeast of the storage building, which is considered a housekeeping issue and business environmental risk for the Site.

- Sediment runoff from aggregate piles on the southern portion of the Site is considered a business environmental risk for the Site. The sediment was observed to be entering a catch basin on Oak Street.

- During the walkover, Wenck observed suspect asbestos containing materials. Based on the age of the original facility, the presence of asbestos is possible and represents a business environmental risk. If improvements/demolition is planned, Wenck recommends completion of an asbestos/regulated materials assessment."

3.2 2020 PHASE II ESA

The 2020 Phase II ESA was completed for the Site in November of 2020 by Wenck (now Stantec). At the time of the 2020 Phase II ESA, the Site remained in use as a cement block manufacturing facility. The purpose of the 2020 Phase II ESA was to determine if the Site had been impacted by hazardous substances, pollutants, or contaminants at concentrations of potential concern as the potential for such impact was identified during the 2020 Phase I ESA.

The scope of the Phase II ESA included the advancement of two soil borings (hand auger) within the block plant building at the Site to assess the trench drain and used oil filter draining area. Four soil borings (push-probe) were advanced on exterior portions of the Site to assess soil and groundwater conditions. Soil samples were collected from all six borings and analyzed for various combinations of the following parameters: diesel range organics (DRO), gasoline range organics (GRO), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), Resource Conservation and Recovery Act (RCRA) metals, and polychlorinated biphenyls (PCBs). Groundwater samples were collected from temporary wells installed in the exterior soil borings and analyzed for DRO, GRO, and VOCS. Three soil vapor samples were also collected and analyzed for VOCs as part of the subsurface investigation at the Site.

Fill material was observed to depths of approximately 2.5 to 6 feet below ground surface (bgs). Various items of debris were observed within the fill material including brick fragments, wood chips, asphalt, and rubber. Field screening of soils was completed using a photoionization detector (PID) and identified readings ranging from 0.7 to 470.3 parts per million (ppm). Fill material appeared to be underlain by sandy clay, clay, and silty clay to boring termination depths. Analytical results identified DRO in five of the six soil samples at concentrations ranging from 15.4 milligrams per kilogram (mg/kg) to 3,340 mg/kg. DRO concentrations detected in soil samples collected from GP-2, located east of the Block Plant building, and GP-4, adjacent to the AST fueling area in the northwest portion of the Site, exceeded the MPCA's Beneficial Reuse threshold of 100 mg/kg. GRO was detected at a concentration of 336 mg/kg in the soil sample collected from GP-4. Various RCRA metals were detected above laboratory reporting limits; however, the concentrations were stated to be within the range of naturally occurring concentrations in Minnesota. Several petroleum VOCs were detected above laboratory reporting limits. Concentrations of 1,2,4 trimethylbenzene and 1,3,5 trimethylbenzene were identified to exceed their Residential Soil References Values (SRVs) but not their Industrial SRVs. Several VOC constituents identified in the soil sample collected from GP-4 exceeded their Screening Soil Leaching Values (SLVs). PCBs were not detected above laboratory reporting limits in the soil samples analyzed for PCBs. With the exception of GP-1, PAHs were detected in all of the soil samples analyzed for PAHs. The detected concentrations were identified to be below their individual or cumulative benzo(a)pyrene (BaP) equivalent Residential SRVs or Screening SLVs.

Groundwater was measured at depths of 11.5 feet bgs in GP-1 located south of the Block Plant building, 19.1 feet bgs in GP-2 located east of the Block Plant building, and 20.4 in GP-4 located adjacent to the AST fueling area in the northwest portion of the Site. Analytical results identified DRO at concentrations of 236 micrograms per liter (µg/L) in the groundwater sample collected from GP-2 and 781 µg/L in the

groundwater sample collected from GP-4. No additional constituents were detected above laboratory reporting limits in groundwater samples.

Analytical results for the soil vapor samples identified various VOCs above laboratory reporting limits; however, none were found to exceed their thirty-three times (33X) Industrial Intrusion Screening Values (ISVs).

The 2020 Phase II Report made the following conclusions and recommendations:

- "Notify the Property Owner of the releases so that they can be reported to the MN State Duty Officer pursuant to MN Statute 115.051 – Duty to Notify and Avoid Water Pollution. Wenck can assist with the notification.
- Once a leak site number is issued by the MPCA and a responsible party for the release has been identified, the MPCA will require a Limited Site Investigation (LSI) or Remedial Investigation (RI) to further assess the apparent tank-related petroleum release(s) on the Site. The LSI/RI will likely include the collection of additional soil/groundwater samples, additional vapor sampling to assess the vapor intrusion risk, and risk assessments of nearby receptors. The goal of the investigation would be to obtain a Petroleum Leak Site File Closure letter. A portion of the investigation and MPCA-approved cleanup actions (if required) would be partially reimbursed through a Department of Commerce program called Petrofund. Petrofund has specific bidding, reporting, and reimbursement applications and reimbursement is not guaranteed.
- The MPCA operates two programs that oversee tank-related petroleum investigations. The Petroleum Remediation Program (PRP) will typically review investigation reports within 3-4 months of submittal and they do not charge for their oversight. The Petroleum Brownfields Program (PBP) is a fee-based program that performs similar oversight as PRP, but with an expedited review schedule (i.e., typically within 30 business days). The PBP also offers liability assurance letters to buyers if requested. Applicable assurance letters may include a General Liability Letter and Leak Site Tank Removal Verification letter. If renovation or redevelopment is planned, the PBP can also review and approve Development Response Action Plans which outline how contaminated media (i.e., soil, groundwater, and soil gas) will be managed during the improvement."

3.3 2022 LSI REPORT

The 2022 LSI Report was completed for the Site in January of 2022. The LSI was completed to further evaluate petroleum impacts at the Site that were identified during the 2020 Phase II ESA. The LSI indicated a release from a 10,000-gallon AST (LS0021454) was discovered during the Phase II ESA. An additional spill incident (#51794) involved a release of 1,500-gallons of used oil on December 1, 1999. The exact location of the #51794 spill incident could not be ascertained; however, analytical data from the 2020 Phase II ESA suggests the incident may have occurred to the east of the shop area in the vicinity of GP-2. The LSI investigation consisted of the advancement of seven soil borings in the vicinity of the 10,000-gallon AST in the northwest corner of the Site and in the area of GP-2, the potential location of spill #51794.

Stantec generally encountered 2.5 to 6 feet of fill material underlain by clayey sand, sandy clay, clay, and silty clay to boring termination depths of 25 to 35 feet bgs. Groundwater levels were taken prior to and after drilling activities. The observed water levels varied as much as four feet (B-2). Stantec indicated this was likely due to the water bearing unit being confined and not necessarily indicative of a fluctuating water table. Analytical results identified the highest petroleum impacts between the concrete slab and down to approximately 10 feet bgs in the area of GP-4, near the 10,000-gallon AST. The soil sample collected from the 2.5-5' sampling interval in boring GP-4 identified DRO at a concentration of 3,340 mg/kg and GRO at a concentration of 336 mg/kg. Remaining borings completed in this area (B-1 through B-3) did not detect constituents of concern above laboratory reporting limits. In the presumed area of spill #51794, DRO was detected at a concentration of 89.5 mg/kg in the soil sample collected from the 0.5-2.5' sampling interval in boring B-5. Stantec noted the relatively low detection of DRO in boring B-5 did not appear related to the 1999 spill incident. Remaining borings completed in this area (B-4, B-6, and B-7) did not detect constituents of concern above laboratory reporting limits.

Groundwater analytical results identified DRO concentrations ranging from 136 to 781 ug/L. Stantec indicated the surficial petroleum impacts may have contributed to the relatively low DRO and toluene impacts in groundwater. Nevertheless, the identified DRO impacts in groundwater at the Site were noted to fall below the PRP's guidance value of 1,000 ug/L and the impacts were considered delineated at 1,000 ug/L with no drinking water exceedances.

Impacts to soil in the area of the 10,000-gallon AST and presumed location of the 1999 spill incident (#51794) were delineated and appeared limited in extent. Additionally, groundwater impacts appeared to be limited in extent and detections did not exceed the PRP's guidance value of 1,000 ug/L. Soil vapor results did not identify VOCs in excess of their respective 33X Industrial ISVs with the exception of benzene in SV-3. Due to the distance between SV-3 and the nearest Site building, vapor intrusion risk to the Site buildings appeared to be low. Based on the results from the LSI investigation and Phase II ESA completed at the Site, Stantec recommended regulatory closure for leak site LS0021454.

3.4 2022 PETROLEUM CLOSURE LETTER

The 2022 Petroleum Closure Letter was issued on March 3, 2022 regarding petroleum release LS0021454 at the Site. The letter indicates regulatory closure was issued for LS0021454; however, due to non-petroleum impacts discovered during previous assessments the Site was referred to the MPCA's Site Assessment Program for potential state and/or federal Superfund oversight. The letter indicates the MPCA reserves the right to reopen the Site file for LS0021454 and to require additional investigation activities and/or cleanup if new information, changes to regulatory requirements, or land use changes are made at the Site.

In the event of future development of the Site or surrounding areas, the presence of petroleum impacts should be assumed to remain at the Site. If petroleum impacts are encountered during future development work at the Site, the MPCA should be notified immediately.

3.5 2023 VAPOR MEMO

The 2023 Vapor Memo was completed for the Site and involved the collection of seven exterior soil vapor samples during the heating season (November 1-March 31). The soil vapor sampling was completed November 6, 2023 in the areas previously assessed as part of the investigations for the 2020 Phase II ESA and 2022 LSI Report. A push-probe rig was used to advance each of the soil vapor sample probes to five feet bgs using the Post-Run Tubing (PRT) method and the rod was pulled back two feet to create a void space for sampling. The soil vapor samples were submitted for laboratory analysis of VOCs.

With the exception of 1,3-butadiene detected in SV-2, no non-petroleum or petroleum-related VOCs were detected above 33X Industrial ISVs in soil vapor samples. The detected concentration of 1,3-butadiene in SV-2 was 145 micrograms per cubic meter (µg/m^3). The 33X Industrial ISV for 1,3-butadiene is 90 µg/m^3. The vapor memo indicated, the detection of 1,3-butadiene did not appear to be related to a release at the Site as there are widespread source of 1,3-butadiene some of which are anthropogenic and others possibly naturally occurring and that the results are seldom reproducible.

The 2023 vapor assessment, in conjunction with previous soil vapor assessments completed at the Site, indicated two seasonal rounds of soil vapor sampling had been completed for the Site. Petroleum VOCs identified in soil vapor at the Site were addressed as part of the LS0021454 leak site and no non-petroleum VOCs were detected in exceedance of their respective 33X Industrial ISVs apart from 1,3-butadiene which is not solely a trigger warranting additional investigation or vapor mitigation decisions.

Stantec recommended the 2023 Vapor Memo be submitted to the MPCA Site Assessment Unit in request of a No Further Remedial Action Planned Letter.

3.6 2024 GEOTECHNICAL REPORT

The 2024 Geotechnical Report was completed for the Site regarding the proposed construction of an apartment building, five townhouses, and two 22-unit storage buildings. The investigation involved the advancement of 11 soil borings to maximum depths of 24.5 feet bgs and the collection of various soil samples for analysis of moisture-densities of native clay soils and #200 wash sieve analysis of native silt and granular soils. The geology in the area of the borings completed at the Site was described as an aggregate base underlain with topsoil, fill material, and soft to stiff collapsed glacial sediments extending to boring termination depths. No groundwater was encountered during the 2024 geotechnical investigation activities.

3.7 2024 PHASE I ESA

The 2024 Phase I ESA was completed for the Site in August 2024 by Stantec Consulting Services, Inc. The intended use of this Phase I ESA was for due diligence in support of acquisition for redevelopment as multi-tenant housing.

The Site at the time of the Phase I ESA consisted of 4.56 acres of land occupied by an approximate 16,600-square-foot vacant block plant and approximate 6,000-square-foot storage building surrounded by unpaved storage areas and a paved parking lot. The southeast corner of the Site is not contiguous and is

located across Oak Street and 4th Avenue East. Access to the Site is from 4th Avenue East, Park Street, and Oak Street. The Site is owned by Duininck Concrete, LLC who previously leased the Site to Amcon Block for cement block manufacturing. Property uses in the area of the Site are commercial and residential.

According to reviewed sources of information, the Site was developed with residential dwellings on the eastern portion by 1938 with the western portion developed as a concrete ready-mix plant by 1951. The residential dwellings were razed between 1997 and 2002, at which point the entire parcel was occupied by a ready-mix plant until 2016 when the Site became solely a block plant with no ready-mix operations.

This assessment has revealed the following *recognized environmental conditions* (RECs) in connection with the Site:

- According to interviewees, the block facility formerly housed a concrete block machine that used hydraulic lines to form concrete and the hydraulic lines, a portion of which were below the concrete floor slab had leaked hydraulic fluid in the past. The reported release of hydraulic fluid to the subsurface represents a REC for the Subject Property.
- The north adjacent site, across 3rd Avenue East (former Alex Exhaust) is identified as MPCA site #LS0015656. Previous investigations completed in connection with this site indicated the approximate extent of soil and groundwater impacts may extend onto the northeast portion of the Subject Property. The incident was issued regulatory closure on February 1, 2011. Based on the regulatory closure status, the MPCA site #LS0015656 is considered a REC for the Subject Property.

This assessment has revealed the following *controlled recognized environmental conditions* (CRECs) in connection with the Subject Property:

- Leak No. LS0021454 was discovered during the 2020 Phase II ESA at the Subject Property and was closed by the MPCA on March 3, 2022. Based on the regulatory closure status with impacts remaining in-place as identified in the subsurface investigations completed at the Subject Property, the LS0021454 release is considered a CREC for the Subject Property.
- Prior investigations on the Subject Property related to Leak No. LS0021454 identified concentrations of non-petroleum related volatile organic compounds (VOCs) below their applicable 33 times (X) Industrial Intrusion Screening Values (ISVs) and 1,3-butadiene above its 33 times Industrial ISVs. As such, the Subject Property was referred to the MPCA's Site Assessment Program and assigned MPCA site SA0000924. Per Minnesota Pollution Control Agency (MPCA) Vapor Intrusion Best Management Practices, another seasonal round of vapor sampling was completed which revealed no VOC detections above their Industrial 33X ISVs except for 1,3-butadiene noting that 1,3-butadiene detections are suspect based on their prevalence in urban environments and often unrelated to a specific release. The existence of the soil gas contaminants and with control being the current industrial use represents a CREC for the Subject Property.

- Spill #51794 was related to a report of used oil surface release in 2000. Interviewees noted during an addition to the block building, a 1,500-gallon used oil AST was damaged and released used oil on the ground during the winter months. Facility staff reportedly contained the used oil on the frozen ground with sand and disposed of the material off-site. This area was also assessed as part of Leak No. LS0021454. Based on the closure status and remaining impacts, spill incident #51794 is considered a CREC for the Subject Property.

- Spill incident #61824 was reported on September 14, 2004, and related to the discovery of a subsurface utility line conveying liquid with a petroleum sheen into the storm sewer at a location described as south of Trunk Highway 29 East and west of Park Street (apparent northeast corner of the Subject Property). Impacted soils were excavated, and the line was disconnected from the sewer system. Based on the closure status and potential for petroleum impacts to remain in-place this incident is considered a CREC for the Subject Property.

This assessment has revealed no *historical recognized environmental conditions* (HRECs) or significant data gaps in connection with the Subject Property.

The following business environmental risks (BERs) were identified during this ESA:

- Historical residential dwellings were present on the east-southeastern portion of the Subject Property until the 2000s. The potential for buried debris, and remnant features (e.g., septic systems and wells) associated with the former residences represent a business environmental risk.

- Residual chemicals/petroleum products were observed inside the block facility. These remaining chemicals should be appropriately removed and disposed off-site.

- Piles of aggregate, sand, and other concrete additives (i.e., fly ash and slag) were observed near the silos located near the southwest corner of the block building. These residual materials should be properly disposed off-site.

- During the walkover, Stantec observed suspect asbestos containing materials in the structures on the Subject Property. Stantec understands that an asbestos survey was recently completed.

3.8 2024 SUPPLEMENTAL INVESTIGATION

The purpose of the Supplemental Investigation was to assess the soil, groundwater, and soil gas conditions at proposed development specific features and also assess RECs identified in the recent Phase I ESA. At the time of the 2024 Supplemental Investigation the Site was occupied by a an approximate 16,600-square-foot vacant block plant and approximate 6,000-square-foot storage building surrounded by unpaved storage areas and a paved parking lot.

The 2024 Supplemental Investigation was conducted on July 16 and 17, 2024. The scope of work for the 2024 Supplemental Investigation consisted of the advancement of eleven (11) soil borings (GP-5 through GP-15) to assess soil and groundwater conditions, installation of five (5) temporary wells in the borings (GP-5, GP-6, GP-7, GP-8, and GP-10) to facilitate groundwater sample collection, and installation of eight (8) temporary soil vapor points for soil vapor sample collection (SV-8 though SV-15). Two soil samples were collected from GP-6 for laboratory analysis and one soil sample was collected from each of the remaining boring for laboratory analysis of DRO, GRO, VOCs, PAHs, and RCRA metals (total of 12 soil samples). Additionally, the soil sample collected from GP-10 was also analyzed for PCBs. One groundwater sample was collected from borings GP-5 through GP-8 and GP-10 (total of five groundwater samples) for laboratory analysis of DRO, GRO and VOCs. Eight soil vapor samples were collected for laboratory analysis of VOCs.

Soil

In the interior block plant soil borings, Stantec generally encountered a layer of concrete at the surface underlain by fill consisting of a mix of brown to gray gravelly sand and dark brown silty sand to depths ranging from 2.5 to 5 feet bgs. The fill layer was underlain by a mix of sand and clay to the boring termination depths of 10 feet bgs. Analytical results revealed DRO impacts which exceed the unregulated fill criteria of 100 mg/kg in three of the four interior borings.

In the exterior soil borings, Stantec generally encountered a layer of concrete or gravelly sand at the surface underlain by fill consisting of a mix of silty and gravelly sand. Wood and plastic fragments were observed within the fill in boring GP-7 at 2 feet bg; however, analytical testing from the fill layer did not reveal impacts associated with debris. In borings GP-5 through GP-7, the fill layer was underlain by intermixing layers of native sand and clay to the boring termination depths of 25 feet bgs. In borings GP-12, GP-13, and GP-15, the fill layer was generally underlain by native clay or a mix of sand and clay to the boring termination depths of 10 feet bgs. An elevated vapor headspace reading of 46.4 ppm was measured within a layer of peat that was observed in boring GP-14 from 1 to 3 feet bgs. Due to the organics noted in the peat, a soil sample was collected from the interval and analyzed for DRO with silica gel cleanup. Analytical data did not reveal impacts within the peat layer; therefore, the elevated vapor headspace reading can be attributed to the organic material within the peat. The peat layer was underlain by native clay to the boring termination depth of 10 feet bgs. A faint petroleum odor was noted in boring GP-6 at 11 to 14 feet bgs; however, vapor headspace readings from this interval were observed to be less than 10 ppm and analytical results did not reveal impact.

DRO was detected in five of the 12 soil samples. The only DRO results above the MPCA's Beneficial Reuse threshold of 100 mg/kg was sample GP-8 (1-3') at a concentration of 1,010 mg/kg, GP-9 (1-3') at a

concentration of 706 mg/kg, and GP-10 (3-5') at a concentration of 160 mg/kg. GRO was only detected in two of the 12 soil samples and each of the results are below the MPCA's Beneficial Reuse threshold of 100 mg/kg. No metal concentrations exceeded their respective Screening SLVs or Residential SRVs. Various petroleum related VOCs were detected in samples GP-10 (3-5') and GP-14 (1-3'). No VOC concentrations exceeded their respective Screening SLVs or SRVs. PCBs were analyzed in sample GP-10 (3-5') owing to the apparent hydraulic fluid release. PCBs were not detected above laboratory reporting limits in the aforementioned soil sample. Six of the 12 samples had concentrations of PAHs above laboratory reporting limits, however, none of the detected concentrations exceed their respective Residential SRVs or Screening SLVs. Benzo(a)pyrene (BaP) equivalent concentrations were calculated to estimate the aggregated carcinogenic potential of PAHs relative to benzo(a)pyrene. Samples GP-6 (11-13'), GP-8 (1-3'), GP-9 (1-3'), GP-10 (3-5'), GP-11 (1-3'), and GP-14 (1-3') had calculated BaP Equivalent concentrations above zero, but below the Residential SRV of 2 mg/kg, Commercial/Industrial SRV of 23, and Screening SLV of 1.4 mg/kg.

Groundwater

The wells installed at boring locations GP-7, GP-8, and GP-10 were initially dry. Water levels were measured after drilling at borings GP-5 at 23.7 feet bgs and GP-6 at 17.7 feet bgs. All five wells were allowed to equilibrate overnight, and water level measurements were recorded again in the temporary wells installed at boring GP-7, GP-8, and GP-10 using an electronic water level meter. Groundwater was measured at 7.0 feet bgs at boring location GP-7, 2.5 feet bgs at boring location GP-8, and 5.2 feet bgs at boring location GP-10.

Groundwater analytical results from temporary wells indicate the presence of DRO at four of the five boring locations where temporary wells were installed and groundwater samples were collected. DRO was not detected above laboratory reporting limits in sample GP-8. Groundwater samples GP-5 and GP-6 indicate the presence of low levels of DRO below the MPCA's PRP action level of 1,000 ug/L. In sample GP-8, DRO was detected slightly above the action level PRP guidance at a concentration of 1,020 ug/L. However, VOCs and GRO were not detected above laboratory reporting limits in groundwater sample GP-8.

In sample GP-10, DRO was detected above the MPCA's PRP action level at an elevated concentration of 56,400 ug/L. Additionally, 1,2,4-trimethylbenzene was detected above the MDH HRL, and GRO was detected at a concentration of 311 ug/L, below the action level PRP guidance. Therefore, analytical results from GP-10 indicate a past release of hydraulic fluid.

Soil Vapor

The soil vapor samples were collected on the Site and analyzed for VOCs by EPA TO-15 during the MPCA's definition of the non-heating season (April 1 – October 31). The VOC 1,3-Butadiene was detected above its 33x Residential ISV of 9.3 µg/m3 at concentrations ranging from 11.7 µg/m3 to 58.4 µg/m3. However, based on widespread sources, some of which are anthropogenic and other possibly naturally occurring, the detections of 1,3-butadiene do not appear related to a release and vapor mitigation decisions should not be made solely on its presence in soil vapor.

Benzene was detected in soil vapor sample SV-10 above the 33x Residential ISV of 43 µg/m3 at a concentration of 60.1 µg/m3. Previous soil vapor investigations indicate a benzene concentration in exceedance of the 33x Industrial ISV of 370 µg/m3 in the northwest portion of the Site (soil vapor sample location SV-3) at a concentration of 1,100 µg/m3. Per the MPCA Best Management Practice, the benzene concentrations indicate the need for a vapor mitigation system to be installed under the new development buildings.

Conclusions

The purpose of the Supplemental Investigation was to assess the soil, groundwater, and soil gas conditions at proposed development specific features and also assess RECs identified in the recent Phase I ESA.

In summary, the prior Phase II ESA, LSI, and recent Supplemental Investigation identified soil and groundwater impacts within and around the existing block plant related to the past block manufacturing (hydraulic fluid release), maintenance (trench drains), the 1999 spill from a former AST, and fueling on the Site (northwestern corner). These impact areas coincide the with the proposed stormwater and detail garage improvements and would be interacted with during the redevelopment.

Although no significant soil or groundwater impacts were identified within the proposal apartment building, the former and recent soil gas testing has revealed two benzene and PCE concentrations that exceed their respective Residential 33X ISVs, indicating the need for active vapor mitigation under the proposed apartment to mitigate the vapor intrusion risk.

Owing to the findings of this Supplemental Investigation, the identified contamination was reported to the State Duty Officer on August 15, 2024 (Report No. 222438).

4.0 SITE RESPONSIBILITY

4.1 FUTURE PROPERTY OWNER AND PLANNED DEVELOPER

Park and 3rd Alexandria, LLC	
Contact	Tim Lundgren
Phone	612-804-3327
Address	408 6th Street, P.O. Box 208, Prinsburg, Minnesota 56281
Email	tim.lundgren@dunick.com

4.2 ARCHITECT

Cole Group Architects, LLC	
Contact	David Majchrzak
Phone	320-654-6570
Address	216 Park Avenue South Suite 102, St. Cloud, MN 56301
Email	david@colegrouparchitects.com

4.3 ENVIRONMENTAL CONSULTANT

Stantec Consulting Services Inc.	
Contact	Eric Stommes and Cory Anderson
Phone	612-709-7198 and 763 479-5185
Address	One Carlson Parkway, Suite 100, Plymouth, MN 55447
Email	Eric.stommes@stantec.com and cory.anderson2@stantec.com

4.4 REGULATORY AGENCY

Minnesota Pollution Control Agency	
Contact	TBD
Phone	TBD
Address	520 Lafayette Road St. Paul, Minnesota 55155
Email	TBD

5.0 RESPONSE ACTION OBJECTIVES

The threshold objectives of the proposed Response Actions are to provide protection of public health, welfare and the environment through remediation of the soil beneath the Site, and satisfaction of the development design criteria for the planned commercial/industrial use development. The proposed RAs call for excavation, treatment, profiling and off-site disposal of impacted media with contaminant impacts exceeding the MPCA Residential Soil Reference Values (SRVs) or Screening Soil Leaching Values (SLVs). Areas of previously identified impacts and anticipated Response Actions are shown on **Figure 4.**

6.0 CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) was developed for the Site for use as the basis for identifying and evaluating potential contaminant sources, transport mechanisms for contaminant migration through the environment, as well as evaluation of risk to receptors. The CSM includes all known sources, release and transport pathways, and potential exposure media. The components of the CSM include:

- Geology and Hydrogeology
- Contaminants of Concern
- Suspected Source Areas
- Exposure Pathways

6.1 PHYSICAL SETTING

6.1.1 Topography

The Site is at an approximate elevation of 1,430 feet above mean sea level (msl). Based on topography, stormwater on the Site flows municipal stormwater sewer systems associated with Park Street, 4th Avenue East, and Oak Street. Historical development may have included grading or filling of the Site to improve the location for construction and drainage.

6.1.2 Geology

Published references describe the surficial geology at the Site as Villard Member consisting of pebbly sandy loam diamicton (Lusardi, 2019). Previous environmental investigations at the Site, discussed in **Section 3**, identified fill material to depths of approximately 2.5 to 6 feet bgs underlain by native sandy clay, clay, silty clay, and clayey sand. Debris consisting of brick fragments, wood chips, asphalt, and rubber were noted in fill soils observed in four boring locations completed during previous investigations.

Shallow bedrock on the Site consists of schist and tonalitic to granodioritic paragneiss that is typically adjacent to large batholithic complexes (Jirsa, 2011). Depth to bedrock is anticipated to be approximately 300 feet below ground surface (bgs) (Olsen and Mossler, 1982).

6.1.3 Hydrogeology

The shallow water table is often a subdued expression of surface topography. Shallow groundwater generally flows from areas of groundwater recharge, such as hills and broad uplands, to areas of groundwater discharge, such as wetlands, rivers, and lakes. The general direction of regional groundwater flow in the area of the Site is presumed to be to northwest toward Lake Agnes. Local conditions may vary due to surface water features, perched groundwater conditions or artificially created drainage systems. The 2020 Phase II ESA encountered groundwater between 13.3 and 25.4 feet bgs and

the 2024 Supplemental Investigation identified groundwater at 23.7 feet bgs in GP-5, 17.7 feet bgs in GP-6, at 7 feet bgs in GP-7, at 2.5 feet bgs in GP-8, and at 5.2 feet bgs in GP-10.

6.2 CONTAMINANTS OF CONCERN AND POTENTIAL PATHWAYS OF CONCERN

6.2.1 Soil

Based on previous environmental assessments, the following are considered Chemicals of Concern (COCs) for the proposed development soil handling and management activities at the Site:

- Diesel Range Organics (DRO)
- Gasoline Range Organics (GRO)
- Petroleum related Volatile Organic Compound (VOC)

In addition, Stantec has identified anthropogenic materials and evidence of petroleum impacts through visual and olfactory screening of soils. These items are also considered items of concern that will need to be managed for the proposed development:

- Debris such as brick fragments, wood chips, asphalt, and rubber
- Petroleum staining and odors

A summary of previously detected contaminants of concern, including laboratory data results, field observations, locations and depths of contaminants are included on **Figure 4**. In general, DRO impacts were identified in shallow soils located in the western portion of the Site, with staining, petroleum odors, and elevated PIDs identified in some deeper soils at GP-10. Additionally, GRO and petroleum related VOCs impacts were identified in shallow soils in boring GP-4 located in the northwestern portion of the Site.

Fill with debris was identified in shallow soils at several boring locations. In boring GP-1, located in the southwestern portion of the Site, fill with asphalt and rubber was noted to approximately 5 feet bgs. In boring GP-2, located in the west/central portion of the Site, fill with some brick fragments was noted to approximately 5 feet bgs. In boring GP-3, located in the northwestern portion of the Site, fill containing some brick fragments was noted to approximately 2.5 feet bgs, and in GP-7, located in the southeastern portion of the Site, fill containing minor amounts of wood and plastic was noted to approximately 3 feet bgs. The above suggest that fill soils containing debris is present in generally small and localized areas at the Site

6.2.1.1 Soil Exposure Pathway

During construction activities, one exposure scenario includes workers coming in contact with contaminated soil. A Site Health and Safety Plan should be completed and kept on Site to alert those coming in contact with Site soil that proper Personal Protection Equipment (PPE) should be worn at all

times. Upon completion of the redevelopment under the MPCA approved Response Action Plan, the human-soil exposure pathway will be eliminated for the end-users of the Site with clean soil buffers in-place. The exposure risk to adjacent receptors including surface water, wetlands and other ecological receptors is low.

6.2.1.2 Soil to Groundwater Leaching Pathway

Removal of the affected media in proposed redevelopment areas will alleviate the potential risks via the soil leaching pathway. A stormwater management system is proposed in the southwest quadrant of the Site. The proposed stormwater management system consists of a lined stormwater retention pond to prevent further leaching of contaminants into groundwater via stormwater infiltration. Impacts to soil and groundwater have been identified in the area of the proposed stormwater retention pond that will require management off-site at a MPCA-permitted landfill.

6.2.2 Groundwater

Based on previous environmental assessments, the following are considered COCs for potential development dewatering activities at the Site:

- Diesel Range Organics (DRO)
- Gasoline Range Organics (GRO)
- Petroleum related VOCs

A summary of previously detected contaminants of concern in groundwater are depicted on **Figure 5**. In general, the impacts to groundwater are located in the western portion of the Site in close proximity in and around the existing block building and former AST fueling area. DRO was detected above the MPCA PRP guidance value in groundwater collected from boring GP-8 located on the western portion of the Site. DRO was detected above the MPCA PRP guidance value in groundwater collected from boring GP-10 located on the western portion of the Site near the center of the proposed stormwater management feature. The VOC, 1,2,4-trimethylbenzene was also detected above the MPCA HRL in the groundwater sample collected from boring GP-10. The groundwater plume may extend to other areas not investigated on the Site.

6.2.2.1 Groundwater Pathway

Previous investigations have identified shallow groundwater at depths between 2.5 feet bgs and 25.4 feet bgs and groundwater on the Site appears sporadic and discontinuous. Based on the current grading and excavation plans, it is anticipated that perched groundwater will be encountered during stormwater retention pond construction and that temporary dewatering will be necessary. Results from the 2024 Supplemental Investigation indicate that shallow perched groundwater in the vicinity of the proposed stormwater retention pond has elevated petroleum related impacts (boring GP-10). Owing to the level of petroleum impact in the perched water, pretreatment of the water will be necessary prior to discharge to the municipal sanitary sewer. In addition, the proposed stormwater retention pond will require lining to prevent leaching of contaminants into groundwater.

The proposed new development will include connection to municipal water services. No private wells have been identified on the Site by the Minnesota Well Index; however, during the recent Phase I ESA walkover, a potential water well head was observed in the southern portion of the block building. This potential well will be further assessed and sealed if present.

6.2.3 Soil Vapor

Previous investigations have identified elevated concentrations of VOCs in Site soil vapor. A summary of previously detected contaminants of concern in soil vapor are depicted on **Figure 6**. The soil vapor sample(s) contained petroleum-related and non-petroleum VOCs at concentrations above 33x the MPCA Residential ISVs. In the proposed residential apartment building footprint, benzene was detected above 33X the MPCA Residential ISV in one sample. Soil vapor samples located outside of the proposed residential apartment building footprint identified benzene above 33X the MPCA Residential ISV at two sample locations, benzene above 33x the MPCA Residential EISV in one sample, and PCE above 33x the MPCA Residential ISV in three samples. Therefore, soil vapor is considered a Site exposure pathway.

6.2.3.1 Soil Vapor Pathway

To mitigate the vapor intrusion pathway, an active sub-slab depressurization system (SSDS) will be installed beneath the proposed multi-family residential apartment building at the Site. The SSDS, through sustained negative pressure, will provide a protective mechanical barrier/extraction system to prevent vapor migration through the building's slab floor.

6.3 SUSPECTED SOURCE AREA EVALUATIONS

The evaluation of potential source areas took into consideration current and historical land use, building layout, building constraints, historical Site use documentation, adjacent property historical use documentation and recent investigation data. The following suspected source areas were considered in this CSM; the former use of the Site as a concrete ready-mix and concrete block plant facility (hydraulic fluid release), maintenance (trench drains), the 1999 spill from a former AST, fueling on the Site (northwest corner), and general historical grading and filling activities.

7.0 DEVELOPMENT PROJECT DESCRIPTION

The proposed development will include the following activities:

- Demolition and removal of all the existing structures;
- Construction of a new three-story multi-family residential apartment building with at-grade tuck under garages;
- Construction of a single-story detached parking garage;
- Construction of outdoor pet areas and a pickleball court;
- Installation of paved surface parking and drive areas, surrounding green space, outdoor patios/plazas, and associated utilities; and
- Construction of a stormwater management system (retention pond) in the southwest corner of the Site.
- Removal of pavement/buildings from the 412 and 401-407 Oak Street parcels; installation of topsoil followed by reseeding.

The proposed multi-family residential apartment building will have an approximate footprint of 28,700 square feet. The proposed redevelopment is scheduled to begin in Summer 2025. See **Appendix A** for details.

8.0 PROPOSED RESPONSE ACTIONS

This RAP presents the procedures for implementing necessary Response Actions with respect to the previously identified impacts during preparation of the Site for redevelopment. After MPCA approval of the RAP/CCP, the Response Actions will consist of the following activities:

1. Demolish the existing structures after special wastes have been properly removed/disposed. **Note that demolition of the central portion of the block building is requested as a MPCA approved response action to allow access to the elevated contamination near boring GP-10 (former hydraulic fluid release).** Following removal of the existing buildings and floor slabs, Stantec will observe the exposed soil for field indications of a release (e.g., staining, odors and debris) and other sub-grade structures and/or piping, particularly below the existing building.
2. Assist the contractor with completing a special waste profile for landfill disposal of the concrete slabs, building foundations, and impacted fill materials excavated during redevelopment.
3. Excavation, monitoring, and management of soil generated by Site development grading activities and import of unregulated fill to accommodate clean soil buffers.
4. Off-site management (i.e., landfill disposal) of block plant mixing products that can not be reuse on-Site (e.g., fly ash and slag).
5. Construction of a stormwater retention pond with an impervious liner to prevent stormwater from infiltrating through residual contaminated soil.
6. Pretreatment of impacted perched water in the area of proposed retention pond (boring GP-10) prior to temporary dewatering to the municipal sanitary sewer.
7. Documentation of, through limited sidewall and excavation bottom sampling, soil conditions of soil exhibiting evidence of impacts that is targeted to be left in place below the readily accessible zone or in areas deemed inaccessible due to construction of Site improvements.
8. Install a Sub-Slab Depressurization System (SSDS) under the floor slab of the new building in accordance with the MPCA's Best Management Practices for Vapor Investigation and Building Mitigation Decisions, April 2020. Additional details of the SSDS are included in **Section 8.9**.

The proposed Response Actions relative to soil impacts are described in detail below and include proposed monitoring, handling, management, and disposal of impacted soils displaced at the Site.

8.1 GENERAL SOIL MANAGEMENT GUIDELINES

Based on previous environmental investigations, the following are considered COCs for the proposed development soil handling and management activities at the Site: DRO, GRO, petroleum related VOCs, and debris such as brick, wood, rubber and asphalt.

8.1.1 Standard Methodology for Soil Management

Stantec proposes the following soil management procedures for the Site:

- *Clean Fill or Unregulated Fill Soils* - Soils deemed to be suitable for unrestricted reuse shall exhibit analytical testing results below the MPCA Residential SRVs and MPCA SLVs, DRO and/or GRO less than 100 mg/kg, headspace PID results using a 10.6 eV PID calibrated to an isobutylene equivalent field screening below 10 parts per million (ppm), and be free from solid waste, debris, asbestos-containing material, visual staining and chemical odors. This soil can be beneficially reused as backfill on the Site or within the accessible zone, defined as the upper four feet of soils in greenspace/patio areas or the upper two feet below buildings and paved areas, as geotechnically appropriate.

- *Regulated Fill for off-Site Disposal* – Soils encountered and excavated during development exceeding the MPCA Industrial SRVs and/or MPCA SLVs, DRO/GRO above 100 mg/kg and/or PID field screening readings over 10 ppm will be classified as Regulated Fill. Regulated Fill will be disposed of at an approved landfill and not re-used on or off Site. Prior to shipment to the landfill, a Special Waste Profile will be prepared and submitted to the landfill for approval of disposal of impacted soils and soils that contain debris and petroleum that will be encountered as part of excavation for the building, footings, utilities or other Site features.

Characterization of unregulated or regulated fill, as well as disposition of unregulated fill exported from the Site, will be completed in accordance with the MPCA guidance document “Best Management Practices for the Off-Site Reuse of Unregulated Fill,” included in this document as **Appendix C**.

8.2 ANTICIPATED SITE SOIL CHARACTERISTICS

A summary of previously detected contaminants of concern, including laboratory data results, field observations, locations and depths of contaminants are included on **Figure 4**. In general, DRO impacts were identified in shallow soils located in the western portion of the Site, with staining, petroleum odors, and elevated PIDs identified in some deeper soils in GP-10. Additionally, GRO and petroleum related VOCs impacts were identified in shallow soils in boring GP-4 located in the northwestern portion of the Site near the AST fueling area.

Fill with debris was identified in shallow soils at several boring locations. In boring GP-1, located in the southwestern portion of the Site, fill with asphalt and rubber was noted to approximately 5 feet bgs. In boring GP-2, located in the west/central portion of the Site, fill with some brick fragments was noted to approximately 5 feet bgs. In boring GP-3, located in the northwestern portion of the Site, fill containing some brick fragments was noted to approximately 2.5 feet bgs, and in GP-7, located in the southeastern portion of the Site, fill containing minor amounts of wood and plastic was noted to approximately 3 feet bgs. The above suggest that fill soils containing debris is present in generally small and localized areas at the Site

8.3 RESPONSE ACTION DEVELOPMENT UNITS

Response Actions will be implemented where certain field screening criteria are exceeded. Screening criteria will vary depending on the relationship between field observation, laboratory analysis, and the physical proximity of the proposed development's features, as described below. It is anticipated that a Field Technician (FT) will be onsite during excavation activities that have the potential to encounter contaminated media.

8.3.1 Proposed Building Footprint Area

Within the building footprint, a 2-foot soil buffer consisting of MPCA-defined unregulated fill will be established and/or confirmed with data. Data to date does not indicate shallow soil impacts within the proposed building footprint. Soils below the established clean soil buffer can be left in place unless it is deemed geotechnically unsuitable for building development.

8.3.2 Proposed Surface Parking, Plaza, Sidewalks and Drive Areas

Within the surface parking areas, plaza, sidewalks, and drive areas, a 2-foot clean soil buffer consisting of MPCA-defined unregulated fill will be established and/or confirmed with data. Soils will be excavated from these areas based on geotechnical recommendations to prepare the subsurface for pavement and to establish a 2-foot clean soil buffer if the soils currently present in the upper 2 feet do not meet MPCA reuse criteria.

8.3.3 Utility Corridors

Utility corridors will be screened to ensure no areas of residual impacts exceed 10 ppm via field screening with a PID to ensure protection of the proposed Site improvements. Screening will be conducted at a minimum of every 20 feet along the corridor, or every 5 lineal feet in areas where impacts are detected. If PID readings greater than 10 ppm are encountered, the impacted, excavated material will be removed and disposed of off-Site at an approved landfill. A vapor barrier 10-mil or greater in thickness will be installed within the utility trench in locations where PID readings greater than 10 ppm remain in the trench base or sidewalls and burrito wrapped around the backfill and utility. The utility trenches will not be backfilled with impacted soils with PID readings above 10 ppm.

8.3.4 Green Space

Within greenspace areas, a 4-foot soil buffer consisting of MPCA-defined unregulated fill will be established or confirmed with data. Soils below the established clean soil buffer can be left in place unless it is deemed geotechnically unsuitable for development.

8.3.5 Proposed Stormwater Management Area

Within the area of the proposed stormwater management feature (retention pond), previous environmental investigations encountered DRO impacts to shallow soils. Petroleum staining, odors, and

elevated PID readings were also noted in some deeper soils in GP-10 located near the center of the proposed stormwater management system.

DRO was detected above the MPCA PRP guidance value in groundwater collected from GP-8 located on the western portion of the Site. Elevated DRO was detected above the MPCA PRP guidance value in groundwater collected from GP-10 located on the western portion of the Site near the center of the proposed stormwater management feature. The VOC 1,2,4-trimethylbenzene was also detected above the MPCA HRL in the groundwater sample collected from GP-10.

A stormwater retention pond is proposed to manage stormwater for the proposed development. The stormwater retention pond will require an impervious liner consisting of 30 mil PVC, 60 mil High Density Polyethylene (HDPE), or Ethylene Propylene Diene Monomer (EPDM) to prevent infiltration of stormwater from the pond. Construction related dewatering is anticipated based on the shallow depth of groundwater in the vicinity of the proposed stormwater retention pond. Due to the elevated petroleum impacts to the perched water, pretreatment of the impacted perched water will be necessary prior to discharging to the municipal sanitary sewer.

A 1-foot soil buffer consisting of MPCA-defined unregulated fill will be established beneath the liner/base of the stormwater management feature. Soils below the established clean soil buffer will be left in place unless there is evidence of previously unknown impact. All soil removed for the construction of the stormwater management feature should be characterized and handled according to **Section 8.1.1**. It is assumed that most of the soil removed from this area of the Site will be characterized as *Regulated for off-Site Disposal.*

8.4 SOIL SAMPLING AND ANALYTICAL TESTING

Soil sampling and analytical testing will be performed as necessary during RAP implementation. The primary types of sampling and analytical testing include:

- Sampling of excavated contaminated materials for disposal facility characterization (if required).
- Sampling of imported materials required to backfill foundations and utility trenches (if required).
- Field screening of soil within the limits of excavation of any potentially impacted media left in place.
- Confirmation soil sampling of impacts left in place within the final excavation, in accordance with MPCA Brownfield Program Response Action Plans Guidance Document c-rem4-43 (April 2024), and **Section 8.6.1**.

It is expected that the laboratory analysis data for soil from the previous Site investigations will be adequate to obtain disposal facility approvals for the project. If required by the selected disposal facility, additional sampling and analytical testing will be completed as required. The parameters of the sampling will be determined by the disposal facility.

8.5 FIELD SCREENING AND SAMPLING OF CONTAMINATED SOIL

The following presents a general overview of the collection of soil samples for field screening and analytical testing. Field screening and soil sampling activities associated with petroleum-related impacts will follow the procedures outlined in the MPCA Guidance Documents.

8.5.1 Headspace Screening Procedure

Field screening will be conducted using soil headspace methodology. The following equipment will be used to conduct headspace organic vapor screening: PID, clean, pint-sized polyethylene bag baggies, logbook or record sheet, and approved personal protective equipment.

Headspace screening will be performed using PID instrumentation. PIDs will be equipped with a 10.6 eV lamp source. The PID calibration will be performed on Site at least daily to a 100 part per million isobutylene equivalent. Stantec will follow the manufacturer's instructions for operation, maintenance and calibration of the instrument. Stantec will keep calibration records in the field book.

Stantec will collect samples from excavation walls, soil piles, or backhoe buckets from freshly exposed surfaces. Soil samples will be obtained at a rate of approximately one sample per 20 cubic yards of soil. For consistency, only static headspace analysis for field screening of soil samples is to be used. Static headspace analysis must be performed using the following method:

- Using a stainless-steel spoon or gloved hand, half-fill a new polyethylene bag with sample (the volume ratio of soil to air is equal) then immediately seal it. Manually break up the soil clumps within the bag.
- Allow headspace development for at least 15 minutes at approximate room temperature. Vigorously shake bags for 15 seconds at the beginning and end of the headspace development period. When temperatures are below the operating range of the instrument, perform headspace development and analysis in a heated vehicle or building. Keep the sample in a shaded area out of direct sunlight. Record the ambient temperature during headspace screening. Complete headspace analysis within approximately 20 minutes of sample collection.
- After headspace development, introduce the instrument sampling probe through a small opening in the bag to a point about one-half of the headspace depth. Keep the probe free of water droplets and soil particles.
- Record the highest meter response on a sampling form. Maximum response usually occurs within about two seconds. Erratic meter response may occur if high organic vapor concentrations or moisture is present. Note any erratic headspace data in the field book.

8.5.2 Soil Segregation and Sampling

Soil exhibiting evidence of a-typical contamination, as identified in **Section 6.2.1** above, will be segregated and stockpiled based on the waste characteristic or type. The FT will coordinate with the Construction Contractor to determine and secure a staging area for placement of contaminated soil. The

contractor will prepare the area by placing a 10-mil plastic on the ground and constructing a 1-foot high soil berm around the perimeter. The plastic will extend beyond the perimeter berm to prevent runoff from and run-on to the staging area. At the end of the day, and prior to leaving the site, the stockpile(s) will be covered with 10-mil plastic sheeting and properly secured. The cover will extend beyond the perimeter soil berm and will be maintained as necessary.

8.6 GENERAL SOIL SAMPLING PROCEDURES

Prior to collecting soil samples, each sample container label will be completed in the field using a waterproof permanent marker. Labels will include the following information:

- Site name
- Sample identification code
- Project number
- Date/time
- Sampler's initials
- Preservation added (if any)
- Analysis to be performed

To minimize the possibility of cross-contamination a new pair of disposable (i.e., nitrile or latex) gloves will be used for each sample collected. When using a sampling tool (i.e., spade or coring device), wash the tool with a detergent solution (e.g. Liquinox®, Alconox®, or equivalent), rinse it and then dry it before each use.

Samples collected for laboratory analyses will be immediately placed in their appropriate lab-provided containers (with preservatives if applicable), placed on ice and shipped to the laboratory for analysis. When sampling excavation stockpiles, sidewalls or floors, the FT will remove at least one foot of exposed soil prior to collecting the sample to ensure the collection of a fresh sample. Samples previously used for soil screening or soil classification for analytical samples will not be used for laboratory analysis.

8.6.1 Confirmation Sampling

Upon completion of any subsurface construction activities within an area of previously identified contaminated soil or exhibiting evidence of waste or contaminated soil that will remain in place, confirmation samples will be collected to characterize materials left in place. The confirmation samples will be analyzed for DRO, GRO, and VOCs based on previous investigation data and any other parameters deemed necessary by FT observations.

Typical Excavation Minimum Confirmation Sampling Rates

Area of Floor (sq ft)	Number of Floor Samples	Area of Sidewall (sq ft)	Number of Sidewall Samples
<500	2	<500	4
50-<1,000	3	500-<1,000	5
1,001-<1,500	4	1,001-<1,500	6
1,501-<2,500	5	1,501-<2,000	7
2,501-<4,000	6	2,001-<3,000	8
4,001-<6,000	7	3,001-<4,000	9
6,001-<8,500	8	>4,000	1 per 45 lineal feet
8,501-<10,890 (0.25 acres)	9	--	--
0.25 acres - 3.0 acres	15 to 30-foot grid	--	--
>3.0 acres	30-foot grid	--	--

Stantec proposes to collect confirmation soil samples only from source areas where contaminated soils are removed or managed in place below referenced clean soil buffers. Additional samples will be collected from greenspace areas that are lacking analytical confirmation of unregulated fill. The confirmation samples would be collected in general accordance with the table above.

No sidewall sampling is planned unless the excavation depth exceeds 5 feet. If the excavation extends beyond the Site boundary, no confirmation samples outside the Site boundaries are proposed.

It should be noted that only the material required to be handled as part of the construction activities will be removed from the excavation. Excavation sampling will be conducted merely to document what material was left in place and not to document successful removal of all impacted material.

All floor and sidewall confirmation sample locations will be documented and may be quickly surveyed using a hand-held GPS device.

8.6.2 Typical Laboratory Methodologies

Typical Laboratory Methodologies

Analyte	Method	Sample Container	Sample Volume	Field Preservation	Hold Time
Metals	Method 6010 or 6020/7471	4 oz. glass	150 grams	None	180 days
TCLP Metals	Method 6010 or 6020/7471	4 oz. glass	250 grams	None	180 days
PCBs	Method 8082	4 oz. glass	250 grams	None	14 days
PAHs/SVOCs	Method 8270 by SIM	4 oz. glass	250 grams	None	14 days
DRO	WI DRO	4 oz amber glass	25-35 grams	None (lab preserved w/methylene chloride)	14 days

Analyte	Method	Sample Container	Sample Volume	Field Preservation	Hold Time
GRO	8015	40 ml glass vial	10 grams	Methanol	14 days
VOCs	Method 8260B	40 ml glass vial	10 grams	Methanol	14 days

If through consultation with the MPCA it is determined samples not included in the above list are required for disposal or confirmation purposes laboratory, methodologies will be forwarded to the MPCA at that time.

8.7 GENERAL FIELD DOCUMENTATION PROCEDURES

General field documentation procedures include:

- The FT will maintain a daily field log which will contain the following information: date, time, temperature, wind direction, name of personnel on Site (contractors, regulatory officials, etc.) status of project and monitoring results from the Contractor and Stantec.
- Photo-documentation of the field work.
- The FT will maintain all disposal documentation generated during the field activities.
- Organization and proper handling of any other necessary documentation generated during the field activities.

8.8 FILL IMPORTING

If clean fill will be imported to the Site, additional information regarding the fill source will be obtained to determine appropriate sampling and testing requirements. If the imported soil consists of native material from a previously undeveloped property or a gravel pit, then no soil samples will be collected for laboratory analysis. Soil samples will be collected for laboratory analysis if multiple import sources are used, or if a potential source is from a previously developed property. The soil samples will be analyzed by a laboratory for DRO, VOCs, PAHs, and RCRA metals, at a minimum. Other parameters may be added based history of the fill source, visual evaluation or other factors. The imported soil will be considered suitable for use on the Site if the results meet MPCA unregulated fill criteria for all parameters.

8.9 VAPOR MITIGATION

Design, construction and operation an active sub-slab vapor mitigation system will occur beneath the multi-family residential apartment building proposed in the northeastern quadrant of the Site in response to elevated benzene and PCE concentrations exceeding 33x the MPCA Residential ISV in soil vapor inside and outside the proposed residential building footprint. No vapor mitigation is proposed for the detached garage because it will not be heated and will only be intermittently occupied.

The vapor mitigation system for the multi-family residential apartment building will consist of an active sub-slab depressurization system (SSDS) that will be installed beneath the concrete slab floor of the building. The lateral depressurization/collection pipes will be connected to a roof top blower capable of achieving -5 Pascal's (Pa) of negative air pressure beneath the slab floor under summer conditions and -

3 Pa of negative pressure under winter conditions, and discharging the vapors above the building's roofline.

8.9.1 Sub-Slab Depressurization System

From a conceptual standpoint, the SSD system will consist of appropriately sized fans connected to lateral depressurization piping installed beneath the floor slab for the purpose of achieving a negative pressure field beneath the building footprints. The installation and continuous operation of the SSD system is anticipated to create negative pressure beneath the structure footprint of at least -3 Pascals (Pa) during the winter season or -5 Pascals during the summer season. The SSD system will vent sub-surface soil vapor to the exterior of the building and prevent vapors from entering the structure.

The proposed sub-slab system incorporates a network of 4-inch perforated PVC piping placed underneath building floor slab. The piping will connect to manifolded 4-inch solid pipe riser(s) that will be connected to the roof fans. The exhaust stack will be a minimum of two feet above the roof line and a minimum of 10-feet from any building opening, including air intakes.

The perforated PVC depressurization piping will be bedded in coarse aggregate trenches to allow air movement between the depressurization pipes. Soil outside the aggregate trenches will consist of a clean washed sand, as geotechnically suitable. No specialized vapor barrier as part of the SSD system is required beneath the floor slab, unless required as part of the construction documents. A specialized vapor barrier (e.g., 15 mil Stego® or Vaporblock®) may be installed and would be viewed as a building enhancement.

The SSD system, through sustained negative pressure, provides a protective mechanical barrier/extraction system to prevent sub-slab vapor migration upwards through the building's slab floor.

As the foundation system is finalized, a sub-slab depressurization system will be finalized and provided to the MPCA for review.

8.9.2 Post Construction Sub-Slab Monitoring and Vapor Sampling

Post-mitigation analytical testing will be conducted between one week and 30 days after system startup to ensure effective operation of the active SSD systems. After construction is completed, it is anticipated that active SSD systems will remain in operation. If the post mitigation confirmation sampling is completed during the heating season, a second round is not proposed. The following details the sampling.

- Install five sub-slab vapor pins within the approximate 28,700 SF building and collect vapor samples from each of them. The pins will be installed per manufacturer recommendations. The vapor pin locations will be selected based upon the location of at-grade residential units. The laboratory-provided Summa cans will have a flow controller capable of 200 ml/minute and will be individually certified. To collect the vapor samples, a shut-in test will be completed. Following sampling, organic vapors will be measured by attaching a photoionization detector (PID) to the sample tubing and recording the highest reading. These sub-slab vapor samples will be analyzed for VOCs using EPA Method TO-15.

- Collect 5 paired indoor air samples in locations near the vapor pins installed in the building. These indoor samples will be collected using a 24-hour time-weighted flow controller and Summa canister placed in the breathing zone (i.e., 3 to 5 feet above the floor). After 24 hours, the Summa canister will be closed and delivered to the laboratory for analysis of VOCs using EPA Method TO-15. The laboratory Summa can will be individually certified.
- Collect one outdoor air sample to document background air contaminants. This outdoor sample will be collected using a 24-hour time-weighted flow controller and Summa canister placed in the breathing zone (i.e., 3 to 5 feet above grade). After 24 hours, the Summa canister will be closed and delivered to the laboratory for analysis of VOCs using EPA Method TO-15. This Summa can will be individually certified.

The vapor pins and additional semi-permanent PFE points, as necessary, will be tested for pressure differential to document sub slab influence.

8.10 WATER PRETREATMENT/DEWATERING

As noted in **Section 8.3.5**, in boring GP-10, located within the proposed stormwater pond, elevated concentrations of the DRO and PVOCs were detected in perched water sample likely from the referenced hydraulic fluid release (56.4 mg/L). DRO concentrations at that level commonly require pre-treatment prior to discharge to the municipal sanitary sewer. Stantec and Park and 3rd Alexandria, LLC plans to seek approval from the City of Alexandria to temporarily discharge to the municipal sanitary sewer. Part of that approval will include pre-treatment of the water prior to discharge. Pretreatment will include utilizing sequenced bag filters and activated carbon vessels on movable skids to treat the contaminated water to levels established by the City of Alexandria. Further details of the pending discharge permitting, and treatment will be provided to the MPCA upon request.

9.0 CONSTRUCTION CONTINGENCY PLAN

9.1 GENERAL

This RAP/CCP has been prepared to address the handling of contaminated soil, ACM and unanticipated wastes encountered during the implementation of the proposed development activities. A list of potential waste types is discussed in greater detail below. If encountered, these materials must be managed in a matter consistent with statutes, rules, regulations and guidance from applicable federal, state and local agencies governing the excavation, management, sampling, storage, transportation and disposal of this material.

In the event that any unanticipated waste or contaminated soil is encountered, Stantec will conduct a hazard assessment/evaluation to determine health and safety requirements (i.e., assessment of monitoring activities, personal protective equipment [PPE] requirements, etc.). If necessary, upon completion of the field assessment the Site Health and Safety Plan (SHSP) will be modified within 24-hours. Safety requirements will then be communicated to all contractors involved in handling the unanticipated waste or contaminated soils.

9.2 SITE CONTROL

During Site earthwork activities, Stantec will have an FT on Site to oversee the handling and management of excavated soil. If, during these activities, contaminated media is encountered the FT will provide on-Site hazard evaluation of the encountered wastes or contaminated soil and coordinate communication of any findings, recommended actions, or change in status with the parties listed in **Section 4**. While on Site, the FT will maintain all appropriate documentation concerning the project (i.e., chain-of-custody documentation, lab testing results, disposal manifests, etc.) The FT shall have, at a minimum, a 40-Hour Hazardous Site Worker Operator (HAZWOPER) Certification including any and all 8-hour refreshers.

If previously undocumented wastes or contaminated soil is encountered during redevelopment activities, an exclusion zone will be designated on Site around the area of concern. The zone will be physically delineated by the FT with flagging, caution tape, or fencing, as appropriate.

The FT will direct the construction contractor to provide appropriate personnel or subcontractors to perform work within the exclusion zone. All personnel allowed entry into the exclusion zone shall be properly trained and certified. Prior to conducting the work, the contractor will be required to provide copies of personnel 40-Hour HAZWOPER certifications as well as a copy of the contractor's Health and Safety Plan. Only personnel who have proof of up-to-date certification (i.e., HAZWOPER) will be allowed to enter the exclusion zone.

Public access to the Site will be restricted, and any compromised perimeter fencing that may allow unauthorized access will be promptly repaired. In the event that an exclusion zone is needed, the FT will direct further response actions in conjunction with MPCA guidelines.

9.3 RECOGNITION OF POTENTIAL WASTE AND/OR CONTAMINATED SOILS

The following occurrences may be signs that hazardous materials have been encountered at the Site during the subsurface activities:

- Strong or unusual chemical odors of solvents, petroleum, etc. from the excavation.
- Encountering suspected industrial waste such as tars, sludge's, semi-solids, powders, resins, or liquids in the excavation.
- Encountering suspected ACM material.
- Discolored soils in or from the excavation.
- Drums and/or containers (labeled or unlabeled), buried metal objects such as cans, jars, or tanks in the excavation.
- Persons who suddenly become ill.

If any of the above occurs indicating that a hazardous substance may have been encountered, activities will be suspended pending further evaluation. As mentioned above, the FT will assess the situation in consultation with the Project Manager using the available field instrumentation, personal protective equipment, and his/her own knowledge and experience to determine the nature of the material and whether it should be segregated for special handling. The FT will then ensure that Site personnel follow the instructions provided.

9.4 SITE HAZARD EVALUATION ACTIVITIES

9.4.1 Chemical Vapor Hazards

Based on investigation findings, it is unlikely that concentrations of chemical vapors will be generated during invasive earthwork activities at the Site. Should the FT discover evidence of a potential vapor hazard, Site activities will be temporarily discontinued. The area in question will be secured and evaluated. Work will continue only after the hazard has been thoroughly evaluated and mitigation and air monitoring plans have been generated.

9.4.2 Particulate Hazards

Particulate matter may be made airborne during excavation activities. Inhalation is the most rapid route of exposure to the body by immediately introducing substances to the respiratory tissue and bloodstream. Health hazards to on-Site workers could also exist from ingestion and through dermal contact with compounds. Ingestion of substances should be virtually eliminated by forbidding eating, drinking, smoking, and any other hand-to-mouth activities on Site. Hands and face should be washed after leaving the Site and prior to any eating, drinking or smoking. Dermal contact will be minimized by hand washing, wearing proper protective clothing, and by using gloves during sampling activities.

9.5 WASTE EVALUATION

In general, excavated, graded and/or augured soils from within the Project area will be continuously inspected for the presence of:

- Suspect Asbestos-Containing Materials (ACM)
- Free product (chemical Dense Non-Aqueous Phase Liquid [DNAPL], oil residues, sludge, etc.)
- Underground Storage Tanks (USTs)
- Barreled wastes
- Electrical transformers
- Creosote timbers
- Car batteries
- Oil filters
- Waste tires
- Ash or clinkers
- Stained soils and/or soils exhibiting strong or unusual odors

If the above items are identified during development, the material will be segregated based on waste type. Additional discussion on segregation and screening procedures is discussed below.

9.5.1 Suspect Asbestos Containing Materials

If asbestos-containing materials (ACM) or asbestos-containing waste materials (ACWM) are observed work will be discontinued and an appropriately certified inspector will be sent to the Site to sample the material. If ACM or ACWM is identified, a licensed asbestos removal contractor will be hired to remove the material from the Site. All work including but not limited to; notification, air monitoring, waste handling and disposal will be conducted per 40 CFR Part 61, Subpart M.

9.5.2 Free Product

If free-product is encountered, work will cease until appropriate collection measures can be assembled on the site and the MPCA representative notified. Stantec, in consultation with the MPCA, will determine appropriate handling, testing and disposal requirements.

9.5.3 Underground Storage Tanks

If unknown or undocumented underground storage tanks (USTs) are encountered, following determination of whether any product remains, an MPCA-certified UST contractor will remove the tanks.

Residual products will be removed from the tank(s) and transported off-site for proper disposal. The tank(s), if of iron construction, will be hauled to a scrap facility to be recycled. Soil surrounding the UST will be monitored for possible impacts and sampled for chemical analysis in accordance with the MPCA Petroleum Remediation Program Guidance Document #3-01.

9.5.4 Barreled Wastes

DOT approved over-pack drums will be used to contain buried barreled wastes if they are discovered. Stantec, in consultation with the MPCA, will determine appropriate testing requirements for disposal purposes. After approval from the MPCA, testing of the materials will be conducted for disposal purposes. Stantec will retain appropriate documentation for future reference. The contents of the drum will be sampled and characterized for disposal in accordance with appropriate state and federal requirements.

9.5.5 Electrical Transformers

If buried electrical transformers are encountered, it should be immediately determined whether they are still connected and energized. They should be sampled for the presence of PCBs and handled according to Toxic Substance Control Act (TSCA) and applicable MPCA regulations. It should be ascertained whether they need to be drained prior to transport and handled according to Minnesota Department of Transportation (MNDOT) regulations. If leakage is observed surrounding the transformers, soil sampling should be conducted according to MPCA guidance.

9.5.6 Creosote Timbers

Materials such as treated railroad ties or wooden pavers will be removed from the subsurface and managed appropriately (i.e., recycled or disposed of off-site). Stantec in consultation with the MPCA, will determine appropriate handling, testing and disposal requirements. Stantec will retain appropriate documentation for future reference.

9.5.7 Batteries

Batteries (if encountered) will be segregated from soils and placed in a corrosion-resistant box. Any recovered batteries will be collected by an approved vendor and hauled off-site for recycling. Stantec, in consultation with the MPCA, will determine appropriate handling, testing and disposal requirements. Stantec will retain appropriate documentation for future reference.

9.5.8 Oil Filters

Oil filters will be segregated from the soil and placed in a steel 55-gallon drum. When a sufficient number of filters are accumulated, they will be picked up by an approved vendor and hauled off-site for recycling. Stantec, in consultation with the MPCA, will determine appropriate handling, testing and disposal requirements. Stantec will retain appropriate documentation for future reference.

9.5.9 Waste Tires

Waste tires will be segregated from the soil and placed in a covered roll-off container. When a sufficient number of tires are accumulated, they will be collected by an approved vendor and hauled off-site for recycling. Stantec, in consultation with the MPCA, will determine appropriate handling, testing and disposal requirements. Stantec will retain appropriate documentation for future reference.

9.5.10 Ash or Clinkers

If encountered, ash material containing clinkers will segregated from the excavated materials. Such material will be appropriately characterized to ensure that it meets appropriate landfill approval. Stantec, in consultation with the MPCA and the receiving landfill, will determine appropriate testing requirements for disposal purposes. Following appropriate sampling and analytical testing, the materials will be hauled off Site for proper disposal. Stantec, in consultation with the MPCA, will determine appropriate handling, testing, and disposal requirements. Stantec will retain appropriate documentation for future reference.

9.5.11 Stained Soils or Soils Exhibiting Strong or Unusual Odors

Soils revealing unusual staining or odors will be segregated from the excavated materials. The materials will be placed in stockpiles and screened using the field screening procedures in **Section 8.5.1**. Stantec, in consultation with the MPCA and the receiving landfill, will determine appropriate testing requirements for disposal purposes. Following appropriate sampling and analytical testing, the materials will be hauled off Site for proper disposal. Stantec will retain appropriate documentation for future reference.

9.5.12 Water Wells

If unused water wells are discovered on the Site during demolition or excavation activities, a licensed water well contractor will assess the well (diameter, depth, well pump etc.) and seal it per Minnesota Department of Health regulations.

10.0 IMPLEMENTATION REPORTING

It is anticipated that the Site development will occur in Summer 2025. Upon completion of all Site soil work related to the development project, an Implementation Report (IR) summarizing the RAP/CCP activities, and any laboratory analytical testing results necessary to document Site conditions, will be submitted to the MPCA for review. The IR report will include an Operations and Maintenance Plan for the Sub-Slab Depressurization System and Stantec will prepare a draft Environmental Covenant to be reviewed/approved by Park and 3rd Alexandria LLC and MPCA. The executed Environmental Covenant will be recorded at Douglas County assessor's office.

Stantec will request the following for Park and 3rd Alexandria, LLC based on completion of the anticipated response actions to be documented in the aforementioned implementation report:

- An Implementation Report Approval indicating that redevelopment activities were managed appropriately and in accordance with the MPCA approved RAP/CCP (VIC and PB Programs);
- Petroleum Leak Site File Closure Confirmation Letter for LS00021454 (PB Program)
- No Further Action Letter for the identified non-petroleum releases to soil, groundwater, and soil vapor (VIC Program)

11.0 REFERENCES

American Engineering Testing, *Report of Geotechnical Exploration, Alexandria Apartments, Alexandria, Minnesota*, April 18, 2024 (2024 Geotechnical Report).

Jirsa, Mark A.; Boerboom, Terrence J.; Chandler, V.W.; Mossler, John H.; Runkel, Anthony C.; and Setterholm, Dale R. *Geologic Map of Minnesota Bedrock Geology*. Minnesota Geological Survey, State Map Series S-21. 2011.

Lusardi, Barbara A.; Gowan, Angela S.; McDonald, Jennifer M.; Marshall, Katherine J.; Meyer, Gary N.; and Wagner, Kaleb G. *Geologic Map of Minnesota Quaternary Geology*. Minnesota Geological Survey, State Map Series S-23. 2019.

Minnesota Pollution Control Agency (MPCA), *Petroleum Tank Release Site File Closure Letter*, March 3, 2022 (2022 Petroleum Closure Letter).

Stantec Consulting Services, Inc., *Investigation Report Petroleum Remediation Program*, January 25, 2022 (2022 LSI Report).

Stantec Consulting Services, Inc., *Soil Vapor Sampling Results Memo, November 2023, Alexandria Block Plant, 910 4th Avenue East, Alexandria, Minnesota, 56308*, December 22, 2023 (2023 Vapor Memo).

Stantec Consulting Services, Inc., *Phase I Environmental Site Assessment, Former Alexandria Block Plant, 901 and 924 4th Avenue East; 923 3rd Avenue East; and 401, 403, 405, and 412 Oak Street, Alexandria, Minnesota,* August 2024 (2024 Phase I ESA).

Stantec Consulting Services, Inc., *Supplemental Investigation, Park and 3rd Lofts Redevelopment, 910, 901 and 924 4th Avenue East; 923 3rd Avenue East; and 401, 403, 405, and 412 Oak Street, Alexandria, Minnesota, 56308*, August 2024 (2024 Supplemental Investigation).

Wenck Associates, Inc., *Phase I Environmental Site Assessment, Alexandria Block Plant, 910 4th Avenue East and 412 Oak Street, Alexandria, Minnesota, 56308*, August 31, 2020 (2020 Phase I ESA).

Wenck Associates, Inc., *Phase II Environmental Site Assessment, Alexandria Block Plant, 910 4th Avenue East and 412 Oak Street, Alexandria, Minnesota, 56308*, November 13, 2020 (2020 Phase II ESA).

Minnesota Pollution Control Agency: Remediation Division; *Best Management Practices for the Off-Site Reuse of Unregulated Fill – Guidance Document c-rem1-01*; March 2024.

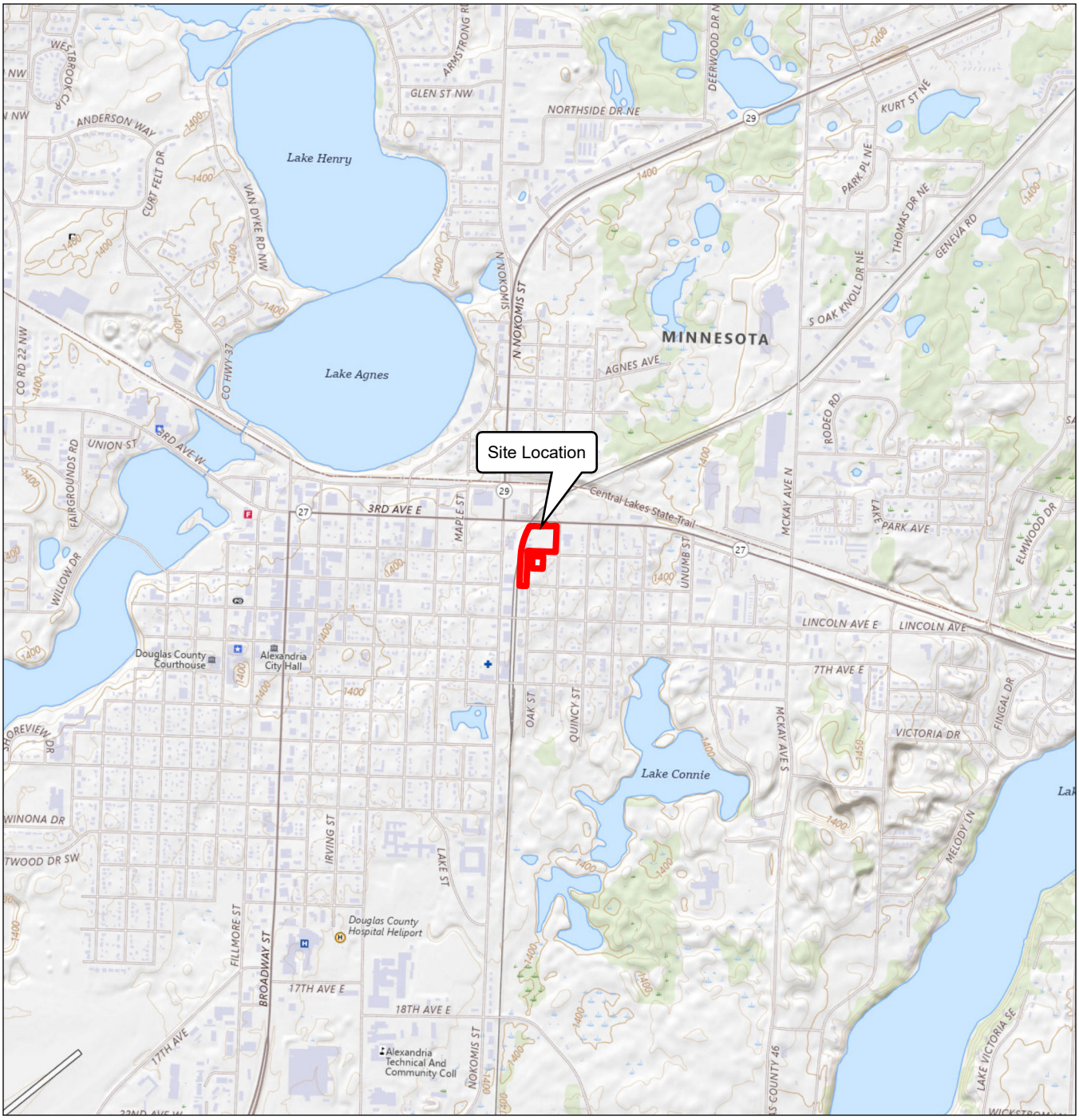
Minnesota Pollution Control Agency: Petroleum Brownfields Program; *Off-Site Use of Regulated Fill Policy – Guidance Document c-rem2-02;* March 2012.

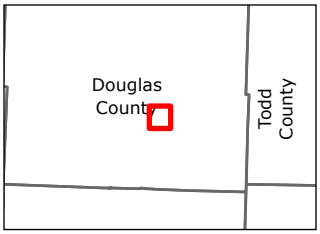
Minnesota Pollution Control Agency: Petroleum Brownfields Program; *Response Action Plans – Guidance Document c-rem4-43;* April 2024.

Other materials referenced in this report are included in the Appendices.

FIGURES

1. Site Location Map
2. Site Detail Map
3. Sample Location Map
4. Soil Sample Results Map
5. Groundwater Sample Results Map
6. Soil Vapor Sample Results Map





Legend

Site Location

0 1,000 2,000 Feet

(At original document size of 8.5x11)
1:24,000

N

Notes

1. Coordinate System: NAD 1983 UTM Zone 15N
2. Data Sources: USGS
3. Background: USGS 7.5 Minute Quadrangle

Stantec

Project Location Prepared by LAH on 2024-08-21
T128N, R37W, S20
Alexandria, Douglas Co., MN

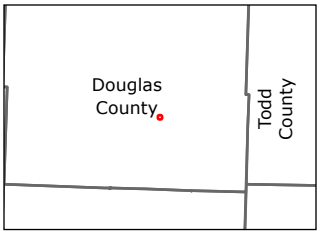
Client/Project 227707105
Park and 3rd Alexandria, LLC
Former Alexandria Block Plant
RAP/CCP

Figure No.
1

Title
Site Location Map

V:\2277\active\227707105\03_data\gis_cad\gis\pro\RAP-CCP\RAP-CCP.aprx Revised: 2024-08-21 By: lhershley

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.



Legend
- Site Location
- Trench Drain

0 65 130 Feet
(At original document size of 8.5x11)
1:1,560

N

Notes
1. Coordinate System: NAD 1983 UTM Zone 15N
2. Data Sources: ESRI
3. Background: ESRI World Imagery, 2022

Stantec

Project Location
T128N, R37W, S20
Alexandria, Douglas Co., MN

Prepared by LAH on 2024-08-21

Client/Project
Park and 3rd Alexandria, LLC
Former Alexandria Block Plant
RAP/CCP

227707105

Figure No.
2

Title
Site Detail Map

V:\2277\active\227707105\03_data\gis_cad\gis\pro\RAP-CCP\RAP-CCP.aprx Revised: 2024-08-21 By: lhershley

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

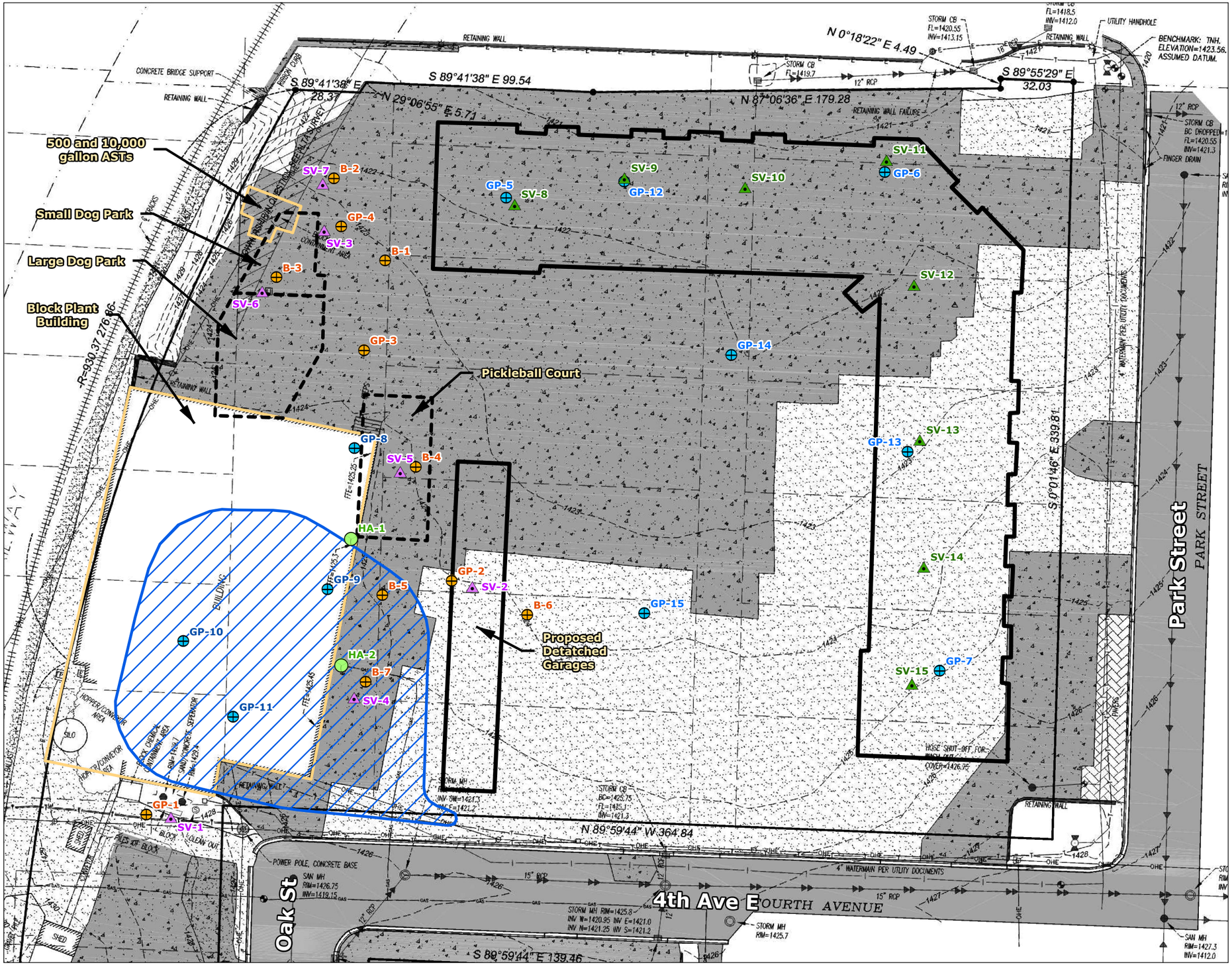


Figure No.
3

Title
Sample Location Map

Client/Project
227707105
Park and 3rd Alexandria, LLC
Former Alexandria Block Plant
RAP/CCP

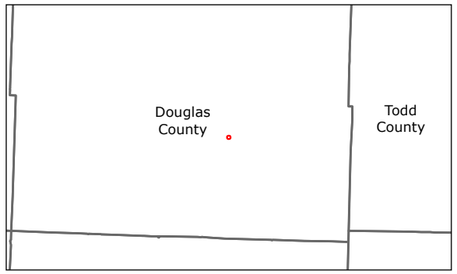
Project Location
T128N, R37W, S20
Alexandria, Douglas Co., MN

Prepared by LAH on 2024-08-28

N

0 22.5 45 Feet
(At original document size of 11x17)
1:540

Legend
- Site Feature
- Proposed Stormwater Pond
- Proposed Building Footprint
- Other Proposed Development Features
- 2024 Boring Location
- 2024 Soil Vapor Sample Location
- Previous Interior Hand Auger Location
- Previous Soil Vapor Sample Location
- Previous Soil Boring Locations

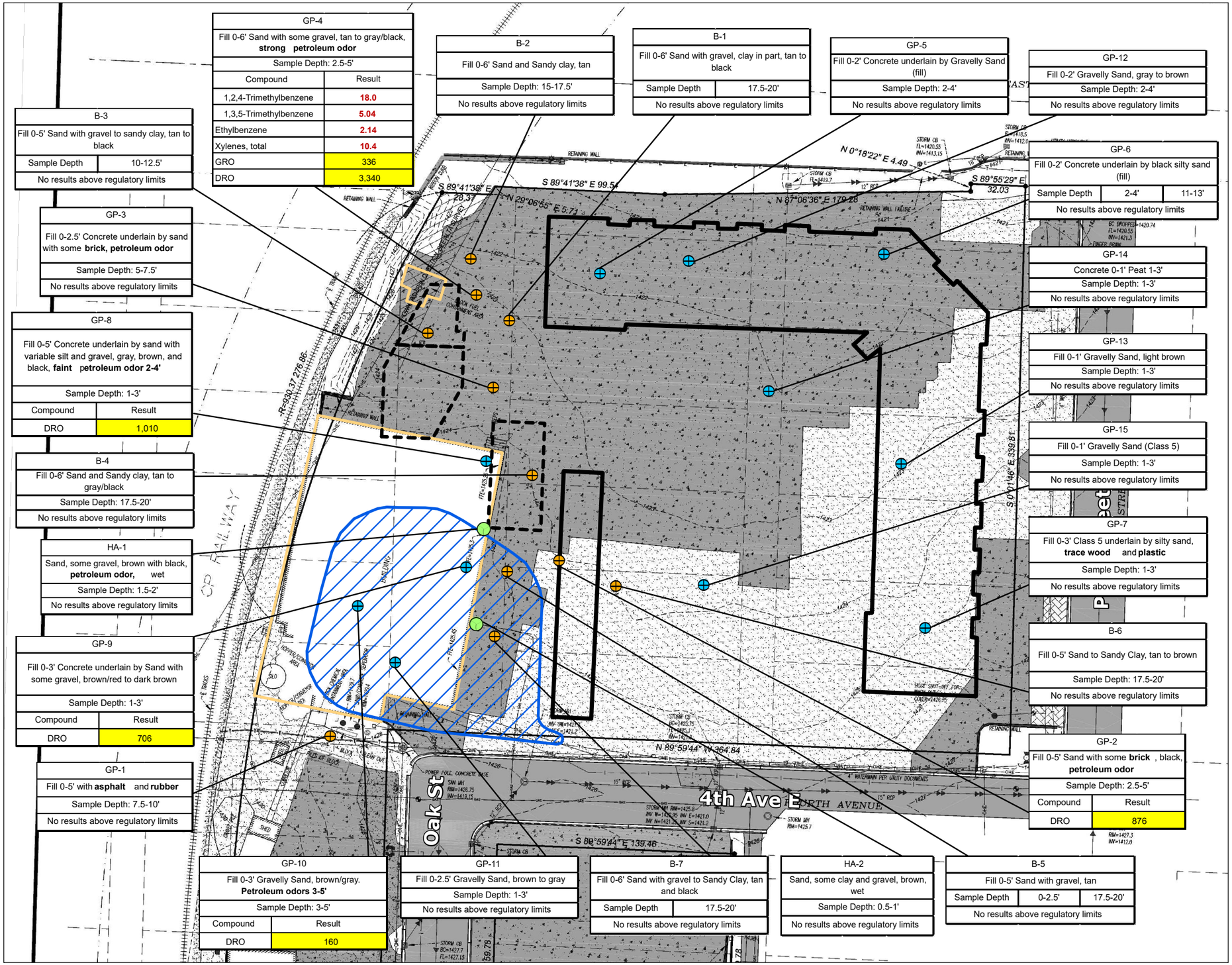


Notes
1. Coordinate System: NAD 1983 UTM Zone 15N
2. Data Sources: Stoeckel-Jahner
3. Background: Stoeckel-Jahner

Stantec

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

V:\227\active\227707105\03_data\gis_cad\gis\proj\RAP-CCP\RAP-CCP.aprx Revised: 2024-08-28 By: lhershley



GP-4	
Fill 0-6' Sand with some gravel, tan to gray/black, **strong petroleum odor**	
Sample Depth: 2.5-5'	
Compound	Result
1,2,4-Trimethylbenzene	18.0
1,3,5-Trimethylbenzene	5.04
Ethylbenzene	2.14
Xylenes, total	10.4
GRO	336
DRO	3,340

B-2
Fill 0-6' Sand and Sandy clay, tan
Sample Depth: 15-17.5'
No results above regulatory limits

B-1	
Fill 0-6' Sand with gravel, clay in part, tan to black	
Sample Depth	17.5-20'
No results above regulatory limits	

GP-5
Fill 0-2' Concrete underlain by Gravelly Sand (fill)
Sample Depth: 2-4'
No results above regulatory limits

GP-12
Fill 0-2' Gravelly Sand, gray to brown
Sample Depth: 2-4'
No results above regulatory limits

B-3	
Fill 0-5' Sand with gravel to sandy clay, tan to black	
Sample Depth	10-12.5'
No results above regulatory limits	

GP-3
Fill 0-2.5' Concrete underlain by sand with some **brick, petroleum odor**
Sample Depth: 5-7.5'
No results above regulatory limits

GP-8	
Fill 0-5' Concrete underlain by sand with variable silt and gravel, gray, brown, and black, **faint petroleum odor 2-4'**	
Sample Depth: 1-3'	
Compound	Result
DRO	1,010

B-4
Fill 0-6' Sand and Sandy clay, tan to gray/black
Sample Depth: 17.5-20'
No results above regulatory limits

HA-1
Sand, some gravel, brown with black, **petroleum odor,** wet
Sample Depth: 1.5-2'
No results above regulatory limits

GP-9	
Fill 0-3' Concrete underlain by Sand with some gravel, brown/red to dark brown	
Sample Depth: 1-3'	
Compound	Result
DRO	706

GP-1
Fill 0-5' with **asphalt** and **rubber**
Sample Depth: 7.5-10'
No results above regulatory limits

GP-6		
Fill 0-2' Concrete underlain by black silty sand (fill)		
Sample Depth	2-4'	11-13'
No results above regulatory limits		

GP-14
Concrete 0-1' Peat 1-3'
Sample Depth: 1-3'
No results above regulatory limits

GP-13
Fill 0-1' Gravelly Sand, light brown
Sample Depth: 1-3'
No results above regulatory limits

GP-15
Fill 0-1' Gravelly Sand (Class 5)
Sample Depth: 1-3'
No results above regulatory limits

GP-7
Fill 0-3' Class 5 underlain by silty sand, **trace wood** and **plastic**
Sample Depth: 1-3'
No results above regulatory limits

B-6
Fill 0-5' Sand to Sandy Clay, tan to brown
Sample Depth: 17.5-20'
No results above regulatory limits

GP-2	
Fill 0-5' Sand with some **brick** , black, **petroleum odor**	
Sample Depth: 2.5-5'	
Compound	Result
DRO	876

GP-10	
Fill 0-3' Gravelly Sand, brown/gray. **Petroleum odors 3-5'**	
Sample Depth: 3-5'	
Compound	Result
DRO	160

GP-11
Fill 0-2.5' Gravelly Sand, brown to gray
Sample Depth: 1-3'
No results above regulatory limits

B-7	
Fill 0-6' Sand with gravel to Sandy Clay, tan and black	
Sample Depth	17.5-20'
No results above regulatory limits	

HA-2
Sand, some clay and gravel, brown, wet
Sample Depth: 0.5-1'
No results above regulatory limits

B-5		
Fill 0-5' Sand with gravel, tan		
Sample Depth	0-2.5'	17.5-20'
No results above regulatory limits		

Figure No.
4

Title
Soil Sample Results Map

Client/Project 227707105
Park and 3rd Alexandria, LLC
Former Alexandria Block Plant
RAP/CCP

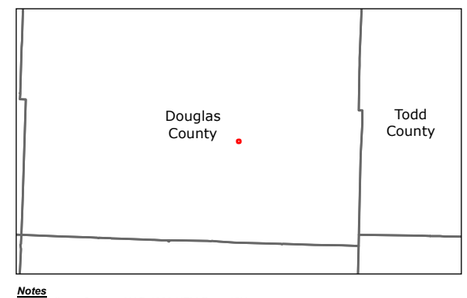
Project Location Prepared by LAH on 2024-08-28
T128N, R37W, S20
Alexandria, Douglas Co., MN

N

0 30 60 Feet
(At original document size of 11x17)
1:720

Legend
- Site Feature
- Proposed Stormwater Pond
- Proposed Building Footprint
- Other Proposed Development Features
- 2024 Boring Location
- Previous Interior Hand Auger Location
- Previous Soil Boring Locations

Soil Data Key	
Units	mg/kg
Residential SRV Exceedance	
Industrial SRV Exceedance	
SLV Exceedance	
Unregulated Fill Guidance Exceedance	

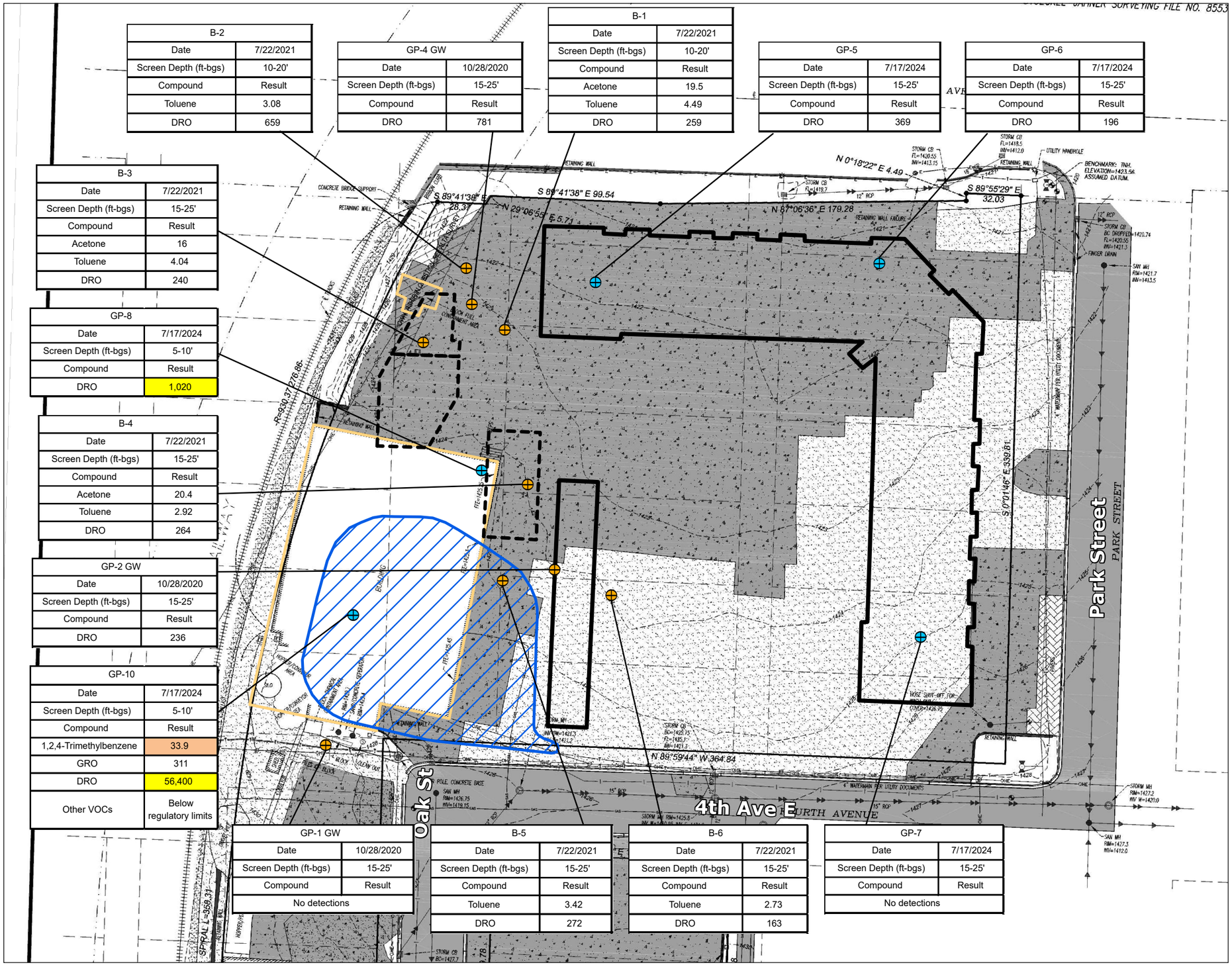


Notes
1. Coordinate System: NAD 1983 UTM Zone 15N
2. Data Sources: Stoeckel-Jahner
3. Background: Stoeckel-Jahner

Stantec

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

V:\227\active\227707105\3_data\gis_cad\gis\pro\RAP-CCP\RAP-CCP.aprx Revised: 2024-08-28 By: lhershley



B-2	
Date	7/22/2021
Screen Depth (ft-bgs)	10-20'
Compound	Result
Toluene	3.08
DRO	659

GP-4 GW	
Date	10/28/2020
Screen Depth (ft-bgs)	15-25'
Compound	Result
DRO	781

B-1	
Date	7/22/2021
Screen Depth (ft-bgs)	10-20'
Compound	Result
Acetone	19.5
Toluene	4.49
DRO	259

GP-5	
Date	7/17/2024
Screen Depth (ft-bgs)	15-25'
Compound	Result
DRO	369

GP-6	
Date	7/17/2024
Screen Depth (ft-bgs)	15-25'
Compound	Result
DRO	196

B-3	
Date	7/22/2021
Screen Depth (ft-bgs)	15-25'
Compound	Result
Acetone	16
Toluene	4.04
DRO	240

GP-8	
Date	7/17/2024
Screen Depth (ft-bgs)	5-10'
Compound	Result
DRO	1,020

B-4	
Date	7/22/2021
Screen Depth (ft-bgs)	15-25'
Compound	Result
Acetone	20.4
Toluene	2.92
DRO	264

GP-2 GW	
Date	10/28/2020
Screen Depth (ft-bgs)	15-25'
Compound	Result
DRO	236

GP-10	
Date	7/17/2024
Screen Depth (ft-bgs)	5-10'
Compound	Result
1,2,4-Trimethylbenzene	33.9
GRO	311
DRO	56,400
Other VOCs	Below regulatory limits

GP-1 GW	
Date	10/28/2020
Screen Depth (ft-bgs)	15-25'
Compound	Result
No detections	

B-5	
Date	7/22/2021
Screen Depth (ft-bgs)	15-25'
Compound	Result
Toluene	3.42
DRO	272

B-6	
Date	7/22/2021
Screen Depth (ft-bgs)	15-25'
Compound	Result
Toluene	2.73
DRO	163

GP-7	
Date	7/17/2024
Screen Depth (ft-bgs)	15-25'
Compound	Result
No detections	

Figure No.

5

Title

Groundwater Sample Results Map

Client/Project 227707105

Park and 3rd Alexandria, LLC
Former Alexandria Block Plant
RAP/CCP

Project Location Prepared by LAH on 2024-08-28

T128N, R37W, S20
Alexandria, Douglas Co., MN

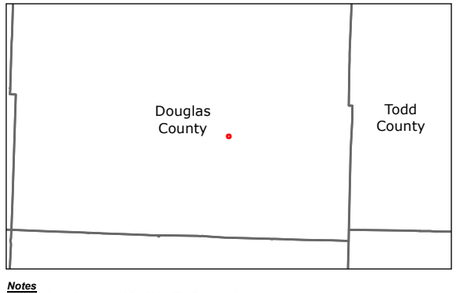
N

0 30 60 Feet
(At original document size of 11x17)
1:720

Legend

- Site Feature
- Proposed Stormwater Pond
- Proposed Building Footprint
- Other Proposed Development Features
- 2024 Boring Location
- Previous Soil Boring Locations

Groundwater Data Key	
Units	ug/L
MDH HRL/HBV Exceedance	
PRP Guidance Exceedance	



Notes

1. Coordinate System: NAD 1983 UTM Zone 15N
2. Data Sources: Stoeckel-Jahner
3. Background: Stoeckel-Jahner

Stantec

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

V:\227\active\227707105\03_data\gis_cad\gis\proRAP-CCP\RAP-CCP.aprx Revised: 2024-08-28 By: thershley

SV-7		
Sample Depth: 3-5' bgs		
Date	7/23/2021	11/6/2023
Compound	Result	Result
Benezene	23	10.1
PCE	<14	63.8

SV-3A/SV-3		
Sample Depth: 3-5' bgs		
Date	10/28/2020	11/6/2023
Compound	Result	Result
Benezene	1,100	<0.639
PCE	<68	98.4

SV-6		
Sample Depth: 3-5' bgs		
Date	7/23/2021	11/6/2023
Compound	Result	Result
Benezene	15	26.5
PCE	<14	192

SV-5		
Sample Depth: 3-5' bgs		
Date	7/23/2021	11/6/2023
Compound	Result	Result
Benezene	12	12
PCE	<14	96.4

SV-8	
Sample Depth: 3-5' bgs	
Date	7/17/2024
Compound	Result
Benezene	4.47
PCE	13

SV-9	
Sample Depth: 3-5' bgs	
Date	7/17/2024
Compound	Result
Benezene	14.1
PCE	19.1

SV-10	
Sample Depth: 3-5' bgs	
Date	7/17/2024
Compound	Result
Benezene	60.1
PCE	15.3

SV-11	
Sample Depth: 3-5' bgs	
Date	7/17/2024
Compound	Result
Benezene	11.7
PCE	9.17

SV-12	
Sample Depth: 3-5' bgs	
Date	7/17/2024
Compound	Result
Benezene	31.9
PCE	18.6

SV-13	
Sample Depth: 3-5' bgs	
Date	7/17/2024
Compound	Result
Benezene	1.83
PCE	13.4

SV-14	
Sample Depth: 3-5' bgs	
Date	7/17/2024
Compound	Result
Benezene	8.56
PCE	13.1

SV-15	
Sample Depth: 3-5' bgs	
Date	7/17/2024
Compound	Result
Benezene	10.8
PCE	19.3

SV-1A/SV-1		
Sample Depth: 3-5' bgs		
Date	10/28/2020	11/6/2023
Compound	Result	Result
Benezene	120	7.63
PCE	<27	80.8

SV-4		
Sample Depth: 3-5' bgs		
Date	7/23/2021	11/6/2023
Compound	Result	Result
Benezene	33	18.4
PCE	<14	188

SV-2A/SV-2		
Sample Depth: 3-5' bgs		
Date	10/28/2020	11/6/2023
Compound	Result	Result
Benezene	50	118
PCE	2.4	132

Figure No.

6

Title

Soil Vapor Sample Results Map

Client/Project 227707105

Park and 3rd Alexandria, LLC
Former Alexandria Block Plant
RAP/CCP

Project Location
T128N, R37W, S20
Alexandria, Douglas Co., MN

Prepared by LAH on 2024-08-28

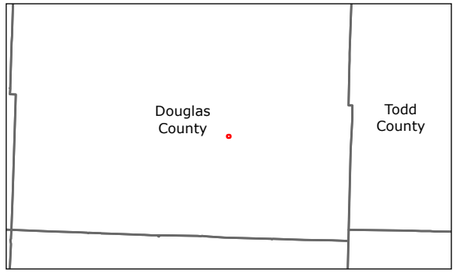
N

0 25 50 Feet
(At original document size of 11x17)
1:600

Legend

- Site Feature
- Proposed Stormwater Pond
- Proposed Building Footprint
- Other Proposed Development Features
- 2024 Soil Vapor Sample Location
- Previous Soil Vapor Sample Location

Soil Vapor Data Key	
Units	ug/m3
33X Residential ISV Exceedance	
33X Residential EISV Exceedance	
<1.0 - Not Detected Above Reporting Limit	



Notes
1. Coordinate System: NAD 1983 UTM Zone 15N
2. Data Sources: Stoeckel-Jahner
3. Background: Stoeckel-Jahner

Stantec

V:\227\active\227707105\03 data\gis cad\gis\pro\RAP-CCP\RAP-CCP.aprx Revised: 2024-08-28 By: lhershey

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

TABLES

1. Comprehensive Soil Analytical Results Summary
2. Comprehensive Groundwater Analytical Results Summary
3. Comprehensive Soil Vapor Analytical Results Summary

Table 1
Comprehensive Soil Analytical Results Summary
Former Alexandria Black Plant
Alexandria, Minnesota
Stantec Proj. 227707105

Compound/Parameter	MPCA Res/Rec Final Chronic (Acute) SRV 2023	MPCA Com/Ind Chronic SRV 2023	MPCA SLVs 2013	CAS No.	Sample ID and Date Collected																																
					GP-1 7.5-10'	GP-2 2.5-5'	GP-3 5-7.5'	GP-4 2.5-5'	HA-1 1.5-2'	HA-2 0.5-1'	Trip Blank-Soil	B-1 (17.5-20')	B-1 (20-22.5')	B-2 (15-17.5')	B-3 (10-12.5')	B-3 (20-22.5')	B-4 (17.5-20')	B-5 (0-2.5')	B-5 (17.5-20')	B-6 (17.5-20')	B-7 (17.5-20')	B-7 (22.5-25')	Soil Trip	GP-10 (3-5')	GP-11 (1-3')	GP-12 (2-4')	GP-13 (1-3')	GP-14 (1-3')	GP-15 (1-3')	GP-5 (2-4')	GP-6 (11-13')	GP-6 (2-4')	GP-7 (1-3')	GP-8 (1-3')	GP-9 (1-3')	Soil Trip Blanks
					10/28/2020	10/28/2020	10/28/2020	10/28/2020	10/28/2020	10/28/2020	10/28/2020	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/23/2021	07/22/2021	07/23/2021	07/16/2024	07/16/2024	07/16/2024	07/16/2024	07/16/2024	07/16/2024	07/16/2024	07/16/2024	07/16/2024	07/16/2024	07/16/2024	07/16/2024
Volatiles Organic Compounds (VOCs) reported in mg/kg																																					
All other VOCs	Various	Various	Various	Various	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	140	220	2.7	95-63-6	<0.117	<0.167	<0.196	**18.0**	<0.127	<0.124	<0.100	<0.128	NS	<0.132	NS	<0.119	<0.123	<0.188	<0.122	<0.124	<0.132	NS	<0.100	**1.8**	<0.068	<0.044	<0.058	**0.37**	<0.063	<0.055	<0.049	<0.054	<0.053	<0.050	<0.058	<0.050
1,3,5-Trimethylbenzene	140	180	2.7	108-67-8	<0.117	<0.167	<0.196	**5.04**	<0.127	<0.124	<0.100	<0.128	NS	<0.132	NS	<0.119	<0.123	<0.188	<0.122	<0.124	<0.132	NS	<0.100	**0.65**	<0.068	<0.044	<0.058	**0.19**	<0.063	<0.055	<0.049	<0.054	<0.053	<0.050	<0.058	<0.050
Benzene	9.5	42	0.017	71-43-2	<0.117	<0.167	<0.196	<0.130	<0.127	<0.124	<0.100	<0.128	NS	<0.132	NS	<0.119	<0.123	<0.188	<0.122	<0.124	<0.132	NS	<0.100	<0.027	<0.027	<0.018	<0.023	<0.029	<0.025	<0.022	<0.020	<0.022	<0.021	<0.020	<0.023	<0.020
Ethylbenzene	190	480	1.0	100-41-4	<0.117	<0.167	<0.196	**2.14**	<0.127	<0.124	<0.100	<0.128	NS	<0.132	NS	<0.119	<0.123	<0.188	<0.122	<0.124	<0.132	NS	<0.100	<0.069	<0.068	<0.044	<0.058	<0.073	<0.063	<0.055	<0.049	<0.054	<0.053	<0.050	<0.058	<0.050
Isopropylbenzene	270	270	9.5	98-82-8	<0.117	<0.167	<0.196	**0.783**	<0.127	<0.124	<0.100	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.069	<0.068	<0.044	<0.058	<0.073	<0.063	<0.055	<0.049	<0.054	<0.053	<0.050	<0.058	<0.050
Methyl tert-butyl ether	440	6300	NE	1634-04-4	<0.117	<0.167	<0.196	<0.130	<0.127	<0.124	<0.100	<0.128	NS	<0.132	NS	<0.119	<0.123	<0.188	<0.122	<0.124	<0.132	NS	<0.100	<0.069	<0.068	<0.044	<0.058	<0.073	<0.063	<0.055	<0.049	<0.054	<0.053	<0.050	<0.058	<0.050
Naphthalene	81	280	4.5	91-20-3	<0.293	<0.418	<0.489	**2.61**	<0.317	<0.311	<0.250	<0.319	NS	<0.330	NS	<0.299	<0.308	<0.470	<0.305	<0.310	<0.329	NS	<0.250	**1.4**	<0.27	<0.18	<0.23	**0.47**	<0.25	<0.22	<0.20	<0.22	<0.21	<0.20	<0.23	<0.20
n-Butylbenzene	110	110	NE	104-51-8	<0.117	<0.167	<0.196	**5.83**	<0.127	<0.124	<0.100	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.47**	<0.068	<0.044	<0.058	**0.11**	<0.063	<0.055	<0.049	<0.054	<0.053	<0.050	<0.058	<0.050
N-Propylbenzene	260	260	NE	103-65-1	<0.117	<0.167	<0.196	**2.39**	<0.127	<0.124	<0.100	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.17**	<0.068	<0.044	<0.058	<0.073	<0.063	<0.055	<0.049	<0.054	<0.053	<0.050	<0.058	<0.050
p-Isopropyltoluene	NE	NE	NE	99-87-6	<0.117	<0.167	<0.196	**1.93**	<0.127	<0.124	<0.100	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.17**	<0.068	<0.044	<0.058	**0.075**	<0.063	<0.055	<0.049	<0.054	<0.053	<0.050	<0.058	<0.050
sec-Butylbenzene	140	140	NE	135-98-8	<0.117	<0.167	<0.196	**2.21**	<0.127	<0.124	<0.100	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.17**	<0.068	<0.044	<0.058	<0.073	<0.063	<0.055	<0.049	<0.054	<0.053	<0.050	<0.058	<0.050
Toluene	820	820	2.5	108-88-3	<0.117	<0.167	<0.196	<0.130	<0.127	<0.124	<0.100	<0.128	NS	<0.132	NS	<0.119	<0.123	<0.188	**0.139**	<0.124	<0.132	NS	<0.100	<0.069	<0.068	<0.044	<0.058	**0.075**	<0.063	<0.055	<0.049	<0.054	<0.053	<0.050	<0.058	<0.050
Xylenes, Total	260	260	5.4	1330-20-7	<0.176	<0.251	<0.294	**10.4**	<0.190	<0.186	<0.150	<0.191	NS	<0.198	NS	<0.179	<0.185	<0.282	<0.183	<0.186	<0.198	NS	<0.150	<0.21	<0.20	<0.13	<0.17	<0.22	<0.19	<0.16	<0.15	<0.16	<0.16	<0.15	<0.17	<0.15
Gasoline Range Organics (GRO) reported in mg/kg																																					
Wisconsin GRO	*100		NE	STL01887	<10.2	<15.4	<16.3	**336**	<10.9	<10.9	NS	<11.4	NS	<11.7	NS	<11.0	<11.3	<15.4	<11.0	<11.0	<12.0	NS	<10.0	**42.2** [1]	<13.7	<12.7	<13.6	**15.1** [R]	<13.2	<13.3	<12.7	<12.4	<13.0	<11.1	<11.5	<10.0
Polychlorinated Biphenyls (PCBs) reported in mg/kg																																					
Polychlorinated biphenyls, Total	0.82	10	0.13	1336-36-3	<0.0551	NS	NS	NS	<0.0562	<0.0570	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.062	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Polynuclear Aromatic Hydrocarbons (PAHs) reported in mg/kg																																					
2-Methylnaphthalene	39	580	NE	91-57-6	<0.0111	**0.0677**	<0.0646	**6.38**	**0.0171**	**0.0117**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Acenaphthene	460	6800	81	83-32-9	<0.0111	<0.0559	<0.0646	**1.16**	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.12**	<0.012	<0.011	<0.012	**0.12**	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.010	NS
Acenaphthylene	NE	NE	NE	208-96-8	<0.0111	<0.0559	<0.0646	**0.154**	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.012	<0.012	<0.011	<0.012	**0.04**	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.010	NS
Anthracene	2800	42000	1300	120-12-7	<0.0111	<0.0559	<0.0646	**0.953**	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.36**	**0.018**	<0.011	<0.012	**0.029**	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	**0.015**	NS
Benzo[a]anthracene	cBaP	cBaP	cBaP	56-55-3	<0.0111	<0.0559	<0.0646	<0.110	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.012	**0.013**	<0.011	<0.012	**0.1**	<0.011	<0.011	**0.013**	<0.011	<0.011	**0.052**	**0.012**	NS
Benzo[a]pyrene	2	23	1.4	50-32-8	<0.0111	<0.0559	**0.0774**	<0.110	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.012	**0.025**	<0.011	<0.012	**0.25**	<0.011	<0.011	**0.011**	<0.011	<0.011	**0.072**	**0.033**	NS
Benzo[b]fluoranthene	cBaP	cBaP	cBaP	205-99-2	<0.0111	**0.0631**	**0.122**	<0.110	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.012	<0.012	<0.011	<0.012	**0.07**	<0.011	<0.011	<0.011	<0.011	<0.011	**0.028**	<0.010	NS
Benzo[g,h,i]perylene	NE	NE	NE	191-24-2	<0.0111	<0.0559	<0.0646	<0.110	<0.0116	**0.0109**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.012	**0.015**	<0.011	<0.012	**0.12**	<0.011	<0.011	<0.011	<0.011	<0.011	**0.053**	**0.016**	NS
Benzo[k]fluoranthene	cBaP	cBaP	cBaP	207-08-9	<0.0111	<0.0559	<0.0646	<0.110	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.041**	**0.11**	<0.011	<0.012	**0.094**	<0.011	<0.011	<0.011	<0.011	<0.011	**0.044**	**0.024**	NS
Chrysene	cBaP	cBaP	cBaP	218-01-9	<0.0111	**0.0564**	**0.0907**	<0.110	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.012	**0.019**	<0.011	<0.012	**0.18**	<0.011	<0.011	**0.012**	<0.011	<0.011	**0.064**	**0.013**	NS
Dibenz[a,h]anthracene	cBaP	cBaP	cBaP	53-70-3	<0.0111	<0.0559	<0.0646	<0.110	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.012	<0.012	<0.011	<0.012	**0.019**	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.010	NS
Fluoranthene	210	2700	670	206-44-0	<0.0111	**0.105**	**0.158**	<0.110	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.015**	**0.026**	<0.011	<0.012	**0.26**	<0.011	<0.011	**0.039**	<0.011	<0.011	**0.12**	**0.022**	NS
Fluorene	390	5800	110	86-73-7	<0.0111	**0.0693**	<0.0646	**1.53**	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.16**	<0.012	<0.011	<0.012	**0.12**	<0.011	<0.011	<0.011	<0.011	<0.011	**0.011**	<0.010	NS
Indeno[1,2,3-cd]pyrene	cBaP	cBaP	cBaP	193-39-5	<0.0111	<0.0559	<0.0646	<0.110	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.012	**0.036**	<0.011	<0.012	**0.1**	<0.011	<0.011	<0.011	<0.011	<0.011	**0.037**	**0.02**	NS
Naphthalene	81	280	4.5	91-20-3	<0.0111	<0.0559	<0.0646	**2.23**	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.14**	**0.015**	<0.011	<0.012	**0.31**	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	**0.016**	NS
Phenanthrene	NE	NE	NE	85-01-8	<0.0111	**0.245**	**0.0878**	**1.73**	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.3**	**0.028**	<0.011	<0.012	**0.34**	<0.011	<0.011	<0.011	<0.011	<0.011	**0.087**	**0.04**	NS
Pyrene	220	3200	440	129-00-0	<0.0111	**0.151**	**0.128**	**0.717**	<0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.081**	**0.021**	<0.011	<0.012	**0.22**	<0.011	<0.011	**0.029**	<0.011	<0.011	**0.12**	**0.026**	NS
BaP Equivalent calculation	2	23	1.4	calculated	<0.0111	**0.006874**	**0.090507**	<0.110	>0.0116	<0.0109	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.0041**	**0.04109**	<0.011	<0.012	**0.29884**	<0.011	<0.011	**0.01242**	<0.011	<0.011	**0.08874**	**0.03873**	NS
Diesel Range Organics (DRO) reported in mg/kg																																					
Diesel Range Organics (DRO)	*100		NE	STL00143	<5.59	**876**	**17.9**	**3340**	**29.3**	**15.4**	NS	NS	<4.84	NS	<4.96	NS	<5.33	<5.11	**89.5**	<4.67	<4.71	<4.36	NS	**160** [1]	**73.7** [R]	<11.2	<8.8	NS	<11.5	<9.6	<7.5	<8.5	<9.0	**1,010** [R]	**706** [R]	NS
ORO - Silica Gel	*100		NE	STL00143	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**15.5**	NS	NS	NS	NS	NS	NS	NS	NS
RCRA Metals reported in mg/kg																																					
Arsenic	9 (9)	9	5.8	7440-38-2	<3.81	<11.2	<4.39	<3.71	<7.78	<7.53	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**4.9**	**2.8**	<1.1	**5.1**	**1.5**	**4.8**	**2.8**	**2.0**	**2.2**	**4.8**	**1.9**	**2.1**	NS
Barium	3100 (260)	41000	1700	7440-39-3	**68.6**	**110**	**103**	**67.1**	**33.0**	**47.5**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**112**	**66.4**	**43.9**	**71.2**	**74.6**	**70.3**	**44.5**	**28.6**	**43.8**	**69.1**	**29.2**	**53.6**	NS
Cadmium	1.6 (9.1)	23	8.8	7440-43-9	<0.951	<2.81	<1.10	<0.928	<1.94	<1.88	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.22**	<0.16	<0.17	<0.17	<0.18	<0.17	<0.16	<0.17	<0.16	<0.16	<0.16	<0.15	NS
Chromium	2.3a / 23,000	62b / 100,000	38#	7440-47-3	**14.9**	**13.2**	**13.9**	**14.5**	**11.8**	**10.5**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**9.6**	**11.4**	**9.0**	**17.0**	**8.6**	**16.9**	**13.1**	**11.9**	**11.5**	**14.3**	**8.3**	**8.8**	NS
Lead	200	460	2700	7439-92-1	**7.26**	**82.7**	**13.4**	**5.91**	**20.9**	**15.9**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**16.5**	**11.0**	**3.9**	**7.7**	**8.3**	**7.1**	**4.7**	**3.6**	**4.1**	**6.7**	**4.0**	**18.5**	NS
Mercury	2.7	3.1	3.3	7439-97-6	<0.0230	**0.314**	**0.0331**	<0.0216	<0.0220	<0.0200	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**0.041**	<0.021	<0.021	**0.023**	<0.021	**0.022**	<0.023	<0.021	**0.029**	**0.029**	<0.019	<0.020	NS
Selenium	78	1200	2.6	7782-49-2	<4.76	<14.0	<5.49	<4.64	<9.72	<9.41	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<1.2	<1.1	<1.1	<1.1	<1.2	<1.1	<1.1	<1.1	<1.0	<1.1	<1.1	<1.0	NS
Silver	78	1200	7.9	7440-22-4	<0.951	<2.81	<1.10	<0.928	<1.94	<1.88	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.62	<0.55	<0.55	<0.57	<0.59	<0.56	<0.53	<0.56	<0.52	<0.55	<0.53	<0.50	NS

Notes:

NE = Not established
NS = Not sampled
ND = Not detected above lab reporting limit
< = Less than the reporting limit
Bold = detected concentration
SRV = Soil Reference Value
SLV = Soil Leaching Value
(xx) = Acute Residential/Recreational SRV
mg/kg = milligrams per kilogram
EPA = Environmental Protection Agency
[1] [G+] Late peaks present outside the GRO window.
[2] [T0] High boiling point hydrocarbons are present in the sample.

MPCA = Minnesota Pollution Control Agency
cBaP = Carcinogenic Polynuclear Aromatic Hydrocarbon used in calculation of benzo(a)pyrene equivalent
* = 100 mg/kg is the soil reuse guidance for DRO/GRO
a = Chronic SRV for chromium VI is 2.3 mg/kg. Chromium III is 23,000 mg/kg
b = Chronic Industrial SRV for chromium VI is 62 mg/kg. Chromium III is 100,000 mg/kg
# = SLV provided for hexavalent chromium (chromium VI)

Residential/Recreational SRV exceedance
Commercial/Industrial SRV exceedance
SLV exceedance
Unregulated Fill Guidance exceedance

Table 2
Comprehensive Groundwater Analytical Results Summary
Former Alexandira Block Plant
Alexandria, Minnesota
Stantec Proj. 227707105

Compound/Parameter	CAS No.	MDH HRL/HBV and (EPA MCL)	Sample ID and Date Collected																		
			GP-1 GW	GP-2 GW	GP-4 GW	Trip Blank-Water	Dup (B-4)	B-1	B-2	B-3	B-4	B-5	B-6	GW Trip 1	GW Trip 2	GP-5	GP-6	GP-7	GP-8	GP-10	GW Trip
			10/28/2020	10/28/2020	10/28/2020	10/28/2020	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/22/2021	07/17/2024	07/17/2024	07/17/2024	07/17/2024	07/17/2024	07/16/2024
Volatile Organic Compounds (VOCs)																					
All other VOCs	Various	Various	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	95-63-6	30 / 30	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.0	<1.0	<1.0	**33.9**	<1.0
1,3,5-Trimethylbenzene	108-67-8	30 / 30	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.0	<1.0	<1.0	**7.0**	<1.0
4-Isopropyltoluene	99-87-6	NE / NE	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.0	<1.0	<1.0	**2.1**	<1.0
Acetone	67-64-1	3000 / 3000	<10.0	<50.0	<10.0	<10.0	**12.3**	**19.5**	<10.0	**16.0**	**20.4**	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**14.9**	<10.0
Naphthalene	91-20-3	70 / NE	<5.00	<25.0	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<1.0	<1.0	<1.0	<1.0	**29.0**	<1.0
n-Butylbenzene	104-51-8	NE / NE	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.0	<1.0	<1.0	**3.1**	<1.0
sec-Butylbenzene	135-98-8	NE / NE	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.0	<1.0	<1.0	**3.5**	<1.0
Toluene	108-88-3	70 / 70 (1000)	<1.00	<5.00	<1.00	<1.00	**4.06**	**4.49**	**3.08**	**4.04**	**2.92**	**3.42**	**2.73**	<1.00	<1.00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes, Total	1330-20-7	300 / 300 (10000)	<3.00	<15.0	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.0	<3.0	<3.0	<3.0	**3.1**	<3.0
Gasoline Range Organics (GRO) - Method Wisconsin Modified 8015 (ug/L)																					
GRO	STL01887	*1000	<100	<500	<100	NS	<100	<100	<100	<100	<500	<100	<100	<100	<100	<100 [1]	<100 [1]	<100 [1]	<100 [1]	**311 [2]**	<100
Diesel Range Organics (DRO) - Method Wisconsin Modified 8015 (ug/L)																					
DRO	STL00143	*1000	<111	**236**	**781**	NS	**219**	**259**	**659**	**240**	**264**	**272**	**163**	NS	NS	**369 [3]**	**196 [3]**	<100	**1,020 [3]**	**56,400 [3]**	NS

Notes:

All results reported in micrograms per liter (ug/L)
NE = Not established
ND = Not detected above laboratory reporting limits
NS = Not Sampled
< = Less than laboratory reporting limits
Detections are shown in boldface
Exceedances are highlighted

MDH = Minnesota Department of Health
HRL/HBV = Health Risk Limit and Health Based Value
EPA = Environmental Protection Agency
MCL = Maximum Contaminant Level
( ) = EPA MCL
a = EPA MCL for total chromium is 100 ug/L
b = EPA Action Level for lead is 15 ug/L
* = Action Level PRP Guidance for DRO is 1,000 ug/L

[1] [G-] Early peaks present outside the GRO window.
[2] [GO] Early and late peaks present outside the GRO window.
[3] [T6] High boiling point hydrocarbons are present in the sample.

Table 3
Comprehensive Soil Vapor Analytical Results
Former Alexandria Block Plant
Alexandria, Minnesota
Stantec Proj. 227707105

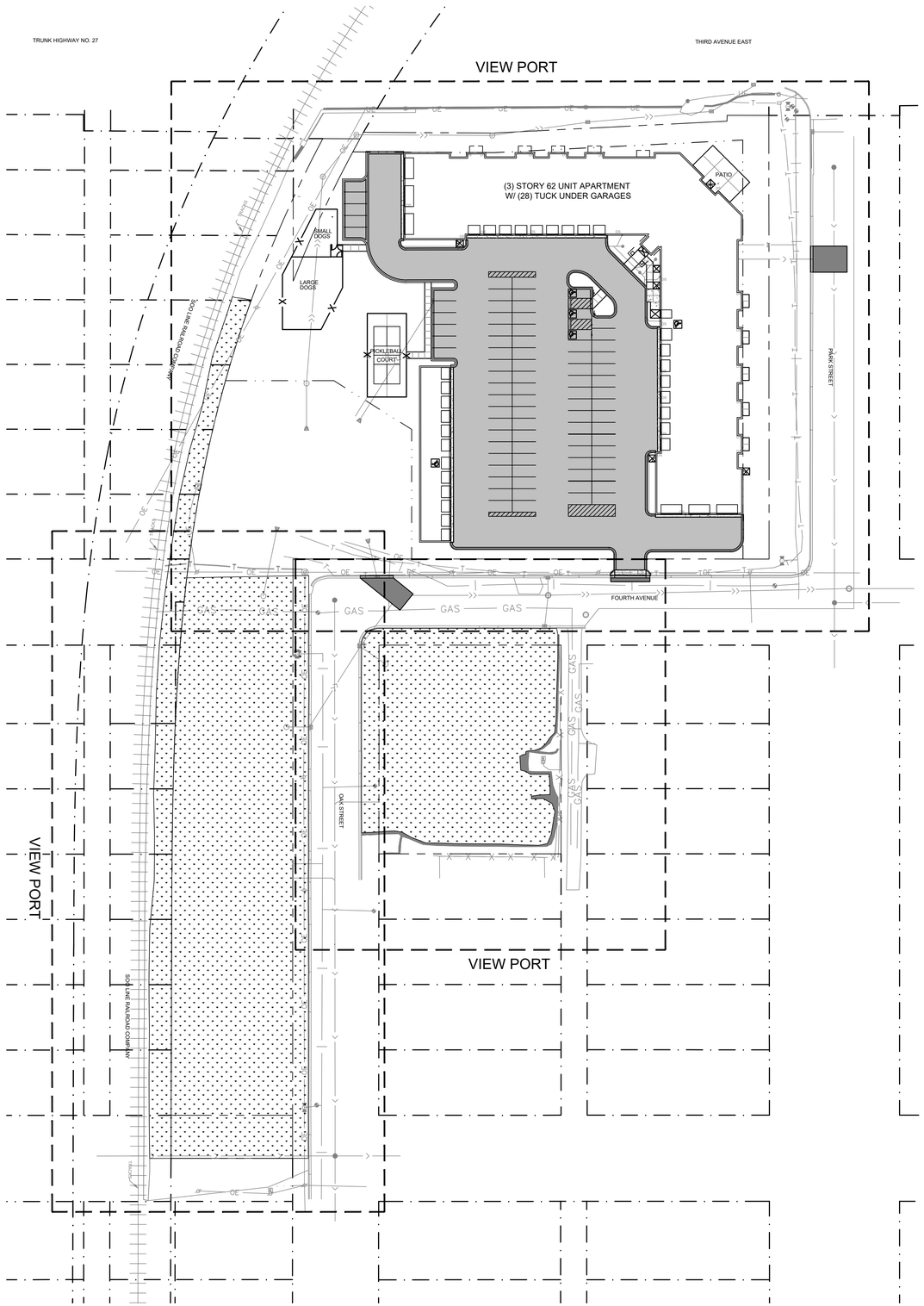
Compound/Parameter	CAS No.	33x Residential ISVs	33x Residential EISVs	Sample ID and Date Collected																					
				SV-1 A	SV-1	SV-2 A	SV-2	SV-3 A	SV-3	SV-4	SV-4	SV-5	SV-5	SV-6	SV-6	SV-7	SV-7	SV-8	SV-9	SV-10	SV-11	SV-12	SV-13	SV-14	SV-15
				10/28/2020	11/06/2023	10/28/2020	11/06/2023	10/28/2020	11/06/2023	07/23/2021	11/06/2023	07/23/2021	11/06/2023	07/23/2021	11/06/2023	07/23/2021	11/06/2023	07/17/2024	07/17/2024	07/17/2024	07/17/2024	07/17/2024	07/17/2024	07/17/2024	07/17/2024
Air - GC/MS VOA (µg/m3) - Detected Compounds Only																									
All Other VOCs	Various	Various	Various	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	95-63-6	2100	6300	< 20	2.38	2.2 J	3.45	< 49	4.06	53	4.34	40	3.01	27	4.17	41	2.85	13.3	21.4	21.5	<0.982	16.8	16.0	21.0	23.6
1,3,5-Trimethylbenzene	108-67-8	2100	6300	< 20	<0.982	< 9.8	1.11	< 49	1.21	19	1.19	14	<0.982	9.4 J	1.07	16	<0.982	4.08	6.43	6.58	<0.982	5.3	5.1	6.77	6.92
1,3-Butadiene	106-99-0	9.3	93	77	9.51	86	145	52	54.2	56	21.9	< 4.4	22.8	< 4.4	29.9	< 4.4	17.1	7.08	11.7	58.4	<4.43	33.4	<4.43	<4.43	<4.43
4-Ethyltoluene	622-96-8	NE	NE	< 20	1.87	< 9.8	<0.982	< 49	2.83	17	3.33	12	2.16	7.2 J	2.86	10	1.97	1.6	2.55	2.72	<0.982	2.24	2.08	2.4	2.84
Acetone	67-64-1	1100000	3200000	970	96.7	140	191	< 600	273 [1]	210	125	150	42.8	51 J	109	150	75.6	141	133	210	229	328	81.7	364 [1]	297 [1]
Benzene	71-43-2	43	310	120	7.63	50	118	1100	<0.639	33	18.4	12	12.0	15	26.5	23	10.1	4.47	14.1	60.1	11.7	31.9	1.83	8.56	10.8
Carbon disulfide	75-15-0	28000	83000	6700	2.91	26	58.8	59 J	55.4	47	8.65	6.6 J	42.6	12 J	38.0	21	3.24	3.21	5.73	30.1	33.3	13.7	<1.24	13.7	3.27 [3]
Chloroethane	75-00-3	140000	430000	< 26	<0.528	< 13	<0.528	< 66	<0.528	< 13	<0.528	< 13	<0.528	< 13	<0.528	< 13	<0.528	<0.528	<0.528	0.776	<0.528	<0.528	<0.528	<0.528	<0.528
Chloromethane	74-87-3	3100	9300	37	1.51	9.3 J	6.22	< 52	2.46	< 10	2.81	< 10	0.483	< 10	<0.413	< 10	<0.413	1.79	1.7	6.98	3.76	2.95	2.33	3.47	<0.413
Cyclohexane	110-82-7	210000	630000	24	2.89	35	42.4	8900	413	< 6.9	6.89	< 6.9	6.44	< 6.9	26.8	< 6.9	5.58	1.2	1.7	12.8	3.86	7.65	1.53	5.61	1.71 [3]
Dichlorodifluoromethane	75-71-8	NE	NE	< 49	895	< 25	<0.989	< 120	<0.989	< 25	<0.989	< 25	<0.989	< 25	<0.989	< 25	1.17	2.43	2.3	2.51	2.13	1.33	2.18	2.68	<0.989
Ethanol	64-17-5	NE	NE	140 J	15.0	46 J	35.6	53 J	<4.71	52 J	16.5	62 J	11.3	41 J	14.2	65 J	12.6	14.9	16.9	43.6	28.3	17.2	25.5	243 [1]	40.0
Ethyl acetate	141-78-6	2400	7300	< 360	<2.27	< 180	6.98	< 900	<2.27	< 180	<2.27	< 180	<2.27	< 180	<2.27	< 180	<2.27	4.39	<2.27	<2.27	<2.27	<2.27	<2.27	<2.27	<2.27
Ethylbenzene	100-41-4	140	1400	< 17	2.16	8.0 J	11.0	100	<0.867	48	6.68	19	2.71	25	6.59	47	4.6	3.88	5.33	10.9	1.18	5.51	4.13	5.51	6.2
Isopropyl alcohol	67-63-0	7000	21000	< 250	<3.07	< 120	15.9	< 620	38.8	< 120	10.5	< 120	7.55	< 120	8.75	< 120	6.74	7.15	7.92	14.8	12.4	<3.07	7.33	110	14.6
m,p-Xylene	179601-23-1	3300	10000	< 43	5.12	15 J	12.4	110	11.9	210	13.6	140	5.98	120	10.3	190	6.24	9.75	15.7	20.1	2.0	15.2	14.6	16.2	17.3
Methyl Ethyl Ketone	78-93-3	100000	310000	100	19.4	24	63.1	< 74	<3.69	60	35.1	38	12.2	< 15	41.9	< 15	26.5	15.6	20.0	50.1	34.8	88.5	8.05	59.0	56.3
Methyl isobutyl ketone	108-10-1	100000	310000	< 41	<5.12	< 20	<5.12	< 100	<5.12	29	<5.12	< 20	<5.12	< 20	<5.12	34	<5.12	<5.12	<5.12	5.73	<5.12	<5.12	<5.12	<5.12	<5.12
Methylene Chloride	75-09-2	21000	63000	< 35	1.03	< 17	11.4	< 87	<0.694	< 17	1.28	< 17	1.52	< 17	<0.694	< 17	0.99	4.9	1.06	56.6	<0.694	<0.694	19.1	19.8	4.44
n-Heptane	142-82-5	14000	43000	24	4.58	72	39.7	8600	<0.818	43	10.8	32	14.6	22	19.5	48	5.89	5.48	11.3	33.1	11.7	15.8	5.48	11.2	11.6
n-Hexane	110-54-3	24000	73000	43	31.9	130	184	21000	250	31	86.0	< 18	80.4	< 18	115	< 18	51.8	4.79	14.6	62.0	21.9	32.9	7.05	15.9	5.99 [3]
Propylene	115-07-1	100000	310000	440	61.5	630	861	710	286	240	375	< 86	172	81 J	460	160	153	39.3	87.8	300	365	389	39.8	232	<2.15
Styrene	100-42-5	31000	93000	< 17	<0.851	< 8.5	<0.851	< 43	<0.851	< 8.5	<0.851	< 8.5	<0.851	< 8.5	<0.851	< 8.5	<0.851	4.98	6.55	6.21	<1.70	3.76	3.56	6.08	4.93
Tetrachloroethene	127-18-4	110	1100	< 27	80.8	2.4 J	132	< 68	98.4	< 14	188	< 14	96.4	< 14	192	< 14	63.8	13.0	19.1	15.3	9.17	18.6	13.4	13.1	19.3
Tetrahydrofuran	109-99-9	70000	210000	6.8 J	41.9	< 150	105	< 740	<0.590	< 150	90.2	< 150	82.6	< 150	101	< 150	59.0	<0.590	<0.590	<0.590	<0.590	<0.590	<0.590	10.5	<0.590
Toluene	108-88-3	140000	430000	40	25.7	26	87.0	22 J	73.8	1200	31.7	780	20.3	730	49.3	1200	23.6	17.4	25.0	59.1	10.5	32.8	20.6	37.6	28.4
trans-1,2-Dichloroethene	156-60-5	700	2100	< 16	<0.793	< 7.9	<0.793	< 40	<0.793	< 7.9	<0.793	< 7.9	<0.793	< 7.9	<0.793	< 7.9	<0.793	<0.793	<0.793	<0.793	<0.793	<0.793	<0.793	0.864	<0.793
Trichloroethene	79-01-6	70	210	< 21	<1.07	< 11	<1.07	< 54	<1.07	< 11	<1.07	< 11	3.07	< 11	<1.07	< 11	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	2.37
Trichlorofluoromethane	75-69-4	33000	100000	< 22	43.7	< 11	<1.12	< 56	<1.12	< 11	<1.12	< 11	<1.12	< 11	<1.12	< 11	<1.12	<1.12	1.25	1.76	1.19	<1.12	<1.12	14.0	314
Xylene(s)	95-47-6	3300	10000	< 17	2.1	5.2 J	6.37	23 J	6.11	85	4.15	56	2.54	47	4.51	67	2.67	4.55	7.33	9.23	<0.867	7.11	6.55	7.67	8.06
Air - GC VOA (% v/v)																									
Carbon dioxide	124-38-9	NE	NE	NS	NS	NS	NS	NS	NS	6.9	NS	3.8	NS	< 0.13	NS	0.22	NS	NS	NS	NS	NS	NS	NS	NS	NS
Methane	74-82-8	NE	NE	NS	NS	NS	NS	NS	NS	< 0.17	NS	0.19	NS	0.25	NS	0.17	NS	NS	NS	NS	NS	NS	NS	NS	NS
Oxygen	7782-44-7	NE	NE	NS	NS	NS	NS	NS	NS	7.3	NS	12	NS	19	NS	19	NS	NS	NS	NS	NS	NS	NS	NS	NS
Carbon monoxide	630-08-0	NE	NE	NS	NS	NS	NS	NS	NS	< 0.17	NS	< 0.14	NS	< 0.13	NS	< 0.16	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:
ISV = Intrusion Screening Value
EISV = Expedited Intrusion Screening Value
VOC = Volatile Organic Compound
NE = Not established
NA = Not applicable
ND = Not detected above laboratory reporting limits
< = Less than laboratory reporting limits

Detections above reporting limits are BOLD
Exceedances are highlighted
[J] - Indicates an Estimated Value for TICs
[1] [D8] The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
[2] [E] Analyte concentration exceeded the calibration range. The reported result is estimated.

APPENDIX A

Proposed Development Plans



GENERAL

- PROPERTY LINE
- EASEMENT LINE
- RIGHT-OF-WAY LINE
- SETBACK LINE
- VIEW PORT LINE FOR SHEETS

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com

© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP
ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegrouparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME THOMAS J. HERKENHOFF
SIGNATURE
DATE 07.22.24 REG. NO. 23570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARTMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS/COMMENTS	REVISIONS/COMMENTS

Project No.
24022
Issue Date:
07-22-24
Document Set:
PRELIMINARY

OVERALL SITE PLAN
C000

NORTH
0 25 50 100

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C000 - Site Plan.dwg

SEE SHEET C101 & C102

P:\Projects\Projects2024\12246070 - Alexagdria Apartments\2. Design\B. Drawing Files\12246070 C100 - Demolition Plan.dwg

SYMBOL LEGEND

- REMOVE AND DISPOSE OF EXISTING BITUMINOUS PAVEMENT SECTION
- REMOVE AND DISPOSE OF EXISTING CONCRETE PAVEMENT SECTION
- APPROXIMATE PAVEMENT CORE/BORING LOCATION SEE PROJECT GEOTECHNICAL REPORT

KEY NOTES

1. REMOVE AND DISPOSE OF EXISTING BITUMINOUS PAVEMENT.
2. REMOVE AND DISPOSE OF EXISTING CONCRETE PAVEMENT.
3. REMOVE AND DISPOSE OF EXISTING CONCRETE CURB AND GUTTER.
4. REMOVE AND DISPOSE OF EXISTING GRAVEL.
5. REMOVE AND DISPOSE OF EXISTING PAVERS.
6. REMOVE AND DISPOSE OF EXISTING BUILDING AND APPURTENANCES.
7. REMOVE AND DISPOSE OF EXISTING SILO.
8. REMOVE AND DISPOSE OF EXISTING SEPERATOR.
9. REMOVE AND DISPOSE OF EXISTING HOPPER AND CONVEYOR BELT.
10. REMOVE AND DISPOSE OF EXISTING LARGE CONCRETE BLOCKS.
11. REMOVE AND DISPOSE OF EXISTING RETAINING WALL.
12. REMOVE AND DISPOSE OF EXISTING POWER POLE, ELECTRIC BOX/METER.
13. REMOVE AND DISPOSE OF EXISTING OVERHEAD ELECTRIC LINE.
14. REMOVE AND DISPOSE OF EXISTING GAS LINE.
15. REMOVE AND DISPOSE OF EXISTING CAR PLUG-IN.
16. REMOVE AND DISPOSE OF EXISTING TELEPHONE BOX.
17. REMOVE AND DISPOSE OF EXISTING MAIL BOX.
18. REMOVE AND DISPOSE OF EXISTING ANTENNA.
19. ABANDON EXISTING WATER SERVICE PER CITY REQUIREMENTS.
20. EXISTING RETAINING WALL SHALL REMAIN IN PLACE (PROTECT).

DEMOLITION NOTES

1. See Sheet C102 for Demolition Notes.

NORTH

0 10 20 40

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com
© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegroparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME THOMAS J. HERKENHOFF

SIGNATURE

DATE 07.22.24 REG. NO. 25570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS/COMMENTS	REVISIONS/COMMENTS

Project No.
24022
Issue Date:
07-22-24
Document Set:
PRELIMINARY

DEMOLITION PLAN
C100

DEMOLITION NOTES

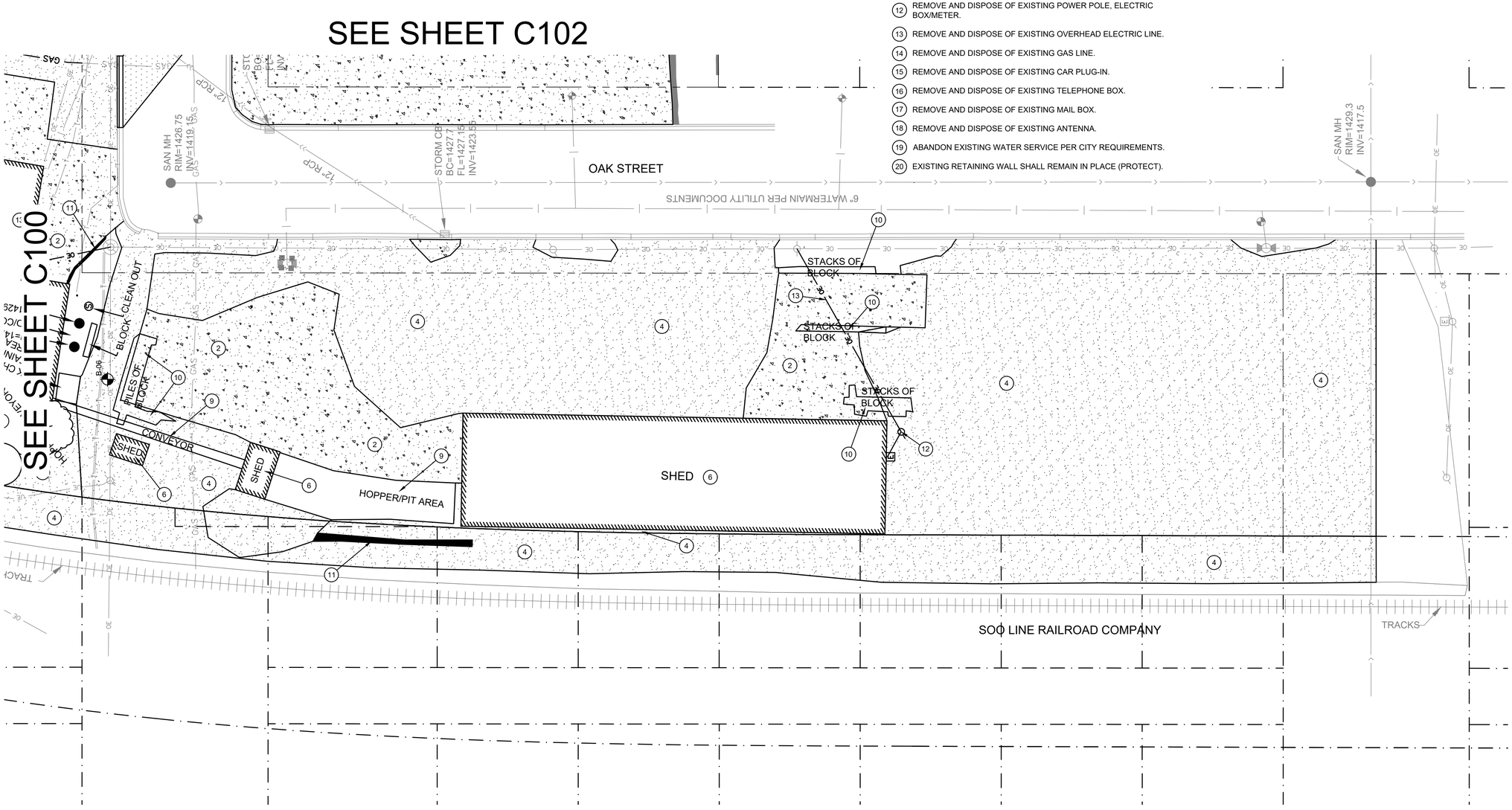
1. See Sheet C102 for Demolition Notes.

KEY NOTES

1. REMOVE AND DISPOSE OF EXISTING BITUMINOUS PAVEMENT.
2. REMOVE AND DISPOSE OF EXISTING CONCRETE PAVEMENT.
3. REMOVE AND DISPOSE OF EXISTING CONCRETE CURB AND GUTTER.
4. REMOVE AND DISPOSE OF EXISTING GRAVEL.
5. REMOVE AND DISPOSE OF EXISTING PAVERS.
6. REMOVE AND DISPOSE OF EXISTING BUILDING AND APPURTENANCES.
7. REMOVE AND DISPOSE OF EXISTING SILO.
8. REMOVE AND DISPOSE OF EXISTING SEPERATOR.
9. REMOVE AND DISPOSE OF EXISTING HOPPER AND CONVEYOR BELT.
10. REMOVE AND DISPOSE OF EXISTING LARGE CONCRETE BLOCKS.
11. REMOVE AND DISPOSE OF EXISTING RETAINING WALL.
12. REMOVE AND DISPOSE OF EXISTING POWER POLE, ELECTRIC BOX/METER.
13. REMOVE AND DISPOSE OF EXISTING OVERHEAD ELECTRIC LINE.
14. REMOVE AND DISPOSE OF EXISTING GAS LINE.
15. REMOVE AND DISPOSE OF EXISTING CAR PLUG-IN.
16. REMOVE AND DISPOSE OF EXISTING TELEPHONE BOX.
17. REMOVE AND DISPOSE OF EXISTING MAIL BOX.
18. REMOVE AND DISPOSE OF EXISTING ANTENNA.
19. ABANDON EXISTING WATER SERVICE PER CITY REQUIREMENTS.
20. EXISTING RETAINING WALL SHALL REMAIN IN PLACE (PROTECT).

SYMBOL LEGEND

- REMOVE AND DISPOSE OF EXISTING BITUMINOUS PAVEMENT SECTION
- REMOVE AND DISPOSE OF EXISTING CONCRETE PAVEMENT SECTION
- APPROXIMATE PAVEMENT CORE/BORING LOCATION SEE PROJECT GEOTECHNICAL REPORT



Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com

© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegrouparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME THOMAS J. HERKENHOFF

SIGNATURE

DATE 07.22.24 REG. NO. 25570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

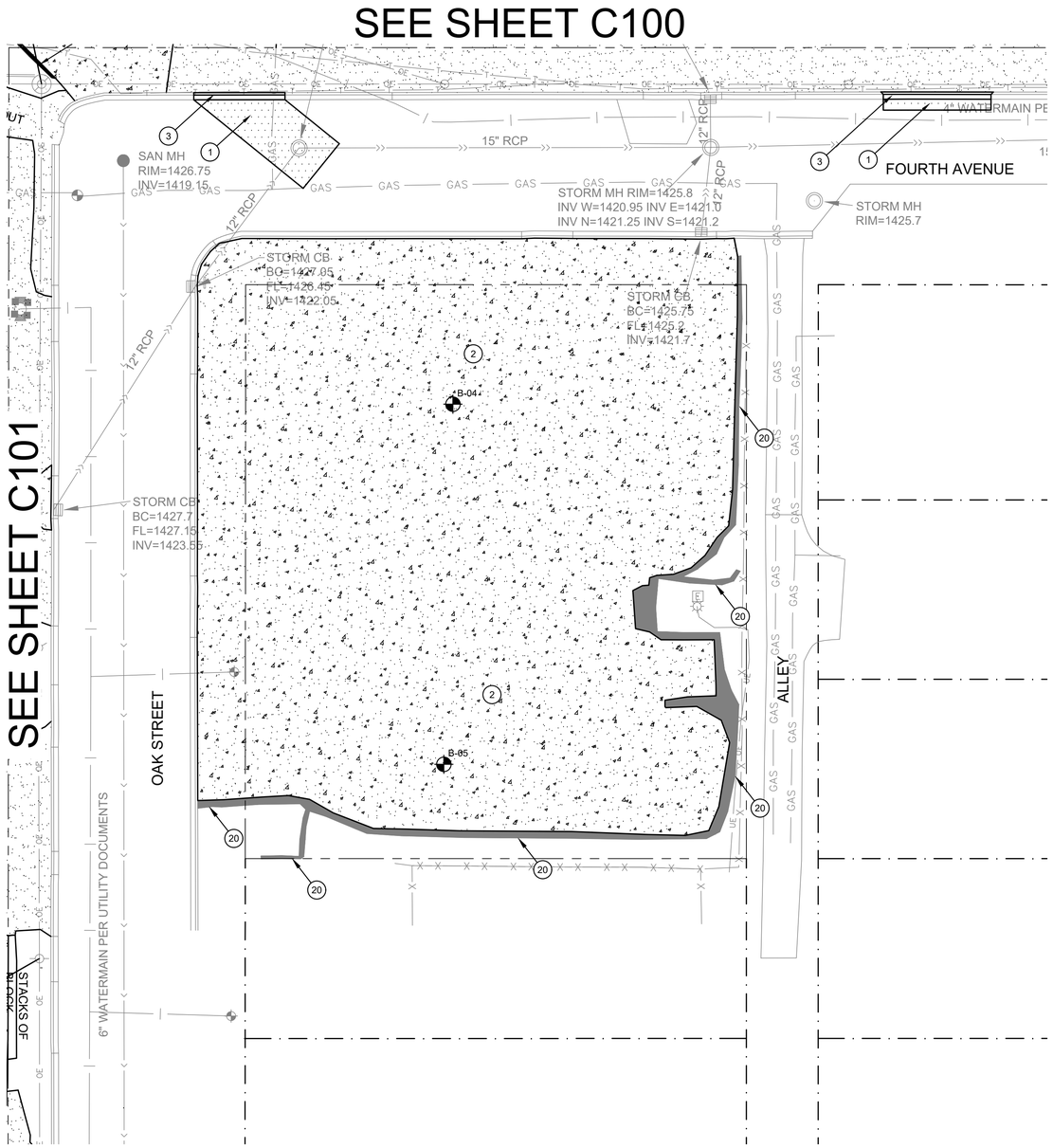
PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS/COMMENTS	REVISIONS/COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMIINARY

DEMOLITION PLAN
C101

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C100 - Demolition Plan.dwg



DEMOLITION NOTES

1. Verify all existing utility locations.
2. It is the responsibility of the Contractor to perform or coordinate all necessary utility demolitions and relocations from existing utility locations to all onsite amenities and buildings. These connections include, but are not limited to, water, sanitary sewer, cable tv, telephone, gas, electric, site lighting, etc.
3. Prior to beginning work, contact Gopher State Onecall (651-454-0002) to locate utilities throughout the area under construction. The Contractor shall retain the services of a private utility locator to locate the private utilities.
4. Sawcut along edges of pavements, sidewalks, and curbs to remain.
5. All construction shall be performed in accordance with state and local standard specifications for construction.
6. Demolition of existing buildings shall be completed according to Federal, State, County and City rules and regulations. Proper Environmental aspects and removals shall be followed including but not limited to proper removal of asbestos, etc.
7. There are contaminated soils on site. Contaminated soil removal shall be reviewed and verified with Stantec.
8. The contractor shall be responsible for obtaining permits that may be needed for working on or around the railroad property. The contractor shall also be responsible for any flaggers that may be needed when working on or around the railroad property.
9. Existing conditions and demolition notes are based off the site survey. Contractor to verify all existing conditions.

SYMBOL LEGEND

REMOVE AND DISPOSE OF EXISTING BITUMINOUS PAVEMENT SECTION

REMOVE AND DISPOSE OF EXISTING CONCRETE PAVEMENT SECTION

APPROXIMATE PAVEMENT CORE/BORING LOCATION SEE PROJECT GEOTECHNICAL REPORT

KEY NOTES

1. REMOVE AND DISPOSE OF EXISTING BITUMINOUS PAVEMENT.
2. REMOVE AND DISPOSE OF EXISTING CONCRETE PAVEMENT.
3. REMOVE AND DISPOSE OF EXISTING CONCRETE CURB AND GUTTER.
4. REMOVE AND DISPOSE OF EXISTING GRAVEL.
5. REMOVE AND DISPOSE OF EXISTING PAVERS.
6. REMOVE AND DISPOSE OF EXISTING BUILDING AND APPURTENANCES.
7. REMOVE AND DISPOSE OF EXISTING SILO.
8. REMOVE AND DISPOSE OF EXISTING SEPERATOR.
9. REMOVE AND DISPOSE OF EXISTING HOPPER AND CONVEYOR BELT.
10. REMOVE AND DISPOSE OF EXISTING LARGE CONCRETE BLOCKS.
11. REMOVE AND DISPOSE OF EXISTING RETAINING WALL.
12. REMOVE AND DISPOSE OF EXISTING POWER POLE, ELECTRIC BOX/METER.
13. REMOVE AND DISPOSE OF EXISTING OVERHEAD ELECTRIC LINE.
14. REMOVE AND DISPOSE OF EXISTING GAS LINE.
15. REMOVE AND DISPOSE OF EXISTING CAR PLUG-IN.
16. REMOVE AND DISPOSE OF EXISTING TELEPHONE BOX.
17. REMOVE AND DISPOSE OF EXISTING MAIL BOX.
18. REMOVE AND DISPOSE OF EXISTING ANTENNA.
19. ABANDON EXISTING WATER SERVICE PER CITY REQUIREMENTS.
20. EXISTING RETAINING WALL SHALL REMAIN IN PLACE (PROTECT).

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com

© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP
ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegroparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME THOMAS J. HERKENHOFF

SIGNATURE

DATE 07.22.24 REG. NO. 25570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

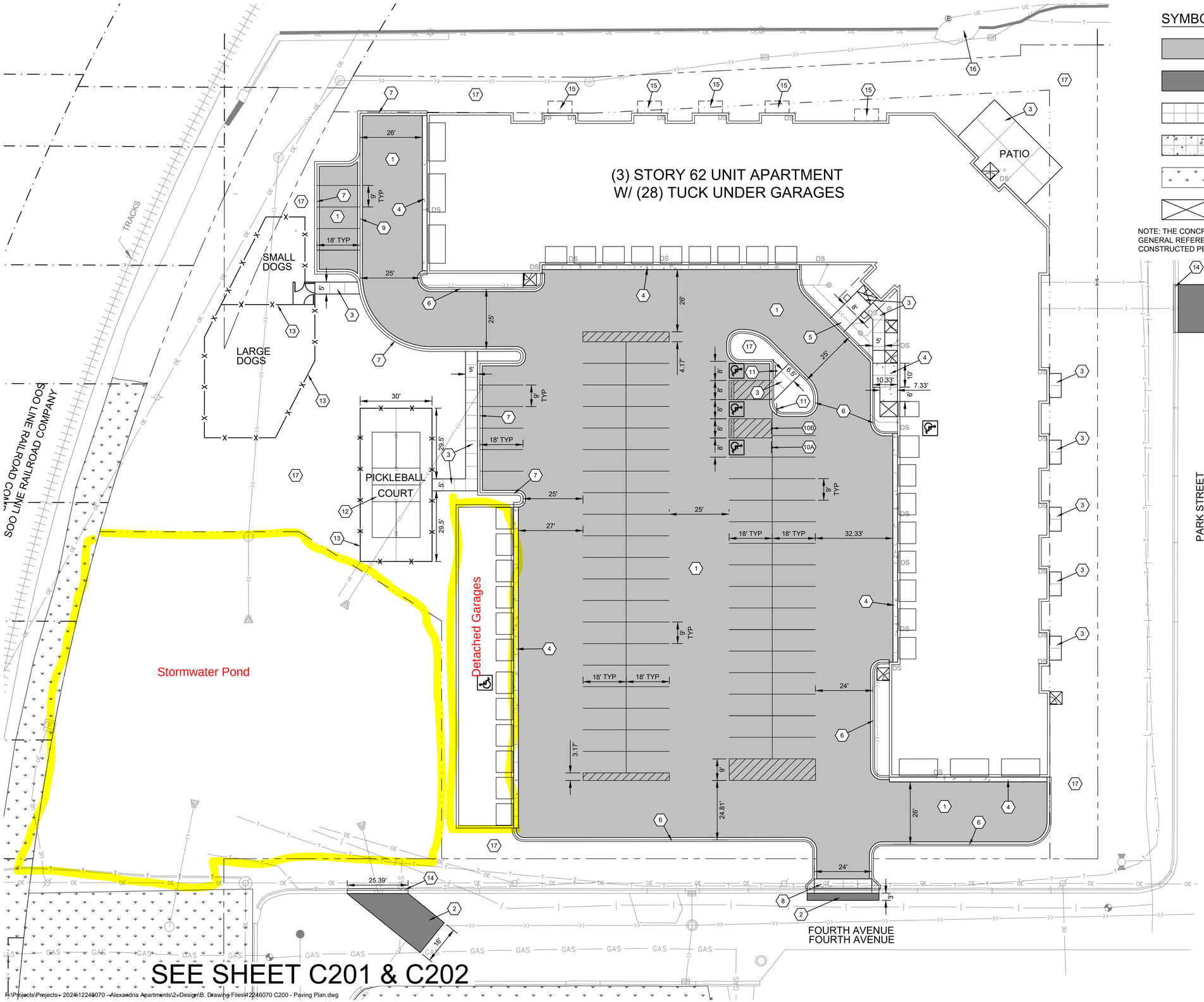
REVISIONS/COMMENTS	REVISIONS/COMMENTS

Project No.
24022
Issue Date:
07-22-24
Document Set:
PRELIMIINARY

DEMOLITION PLAN
C102

NORTH
0 10 20 40

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C100 - Demolition Plan.dwg



SYMBOL LEGEND

- NEW LIGHT-DUTY BITUMINOUS PAVEMENT SEE DETAIL 1/C500
- NEW HEAVY-DUTY BITUMINOUS PAVEMENT MATCH EXISTING
- NEW LIGHT-DUTY CONCRETE PAVEMENT SEE DETAIL 2/C500
- NEW HEAVY-DUTY CONCRETE PAVEMENT SEE DETAIL 3/C500
- NEW SEED OVER 4" GOOD QUALITY TOPSOIL
- NEW STOOP SEE ARCH. AND STRUCTURAL

NOTE: THE CONCRETE JOINTS ARE SHOWN ONLY FOR GENERAL REFERENCE. ACTUAL JOINTS SHALL BE CONSTRUCTED PER PROJECT SPECIFICATIONS.

GENERAL

- PROPERTY LINE
- EASEMENT LINE
- RIGHT-OF-WAY LINE
- SETBACK LINE

KEY NOTES

1. NEW LIGHT-DUTY BITUMINOUS PAVEMENT, SEE DETAIL 1/C500
2. NEW BITUMINOUS PAVEMENT IN RIGHT OF WAY, MATCH EXISTING
3. NEW LIGHT-DUTY CONCRETE PAVEMENT, SEE DETAIL 2/C500
4. NEW HEAVY-DUTY CONCRETE PAVEMENT, SEE DETAIL 3/C500
5. NEW ACCESSIBLE CURB RAMP, SEE DETAIL 4/C500
6. NEW B612 CONCRETE CURB, SEE DETAIL 5/C500
7. NEW SURMOUNTABLE CURB,SEE DETAIL 6/C500
8. NEW DRIVEWAY APRON,SEE DETAIL 7/C500
9. NEW CONCRETE VALLEY GUTTER, SEE DETAIL 8/C500
10. NEW PARKING SIGN, POST, AND BOLLARD, SEE DETAIL 1/C501
    - _A: ADA PARKING
    - _B: ADA ACCESS AISLE
11. NEW ADA PARKING SIGN AND POST, SEE DETAIL 2/C501
12. NEW PICKLEBALL COURT, SEE 3A/C500
13. NEW FENCE, SEE ARCHITECT PLANS
14. NEW B618 CONCRETE CURB, SEE DETAIL 9/C500
15. NEW DECK, SEE ARCH
16. FAILING RETAINING WALL TO BE RECONSTRUCTED BY CITY AND/OR COUNTY.
17. NEW LANDSCAPING, SEE ARCH

NORTH

0 10 20 40

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com

© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegrouparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME THOMAS J. HERKENHOFF

SIGNATURE

DATE 07.22.24 REG. NO. 23520

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

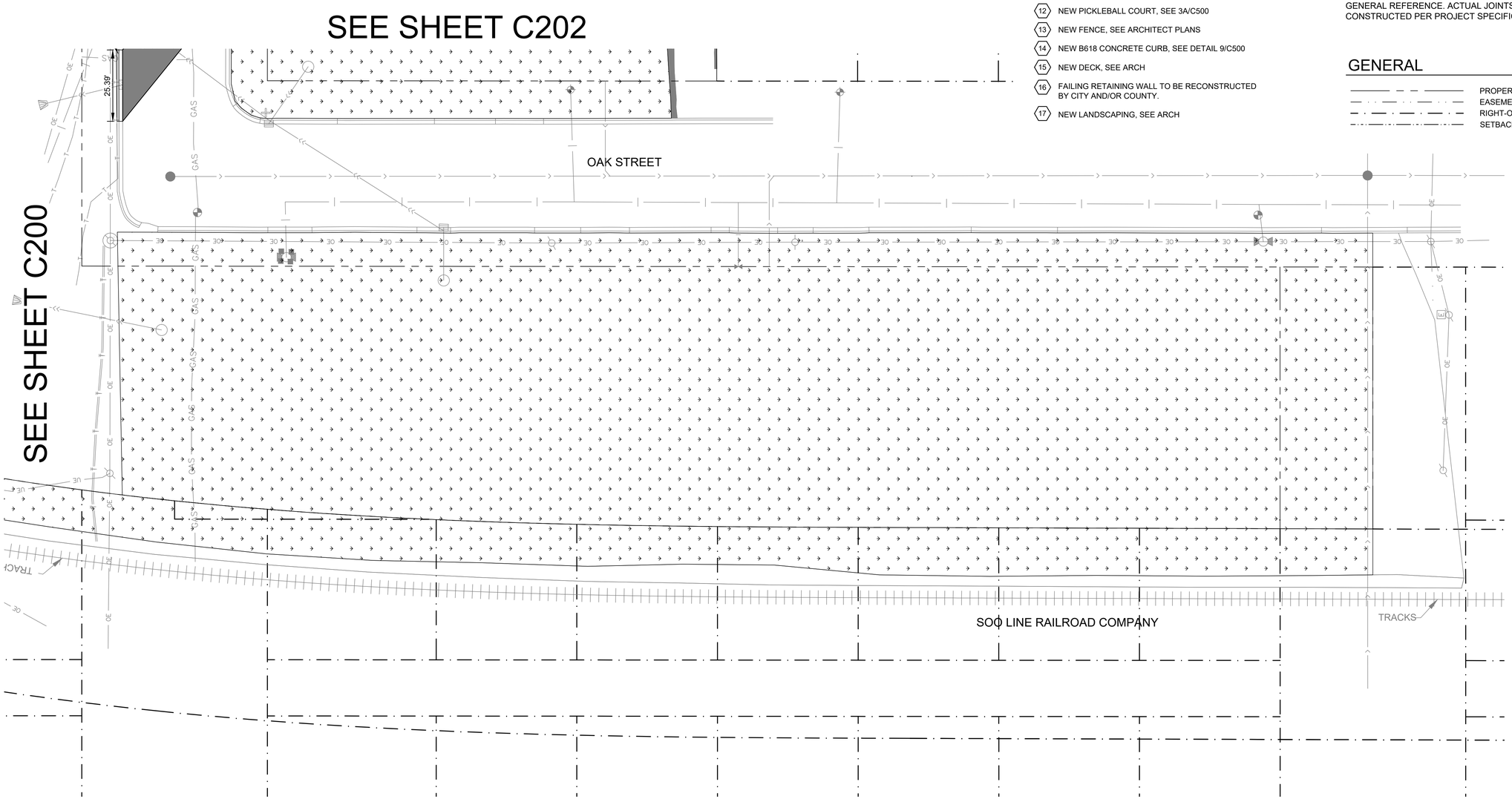
REVISIONS/COMMENTS

REVISIONS/COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMINARY

PAVING & DIMENSION PLAN
C200

R:\Projects\Projects- 2024\12246070 -Alexandria Apartments\2-Design\B. Drawing Files\12246070 C200 - Paving Plan.dwg



KEY NOTES

1. NEW LIGHT-DUTY BITUMINOUS PAVEMENT, SEE DETAIL 1/C500
2. NEW BITUMINOUS PAVEMENT IN RIGHT OF WAY, MATCH EXISTING
3. NEW LIGHT-DUTY CONCRETE PAVEMENT, SEE DETAIL 2/C500
4. NEW HEAVY-DUTY CONCRETE PAVEMENT, SEE DETAIL 3/C500
5. NEW ACCESSIBLE CURB RAMP, SEE DETAIL 4/C500
6. NEW B612 CONCRETE CURB, SEE DETAIL 5/C500
7. NEW SURMOUNTABLE CURB,SEE DETAIL 6/C500
8. NEW DRIVEWAY APRON,SEE DETAIL 7/C500
9. NEW CONCRETE VALLEY GUTTER, SEE DETAIL 8/C500
10. NEW PARKING SIGN, POST, AND BOLLARD, SEE DETAIL 1/C501
    - _A: ADA PARKING
    - _B: ADA ACCESS AISLE
11. NEW ADA PARKING SIGN AND POST, SEE DETAIL 2/C501
12. NEW PICKLEBALL COURT, SEE 3A/C500
13. NEW FENCE, SEE ARCHITECT PLANS
14. NEW B618 CONCRETE CURB, SEE DETAIL 9/C500
15. NEW DECK, SEE ARCH
16. FAILING RETAINING WALL TO BE RECONSTRUCTED BY CITY AND/OR COUNTY.
17. NEW LANDSCAPING, SEE ARCH

SYMBOL LEGEND

- NEW LIGHT-DUTY BITUMINOUS PAVEMENT SEE DETAIL 1/C500
- NEW HEAVY-DUTY BITUMINOUS PAVEMENT MATCH EXISTING
- NEW LIGHT-DUTY CONCRETE PAVEMENT SEE DETAIL 2/C500
- NEW HEAVY-DUTY CONCRETE PAVEMENT SEE DETAIL 3/C500
- NEW SEED OVER 4" GOOD QUALITY TOPSOIL

NOTE: THE CONCRETE JOINTS ARE SHOWN ONLY FOR GENERAL REFERENCE. ACTUAL JOINTS SHALL BE CONSTRUCTED PER PROJECT SPECIFICATIONS.

GENERAL

- PROPERTY LINE
- EASEMENT LINE
- RIGHT-OF-WAY LINE
- SETBACK LINE

NORTH

0 10 20 40

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com
© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegrouparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME THOMAS J. HERKENHOFF
SIGNATURE
DATE 07.22.24 REG. NO. 25570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

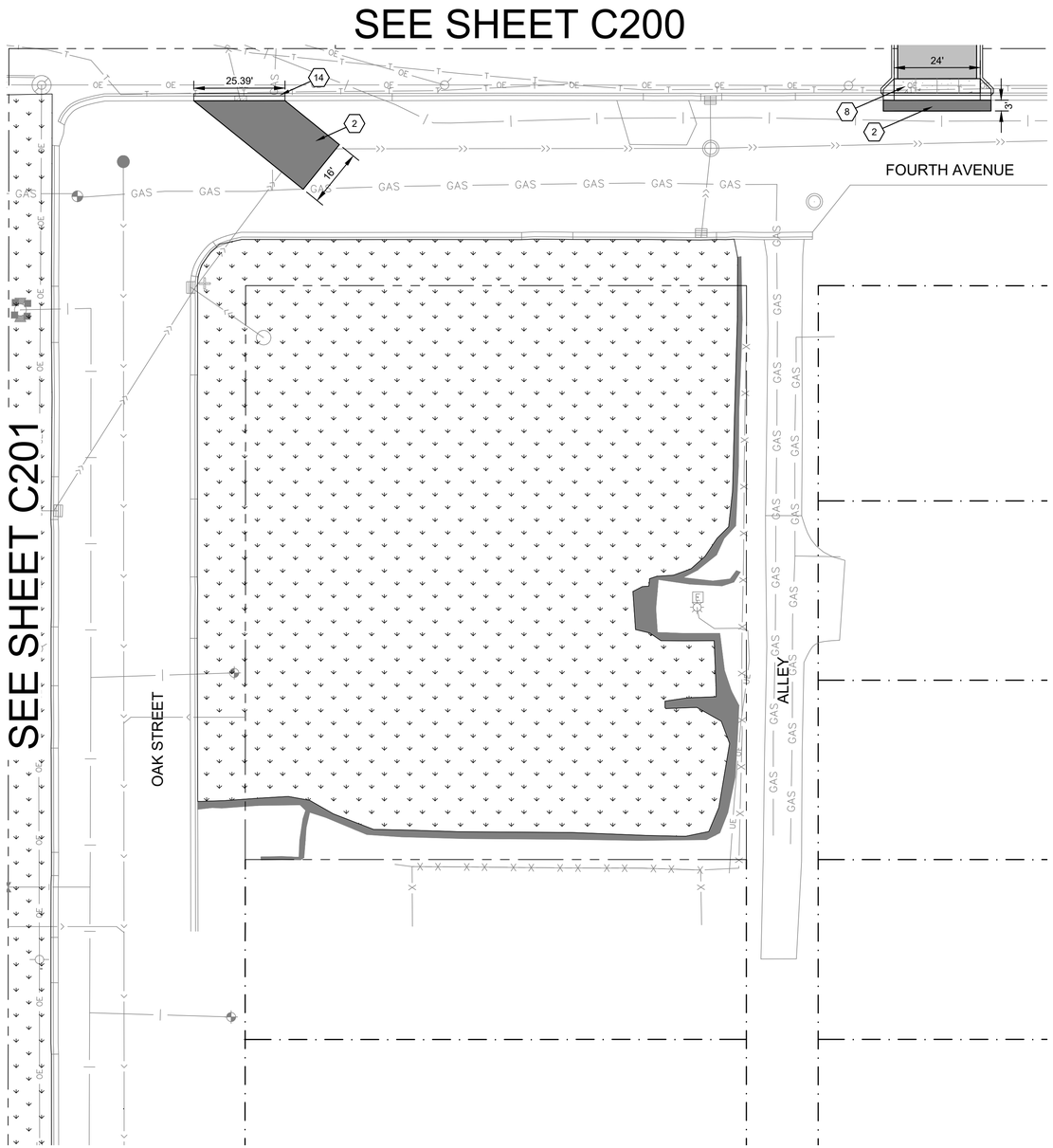
PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS/COMMENTS
REVISIONS/COMMENTS

Project No.
24022
Issue Date:
07-22-24
Document Set:
PRELIMINARY

PAVING & DIMENSION PLAN
C201

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C200 - Paving Plan.dwg



SYMBOL LEGEND

- NEW LIGHT-DUTY BITUMINOUS PAVEMENT SEE DETAIL 1/C500
- NEW HEAVY-DUTY BITUMINOUS PAVEMENT MATCH EXISTING
- NEW LIGHT-DUTY CONCRETE PAVEMENT SEE DETAIL 2/C500
- NEW HEAVY-DUTY CONCRETE PAVEMENT SEE DETAIL 3/C500
- NEW SEED OVER 4" GOOD QUALITY TOPSOIL

NOTE: THE CONCRETE JOINTS ARE SHOWN ONLY FOR GENERAL REFERENCE. ACTUAL JOINTS SHALL BE CONSTRUCTED PER PROJECT SPECIFICATIONS.

GENERAL

- PROPERTY LINE
- EASEMENT LINE
- RIGHT-OF-WAY LINE
- SETBACK LINE

KEY NOTES

1. NEW LIGHT-DUTY BITUMINOUS PAVEMENT, SEE DETAIL 1/C500
2. NEW BITUMINOUS PAVEMENT IN RIGHT OF WAY, MATCH EXISTING
3. NEW LIGHT-DUTY CONCRETE PAVEMENT, SEE DETAIL 2/C500
4. NEW HEAVY-DUTY CONCRETE PAVEMENT, SEE DETAIL 3/C500
5. NEW ACCESSIBLE CURB RAMP, SEE DETAIL 4/C500
6. NEW B612 CONCRETE CURB, SEE DETAIL 5/C500
7. NEW SURMOUNTABLE CURB,SEE DETAIL 6/C500
8. NEW DRIVEWAY APRON,SEE DETAIL 7/C500
9. NEW CONCRETE VALLEY GUTTER, SEE DETAIL 8/C500
10. NEW PARKING SIGN, POST, AND BOLLARD, SEE DETAIL 1/C501
    - _A: ADA PARKING
    - _B: ADA ACCESS AISLE
11. NEW ADA PARKING SIGN AND POST, SEE DETAIL 2/C501
12. NEW PICKLEBALL COURT, SEE 3A/C500
13. NEW FENCE, SEE ARCHITECT PLANS
14. NEW B618 CONCRETE CURB, SEE DETAIL 9/C500
15. NEW DECK, SEE ARCH
16. FAILING RETAINING WALL TO BE RECONSTRUCTED BY CITY AND/OR COUNTY.
17. NEW LANDSCAPING, SEE ARCH

NORTH

0 10 20 40

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com
© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegrouparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME THOMAS J. HERKENHOFF
SIGNATURE
DATE 07.22.24 REG. NO. 25520

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

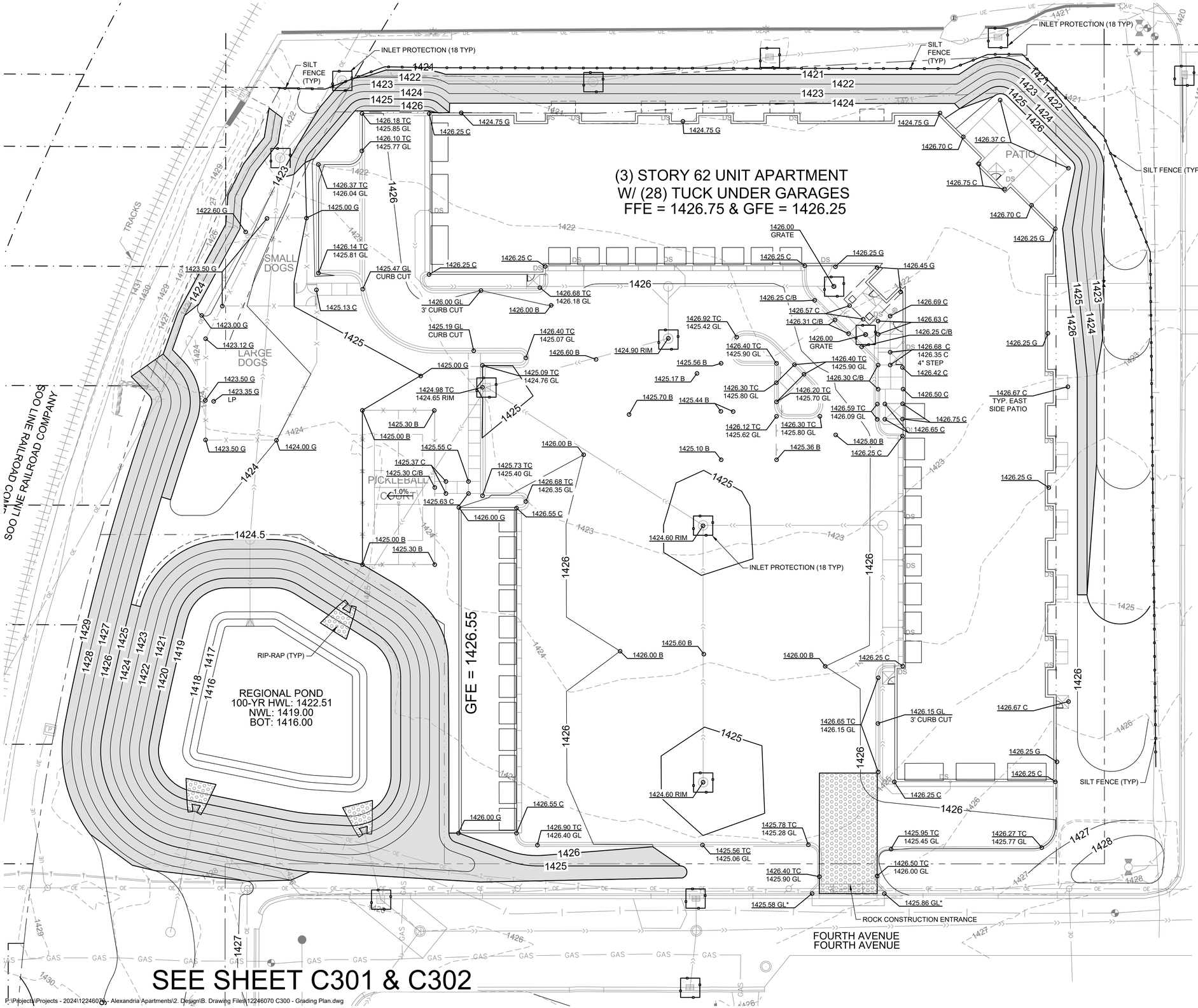
PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS COMMENTS	REVISIONS COMMENTS

Project No.
24022
Issue Date:
07-22-24
Document Set:
PRELIMINARY

PAVING & DIMENSION PLAN
C202

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C200 - Paving Plan.dwg



SYMBOL LEGEND

- 950 — EXISTING CONTOURS
- 950 — PROPOSED CONTOURS - MAJOR INTERVAL
- 949 — PROPOSED CONTOURS - MINOR INTERVAL
- GRADE BREAK LINE
- 2.0% — GRADE SLOPE
- SILT FENCE, SEE DETAIL 2/C502
- RIP-RAP, SEE DETAIL 5/C502
  ROCK CONST. ENTRANCE, SEE DETAIL 1/C502
- EROSION CONTROL BLANKET, SEE DETAIL 4/C502
- INLET PROTECTION, SEE DETAIL 3/C502

SPOT ABBREVIATIONS:

1410.00 TC
1409.50 GL

TC - TOP OF CURB
GL - GUTTER LINE
B - BITUMINOUS
C - CONCRETE
G - GROUND
LP - LOW POINT
RIM - TOP OF CASTING
FFE - FINISHED FLOOR ELEVATION
GFE - GARAGE FLOOR ELEVATION
(*) - EXISTING TO BE VERIFIED

GRADING NOTES

1. See Sheet C302 for Grading Notes.

EROSION CONTROL NOTES

1. See Sheet C302 for Erosion Control Notes.

NORTH

0 10 20 40

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com

© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
Saint Cloud, MN 56301
(320) 654-6570
www.colegroupparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME THOMAS J. HERKENHOFF

SIGNATURE

DATE 07.22.24 REG. NO. 25570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS COMMENTS	REVISIONS COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMINARY

Gading & Erosion Control Plan
C300

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C300 - Grading Plan.dwg

GRADING NOTES

1. See Sheet C302 for Grading Notes.

EROSION CONTROL NOTES

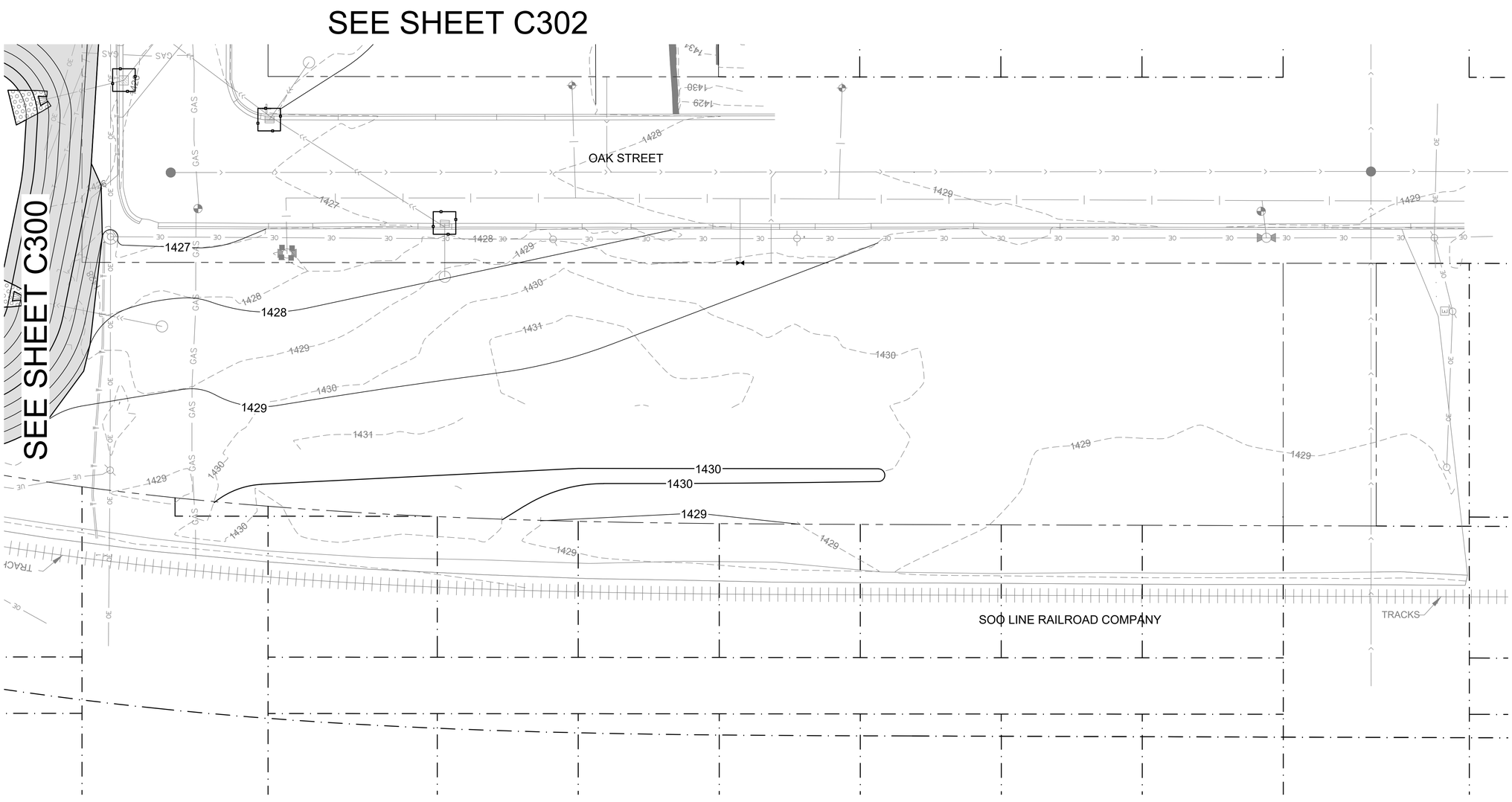
1. See Sheet C302 for Erosion Control Notes.

1410.00 TC
1409.50 GL

SPOT ABBREVIATIONS:
TC - TOP OF CURB
GL - GUTTER LINE
B - BITUMINOUS
C - CONCRETE
G - GROUND
LP - LOW POINT
RIM - TOP OF CASTING
FFE - FINISHED FLOOR ELEVATION
GFE - GARAGE FLOOR ELEVATION
(*) - EXISTING TO BE VERIFIED

SYMBOL LEGEND

- 950 — EXISTING CONTOURS
- 950 — PROPOSED CONTOURS - MAJOR INTERVAL
- 949 — PROPOSED CONTOURS - MINOR INTERVAL
- GRADE BREAK LINE
- 2.0% — GRADE SLOPE
- SILT FENCE, SEE DETAIL 2/C502
- RIP-RAP, SEE DETAIL 5/C502
- ROCK CONST. ENTRANCE, SEE DETAIL 1/C502
- EROSION CONTROL BLANKET, SEE DETAIL 4/C502
- INLET PROTECTION, SEE DETAIL 3/C502



NORTH

0 10 20 40

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com

© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegrouparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME THOMAS J. HERKENHOFF

SIGNATURE

DATE 07/22/24 REG. NO. 25570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

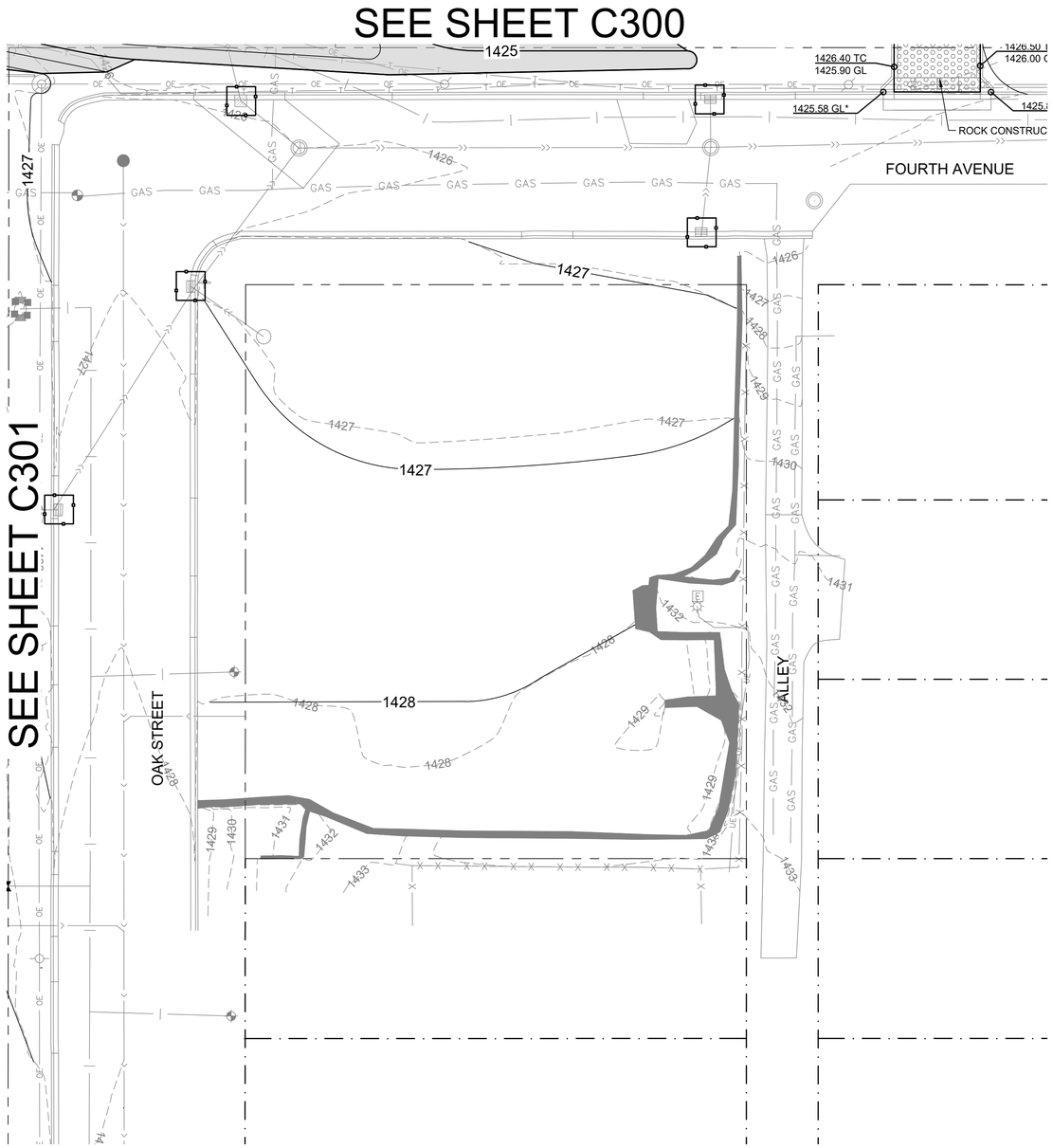
PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS	COMMENTS	REVISIONS	COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMINARY

Gading & Erosion Control Plan
C301

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C300 - Grading Plan.dwg



EROSION CONTROL NOTES

1. Owner and Contractor shall obtain MPCA-NPDES permit. Contractor shall be responsible for all fees pertaining to this permit. The SWPPP shall be kept onsite at all times.
2. Install temporary erosion control measures (inlet protection, silt fence, and rock construction entrances) prior to beginning any excavation or demolition work at the site.
3. Erosion control measures shown on the erosion control plan are the absolute minimum. The contractor shall install temporary earth dikes, sediment traps or basins, additional siltation fencing, and/or disk the soil parallel to the contours as deemed necessary to further control erosion. All changes shall be recorded in the SWPPP.
4. All construction site entrances shall be surfaced with crushed rock across the entire width of the entrance and from the entrance to a point 50' into the construction zone.
5. The toe of the silt fence shall be trenched in a minimum of 6". The trench backfill shall be compacted with a vibratory plate compactor.
6. All grading operations shall be conducted in a manner to minimize the potential for site erosion. Sediment control practices must be established on all down gradient perimeters before any up gradient land disturbing activities begin.
7. All exposed soil areas must be stabilized as soon as possible to limit soil erosion but in no case later than 7 days after the construction activity in that portion of the site has temporarily or permanently ceased. Temporary stockpiles without significant silt, clay or organic components (e.g., clean aggregate stockpiles, demolition concrete stockpiles, sand stockpiles) and the constructed base components of roads, parking lots and similar surfaces are exempt from this requirement.
8. The normal wetted perimeter of any temporary or permanent drainage ditch or swale that drains water from any portion of the construction site, or diverts water around the site, must be stabilized within 200 lineal feet from the property edge, or from the point of discharge into any surface water. Stabilization of the last 200 lineal feet must be completed within 24 hours after connecting to a surface water. Stabilization of the remaining portions of any temporary or permanent ditches or swales must be complete within 7 days after connecting to a surface water and construction in that portion of the ditch has temporarily or permanently ceased.
9. Pipe outlets must be provided with energy dissipation within 24 hours of connection to surface water.
10. All riprap shall be installed with a filter material or soil separation fabric and comply with the Minnesota Department of Transportation Standard Specifications.
11. All storm sewers discharging into wetlands or water bodies shall outlet at or below the normal water level of the respective wetland or water body at an elevation where the downstream slope is 1 percent or flatter. The normal water level shall be the invert elevation of the outlet of the wetland or water body.
12. All storm sewer catch basins not needed for site drainage during construction shall be covered to prevent runoff from entering the storm sewer system. Catch basins necessary for site drainage during construction shall be provided with inlet protection.
13. In areas where concentrated flows occur (such as swales and areas in front of storm catch basins and intakes) the erosion control facilities shall be backed by stabilization structure to protect those facilities from the concentrated flows.
14. Inspect the construction site once every seven days during active construction and within 24 hours after a rainfall event greater than 0.5 inches in 24 hours. All inspections shall be recorded in the SWPPP.
15. All BMPs must be repaired, replaced, or supplemented when they become nonfunctional or the sediment reaches 1/3 of the capacity of the BMP. These repairs must be made within 24 hours of discovery, or as soon as field conditions allow access. All repairs shall be recorded in the SWPPP.
16. If sediment escapes the construction site, off-site accumulations of sediment must be removed in a manner and at a frequency sufficient to minimize off-site impacts.
17. All soils tracked onto pavement shall be removed daily.
18. All infiltration areas must be inspected to ensure that no sediment from ongoing construction activity is reaching the infiltration area and these areas are protected from compaction due to construction equipment driving across the infiltration area.
19. Temporary soil stockpiles must have silt fence or other effective sediment controls, and cannot be placed in surface waters, including stormwater conveyances such as curb and gutter systems, or conduits and ditches unless there is a bypass in place for the stormwater.
20. Collected sediment, asphalt and concrete millings, floating debris, paper, plastic, fabric, construction and demolition debris and other wastes must be disposed of properly and must comply with MPCA disposal requirements.
21. Oil, gasoline, paint and any hazardous substances must be properly stored, including secondary containment, to prevent spills, leaks or other discharge. Restricted access to storage areas must be provided to prevent vandalism. Storage and disposal of hazardous waste must be in compliance with MPCA regulations.
22. External washing of trucks and other construction vehicles must be limited to a defined area of the site. Runoff must be contained and waste properly disposed of. No engine degreasing is allowed onsite.
23. All liquid and solid wastes generated by concrete washout operations must be contained in a leak-proof containment facility or impermeable liner. A compacted clay liner that does not allow washout liquids to enter ground water is considered an impermeable liner. The liquid and solid wastes must not contact the ground, and there must not be runoff from the concrete washout operations or areas. Liquid and solid wastes must be disposed of properly and in compliance with MPCA regulations. A sign must be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
24. Upon completion of the project and stabilization of all graded areas, all temporary erosion control facilities (silt fences, hay bales, etc.) shall be removed from the site.
25. All permanent sedimentation basins must be restored to their design condition immediately following stabilization of the site.
26. Contractor shall submit Notice of Termination for MPCA-NPDES permit within 30 days after Final Stabilization.

SYMBOL LEGEND

- 950 — EXISTING CONTOURS
- 950 — PROPOSED CONTOURS - MAJOR INTERVAL
- 949 — PROPOSED CONTOURS - MINOR INTERVAL
- GRADE BREAK LINE
- 2.0% — GRADE SLOPE
- SILT FENCE, SEE DETAIL 2/C502
- RIP-RAP, SEE DETAIL 5/C502
- ROCK CONST. ENTRANCE, SEE DETAIL 1/C502
- EROSION CONTROL BLANKET, SEE DETAIL 4/C502
- INLET PROTECTION, SEE DETAIL 3/C502

1410.00 TC
1409.50 GL

SPOT ABBREVIATIONS:
TC - TOP OF CURB
GL - GUTTER LINE
B - BITUMINOUS
C - CONCRETE
G - GROUND
LP - LOW POINT
RIM - TOP OF CASTING
FFE - FINISHED FLOOR ELEVATION
GFE - GARAGE FLOOR ELEVATION
(*) - EXISTING TO BE VERIFIED

GRADING NOTES

1. Tree protection consisting of snow fence or safety fence installed at the drip line shall be in place prior to beginning any grading or demolition work at the site.
2. All elevations with an asterisk (*) shall be field verified. If elevations vary significantly, notify the Engineer for further instructions.
3. Grades shown in paved areas represent finish elevation.
4. All disturbed areas to receive 4" of good quality topsoil and seed.
5. All construction shall be performed in accordance with state and local standard specifications for construction.
6. The contractor shall be responsible for obtaining permits that may be needed for working on or around the railroad property. The contractor shall also be responsible for any flaggers that may be needed when working on or around the railroad property

NORTH

0 10 20 40

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com
© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP
ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegroparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME THOMAS J. HERKENHOFF
SIGNATURE
DATE 07.22.24 REG. NO. 25570

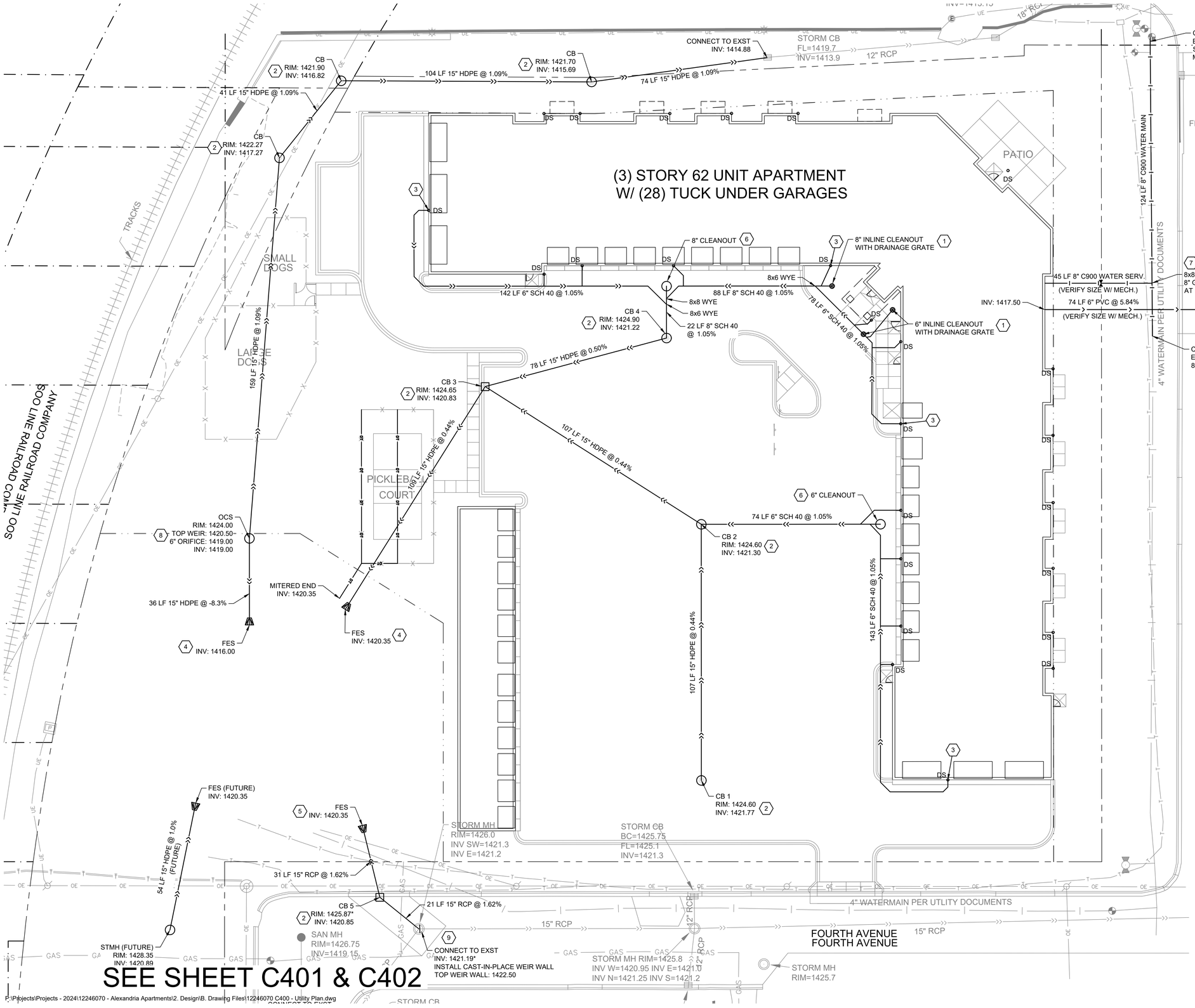
DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS/COMMENTS	REVISIONS/COMMENTS

Project No.
24022
Issue Date:
07-22-24
Document Set:
PRELIMIINARY

Gading & Erosion Control Plan
C302



SEE SHEET C401 & C402

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C400 - Utility Plan.dwg

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com
© 2024 Larson Engineering, Inc. All rights reserved.

SYMBOL LEGEND

CTV	CABLE UNDERGROUND LINE
OE	ELECTRIC OVERHEAD LINE
UE	ELECTRIC UNDERGROUND LINE
FO	FIBER OPTIC UNDERGROUND LINE
GAS	NATURAL GAS UNDERGROUND LINE
	SANITARY SEWER PIPE
	STORM SEWER PIPE
T	TELEPHONE UNDERGROUND LINE
	WATERMAIN PIPE
DT	DRAINTILE PIPE
	STORM MANHOLE
	CATCH BASIN
	CURB INLET
	FLARED END
	SANITARY MANHOLE
	HYDRANT
	GATE VALVE & BOX
	WATER SHUTOFF

KEY NOTES

1. NEW IN-LINE DRAIN, SEE DETAIL 3/C501
2. NEW CATCH BASIN MANHOLE, SEE DETAIL 4/C501
3. NEW ROOF DRAIN CONNECTION, SEE DETAIL 5/C501
4. NEW FLARED END SECTION (HDPE), SEE DETAIL 6/C501
5. NEW FLARED END SECTION (RCP), SEE DETAIL 7/C501
6. NEW CLEANOUT, SEE DETAIL 8/C501
7. NEW GATE VALVE, SEE DETAIL 6/C502
8. NEW OUTLET CONTROL STRUCTURE, SEE DETAIL 2/C402
9. NEW CAST-IN-PLACE WEIR WALL INSIDE EXISTING STRUCTURE, SEE DETAIL 1/C402

UTILITY NOTES

1. See Sheet C402 for Utility Notes

NORTH

0 10 20 40

COLE GROUP
ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegrouparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME THOMAS J. HERKENHOFF
SIGNATURE
DATE 07.22.24 REG. NO. 23570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARTMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS/COMMENTS	REVISIONS/COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMINARY

UTILITY PLAN
C400

UTILITY NOTES

1. See Sheet C402 for Utility Notes

KEY NOTES

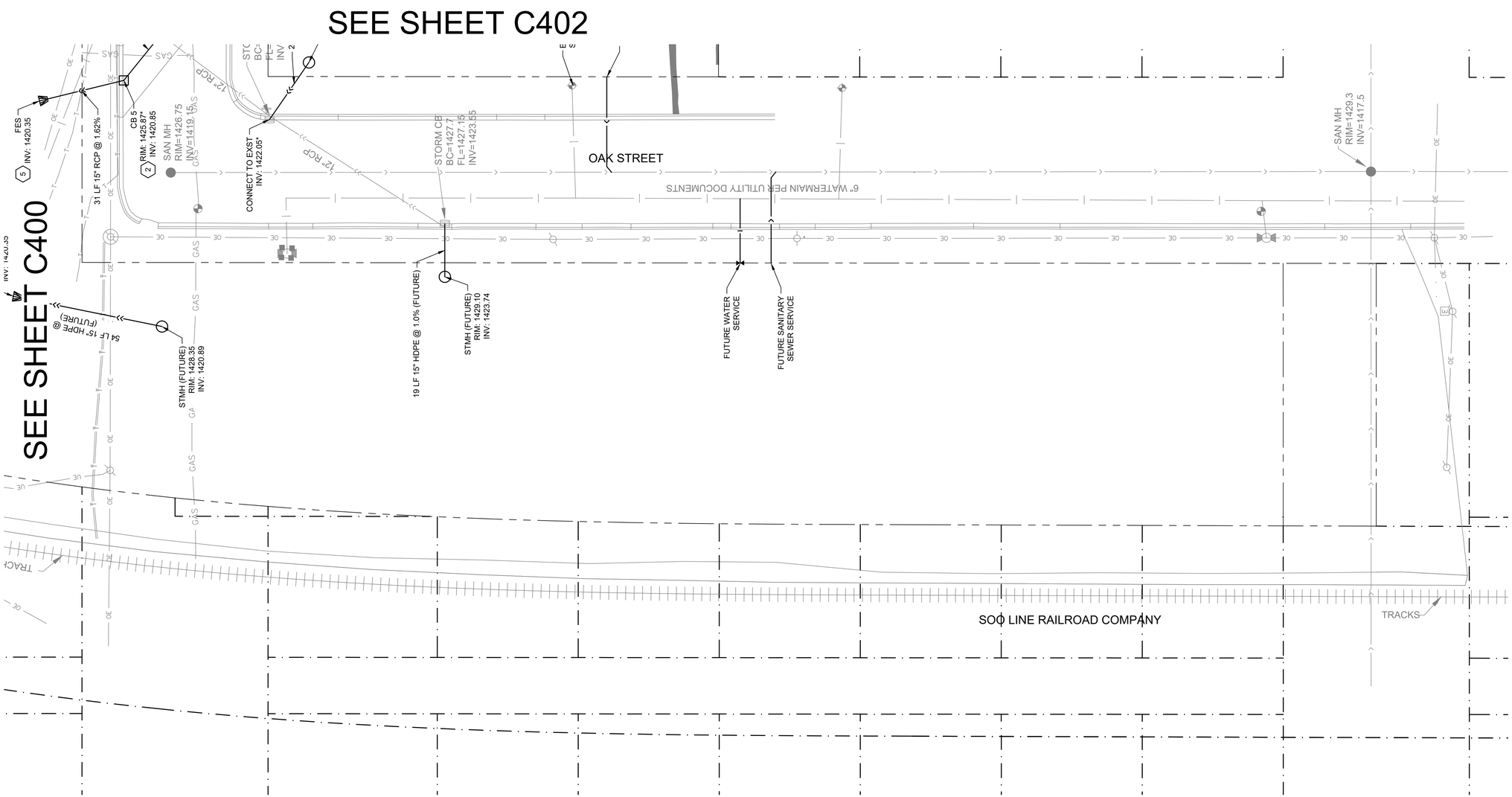
1. NEW IN-LINE DRAIN, SEE DETAIL 3/C501
2. NEW CATCH BASIN MANHOLE, SEE DETAIL 4/C501
3. NEW ROOF DRAIN CONNECTION, SEE DETAIL 5/C501
4. NEW FLARED END SECTION (HDPE), SEE DETAIL 6/C501
5. NEW FLARED END SECTION (RCP), SEE DETAIL 7/C501
6. NEW CLEANOUT, SEE DETAIL 8/C501
7. NEW GATE VALVE, SEE DETAIL 6/C502
8. NEW OUTLET CONTROL STRUCTURE, SEE DETAIL 2/C402
9. NEW CAST-IN-PLACE WEIR WALL INSIDE EXISTING STRUCTURE, SEE DETAIL 1/C402

SYMBOL LEGEND

	STORM MANHOLE	CTV	CABLE UNDERGROUND LINE
	CATCH BASIN	OE	ELECTRIC OVERHEAD LINE
	CURB INLET	UE	ELECTRIC UNDERGROUND LINE
	FLARED END	FO	FIBER OPTIC UNDERGROUND LINE
	SANITARY MANHOLE	GAS	NATURAL GAS UNDERGROUND LINE
	HYDRANT		SANITARY SEWER PIPE
	GATE VALVE & BOX		STORM SEWER PIPE
	WATER SHUTOFF	T	TELEPHONE UNDERGROUND LINE
	LIGHT POLE		WATERMAIN PIPE
		DT	DRAINTILE PIPE

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com

© 2024 Larson Engineering, Inc. All rights reserved.



NORTH

0 10 20 40

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
17717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME THOMAS J. HERKENHOFF
SIGNATURE
DATE 07-22-24 REG. NO. 23570

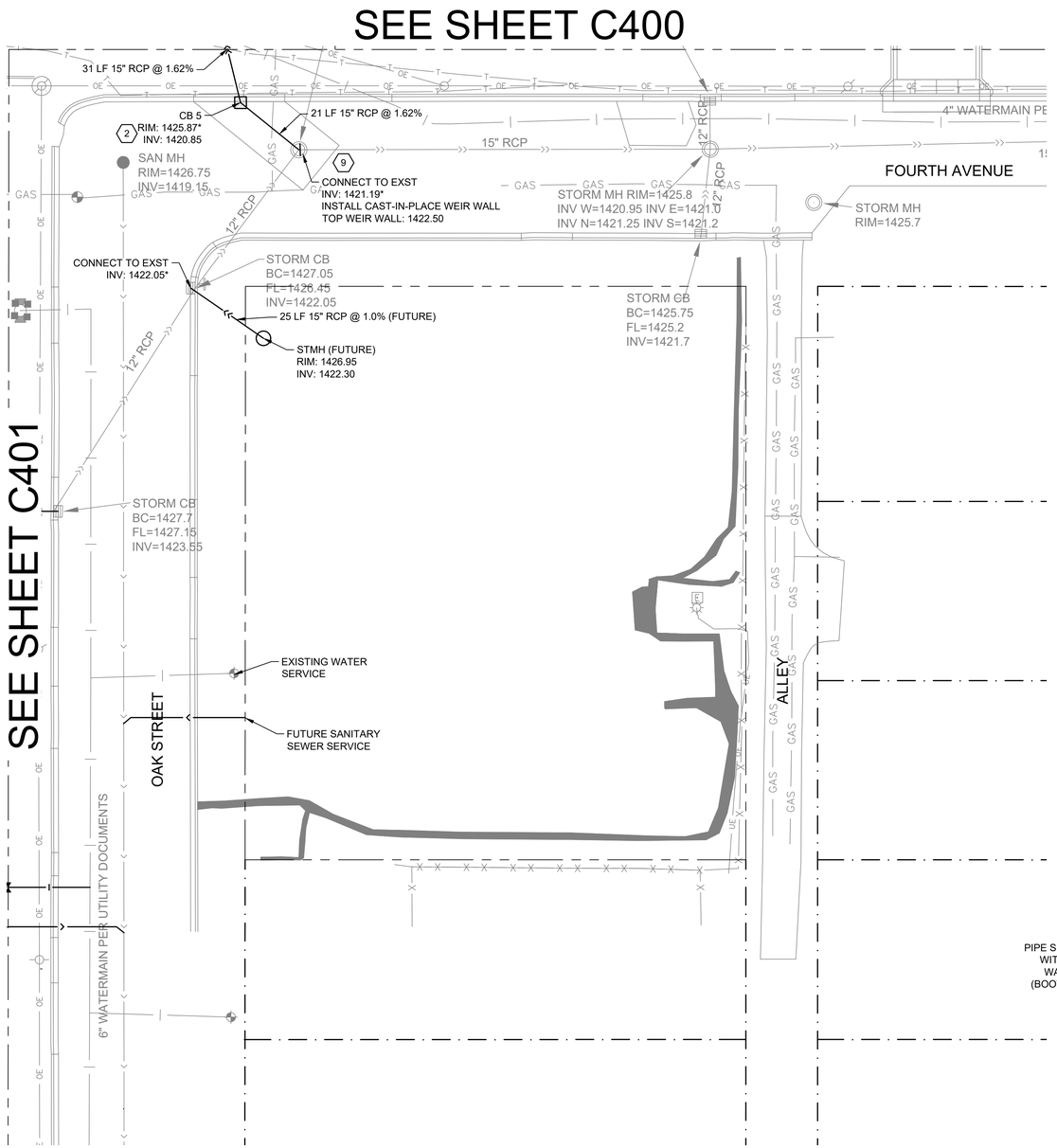
COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegrouparchitects.com

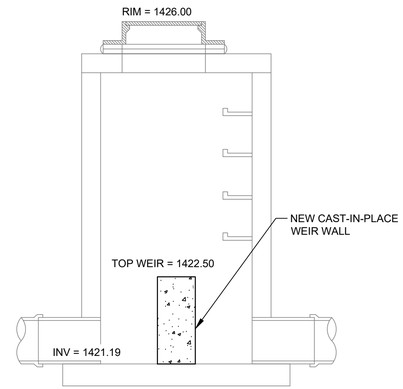
REVISIONS/COMMENTS
REVISIONS/COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMIINARY

UTILITY PLAN
C401

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C400 - Utility Plan.dwg



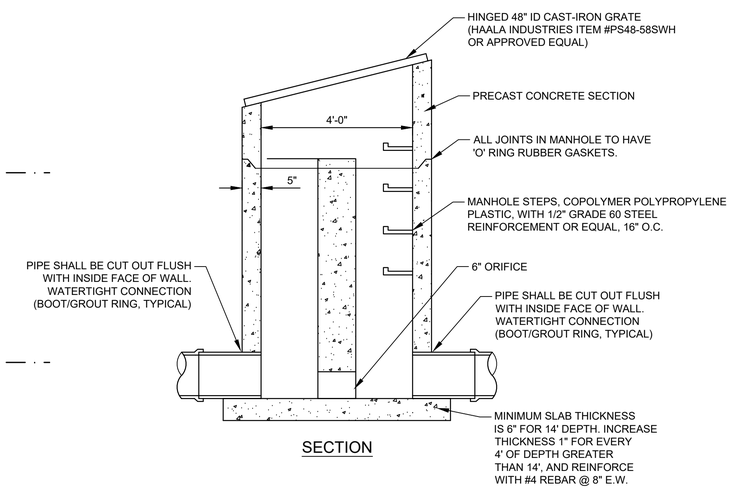


SECTION

1 C402

EXISTING STRUCTURE NEW WEIR WALL DETAIL

NOT TO SCALE



SECTION

2 C402

OUTLET CONTROL STRUCTURE MANHOLE DETAIL

NOT TO SCALE

UTILITY NOTES

1. It is the responsibility of the contractor to perform or coordinate all necessary utility connections and relocations from existing utility locations to the proposed building, as well as to all onsite amenities. These connections include but are not limited to water, sanitary sewer, cable TV, telephone, gas, electric, site lighting, etc.
2. All service connections shall be performed in accordance with state and local standard specifications for construction. Utility connections (sanitary sewer, watermain, and storm sewer) may require a permit from the City.
3. The contractor shall verify the elevations at proposed connections to existing utilities prior to any demolition or excavation.
4. The contractor shall notify all appropriate engineering departments and utility companies 72 hours prior to construction. All necessary precautions shall be made to avoid damage to existing utilities.
5. Storm sewer requires testing in accordance with Minnesota plumbing code 4714.1107 where located within 10 feet of waterlines or the building.
6. HDPE storm sewer piping shall meet ASTM F2306 and fittings shall meet ASTM D3212 joint pressure test. Installation shall meet ASTM C2321.
7. All RCP pipe shown on the plans shall be MN/DOT class 3.
8. Maintain a minimum of 7 ½' of cover over all water lines and sanitary sewer lines. Where 7 ½' of cover is not provided, install 2" rigid polystyrene insulation (MN/DOT 3760) with a thermal resistance of at least 5 and a compressive strength of at least 25 psi. Insulation shall be 8' wide, centered over pipe with 6" sand cushion between pipe and insulation. Where depth is less than 5', use 4" of insulation.
9. Install water lines 12" above sewers. Where the sewer is less than 12" below the water line (or above), install sewer piping of materials approved for inside building use for 10 feet on each side of the crossing.
10. All watermain piping shall be class 52 ductile iron pipe unless noted otherwise.
11. See Project Specifications for bedding requirements.
12. Pressure test and disinfect all new watermains in accordance with state and local requirements.
13. Sanitary sewer piping shall be PVC, SDR-35 for depths less than 12', PVC SDR-26 for depths between 12' and 26', and class 52 D.I.P. for depths of 26' or more.
14. A structure adjustment shall include removing and salvaging the existing casting assembly, removing existing concrete rings to the precast section. Install new rings and salvaged casting to proposed grades, cleaning casting flange by mechanical means to insure a sound surface and install an external chimney seal from casting to precast section. Chimney seals shall be Infi-Shield Uni-Band or an approved equal.

SYMBOL LEGEND

CTV	CABLE UNDERGROUND LINE
OE	ELECTRIC OVERHEAD LINE
UE	ELECTRIC UNDERGROUND LINE
FO	FIBER OPTIC UNDERGROUND LINE
GAS	NATURAL GAS UNDERGROUND LINE
	SANITARY SEWER PIPE
	STORM SEWER PIPE
T	TELEPHONE UNDERGROUND LINE
	WATERMAIN PIPE
DT	DRAINTILE PIPE
	STORM MANHOLE
	CATCH BASIN
	CURB INLET
	FLARED END
	SANITARY MANHOLE
	HYDRANT
	GATE VALVE & BOX
	WATER SHUTOFF
	LIGHT POLE

KEY NOTES

1. NEW IN-LINE DRAIN, SEE DETAIL 3/C501
2. NEW CATCH BASIN MANHOLE, SEE DETAIL 4/C501
3. NEW ROOF DRAIN CONNECTION, SEE DETAIL 5/C501
4. NEW FLARED END SECTION (HDPE), SEE DETAIL 6/C501
5. NEW FLARED END SECTION (RCP), SEE DETAIL 7/C501
6. NEW CLEANOUT, SEE DETAIL 8/C501
7. NEW GATE VALVE, SEE DETAIL 6/C502
8. NEW OUTLET CONTROL STRUCTURE, SEE DETAIL 2/C402
9. NEW CAST-IN-PLACE WEIR WALL INSIDE EXISTING STRUCTURE, SEE DETAIL 1/C402

NORTH

0 10 20 40

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com
© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-5570
www.colegrouparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME THOMAS J. HERKENHOFF
SIGNATURE
DATE 07.22.24 REG. NO. 23570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

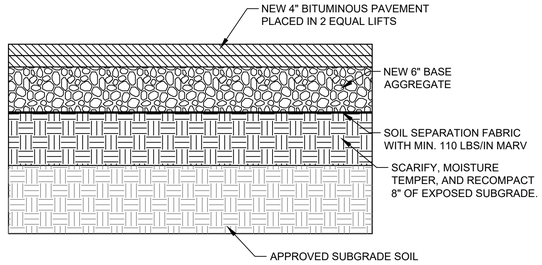
PROPOSED APARTMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS/COMMENTS
REVISIONS/COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMINARY

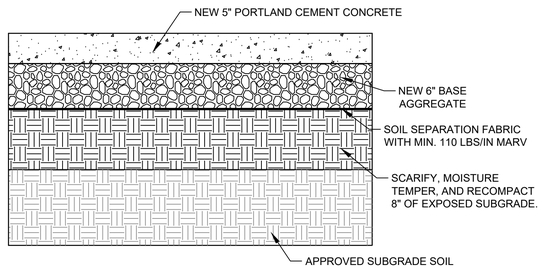
UTILITY PLAN
C402

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C400 - Utility Plan.dwg



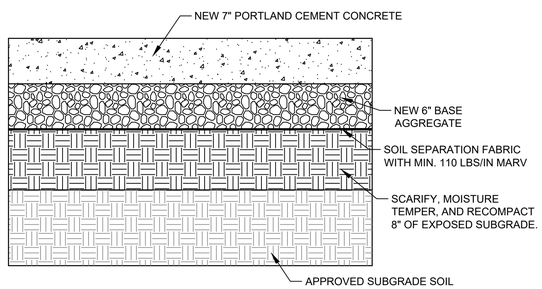
1 C500 BITUMINOUS PAVEMENT SECTION

NOT TO SCALE



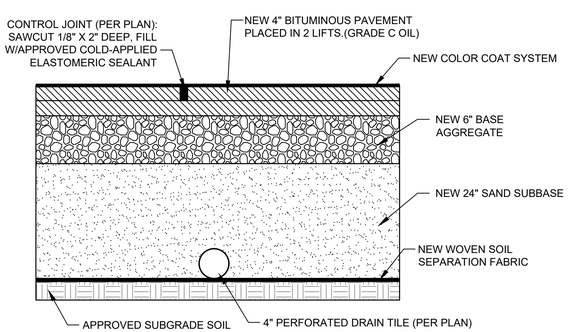
2 C500 CONCRETE CONSTRUCTION DETAIL

NOT TO SCALE



3 C500 CONCRETE CONSTRUCTION DETAIL

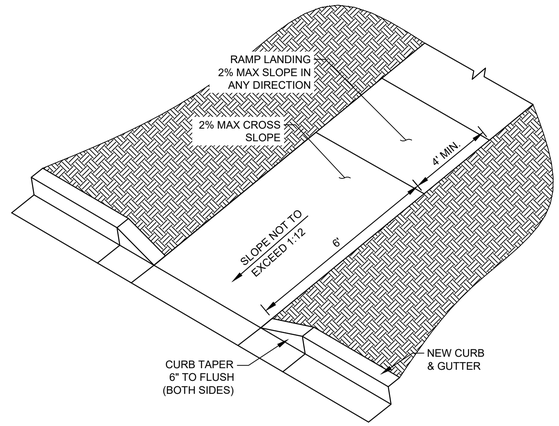
NOT TO SCALE



NOTE: EXTEND SAND SECTION 36" MIN. BEYOND ALL PAVEMENTS.

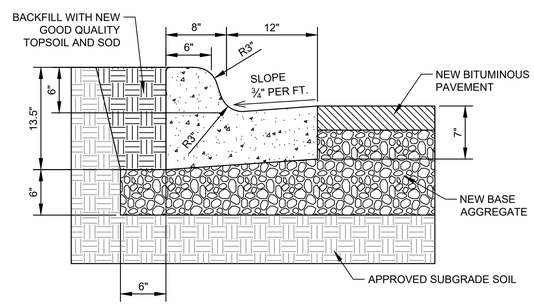
3A C500 TENNIS COURT PAVEMENT SECTION DETAIL

NOT TO SCALE



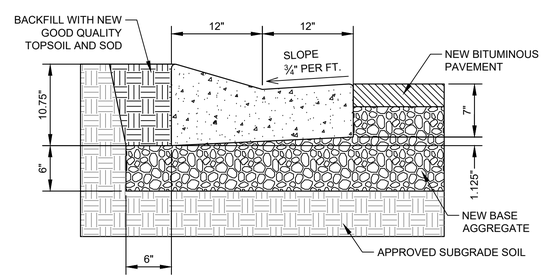
4 C500 ACCESSIBLE RAMP DETAIL

NOT TO SCALE



5 C500 B612 CONCRETE CURB & GUTTER DETAIL

NOT TO SCALE

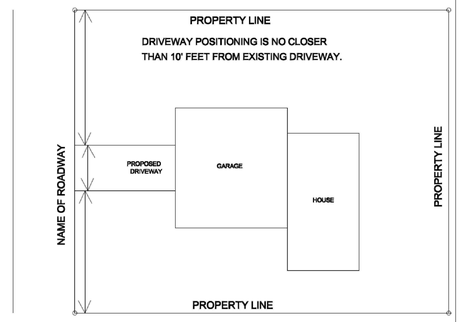


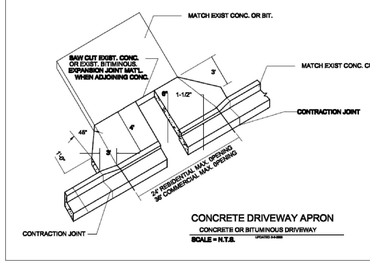
6 C500 SURMOUNTABLE CURB & GUTTER DETAIL

NOT TO SCALE

CITY OF ALEXANDRIA DRIVEWAY PERMIT

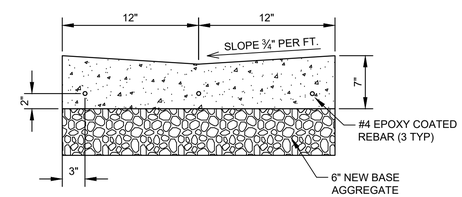
PROVIDE THE ACTUAL DIMENSIONS OF THE DRIVEWAY AND DISTANCE DRIVEWAY IS FROM PROPERTY CORNERS AT APPROPRIATE PLACES ON DRAWING.





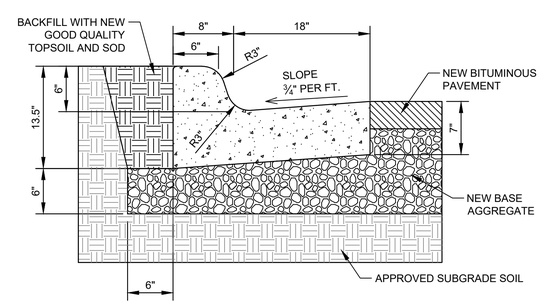
7 C500 CITY DETAIL

NOT TO SCALE



8 C500 CONCRETE VALLEY GUTTER DETAIL

NOT TO SCALE



9 C500 B618 CONCRETE CURB & GUTTER DETAIL

NOT TO SCALE

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com
© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegrouparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME THOMAS J. HERKENHOFF
SIGNATURE
DATE 07/22/24 REG. NO. 23570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

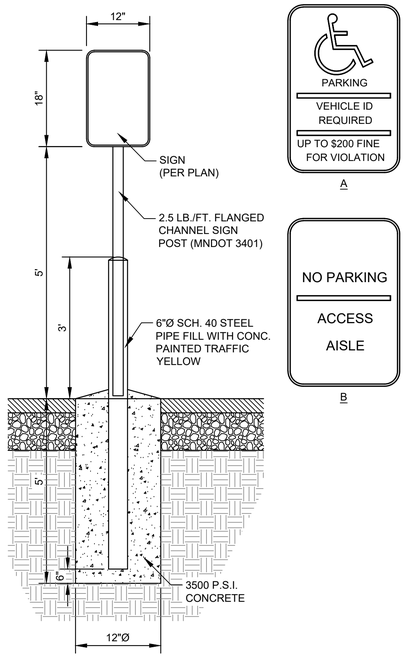
PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS/COMMENTS	REVISIONS/COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMINARY

DETAILS
C500

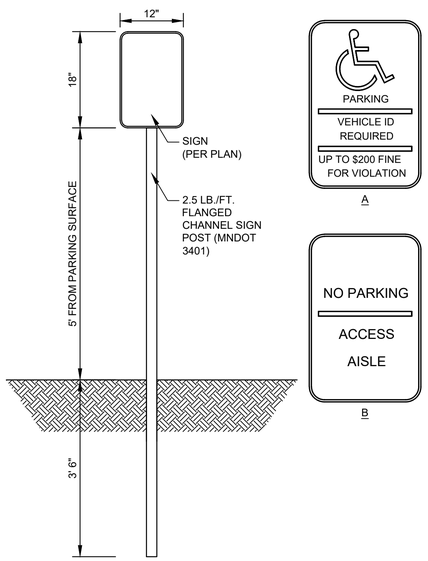
P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C500 - Details.dwg



ACCESSIBLE PARKING SIGN, POST, AND BOLLARD DETAIL

1 / C501

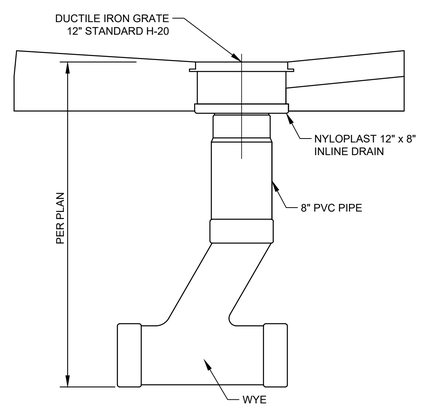
NOT TO SCALE



ACCESSIBLE PARKING SIGN AND POST DETAIL

2 / C501

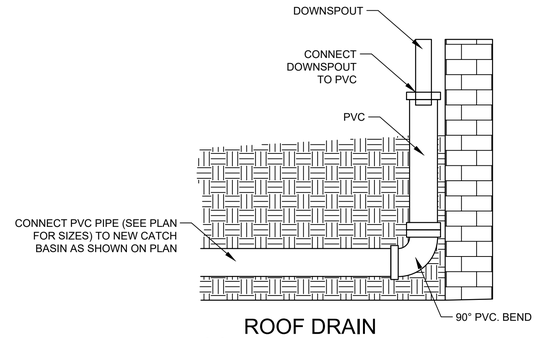
NOT TO SCALE



INLINE DRAIN DETAIL

3 / C501

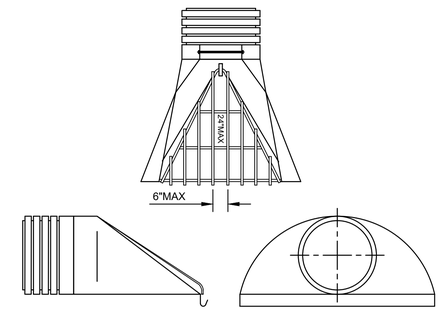
NOT TO SCALE



ROOF DRAIN CONNECTION DETAIL

5 / C501

NOT TO SCALE

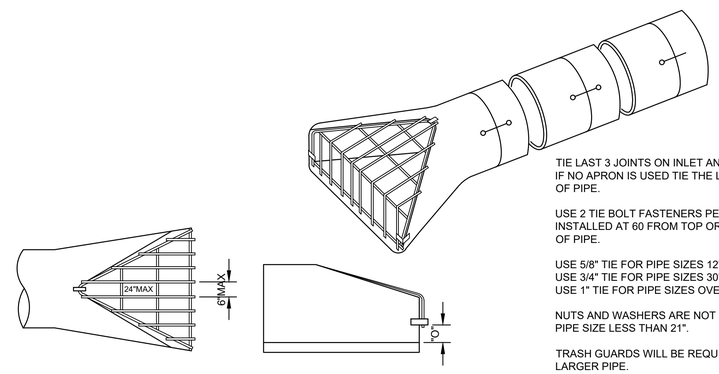


PROVIDE 3 CLIPS TO FASTEN TRASH GUARD TO F.E.S.
HOT DIP GALVANIZE AFTER FABRICATION.

FLARED END SECTION DETAIL

6 / C501

NOT TO SCALE



PROVIDE 3 CLIPS TO FASTEN TRASH GUARD TO F.E.S.
HOT DIP GALVANIZE AFTER FABRICATION.

TIE LAST 3 JOINTS ON INLET AND OUTLET.
IF NO APRON IS USED TIE THE LAST 3 SECTIONS OF PIPE.

USE 2 TIE BOLT FASTENERS PER JOINT INSTALLED AT 60 FROM TOP OR BOTTOM OF PIPE.

USE 5/8" TIE FOR PIPE SIZES 12" TO 27".
USE 3/4" TIE FOR PIPE SIZES 30" TO 66".
USE 1" TIE FOR PIPE SIZES OVER 72".

NUTS AND WASHERS ARE NOT REQUIRED ON PIPE SIZE LESS THAN 21".

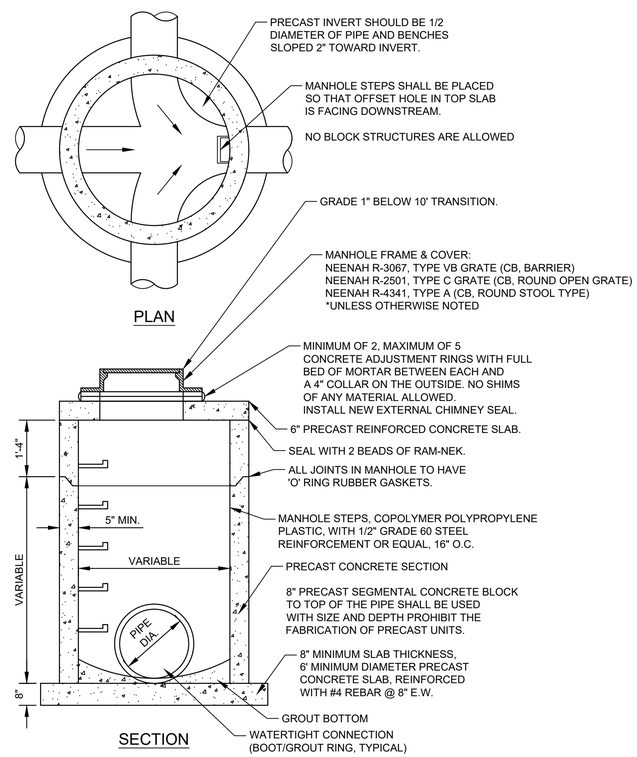
TRASH GUARDS WILL BE REQUIRED ON 18" OR LARGER PIPE.

SIZE OF PIPE	BARS	BOLTS	"O"
12" TO 18"	3/4"	5/8"	4"
21" TO 42"	1"	3/4"	6"
48" TO 72"	1-1/4"	1"	12"

FLARED END SECTION DETAIL

7 / C501

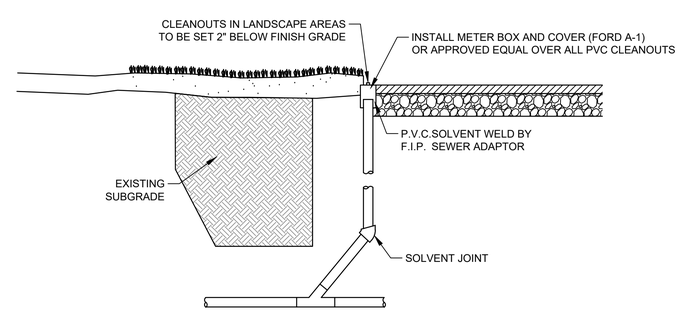
NOT TO SCALE



CATCH BASIN MANHOLE DETAIL

4 / C501

NOT TO SCALE



CLEANOUT DETAIL

8 / C501

NOT TO SCALE

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com

© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP
ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegrouparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME THOMAS J. HERKENHOFF

SIGNATURE

DATE 07/22/24 REG. NO. 23570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARTMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

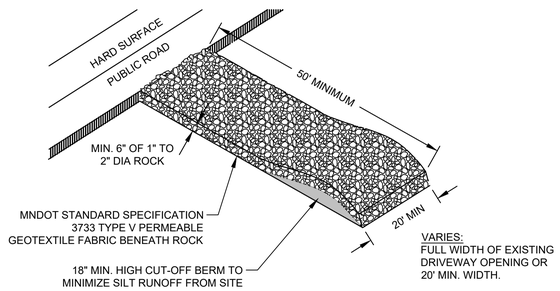
REVISIONS/COMMENTS	REVISIONS/COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMINARY

DETAILS

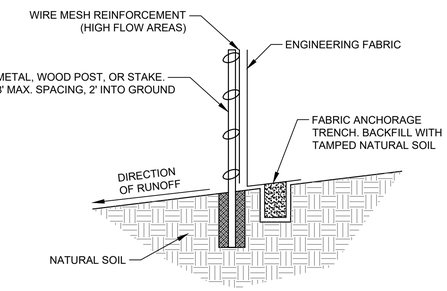
C501

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C500 - Details.dwg



1 C502 ROCK CONSTRUCTION ENTRANCE

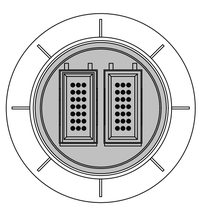
NOT TO SCALE



NOTE: DEPENDING UPON CONFIGURATION, ATTACH FABRIC TO WIRE MESH WITH HOG RINGS, STEEL POSTS WITH WIRES, OR WOOD POSTS WITH STAPLES.

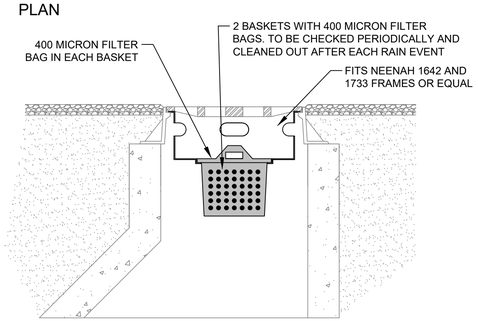
2 C502 SILT FENCE INSTALLATION DETAIL

NOT TO SCALE



PLAN

FILTER AREA	5.65 FT^2
OVERFLOW AREA	0.42 FT^2
MAXIMUM OVERFLOW RATE (@ 7" HEAD)	1.99 CFS
MAXIMUM OVERFLOW RATE (@ 13" HEAD)	2.79 CFS
BASKET WEIGHT (EMPTY)	1 LB
BASKET WEIGHT (FULL-APPROX.)	45 LBS

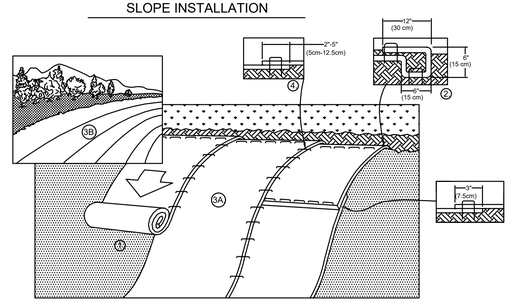


PROFILE

3 C502 INFRASAFE INLET PROTECTION DEVICE (OR EQ.)

NOT TO SCALE

SLOPE INSTALLATION



1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
   NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5 CM - 12.5 CM) OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE RECP's WIDTH.
   NOTE:
   *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.

NORTH AMERICAN GREEN
EROSION CONTROL Products Guaranteed SOLUTIONS
14649 HIGHWAY 41 NORTH
EVANSVILLE, IN 47725
800-772-2040
www.nagreen.com

Category 4 Erosion Control Blanket:
North American Green S150 erosion control blanket or approved equal.

Top Net
Polypropylene
1.5 lbs/1,000 ft2
(0.73 kg/100 m2) approx. wt.

Bottom Net
Polypropylene
1.5 lbs/1,000 ft2
(0.73 kg/100 m2) approx. wt.

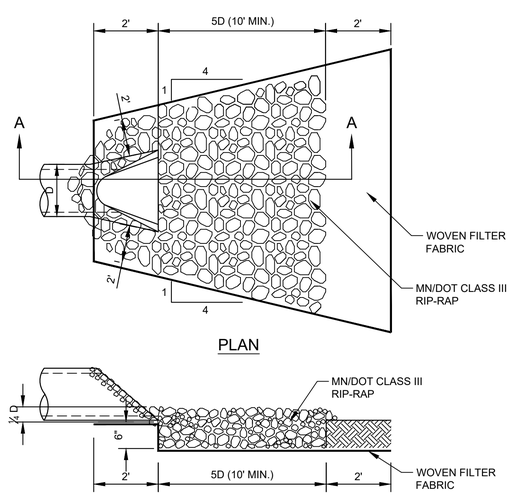
Straw Fiber
0.50 LBS/YD2
(0.27 KG/M2)

Thread
Photodegradable

Staples/Anchors:
The type of anchors used to secure the blanket to the ground shall be Steel wire11 Gauge 1" wide x 8" long.

4 C502 EROSION CONTROL BLANKET

NOT TO SCALE



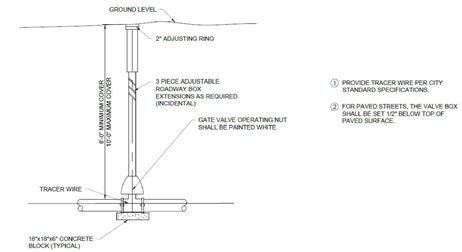
NOTE:
FW300 MIRAFI FABRIC OR EQUAL

5 C502 RIP-RAP AT OUTLETS

NOT TO SCALE

ALP Utilities Water Service Policy

Exhibit K – Inline Water Valve



6 C502 INLINE WATER VALVE DETAIL

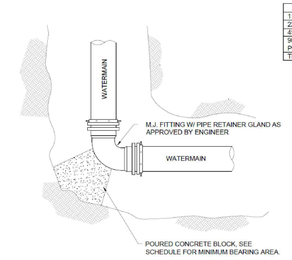
NOT TO SCALE

ALP Utilities Water Service Policy

Exhibit C – Water Main Thrust Blocking

BEARING AREA (SQ. FT.)

	6"	8"	10"	12"
11 1/4" BEND	0	1.0	1.2	1.7
22 1/2" BEND	1.0	1.5	2.6	3.4
45° BEND	1.6	2.9	4.6	6.6
90° BEND OR PLUGGED CROSS	3.1	5.3	8.4	12.0
TEE OR PLUG	2.9	3.8	5.9	8.5



POLY ENCASE ALL FITTINGS.

7 C502 THRUST BLOCKING DETAIL

NOT TO SCALE

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com

© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegrouparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME THOMAS J. HERKENHOFF
SIGNATURE
DATE 07.22.24 REG. NO. 23570

DEVELOPER:
DUININCK COMPANIES
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS COMMENTS
REVISIONS COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMINARY

DETAILS
C502

P:\Projects\Projects - 2024\12246070 - Alexandria Apartments\2. Design\B. Drawing Files\12246070 C500 - Details.dwg

PROJECT SPECIFIC SWPPP INFORMATION:

I. GENERAL CONSTRUCTION ACTIVITY INFORMATION

PROJECT NAME: PARK & 3RD LOFTS
PROJECT LOCATION: NE CORNER OF 4TH AVE AND OAK ST
ALEXANDRIA, MN 56308

PROJECT CONTACTS
OWNER: DUININCK COMPANIES
1717 16TH ST NE
WILLMAR, MN 56201
CONTACT: TIM LUNDGREN
612-804-3327
TIM.LUNDGREN@DUININCK.COM

ENGINEER: LARSON ENGINEERING, INC.
3524 LABORE ROAD
WHITE BEAR LAKE, MN 55110
CONTACT: XXXX, P.E., 651-481-9120,
THERKENHOFF@LARSONENGR.COM

CONTRACTOR: COMPANY **(TBD)**
ADDRESS
CITY, STATE, ZIP
CONTACT: NAME, PHONE, EMAIL

CITY WHERE WORK WILL TAKE PLACE: ALEXANDRIA, MN
COUNTY WHERE WORK WILL TAKE PLACE: DOUGLAS

LATITUDE/LONGITUDE OF APPROXIMATE CENTROID OF PROJECT: **45**° 53' 19" N, 95° 21' 53" W

PROJECT TYPE (CIRCLE ONE): RESIDENTIAL COMMERCIAL/INDUSTRIAL
ROAD CONSTRUCTION RESIDENTIAL & ROAD CONSTRUCTION
OTHER (DESCRIBE): _____

DATES OF CONSTRUCTION (ESTIMATED):
Construction start date: 10/2024
Construction completion date: 04/2026

PROJECT DESCRIPTION:
The project will consist of the construction of a new apartment building, parking lot, and associated stormwater and utilities. Two additional outlots are included in the project and will be cleared for future development.

PROJECT LIMITS:
See the project plans, in particular the grading & erosion control plans, for site disturbance limits.

SITE DISTURBANCE SUMMARY (to nearest tenth acre)**:**

Total number of acres to be disturbed:	4.5
Pre-Construction acres of impervious:	4.4
Post-Construction acres of impervious:	3.2
Total new impervious acres:	-1.2 (DECREASE)

II. RECEIVING WATERS

RECEIVING WATERS (WITHIN ONE MILE OF PROJECT PROPERTY EDGE):

NAME OF WATER BODY	TYPE	SPECIAL WATER?	IMPAIRED WATER?
LAKE AGNES	LAKE	NO	YES
LAKE WINONA	LAKE	NO	YES
LAKE HENRY	LAKE	NO	YES

TOTAL MAXIMUM DAILY LOAD (TMDL) WATERS
N/A

IDENTIFY WETLAND IMPACTS:

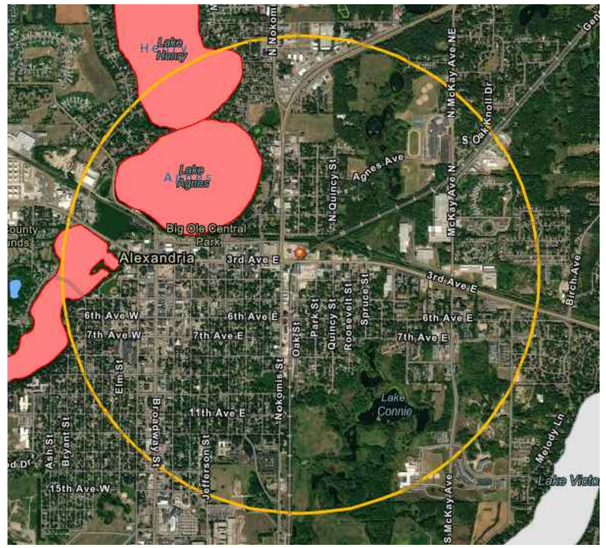
1. Will construction result in any potential adverse impacts to wetlands, including excavation, degradation of water quality, draining, filling, permanent inundation or flooding, conversion to a stormwater pond?
   No.
   If yes, describe impacts and mitigation measures that were taken to address the impacts and include copies of permits or approvals from an official state wide wetland program issued specifically for this project or site:
   N/A

ENVIRONMENTALLY SENSITIVE AREAS:

1. Identify adjacent public waters where the MN DNR has declared "work in water restrictions" during fish spawning timeframes:
   None identified.

2. Describe any stormwater mitigation measures that will be implemented, as a result of an environmental review, endangered or threatened species review or archeological site review:
   N/A

PROJECT LOCATION AND RECEIVING WATERS MAP:



III. PROJECT PLANS AND SPECIFICATIONS

Refer to the project plans, specifications, geotechnical report, and stormwater calculations which depict various features that are relevant to this project. Such features may include, but are not limited to, the following:

- Project location and construction limits.
- Existing and final grades, including dividing lines and direction of flow for all pre and post-construction stormwater runoff drainage areas located within the project limits.
- Soil types at the site.
- Locations of impervious surfaces.
- Locations of areas not to be disturbed (e.g., buffer zones, wetlands, etc.)
- Steep slope locations.
- Locations of areas where construction will be phased to minimize duration of exposed soils.
- Locations of all temporary and permanent erosion control and sediment control best management practices (BMP's).
- Buffer zones as required in item 9.17 and 23.11 of the permit.
- Locations of potential pollution-generating activities identified in Section 12 of the permit.
- Standard details for erosion and sediment control BMP's to be installed at the site.

The anticipated erosion prevention and sediment control BMP quantities needed for the life of this project include the following. These quantities are estimated only and shall be verified by the Contractor.

BMP	Estimated Quantity	Final Quantity
Rock Construction Entrance	1 EA	_____
Silt Fence	625 LF	_____
Inlet Protection	18 EA	_____
FES Outlet Rip-Rap	3 EA (size per plan)	_____
Turf Seeding	1.04 ACRES	_____
Turf Sod	1.59 ACRES	_____
Erosion Blanket	2,440 SY	_____

SOIL INFORMATION

Refer to geotechnical report for site specific soil information.

TEMPORARY SEDIMENT CONTROL (SITE SPECIFIC ITEMS)

1. Is the project required to install a temporary sediment basin due to 10 or more acres draining to a common location, or 5 acres or more if the site is located within 1 mile of a special or impaired water?
   No.
   If yes, describe (or attach plans) showing how the basin will be designed and constructed in accordance with Section 14.
   N/A
2. Will the project include dewatering, basin draining?
   No.
   If yes, describe measures to be used to treat/dispose of turbid or sediment-laden water and method to prevent erosion or scour of discharge points (see Section 10 of the permit):
   N/A. Based on soil boring results, dewatering is not anticipated.

3. Will the project include use of filters for backwash water?
   No.
   If yes, describe how filter backwash water will be managed on the site or properly disposed of:
   N/A

PERMANENT STORMWATER MANAGEMENT (SITE SPECIFIC ITEMS)

1. Will the project result in one acre or more of new impervious surface or result in one acre or more of new impervious in total if the project is part of a larger plan of development?
   No.
   If yes, a water quality volume of one inch of runoff from the cumulative new impervious surfaces must be retained on site (Section 15) through infiltration unless prohibited due to one of the reasons in item 16.14 through 16.21. If infiltration is prohibited, identify other methods of stormwater treatment used (e.g. filtration, wet sedimentation basin, regional ponding, or equivalent method):
   A regional pond is proposed to provide a water quality volume equivalent to 1-inch over the new and reconstructed impervious surface.

2. Attach design parameters for the planned permanent stormwater management system, including volume calculations, discharge rate calculations, construction details including basin depth, outlet configurations, location, design of pre-treatment devices, and timing for installation.
   See the project plans and stormwater calculations.

3. For infiltration systems, provide at least one soil boring, test pit, or infiltrometer test in the location of the infiltration practice for determining infiltration rates.
   See the geotechnical evaluation reports contained within the stormwater calculations. Additional in-field testing and geotechnical observations are planned during construction to verify soil characteristics at the proposed basin location.

4. For projects that discharge to trout streams, including tributaries to trout streams, identify method of incorporating temperature controls into the permanent stormwater management system.
   N/A

SEQUENCE OF CONSTRUCTION ACTIVITIES

1. Install stabilized rock construction entrances.
2. Install perimeter erosion control BMP's (silt fence, bio-logs, etc).
3. Install temporary construction fencing at infiltration areas and other areas not be disturbed.
4. Install inlet protection throughout project area and downstream inlets.
5. Construct temporary sediment basins/traps as necessary.
6. Strip and stockpile topsoil.
7. Complete rough grading of site.
8. Stabilize denuded areas and stockpiles.
9. Install site utilities.
10. Install temporary inlet protection at newly installed catch basins/inlets.
11. Install curb and gutter and pavement sections.
12. Place topsoil and final grading of areas to be vegetated.
13. Remove accumulated sediment from basins / ponds.
14. Final grade pond and infiltration areas, including soil de-compaction as specified.
15. Complete stormwater basin as-built surveys (as required by project specifications and/or local jurisdictional authorities).
16. Complete permanent stabilization including plantings, seeding, and mulch.
17. Upon completion of construction activity and satisfactory vegetation establishment, remove remaining temporary erosion and sediment control BMPs.
18. Reseed / restore any areas disturbed during BMP removal.

SEEDING NOTES AND REQUIREMENTS:

1. The Contractor is responsible to salvage and preserve existing topsoil as necessary for final stabilization. All topsoil to be salvaged and re-used shall be processed as necessary to meet project specifications.
2. Prior to final seeding, all areas to be vegetated shall be scarified/decompacted and amended as specified in the plans and specifications.
3. Unless otherwise noted, all seed mixes and applications shall be in accordance with MNDOT Seeding Manual, latest edition.
4. See the project plans and specifications for seed mixtures, mulch, slope stabilization, and all other landscaping requirements.

FINAL STABILIZATION:

Ensure Final Stabilization of the site. Final Stabilization is not complete until all of the following requirements are complete:

1. All soil disturbing activities at the site have been completed and soils are stabilized by a uniform perennial vegetative cover with a density of 70 percent of its expected final growth over the entire pervious surface area, or other equivalent means necessary to prevent soil erosion under erosive conditions.
2. The permanent stormwater management system is constructed and operating as designed. Temporary or permanent sedimentation basins that are to be used as permanent water quality management basins have been cleaned of any accumulated sediment. All sediment has been removed from conveyance systems and ditches are stabilized with permanent cover.
3. All temporary synthetic and structural erosion prevention and sediment control BMPs (such as silt fence, bio-logs, etc.) have been removed from the site. BMPs designed to decompose on site may be left in place.
4. Upon correction of all erosion and sediment items and achieving vegetative cover, temporary erosion prevention and sediment control BMPs will be removed and properly disposed/recycled.
5. Within 30 days of final stabilization, a notice of termination shall be submitted to the MPCA (see Permit Termination Req's) .

GENERAL SWPPP NOTES:

1. The Contractor and all Subcontractors involved with construction activity that disturbs soil, or implements a pollution control measure as part of the Storm Water Pollution Prevention Plan (SWPPP) for this project, must comply with the requirements of the National Pollution Discharge Elimination System (NPDES) / State Disposal System (SDS) Program, General Permit MNR10001, Dated August 1, 2018.
2. The Contractor and all Subcontractors shall be responsible for reviewing the NPDES Permit in its entirety, to ensure that all SWPPP measures are in place and permit requirements fulfilled throughout the duration of the project.

SWPPP TRAINING (SECTION 21):

SWPPP PREPARER:

COMPANY:	LARSON ENGINEERING, INC.
CONTACT:	T.J. ROSE, P.E. 651-203-1911 TROSE@LARSONENGR.COM
COURSE, INSTRUCTOR:	DESIGN OF CONSTRUCTION SWPPP
TRAINING ENTITY:	UNIVERSITY OF MINNESOTA
EXPIRATION:	MAY 31, 2027

SWPPP CONTACT:

CONTRACTOR:	**(TBD)**
CONTACT:	NAME, PHONE, EMAIL
COURSE, INSTRUCTOR:	
TRAINING ENTITY:	
EXPIRATION:	

This SWPPP was prepared by personnel certified in design of construction SWPPP's as listed above. Copies of respective certifications are available upon request. In accordance with Section 21 of the permit, the following individuals must receive training, and the content and extent of the training is commensurate with the individual's job duties and responsibilities with regard to activities covered under the permit:

a. Individuals preparing the SWPPP for the project.
b. Individuals overseeing implementation of, revising and/or amending the SWPPP, and individuals performing inspections for the project.
c. Individuals performing or supervising the installation, maintenance and repair of BMP's.

Individuals must receive training from local, state, federal agencies, professional organizations, or other entities with expertise in erosion prevention, sediment control, permanent stormwater treatment and the MN NPDES/SDS Construction Stormwater permit. Individuals shall attend a refresher-training course every three (3) years.

SWPPP IMPLEMENTATION RESPONSIBILITIES:

1. The Owner and Contractor are Permittee(s) as identified by the NPDES permit.
2. The Contractor shall be responsible for all on-site implementation of the SWPPP, including all Subcontractor activities.
3. The Contractor shall provide knowledgeable and experienced person(s) in the application, installation, and maintenance of Erosion and Sediment Control BMP's throughout the project.
4. The Contractor shall provide person(s) meeting the training requirements of the NPDES permit to conduct inspection and maintenance of all erosion prevention and sediment control BMP's in accordance with permit requirements. One of these individuals must be available for an on-site inspection within 72 hours upon request by the MPCA.
5. The Contractor shall provide training documentation for all individual(s) required by the permit. This training documentation shall be recorded in the SWPPP prior to construction, or as soon as personnel for the project have been determined. Documentation shall include:
   a. Names of personnel associated with the project required to be trained (as listed above and under Section 21 of the permit).
   b. Dates of training, name of instructor, and entity providing training.
   c. Content of training course or workshop including number of hours of training.

INSPECTIONS AND MAINTENANCE:

1. The Contractor shall provide person(s) meeting the training requirements to conduct inspection and maintenance of all erosion prevention and sediment control BMP's under this project in accordance with permit requirements.
2. An example MPCA construction stormwater checklist can be found at the link below. Note: This template inspection report does not address all aspects of the NPDES Permit. The completion of this checklist does not guarantee that all permit requirements are in compliance; it is the responsibility of the Permittee(s) to read and understand the full permit requirements.

https://www.pca.state.mn.us/sites/default/files/wq-strm2-36.docx

RECORDS RETENTION:

The SWPPP, including all changes/amendments, and inspections and maintenance records shall be kept on site during normal working hours by individuals who have operational control of that portion of the site.

All Owner(s) shall keep the SWPPP, along with the following additional records, on file for three (3) years after submittal of the NOT as outlined in Section 4:

a. The Final SWPPP;
b. Any other stormwater related permits required for the project;
c. Records of all inspection and maintenance conducted during construction;
d. All permanent operation and maintenance agreements that have been implemented, including all Right-Of-Way, Contracts, Covenants, and other binding requirements regarding perpetual maintenance; and
e. All required calculations for design of the temporary and permanent stormwater management systems.

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com

© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegroparchitects.com

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME THOMAS J. HERKENHOFF
SIGNATURE
DATE 07.22.24 REG. NO. 25570

REVISIONS/COMMENTS	REVISIONS/COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMINARY

SWPPP
C600

GENERAL SWPPP REQUIREMENTS AND NOTES:

SWPPP AMENDMENTS (SECTION 6):

1. One of the individuals described in item 21.2.a or 21.2.b of the permit or another qualified individual must complete all SWPPP changes. Changes involving the use of less stringent BMPs must include a justification describing how the replacement BMP is effective for the site characteristics.
2. The SWPPP shall be amended to include additional or modified BMPs as necessary to correct problems identified or address situations whenever there is a change in design, construction, operation, maintenance, weather or seasonal conditions having a significant effect on the discharge of pollutants to surface waters or groundwater.
3. The SWPPP shall be amended to include additional or modified BMPs as necessary to correct problems identified or address situations whenever inspections or investigations by the site owner or operator, USEPA or MPCA officials indicate the SWPPP is not effective in eliminating or significnatly minimizing the ischarge of pollutants to surface waters or groundwater or the discharges are cuasing water quality standard exceedances (e.g., nuisance conditions as defined in Minn. R. 7050.0210, subp. 2 or the SWPPP is not consistend with the ofjectives of the USEPA approved TMDL.

BMP SELECTION AND INSTALLATION (SECTION 7):

1. All BMPs identified in the SWPPP document and construction plans shall be selected, installed, and maintained in an appropriate and functional manner in accordance with relevant manufacturer specifications and accepted engineering practices.
2. Do not disturb more land (i.e., phasing) than can be effectively inspected and maintained in accordance with Section 11.

TEMPORARY EROSION PREVENTION PRACTICES (SECTION 8)

1. Prior to beginning any construction work at the site, locations of areas not to be disturbed must be delineated (e.g., with flags, stakes, signs, silt fence, snow fence, etc.) throughout the project site.

2. Minimize the need for disturbance of portions of the project with steep slopes. For those sloped areas which must be disturbed, use techniques such as phasing and stabilization practices designed for steep slopes (e.g., slope draining and terracing).

3. Stabilize all exposed soil areas (including stockpiles). Stabilization must be initiated immediately to limit soil erosion whenever any construction activity has permanently or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days (or 7 days if within one mile of an identified impaired water). Stabilization must be completed no later than 14 calendar days (or 7 days if within one mile of an identified impaired water) after the construction activity has ceased.

4. Stabilization is not required on constructed base components of roads, parking lots, and similar surfaces. Stabilization is not required on temporary stockpiles without significant silt, clay or organic components (e.g., clean aggregate stockpiles, demolition concrete stockpiles, sand stockpiles) but sediment controls must be placed at the base of the stockpile.

5. For Public Waters that the Minnesota Department of Natural Resources has promulgated "work in water restrictions" during specified fish spawning time frames, all exposed soil areas that are within 200 feet of the water's edge, and drain to these waters must complete the stabilization activities within 24 hours during the restriction period.

6. Stabilize the normal wetted perimeter of the last 200 linear feet of temporary or permanent drainage ditches or swales that drain water from the site within 24 hours after connecting to a surface water or property edge. Stabilize remaining portions of temporary or permanent ditches or swales within 14 calendar days (or 7 days if within one mile of an identified impaired water) after connecting to a surface water or property edge and construction in that portion of the ditch temporarily or permanently ceases.

7. Temporary or permanent ditches or swales being used as sediment containment systems during construction (with properly designed rock-ditch checks, bio rolls, silt dikes, etc.) do not need to be stabilized during the temporary period of use as a sediment containment system. These areas must be stabilized within 24 hours after no longer being used for as a sediment containment system.

8. Applying mulch, hydromulch, tackifier, polyacrylamide or similar erosion prevention practices is not acceptable within any portion of the normal wetted perimeter of a temporary or permanent drainage ditch or swale section with a continuous slope of greater than 2 percent.

9. Pipe outlets must be provided with temporary or permanent energy dissipation within 24 hours after connection to a surface water or permanent stormwater treatment system.

10. Route water around unstabilized areas on the site and to reduce erosion, unless infeasible. Use erosion controls and velocity dissipation devices such as check dams, sediment traps, riprap, or grouted riprap at outlets within and along the length of any constructed stormwater conveyance channel, and at any outlet, to provide a non-erosive flow velocity, to minimize erosion of channels and their embankments, outlets, adjacent stream banks, slopes, and downstream waters during discharge conditions.

11. Unless infeasible due to lack of pervious or vegetated areas, direct discharges from BMPs to vegetated areas of the site (including any natural buffers) in order to increase sediment removal and maximize stormwater infiltration. Use velocity dissipation devices if necessary to prevent erosion when directing stormwater to vegetated areas.

12. Infiltration areas shall not be excavated until all upstream areas have been stabilized and/or upstream BMPs are in place to properly prevent sediment deposition. Only low impact equipment shall be allowed in infiltration areas which shall be clearly identified, staked, and marked/fenced off.

13. Project phasing shall be implemented to ensure land disturbance and temporary erosion control measures can be effectively inspected and maintained throughout the duration of the project in accordance with the Inspection and Maintenance requirements of Section 11.

TEMPORARY SEDIMENT CONTROL PRACTICES (SECTION 9)

1. Sediment control practices must be established on all down gradient perimeters and be located upgradient of any buffer zones. The perimeter sediment control practices must be in place before any upgradient land-disturbing activities begin. These practices shall remain in place until Final Stabilization has been established.

2. If downgradient sediment controls become overloaded, based on frequent failure or excessive maintenance requirements, additional upgradient sediment control practices or redundant BMPs shall be installed to eliminate the overloading concerns. All changes shall be recorded in the SWPPP.

3. Temporary or permanent drainage ditches and sediment basins designed as part of a sediment containment system (e.g., ditches with rock-check dams) require sediment control practices only as appropriate for site conditions.

4. A floating silt curtain placed in the water is not an acceptable sediment control BMP except when working on a shoreline or below the waterline. Immediately after construction activity (e.g., installation of rip rap along the shoreline) in that area is complete, upland perimeter control practices shall be installed if exposed soils still drain to a surface water.

5. Re-install all sediment control practices that have been adjusted or removed to accommodate short-term activities such as clearing or grubbing, or passage of vehicles, immediately after the short-term activity has been completed. Complete any short-term activity that requires removal of sediment control practices as quickly as possible and re-install sediment control practices before the next precipitation event even if the short-term activity is not complete.

6. All storm drain inlets must be protected by appropriate BMPs during construction until all sources with potential for discharging to the inlet have been stabilized. Inlet protection may be removed for a particular inlet if a specific safety concern (street flooding/freezing) has been identified by the Permittee(s) or the jurisdictional authority (e.g., city/county/township/MnDOT engineer).The Permittee(s) must document the need for removal in the SWPPP.

7. Temporary soil stockpiles must have silt fence or other effective sediment controls, and cannot be placed in any natural buffers or surface waters, including stormwater conveyances such as curb and gutter systems, or conduits and ditches unless there is a bypass in place for the stormwater.

8. Where vehicle traffic leaves any part of the site (or onto paved roads within the site) install a vehicle tracking BMP to minimize the track out of sediment from the construction site. Examples of vehicle tracking BMPs include (but are not limited to) rock pads, mud mats, slash mulch, concrete or steel wash racks, or equivalent systems. Use street sweeping if such vehicle tracking BMPs are not adequate to prevent sediment from being tracked onto the street.

9. The Permittee(s) must install temporary sedimentation basins as required in accordance with permit requirements.

10. Minimize soil compaction by restricting vehicle access in areas where final vegetative stabilization will occur, unless otherwise infeasible.

11. Discharges from BMPs shall be directed to vegetated areas unless infeasible.

12. Preserve a 50 foot natural buffer or (if a buffer is infeasible on the site) provide redundant (double) perimeter sediment controls when a surface water is located within 50 feet of the project's earth disturbances and stormwater flows to the surface water.

13. Perimeter sediment controls shall be installed at least 5 feet apart unless limited by lack of available space. Natural buffers are not required adjacent to road ditches, judicial ditches, county ditches, stormwater conveyance channels, storm drain inlets, and sediment basins. If preserving the buffer is infeasible, the reasons for which shall be recorded in the SWPPP.

14. The use of polymers, flocculants, or other sedimentation treatment chemicals, if used on the project, shall be used in accordance with accepted engineering practices, dosing specifications, and sediment removal design specifications provided by the product manufacturer or supplier. Use conventional erosion and sediment controls prior to the chemical addition to ensure effective treatment. Chemicals may only be applied where treated stormwater is directed to a sediment control system which allows or filtration of settlement of the floc prior to discharge.

15. If the proposed project as shown on the plans has 10 or more acres draining to a common location or 5 acres or more if the site is within one mile of a special or impaired water (as identified in Section II - Receiving Waters and Environmentally Sensitive Areas), then a temporary sediment basin must be constructed as shown on the plans. Temporary sediment basins will have a minimum of 3,600 cubic feet of storage per acre draining to the basin. The basin outlet shall provide for discharging water from the surface to minimize discharging of pollutants. A stabilized emergency overflow shall be constructed.

DEWATERING AND BASIN DRAINING (SECTION 10)

1. Discharge turbid or sediment-laden waters related to dewatering or basin draining (e.g., pumped discharges, trench/ditch cuts for drainage) to a temporary or permanent sediment basin on the project site unless infeasible. Discharge from the temporary or permanent sedimentation basins to surface waters if the basin water has been visually checked to ensure adequate treatment has been obtained in the basin and that nuisance conditions will not result from the discharge. If the water cannot be discharged to a sedimentation basin prior to entering the surface water, it must be treated with the appropriate BMPs, such that the discharge does not adversely affect the receiving water or downstream properties.

2. Discharge water that contains oil or grease, must use an oil-water separator or suitable filtration device (e.g. cartridge filters, absorbents pads) prior to discharging the water.

3. All water from dewatering or basin-draining activities must be discharged in a manner that does not cause nuisance conditions, erosion in receiving channels or downslope properties, erosion or scour in the immediate vicinity of discharge points, or inundation in wetlands causing significant adverse impact to the wetland.

4. The use of filters with backwash water, haul the backwash water away for disposal, return the backwash water to the beginning of the treatment process, or incorporate the backwash water into the site in a manner that does not cause erosion. Discharge backwash water to the sanitary sewer if permission is granted by the sanitary sewer authority. Replace and clean the filter media used in dewatering devices when required to retain adequate function.

INSPECTIONS AND MAINTENANCE (SECTION 11)

1. Owner and Contractor shall ensure that a trained person (as identified in item 21.2.b) of the permit will inspect the entire construction site at a minimum:
   - Once every seven (7) days during active construction, and
   - Within 24 hours after a rainfall event greater than 1/2 inch in 24 hours

2. Inspect all erosion prevention and sediment control BMPs and Pollution Prevention Management Measures to ensure integrity and effectiveness during all routine and post-rainfall event inspections. All nonfunctional BMPs must be repaired, replaced, or supplemented with functional BMPs by the end of the next business day after discovery, or as soon as field conditions allow access unless another time frame is specified below. Investigate and comply with the following Inspection and Maintenance requirements:

   a. All perimeter control devices must be repaired, replaced, or supplemented when they become nonfunctional or the sediment reaches one-half (1/2) of the height of the device. These repairs must be made by the end of the next business day after discovery, or thereafter as soon as field conditions allow access.
   b. Temporary and permanent sedimentation basins must be drained and the sediment removed when the depth of sediment collected in the basin reaches one-half (1/2) the storage volume. Drainage and removal must be completed within 72 hours of discovery, or as soon as field conditions allow access.
   c. Inspect and photograph dewatering discharges at the beginning and at least once every 24 hours during operation.
   d. Surface waters, including drainage ditches and conveyance systems, must be inspected for evidence of erosion and sediment deposition during each inspection. Remove all deltas and sediment deposited in surface waters, including drainage ways, catch basins, and other drainage systems, and restabilize the areas where sediment removal results in exposed soil. The removal and stabilization must take place within seven (7) days of discovery unless precluded by legal, regulatory, or physical access constraints. Use all reasonable efforts to obtain access. If precluded, removal and stabilization must take place within seven (7) calendar days of obtaining access. Contact all local, regional, state and federal authorities and receiving any applicable permits, prior to conducting any work in surface waters.
   e. Construction site vehicle exit locations must be inspected for evidence of off-site sediment tracking onto paved surfaces. Tracked sediment must be removed from all paved surfaces both on and off site within 24 hours of discovery, or if applicable, within a shorter time.
   f. Streets and other areas adjacent to the project must be inspected for evidence of off-site accumulations of sediment. If sediment is present, it must be removed in a manner and at a frequency sufficient to minimize off-site impacts (e.g., fugitive sediment in streets could be washed into storm sewers by the next rain and/or pose a safety hazard to users of public streets).

5. Inspection frequency adjustment:
   a. Inspections of areas with permanent cover can be reduced to once per month, even if construction activity continues on other portions of the site; or
   b. where sites have permanent cover on all exposed soil and no construction activity is occurring anywhere on the site, inspections can be reduced to once per month and, after 12 months, may be suspended completely until construction activity resumes. The MPCA may require inspections to resume if conditions warrant; or
   c. where construction activity has been suspended due to frozen ground conditions, inspections may be suspended. Inspections must resume within 24 hours of runoff occurring, or upon resuming construction, whichever comes first.

3. All inspections and maintenance activities within 24 hours of being conducted must be recorded and retained in the SWPPP. These records must include:
   a. Date and time of inspections
   b. Name of person(s) conducting inspections
   c. Findings of inspections, including the specific location where corrective actions are needed
   d. Corrective actions taken (including dates, times, and party completing maintenance activities)
   e. Date and amount of all rainfall events greater than 1/2 inch (0.5 inches) in 24 hours. Rainfall amounts must be obtained by a properly maintained rain gauge installed onsite, a weather station that is within 1 mile of your location or a weather reporting system that provides site specific rainfall data from radar summaries.
   f. If any discharge is observed to be occurring during the inspection, a record of all points of the property from which there is a discharge must be made, and the discharge should be described (i.e., color, odor, floating, settled, or suspended solids, foam, oil sheen, and other obvious indicators of pollutants) and photographed.
   g. Any amendments to the SWPPP proposed as a result of the inspection must be documented within seven (7) calendar days.

4. All infiltration areas must be inspected to ensure that no sediment from ongoing construction activity is reaching the infiltration area. All infiltration areas must be inspected to ensure that equipment is not being driven across the infiltration area.

POLLUTION PREVENTION MANAGEMENT MEASURES (SECTION 12)

Implement the following pollution prevention management measures on the site:

1. Storage, Handling, and Disposal of Construction Products, Materials, and Wastes shall comply with the following to minimize the exposure to stormwater of any of the products, materials, or wastes. Products or wastes which are either not a source of contamination to stormwater or are designed to be exposed to stormwater are not held to this requirement:

   a. Building products that have the potential to leach pollutants must be under cover (e.g., plastic sheeting or temporary roofs) to prevent the discharge of pollutants or protected by a similarly effective means designed to minimize contact with stormwater.
   b. Pesticides, herbicides, insecticides, fertilizers, treatment chemicals, and landscape materials must be under cover (e.g., plastic sheeting or temporary roofs) to prevent the discharge of pollutants or protected by similarly effective means designed to minimize contact with stormwater.
   c. Hazardous materials, toxic waste, (including oil, diesel fuel, gasoline, hydraulic fluids, paint solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids) must be properly stored in sealed containers to prevent spills, leaks or other discharge. Restricted access storage areas must be provided to prevent vandalism. Storage and disposal of hazardous waste or hazardous materials must be in compliance with Minn. R. ch. 7045 including secondary containment as applicable.
   d. Solid waste must be stored, collected and disposed of properly in compliance with Minn. R. ch. 7035.
   e. Portable toilets must be positioned so that they are secure and will not be tipped or knocked over. Sanitary waste must be disposed of properly in accordance with Minn. R. ch. 7041.

2. Fueling and Maintenance of Equipment or Vehicles; Spill Prevention and Response: Take reasonable steps to prevent the discharge of spilled or leaked chemicals, including fuel, from any area where chemicals or fuel will be loaded or unloaded including the use of drip pans or absorbents unless infeasible. Conduct fueling in a contained area unless infeasible. Ensure adequate supplies are available at all times to clean up discharged materials and that an appropriate disposal method is available for recovered spilled materials. Report and clean up spills immediately as required by Minn. Stat. § 115.061, using dry clean up measures where possible.

3. Vehicle and equipment washing: Wash the exterior of vehicles or equipment on the project site, washing must be limited to a defined area of the site. Runoff from the washing area must be contained in a sediment basin or other similarly effective controls and waste from the washing activity must be properly disposed of. Properly use and store soaps, detergents, or solvents. No engine degreasing is allowed on site.

4. Concrete and other washouts waste: Provide effective containment for all liquid and solid wastes generated by washout operations (concrete, stucco, paint, form release oils, curing compounds and other construction materials) related to the construction activity. The liquid and solid washout wastes must not contact the ground, and the containment must be designed so that it does not result in runoff from the washout operations or areas. Liquid and solid wastes must be disposed of properly and in compliance with MPCA rules. A sign must be installed adjacent to each washout facility that requires site personnel to utilize the proper facilities for disposal of concrete and other washout wastes.

PERMIT TERMINATION (SECTIONS 4 AND 13)

1. Permittees must submit a NOT within 30 days after all termination conditions listed in Section 13 are complete.

2. Permittees must submit a NOT within 30 days after selling or otherwise legally transferring the entire site, including permit responsibility for roads (e.g., street sweeping) and stormwater infrastructure final clean out, or transferring portions of a site to another party. The permittees' coverage under the permit terminates at midnight on the submission date of the NOT.

3. Permittees may terminate permit coverage prior to completion of all construction activity if they meet all of the following conditions:
   a. Construction activity has ceased for at least 90 days; and
   b. at least 90 percent (by area) of all originally proposed construction activity has been completed and permanent cover has been established on those areas; and
   c. on areas where construction activity is not complete, permanent cover has been established; and
   d. the site complies with items 13.3 through 13.7 of the permit.

   After permit coverage is terminated under this item, any subsequent development on the remaining portions of the site will require permit coverage if the subsequent development itself or as part of the remaining common plan of development or sale will result in land disturbing activity of one (1) or more acres in size.

4. Permittees may terminate coverage upon MPCA approval after submitting information documenting the owner canceled the project.

5. Permittees must complete all construction activity and must install permanent cover over all areas prior to submitting the NOT. Vegetative cover must consist of a uniform perennial vegetation with a density of 70 percent of its expected final growth. Vegetation is not required where the function of a specific area dictates no vegetation, such as impervious surfaces or the base of a sand filter.

6. Permittees must clean the permanent stormwater system of any accumulated sediment and must ensure the system meets all applicable requirements in Section 15 through 19 of the permit and is operating as designed.

7. Permittees must remove all sediment from conveyance systems prior to submitting the NOT.

8. Permittees must remove all temporary synthetic erosion prevention and sediment control BMPs prior to submitting the NOT. BMPs designed to decompose on-site may be left in place.

9. For residential construction only, permit coverage terminates on individual lots if the structures are finished and temporary erosion prevention and downgradient perimeter control is complete, the residence sells to the homeowner, and the permittee distributes the MPCA's "Homeowner Fact Sheet" to the homeowner.

10. For construction projects on agricultural land (e.g., pipelines across cropland), disturbed land must be returned to its preconstruction agricultural condition prior to submitting the NOT.

11. When submitting the NOT, permittees must include either ground or aerial photographs showing vegetative cover requirements have been met as listed above. All submitted photographs shall include the date and specific site location.

LONG TERM OPERATION AND MAINTENANCE:

1. Upon the completion of construction activity and NPDES permit termination, in accordance with Sections 4 and 13, the Property Owner shall become the responsible party for long term operation and maintenance (O&M) of all permanent stormwater management features under this project.

2. All associated operations, inspections, maintenance, and record keeping shall be performed by trained individual(s) familiar with the site stormwater management system.

3. Record keeping of inspections and maintenance items shall be maintained by the Owner in accordance with applicable Maintenance Agreements/Declarations as required by local jurisdictional authorities.

Larson Engineering, Inc.
816 W. St. Germain Street, Ste 308
St. Cloud, MN 56301
320.774.1944
www.larsonengr.com

© 2024 Larson Engineering, Inc. All rights reserved.

COLE GROUP
ARCHITECTS LLC.
216 Park Avenue South
Suite 102
St. Cloud, MN 56301
(320) 654-6570
www.colegroparchitects.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME THOMAS J. HERKENHOFF

SIGNATURE

DATE 07.22.24 REG. NO. 25570

DEVELOPER:
DUININCK COMPANIES
TIM LUNDGREN
1717 16TH ST. NE
WILLMAR, MN 56201
PHONE: (612) 804-3327

PROPOSED APARMENT BUILDING:
PARK & 3RD LOFTS
ALEXANDRIA, MN

REVISIONS/COMMENTS	REVISIONS/COMMENTS	REVISIONS/COMMENTS

Project No. 24022
Issue Date: 07-22-24
Document Set: PRELIMINARY

SWPPP

C601

APPENDIX B

Previous Environmental Investigations (Boring Logs)

WELL NUMBER GP-1

WENCK

CLIENT Duininck Concrete, LLC
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER B000565-20-501
PROJECT LOCATION 901 4th Avenue East, Alexandria, Minnesota
DATE STARTED 10/28/20 **COMPLETED** 10/28/20
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
AT START OF DRILLING ---
LOGGED BY Alison Creeger **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING 11.5 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0							
	PP	8	FILL		0.5 CONCRETE CLAY, trace sand, fine grained, dark brown/black, moist, asphalt, rubber	19.2	
	PP	8	FILL		5.0	13.0	
5							
	PP	30	CL		CLAY, trace sand and gravel, very fine grained, medium-stiff, light brown, slight moist, redox	16.8	1" PVC riser
	PP	30	CL			19.7	
10							
	PP	30	CL		12.0	3.2	
	PP	30	CL		SANDY CLAY, trace to some gravel, medium to fine grained, soft, light brown, moist, redox	2.7	
15					15.0		
	PP	30	CL		SANDY CLAY, medium to fine grained, soft, light brown, moist	2.1	
	PP	30	CL		18.0 SANDY CLAY, some gravel, medium grained, soft, light brown, moist	2.5	
20							1" PVC screen
	PP	15	CL			4.1	
	PP	15	CL			4.3	
25					25.0		
					E.O.B. @ 25.0 ' BGS.		

WELL NUMBER GP-2

WENCK

CLIENT Duininck Concrete, LLC
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER B000565-20-501
PROJECT LOCATION 901 4th Avenue East, Alexandria, Minnesota
DATE STARTED 10/28/20 **COMPLETED** 10/28/20
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
AT START OF DRILLING ---
LOGGED BY Alison Creeger **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING 19.1 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0	PP	15	FILL		SAND, some gravel, medium grained, loose, tan, dry	2.5	
2.5	PP	15	FILL		SAND, some gravel and brick, medium grained, loose, black, moist, petroleum odor	14.1	
5.0	PP	8	CL		CLAY, fine grained, soft, black, moist, petroleum odor	3.9	
6.0	PP	8	CL		CLAY, trace gravel, fine grained, soft, gray, moist, petroleum odor	3.1	1" PVC riser
10.0	PP	22	CL		SANDY CLAY, trace gravel, medium to fine grained, medium-stiff, light brown, moist, redox	5.4	
	PP	22				4.2	
	PP	30				5.7	
	PP	30				5.1	
20.0	PP	30	CL		SANDY CLAY, fine grained, soft, brown, moist	5.7	1" PVC screen
22.5	PP	30	CL		SANDY CLAY, fine grained, medium-stiff, brown, moist	6.0	
25.0					E.O.B. @ 25.0 ' BGS.		

WELL NUMBER GP-3

WENCK

CLIENT Duininck Concrete, LLC
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER B000565-20-501
PROJECT LOCATION 901 4th Avenue East, Alexandria, Minnesota
DATE STARTED 10/28/20 **COMPLETED** 10/28/20
GROUND ELEVATION ---
HOLE SIZE 2 inches
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
AT START OF DRILLING ---
LOGGED BY Alison Creeger **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES No groundwater detected.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0							
			FILL		0.5 CONCRETE		
	PP	8	FILL		SAND, some gravel and brick, loose, medium to coarse grained, dry, grey 2.5	4.7	
	PP	8	CL		CLAY, trace sand and woodchips, fine to medium grained, medium-stiff, black, organics, petroleum odor	5.3	
5	PP	15	CL			5.3	1" PVC riser
	PP	15	CL			5.3	
10	PP	1	CL		Rock stuck in 10-15' sleeve, limiting recovery	7.6	
	PP	1	CL		15.0	7.6	
15	PP	15	CL-ML		SILTY CLAY, some sand, fine grained, soft, brown, moist	6.6	
	PP	15	CL-ML		20.0	6.6	1" PVC screen
20	PP	30	CL		SANDY CLAY, some gravel, medium to fine grained, medium-stiff, brown-grey, moist	2.4	
	PP	30	CL		25.0	6.0	
25					E.O.B. @ 25.0 ' BGS.		

WELL NUMBER GP-4

WENCK

CLIENT Duininck Concrete, LLC
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER B000565-20-501
PROJECT LOCATION 901 4th Avenue East, Alexandria, Minnesota
DATE STARTED 10/28/20 **COMPLETED** 10/28/20
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
AT START OF DRILLING ---
LOGGED BY Alison Creeger **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING 20.4 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0			FILL		0.5 CONCRETE	
	PP	8	FILL		SAND, some gravel, medium grained, tan, slightly moist, petroleum odor 2.5	368.2
5	PP	8	FILL		SAND, some gravel, trace clay, medium grained, loose, gray/black, slight moist, strong petroleum odor 6.0	470.3
	PP	30	CL		SANDY CLAY, medium to fine grained, medium-stiff, gray, moist, redox, strong petroleum odor 7.5	162.7
10	PP	30	CL		SANDY CLAY, medium to fine grained, soft, gray, wet, redox, slight petroleum odor 10.0	51.6
	PP	30	CL		SANDY CLAY, medium to fine grained, soft, light brown, wet 12.5	9.7
15	PP	30			SANDY CLAY, medium grained, medium-stiff, light brown, moist	6.7
	PP	30			Rock at 17.5 feet BGS	8.4
20	PP	30	CL			11.1
	PP	30				7.1
25	PP	30			25.0	5.2

E.O.B. @ 25.0 ' BGS.

WELL DIAGRAM: 1" PVC riser; 1" PVC screen

BORING NUMBER HA-1

WENCK

CLIENT Duininck Concrete, LLC
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER B000565-20-501
PROJECT LOCATION 901 4th Avenue East, Alexandria, Minnesota
DATE STARTED 10/28/20 **COMPLETED** 10/28/20
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
AT START OF DRILLING ---
LOGGED BY Alison Creeger **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0						
		6	SP		0.5 SAND, some gravel, medium to course grained, very loose, brown, wet	0.7
		6	SP		1.0 SAND, some gravel, medium to course grained, very loose, brown with black streaks (discoloration), wet, petroleum odor	1.9
		6	SP		SAND, some gravel, medium to course grained, very loose, black with brown, wet, petroleum odor	4.5
		6				4.5
		6				4.4
		6				3.4
		6			3.5 Refusal at 3.5 feet BGS	3.9
					E.O.B. @ 3.5 ' BGS.	

BORING NUMBER HA-2

WENCK

CLIENT Duininck Concrete, LLC
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER B000565-20-501
PROJECT LOCATION 901 4th Avenue East, Alexandria, Minnesota
DATE STARTED 10/28/20 **COMPLETED** 10/28/20
GROUND ELEVATION **HOLE SIZE** 2 inches
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
AT START OF DRILLING ---
LOGGED BY Alison Creeger **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0						
			SP		SAND, some clay and gravel, medium to course grained, very loose, brown, wet.	2.0
						2.1
						1.2
						2.6
						2.1
2.5					Refusal at 2.5 feet BGS	
					E.O.B. @ 2.5 ' BGS.	

BORING NUMBER B-1

WENCK

CLIENT Duininck Concrete
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER 227704235
PROJECT LOCATION 910 4th Avenue East , Alexandria, MN
DATE STARTED 7/22/21 **COMPLETED** 7/22/21
GROUND ELEVATION 1425 ft **HOLE SIZE** 2"
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 4' Dual-Tube
AT START OF DRILLING 20.2 ft / Elev 1404.8 ft
LOGGED BY Lucas Fossum **CHECKED BY** Eric Stommes
AT END OF DRILLING 18.3 ft / Elev 1406.7 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0						0.5 Concrete 1424.5	
				FILL		SAND, with gravel, medium grained, tan, medium dry 2.5 1422.5	2.4
				FILL		SAND, with clay and gravel, medium dense, fine sand, black, moist 6.0 1419.0	2.1
5				CL		SANDY CLAY, medium stiff, fine grained sand, gray, moist 9.0 1416.0	1.9
				CL		SANDY CLAY, soft, fine grained sand, gray/brown, moist, slight petroleum odor 12.0 1413.0	2.7
10				SC		CLAYEY SAND, dense, fine sand, tan, moist 17.0 1408.0	2.6
15				SC		CLAYEY SAND, dense, fine sand, brown, moist 21.0 1404.0	1.3
20		(17.5-20) Soil analytical sample		SC		CLAYEY SAND, dense, fine sand, brown/gray, wet 23.0 1402.0	2.7
25				SC		CLAYEY SAND, dense, fine sand, brown, wet 25.0 1400.0	3.0
						E.O.B. @ 25.0 ' BGS.	1.5

BORING NUMBER B-2

WENCK

CLIENT Duininck Concrete
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER 227704235
PROJECT LOCATION 910 4th Avenue East , Alexandria, MN
DATE STARTED 7/22/21 **COMPLETED** 7/22/21
GROUND ELEVATION 1425 ft **HOLE SIZE** 2"
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 4' Dual-Tube
AT START OF DRILLING 17.0 ft / Elev 1408.0 ft
LOGGED BY Lucas Fossum **CHECKED BY** Eric Stommes
AT END OF DRILLING 13.3 ft / Elev 1411.7 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0						0.5 Concrete 1424.5	
				FILL		SAND, with gravel, loose, tan, medium to coarse grained, medium dry	0.9
						3.0 1422.0	
				FILL		SANDY CLAY, with gravel, medium stiff, fine sand, medium moist	2.9
5						6.0 1419.0	
				CL		SANDY CLAY, trace gravel, medium soft, fine sand, medium moist	3.1
							3.1
10						10.0 1415.0	
				SC		CLAYEY SAND, trace gravel, dense, soft, fine sand, moist, tan	2.9
							2.5
15							
		(15-17.5) Soil analytical sample					1.6
						18.0 1407.0	
				SC		CLAYEY SAND, dense, medium to coarse grained, tan, wet	3.3
20						21.0 1404.0	
		(20-22.5) Grain size analysis		SC		CLAYEY SAND, with gravel, coarse grained, loose, tan, wet	1.7
						23.0 1402.0	
				SC		CLAYEY SAND, trace gravel, dense, fine grained sand, tan, wet	3.1
25						25.0 1400.0	
						E.O.B. @ 25.0 ' BGS.	

BORING NUMBER B-3

WENCK

CLIENT Duininck Concrete
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER 227704235
PROJECT LOCATION 910 4th Avenue East , Alexandria, MN
DATE STARTED 7/22/21 **COMPLETED** 7/22/21
GROUND ELEVATION 1425 ft **HOLE SIZE** 2"
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 4' Dual-Tube
AT START OF DRILLING 25.4 ft / Elev 1399.6 ft
LOGGED BY Lucas Fossum **CHECKED BY** Eric Stommes
AT END OF DRILLING 23.4 ft / Elev 1401.6 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		PID (ppm)
0						0.5 Concrete	1424.5	
				FILL		SAND, with gravel, loose, tan, medium grained, dry		0.4
						3.0	1422.0	
				FILL		SANDY CLAY, trace gravel, medium stiff, black, fine sand, moist		0.6
5						5.0	1420.0	
				SC		CLAYEY SAND, trace gravel, medium soft, brown, fine sand, moist		1.1
								1.1
10								
		(10-12.5) Grain size analysis				11.0	1414.0	
				CL		SANDY CLAY, medium stiff, tan, fine sand, moist		1.5
						14.0	1411.0	1.7
15						SANDY CLAY, medium soft, brown, fine sand, moist		
				CL				1.1
						17.0	1408.0	
				SC		CLAYEY SAND, trace gravel, stiff, gray, fine grained sand, moist		0.9
20								
		(20-22.5) Soil analytical sample				22.0	1403.0	2.0
				SC		CLAYEY SAND, medium dense, fine grained sand, gray, wet		2.4
25								
						27.0	1398.0	2.4
				SC		CLAYEY SAND, trace gravel, stiff, fine grained sand, brown, wet REFUSAL @ 35'		3.1
30								
								2.6
								2.1
35						35.0	1390.0	
						E.O.B. @ 35.0 ' BGS.		

BORING NUMBER B-4

WENCK

CLIENT Duininck Concrete
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER 227704235
PROJECT LOCATION 910 4th Avenue East , Alexandria, MN
DATE STARTED 7/22/21 **COMPLETED** 7/22/21
GROUND ELEVATION 1425 ft **HOLE SIZE** 2"
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 4' Dual-Tube
AT START OF DRILLING 21.1 ft / Elev 1403.9 ft
LOGGED BY Lucas Fossum **CHECKED BY** Eric Stommes
AT END OF DRILLING 20.4 ft / Elev 1404.6 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0						0.5 Concrete 1424.5	
				FILL		SAND, with gravel, tan, medium grained, medium dry	1.9
						3.0 1422.0	
				FILL		SANDY CLAY, trace gravel, gray/black, fine sand, medium stiff, medium moist	1.2
5						6.0 1419.0	
				SC		CLAYEY SAND, trace gravel, dense, tan, fine grained sand, moist,	1.0
							2.3
10							
							1.6
							2.3
15							
						16.0 1409.0	
				SC		CLAYEY SAND, trace gravel, dense, brown, fine sand, moist	1.5
		(17.5-20) Soil analytical sample					2.6
20						20.0 1405.0	
				SC		CLAYEY SAND, medium dense, gray/brown, fine grained sand, wet	2.8
							3.0
25						25.0 1400.0	
						E.O.B. @ 25.0 ' BGS.	

BORING NUMBER B-5

WENCK

CLIENT Duininck Concrete
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER 227704235
PROJECT LOCATION 910 4th Avenue East , Alexandria, MN
DATE STARTED 7/22/21 **COMPLETED** 7/22/21
GROUND ELEVATION 1425 ft **HOLE SIZE** 2"
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 4' Dual-Tube
AT START OF DRILLING 17.0 ft / Elev 1408.0 ft
LOGGED BY Lucas Fossum **CHECKED BY** Eric Stommes
AT END OF DRILLING 16.9 ft / Elev 1408.1 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0		(0.5-2.5) Soil analytical sample				0.5 Concrete 1424.5	
				FILL		SAND, with gravel, medium dense, tan, medium to coarse grained, medium dry	10.4
							4.0
5						5.0 1420.0	
				SC		SANDY CLAY, trace gravel, medium soft, fine grained sand, tan, moist	0.8
							0.6
						9.0 1416.0	
10				SC		CLAYEY SAND, some gravel, medium loose, fine grained sand, brown, moist	
						11.0 1414.0	
				SC		CLAYEY SAND, dense, fine grained sand, brown, moist	0.5
							0.0
15							
							0.0
						17.0 1408.0	
				SC		CLAYEY SAND, medium loose, fine grained sand, tan/brown, wet	
		(17.5 -20) Soil analytical sample					0.3
20							
						21.0 1404.0	
				SC		CLAYEY SAND, medium dense, fine grained sand, brown, wet	0.2
							0.1
25						25.0 1400.0	
						E.O.B. @ 25.0 ' BGS.	

BORING NUMBER B-6

WENCK

CLIENT Duininck Concrete
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER 227704235
PROJECT LOCATION 910 4th Avenue East , Alexandria, MN
DATE STARTED 7/22/21 **COMPLETED** 7/22/21
GROUND ELEVATION 1425 ft **HOLE SIZE** 2"
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 4' Dual-Tube
AT START OF DRILLING 18.7 ft / Elev 1406.3 ft
LOGGED BY Lucas Fossum **CHECKED BY** Eric Stommes
AT END OF DRILLING 16.9 ft / Elev 1408.1 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0				FILL		SAND, trace gravel, loose, tan, medium to coarse grained, dry (1.0 / 1424.0)	
				FILL		SANDY CLAY, medium stiff, brown, fine grained sand, medium dry	2.9
							4.6
5				SC		SANDY CLAY, medium soft, brown/gray, fine grained sand, medium moist (5.0 / 1420.0)	3.1
							2.1
10				SC		CLAYEY SAND, trace gravel, dense, tan, fine grained sand, moist (9.0 / 1416.0)	1.6
							1.7
15				SC		CLAYEY SAND, trace gravel, dense, tan/brown, coarse grained, wet (16.0 / 1409.0)	2.6
				SC		CLAYEY SAND, trace gravel, medium dense, brown, fine grained sand, wet (17.0 / 1408.0)	
20		(17.5-20) Soil analytical sample		SC			2.9
							0.6
							0.3
25				SC		CLAYEY SAND, medium dense, tan/brown, fine to medium grained sand, wet (24.0 / 1401.0)	
						(25.0 / 1400.0) E.O.B. @ 25.0 ' BGS.	

BORING NUMBER B-7

WENCK

CLIENT Duininck Concrete
PROJECT NAME Alexandria Block Plant
PROJECT NUMBER 227704235
PROJECT LOCATION 910 4th Avenue East , Alexandria, MN
DATE STARTED 7/23/21 **COMPLETED** 7/23/21
GROUND ELEVATION 1425 ft **HOLE SIZE** 2"
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 4' Dual-Tube
AT START OF DRILLING ---
LOGGED BY Lucas Fossum **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0						0.5 Concrete 1424.5	
				FILL		SAND, with gravel, medium grained, tan, loose, medium dry 2.0 1423.0	0.1
				FILL		SANDY CLAY, medium stiff, tan and black, fine grained sand, medium moist 6.0 1419.0	0.3
5							
				SC		SANDY CLAY, medium stiff, tan, fine grained sand, moist 10.0 1415.0	0.5
							0.3
10							
				SC		CLAYEY SAND, medium dense, brown, fine sand, moist 17.0 1408.0	0.3
							0.5
15							
							0.1
		(17.5-20) Soil analytical sample		SC		CLAYEY SAND, dense, brown, fine grained sand, wet	0.8
20							
							1.1
		(22.5-25) Grain size analysis					2.9
25						25.0 1400.0	
						E.O.B. @ 25.0 ' BGS.	

WELL NUMBER GP-5

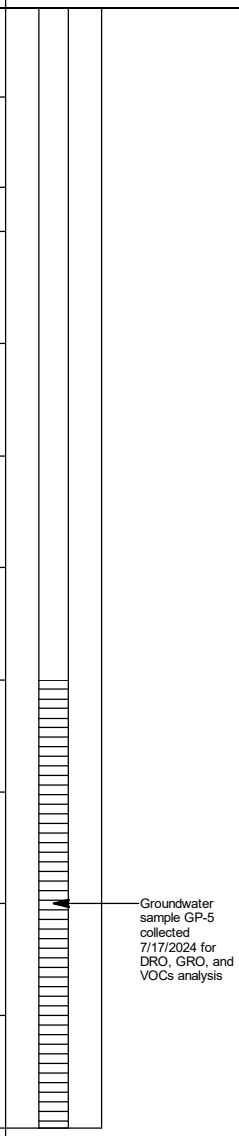
Stantec

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Dual-Tube
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES Temp well installed and left overnight
24hrs AFTER DRILLING 23.7 ft / Elev 1406.3 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0				FILL		0.5 Concrete 1429.5	
	GB 1	GP-5 (2-4') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis		FILL		Gravelly sand, medium dense, gray/light brown, fine to coarse grained 2.0 1428.0	0.9
	GB 2		30	CL		Sandy clay, medium stiff to stiff, gray, fine to medium grained 3.5 1426.5	1.2
5	GB 3			CL		Clay, medium stiff, brown, fine grained 5.0 1425.0	1.2
	GB 4		60	CL		Clay, medium stiff, brown, fine grained, trace gravel	0.4
10	GB 5			CL			0.3
	GB 6		24	CL			1.0
15	GB 7			CL			0.5
	GB 8		36	CL			1.0
20	GB 9			CL			1.7
	GB 10		60	CL			1.6
25	GB 11			CL		25.0 1405.0	1.8

E.O.B. @ 25.0 ' BGS.

WELL DIAGRAM



GENERAL BH / TP / WELL BORING LOGS.GPJ WENCK-STANTEC MASTER SOIL BORINGS.GDT 7/30/24

WELL NUMBER GP-6

Stantec

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Dual-Tube
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES Temp well installed and left overnight
24hrs AFTER DRILLING 17.7 ft / Elev 1412.4 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0				FILL		0.5 Concrete 1429.5	
	GB 1	GP-6 (2-4') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis	36	FILL		Silty sand, dense, black, fine grained 2.0 1428.0	1.0
	GB 2			CL		Sand clay, medium stiff, dark brown, fine to medium grained	0.2
5							
	GB 3		30			7.5 1422.5	0.4
				CL		Clay, medium stiff, brown, fine grained 8.5 1421.5	
	GB 4			SP		Sand, poorly graded, medium dense, dark brown, fine to coarse grained 9.5 1420.5	0.3
10							
	GB 5	GP-6 (11-13') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis		CL		Clay, medium stiff, brown, fine grained 11.0 1419.0	7.2
	GB 6		54	CL		Clay, medium stiff, gray, fine grained, trace gravel, moist, faint petroleum odor	8.9
	GB 7					14.0 1416.0	2.2
15				SP		Sand, poorly graded, medium dense, brown, fine to medium grained, some gravel, moist to wet 15.0 1415.0	
	GB 8		60			Clay, loose to medium stiff, light brown, fine grained, moist	1.2
	GB 9			CL			0.8
20							
	GB 10		60				0.3
	GB 11						0.1
25						25.0 1405.0	
						E.O.B. @ 25.0 ' BGS.	

WELL DIAGRAM

Groundwater sample GP-6 collected 7/17/2024 for DRO, GRO, and VOCs analysis

WELL NUMBER GP-7

Stantec

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Dual-Tube
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES Temp well installed and left overnight. Temp well dry when first installed **24hrs AFTER DRILLING** 7.0 ft / Elev 1423.0 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0	GB 1	GP-7 (1-3') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis		FILL		0.5 Gravelly Sand (Class 5) 1429.5	0.6
				FILL		1.0 Silty sand, dense, dark brown, fine grained 1429.0	
	GB 2		48	FILL		Silty sand, medium dense, brown, fine to medium grained, some gravel, trace clay, wood and plastic fragments at 2' bg 3.0 1427.0	0.9
	GB 3					Sandy clay, medium stiff, brown, fine to medium grained, some gravel after 5'	0.4
5							
	GB 4		60				1.4
	GB 5						2.6
10							
	GB 6		58	CL			1.2
	GB 7						0.9
15							
	GB 8		54				0.6
	GB 9						0.8
20				SP		19.5 1410.5 20.0 Sand, poorly graded, medium dense, light brown, fine to medium grained 1410.0	
	GB 10		60	CL		Clay, medium stiff to stiff, brown, some gravel	0.2
	GB 11					24.0 1406.0	0.2
25				SC		25.0 Clayey sand, medium dense to dense, brown, fine to medium grained, some gravel 1405.0	
						E.O.B. @ 25.0 ' BGS.	

WELL DIAGRAM

Groundwater sample GP-7 collected 7/17/2024 for DRO, GRO, and VOCs analysis

GENERAL BH / TP / WELL BORING LOGS.GPJ WENCK-STANTEC MASTER SOIL BORINGS.GDT 7/30/24

WELL NUMBER GP-8

Stantec

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES Temp well installed and left overnight. Temp well dry when first installed. ▼ **24hrs AFTER DRILLING** 2.5 ft / Elev 1427.6 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0	GB 1	GP-8 (1-3') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis	36	FILL		Concrete (1.0 / 1429.0)	3.2	
				FILL		Sand, poorly graded, medium dense, dark brown, fine to medium grained, some gravel (2.0 / 1428.0)		
				FILL		Silty sand, medium dense, gray, fine to coarse grained, faint petroleum odor (2.5 / 1427.5)		
	GB 2			FILL		Gravelly sand, medium dense, gray, medium to coarse grained, moist (3.0 / 1427.0)	1.6	
				FILL		Sand, poorly graded, with gravel, medium dense, light brown/gray, medium to coarse grained, faint odor (4.0 / 1426.0)		
5				FILL		Silty sand, medium dense to dense, black, fine grained, trace clay (5.0 / 1425.0)		
	GB 3		40	SP		Gravelly sand, loose, gray, fine to coarse grained, wet (7.0 / 1423.0)	0.1	
				CL		Clay, medium stiff, gray, fine to medium grained, some sand (8.0 / 1422.0)		Groundwater sample GP-8 collected 7/17/2024 for DRO, GRO, and VOCs analysis
	GB 4			SM		Silty sand, medium dense, black, fine grained, trace clay and gravel (8.5 / 1421.5)	0.9	
10				CL		Clay, medium stiff, gray, fine to medium grained, faint organic odor (10.0 / 1420.0)		

E.O.B. @ 10.0 ' BGS.

BORING NUMBER GP-9

Stantec

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0							
	GB 1	GP-9 (1-3') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis	36	FILL		Concrete 1.0 1429.0	
				FILL		Sand, poorly graded, medium dense, brown/red to dark brown, fine to coarse grained, some gravel 3.0 1427.0	3.5
	GB 2			SC		Clayey sand, medium dense, brown, fine to medium grained, some gravel 4.0 1426.0	0.8
5				SM		Silty sand, medium dense, black, fine grained, gravel lens at 4.5' 6.0 1424.0	
	GB 3		40	SP		Gravelly sand, loose, gray, medium to coarse grained 7.0 1423.0	1.4
	GB 4			CL		Clay, soft, gray, fine grained 9.0 1421.0	1.6
10				CL		Sandy clay, medium stiff to stiff, gray to brown, fine to medium grained 10.0 1420.0	
						E.O.B. @ 10.0 ' BGS.	

WELL NUMBER GP-10

Stantec

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES Temp well installed and left overnight. Temp well dry when first installed. ▼ **24hrs AFTER DRILLING** 5.2 ft / Elev 1424.8 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0				FILL		Concrete 0.5 — 1429.5		
	GB 1		48	FILL		Gravelly sand, medium dense, brown/gray, medium to coarse grained	4.2	
						3.0 — 1427.0		
	GB 2	GP-10 (3-5') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, PCBs, and Dry Weight analysis		CL		Clay, medium stiff to stiff, black, fine grained, petroleum odor, some sand	124.6	
5						5.0 — 1425.0		
				CL		Sandy clay, medium stiff, gray, fine to medium grained 5.5 — 1424.5		
	GB 3		60	CL		Clay, medium stiff to stiff, gray, fine grained, some gravel	59.4	
	GB 4						59.9	Groundwater sample GP-10 collected 7/17/2024 for DRO, GRO, and VOCs analysis
10						10.0 — 1420.0		
						E.O.B. @ 10.0 ' BGS.		

BORING NUMBER GP-11

Stantec

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0				FILL		Concrete 0.5 1429.5	
	GB 1	GP-11 (1-3') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis	48	FILL		Gravelly sand, medium dense, brown to gray, fine to coarse grained 2.5 1427.5	1.1
	GB 2			CL		Clay, medium stiff to stiff, black to gray, fine grained 5.0 1425.0	1.3
5	GB 3		60	CL		Clay, medium stiff to stiff, light brown, fine grained 8.0 1422.0	2.5
	GB 4			CL		Sandy clay, medium stiff, brown/gray, fine to medium grained 10.0 1420.0	2.1
10						E.O.B. @ 10.0 ' BGS.	

BORING NUMBER GP-12

Stantec

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0				FILL		Concrete 0.5 1429.5	
	GB 1	GP-12 (2-4') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis		FILL		Gravelly sand, medium dense, gray to brown, fine to coarse grained, trace clay 2.0 1428.0	0.7
	GB 2		36	CL		Clay, medium stiff, dark brown, fine grained 3.0 1427.0	0.7
5	GB 3			CL		Clay, medium stiff, light brown, fine grained, some gravel	0.7
	GB 4		56	CL			0.9
	GB 5			CL		8.0 1422.0 Sandy clay, medium stiff, light brown, fine to medium grained 10.0 1420.0	0.7
10						E.O.B. @ 10.0 ' BGS.	

BORING NUMBER GP-13

Stantec

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0	GB 1			FILL		Gravelly sand, medium dense, light brown, fine to coarse grained (1.0 – 1429.0)	0.1
	GB 2	GP-13 (1-3') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis	58	CL		Clay, medium stiff to stiff, brown, fine to medium grained, some gravel	1.1
	GB 3						0.5
5	GB 4		40				0.5
	GB 5						0.5
10						(10.0 – 1420.0)	
						E.O.B. @ 10.0 ' BGS.	

BORING NUMBER GP-14

Stantec

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0				FILL		Concrete 1.0 1429.0	
	GB 1	GP-14 (1-3') collected for DRO with silica gel cleanup, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis	36	PT		Peat, medium dense, black, fine, trace organics 3.0 1427.0	46.4
5	GB 2			CL		Clay, medium stiff, dark gray transitioning to light brown near 10', fine grained, trace gravel	2.3
	GB 3		48				5.1
10	GB 4					10.0 1420.0	2.8
						E.O.B. @ 10.0 ' BGS.	

BORING NUMBER GP-15

Stantec

CLIENT Park and 3rd Alexandria, LLC
PROJECT NAME Park and 3rd Lofts Redevelopment
PROJECT NUMBER 227707105
PROJECT LOCATION Alexandria, MN
DATE STARTED 7/16/24 **COMPLETED** 7/16/24
GROUND ELEVATION 1,430 ft amsl **HOLE SIZE** 2
DRILLING CONTRACTOR Midwestern Drilling, LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe with 5' Macro-Core
DURING DRILLING ---
LOGGED BY Casey Lucht **CHECKED BY** Eric Stommes
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	ANALYTICAL SAMPLE	SAMPLE RECOVERY (in)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0				FILL		Gravelly sand (Class 5) 1.0 1429.0	
	GB 1	GP-15 (1-3') collected for DRO, GRO, VOCs, PAHs, RCRA Metals, and Dry Weight analysis	60	SC		Clayey sand, medium dense to dense, light brown, fine grained 3.0 1427.0	0.4
5	GB 2			CL		Sandy clay, medium stiff to stiff, brown, fine to medium grained, trace gravel	1.2
	GB 3		56				0.9
10	GB 4					10.0 1420.0	0.7
						E.O.B. @ 10.0 ' BGS.	

Alexandria Apartments

AET Project #P-0030207

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-01 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **201.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
1	3" - SILTY SAND WITH GRAVEL, fine to coarse grained, brown		M	AS						
2	FILL/TOPSOIL, SANDY CLAY, dark brown									
	LEAN CLAY, trace sand, brown, firm to stiff, (CL)									
3		9	M	SS	18	3.3	14	122		
4										
5		11	M	SS	20	3.0	13	123		
6										
7										
8		7	M	SS	20	1.1	13	144		
9										
10		11	M	SS	22	2.0	13	132		
11										
12										
13		13	M	SS	20	3.5	12	145		
14										
15		9	M	SS	20	3.3	11	134		
16										
17										
18		12	M	SS	22	3.1	11	140		
19										
20		12	M	SS	20	2.2	11	137		
21										
22										
23										
24		8	M	SS	22	2.2	12	134		
	END OF BORING - 24.9'									

DEPTH:	DRILLING METHOD
0-23½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/18/24	**--**	**24.9**	**23.5**	**--**	**--**	**None**

BORING COMPLETED: **3/18/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-02 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **199.5**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
1	3" - SILTY SAND WITH GRAVEL, fine to coarse grained, brown		M	AS						
2	1' - FILL/TOPSOIL, SANDY CLAY, black to dark brown									
3	LEAN CLAY, trace sand, brown, firm to stiff, (CL)	9	M	SS	16	4.6				
4										
5		8	M	SS	20	2.3				
6										
7										
8		5	M	SS	22	1.1				
9										
10		5	M	SS	20	0.9				
11										
12										
13		5	M	SS	18	1.3				
14										
15			M	TW						
16										
17										
18		8	M	SS	20	2.3				
19										
20	4" lens of sand at 20'	13	M	SS	22	2.5				
21										
22										
23										
24		9	M	SS	20	2.5				
	END OF BORING - 24.9'									

DEPTH:	DRILLING METHOD
0-23½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/18/24	**--**	**24.9**	**23.5**	**--**	**--**	**None**

BORING COMPLETED: **3/18/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-03 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **200.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	4" - SILTY SAND WITH GRAVEL, fine to coarse grained, brown		M	AS						
1	1" - FILL/TOPSOIL, SANDY CLAY, black to brown									
2	LEAN CLAY, trace sand, brown to gray, stiff, (CL)									
3		9	M	SS	18	3.3				
4										
5		9	M	SS	20	1.9				
6	**END OF BORING - 6.0'**									

DEPTH:	DRILLING METHOD
0-4½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/18/24	**--**	**6.0**	**4.5**	**--**	**--**	**None**

BORING COMPLETED: **3/18/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-04 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **203.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	7" of CONCRETE		M	AS						
1	AGGREGATE BASE, fine to coarse grained, dark brown to black									
2										
	LEAN CLAY, trace sand, dark brown, firm, (CL)									
3		8	M	SS	16	3.6				
4	LEAN CLAY, trace sand, brown, firm to stiff, (CL)									
5		9	M	SS	16	2.3				
6										
7										
8		12	M	SS	20	2.4				
9										
10		11	M	SS	18	2.6				
11										
12										
13		13	M	SS	20	4.7				
14										
15		8	M	SS	18	1.8				
16	**END OF BORING - 16.0'**									

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS						
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-14½'	**3.25" HSA**	**3/19/24**	**--**	**16.0**	**14.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-05 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **204.5**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	8" of CONCRETE		M	AS						
1	AGGREGATE BASE, fine to coarse grained, dark brown									
2	LEAN CLAY, brown, firm, (CL)									
3		14	M	SS	8	1.7	8	135		
4										
5		20	M	SS	8	2.5	14	120		
6										
7										
8		20	M	SS	7	1.4	13	145		
9										
10		22	M	SS	8	3.6	10	147		
11										
12	SANDY LEAN CLAY, brown, stiff, (CL)									
13		18	M	SS	10	5.0	11	147		
14										
15		20	M	SS	9	3.6	11	155		
16	**END OF BORING - 16.0'**									

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS						
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-14½'	**3.25" HSA**	**3/19/24**	**--**	**16.0**	**14.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-06 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **206.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	7" of CONCRETE		M	AS						
1	AGGREGATE BASE, fine to coarse grained, dark brown									
2	SANDY LEAN CLAY, dark brown, stiff, (CL)									
3		13	M	SS	18	3.8				
4	LEAN CLAY, trace sand, brown, firm to stiff, (CL)									
5		6	M	SS	12	3.0				
6										
7										
8		10	M	SS	20	2.7				
9										
10		10	M	SS	20	2.9				
11										
12										
13		11	M	SS	18	4.5				
14										
15		9	M	SS	20	2.1				
16	**END OF BORING - 16.0'**									

DEPTH:	DRILLING METHOD
0-14½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**16.0**	**14.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-07 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **200.2**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	6" of CONCRETE		M	AS						
1	AGGREGATE BASE, fine to coarse grained, brown to gray									
2	FILL, CLAY, trace sand, brown to black									
3		13	M	SS	18					
4										
5		4	M	SS	18					
6	BURIED TOPSOIL, ORGANIC CLAY, trace sand, black									
7	FILL, CLAY, trace sand, brown to black									
8		8	M	SS	16	3.1				
9	LEAN CLAY, trace sand, brown to gray, soft to stiff, (CL)									
10		4	M	SS	20	0.6				
11										
12										
13		6	M	SS	18	1.7				
14										
15		11	M	SS	18	4.8				
16	**END OF BORING - 16.0'**									

DEPTH:	DRILLING METHOD
0-14½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**16.0**	**14.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-08 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **198.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	3" of CONCRETE		M	AS						
1	AGGREGATE BASE, fine to coarse grained, dark brown									
2	LEAN CLAY, trace sand, brown to gray, firm to stiff, (CL)									
3		6	M	SS	16	3.8	15	118		
4										
5		6	M	SS	20	3.7	13	121		
6										
7										
8		9	M	SS	22	2.5	11	135		
9										
10	Rock	14	M	SS	3		10			
11										
12										
13		9	M	SS	16	2.3	13	129		
14										
15		8	M	SS	18	2.9	12	137		
16										
17										
18		8	M	SS	16	4.9	11	146		
19	SANDY LEAN CLAY, brown, stiff, (CL)									
20		12	M	SS	20	1.2	11	146		
21										
22										
23										
24		10	M	SS	20	1.0	11	139		
	END OF BORING - 24.9'									

DEPTH:	DRILLING METHOD
0-23½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**24.9**	**23.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-09 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **198.1**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	4.5" of CONCRETE									
1	AGGREGATE BASE, fine to coarse grained, gray to brown		M	AS						
2	SANDY LEAN CLAY, light brown to light gray, firm to stiff, (CL)									
3		6	M	SS	18	6.0				
4										
5		9	M	SS	20	3.5				
6										
7	LEAN CLAY, trace sand, brown, stiff, (CL)									
8		9	M	SS	16	1.1				
9										
10		12	M	SS	12					
11										
12	SANDY LEAN CLAY, brown, very stiff to stiff, (CL)									
13		16	M	SS	18	4.7				
14										
15		13	M	SS	18	5.1				
16										
17										
18		9	M	SS	16	3.6				
19										
20		10	M	SS	18	4.9				
21										
22										
23	LEAN CLAY, trace sand, gray to brown, firm, (CL)									
24		7	M	SS	22	3.8				
	END OF BORING - 24.9'									

DEPTH:	DRILLING METHOD
0-23½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**24.9**	**23.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-10 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **198.1**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	4.75" of CONCRETE									
1	AGGREGATE BASE, fine to coarse grained, brown		M	AS						
2	FILL/TOPSOIL, CLAY, trace sand, black to brown									
3		6	M	SS	16					
4										
5		9	M	SS	6		13			
6										
7	FILL, SAND, fine to coarse grained, gray to brown									
8		6	M	SS	12		10			
9										
10	LEAN CLAY, trace sand, brown to gray, soft, (CL)	2	M	SS	18	1.1	23	112		
11										
12										
13			M	TW						
14	LEAN CLAY, brown, firm, (CL)									
15		5	M	SS	18	1.3	14	142		
16										
17										
18		7	M	SS	20	1.6	12	142		
19	LEAN CLAY, trace sand, dark gray, firm, (CL)									
20		6	M	SS	22	2.4	13	130		
21										
22										
23										
24		7	M	SS	22	2.2	13	126		
	END OF BORING - 24.9'									

DEPTH:	DRILLING METHOD
0-23½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**24.9**	**23.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET JOB NO: **P-0030207** LOG OF BORING NO. **B-11 (p. 1 of 1)**

PROJECT: **Proposed Alexandria Apartments; Alexandria, Minnesota**

SURFACE ELEVATION: **199.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS qp	WC	DEN	%-#200	qu
	6" of CONCRETE		M	AS						
1	AGGREGATE BASE, GRAVEL, dark brown									
2	FILL, CLAY, trace sand, brown to dark brown									
3		5	M	SS	12					
4										
5	FILL, SAND, fine grained, brown	11	M	SS	20					
6	**END OF BORING - 6.0'**									

DEPTH:	DRILLING METHOD
0-4½'	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/19/24	**--**	**6.0**	**4.5**	**--**	**--**	**None**

BORING COMPLETED: **3/19/24**

DR: **MJ** LG: **BA** Rig: **108**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

APPENDIX C

MPCA Guidance Documents

Best management practices for the off-site reuse of unregulated fill

This document defines **unregulated fill** and provides guidance from the Minnesota Pollution Control Agency (MPCA) Remediation Division regarding Best Management Practices for its off-site reuse.

Off-site reuse of excess soil as fill or aggregate is a common practice at many development and road construction projects. If no known or potential sources of contamination are identified during environmental due diligence and subsequent field observations, then sampling of excess soil for laboratory analysis is not necessary. However, when excess soil originates from a site with known or potential sources of contamination, characterization of the soil is warranted prior to off-site reuse to ensure the protection of human health and the environment.

If limited contamination is detected in the soil, the unregulated fill criteria and best management practices described herein provide a framework for making informed decisions about the off-site reuse of the soil. If the soil does not meet the criteria for unregulated fill, manage or dispose of the soil in accordance with applicable local, state, and federal regulations.

I. Definition of unregulated fill

Unregulated fill, for the purpose of this guidance, is defined as excess soil in which a release of contaminants has been identified at concentrations less than the MPCA's most conservative risk-based values (see complete criteria in Section III). Thus, the identified contaminants in the fill are present at concentrations that are not of regulatory concern to the MPCA. Unregulated fill is not a solid waste.*

II. Exclusions

1. Some excess soil and other material generated at a redevelopment site may be regulated as either solid or hazardous waste and must be managed according to applicable solid or hazardous waste laws, including:
   - Soil that is characteristically hazardous or contaminated due to a release of a listed hazardous waste, as defined in Minn. R. ch. 7045. Such soil must be managed in accordance with the requirements of the MPCA's Resource Conservation and Recovery Act (RCRA) program.
   - Waste material such as salvaged bituminous, crushed concrete, bricks, fly ash, etc. proposed to be reused as fill. The beneficial reuse of solid wastes is governed by Minn. R. 7035.2860. Information regarding the beneficial reuse of solid wastes can be found on the MPCA's website at http://www.pca.state.mn.us/waste/sw-utilization.html.
2. The management and reuse of dredged material may be regulated by permit or subject to other regulations. Information about the management of dredged materials can be found on the MPCA's website at http://www.pca.state.mn.us/water/dredgedmaterials.html.

**If sent to a permitted landfill for disposal, unregulated fill may be subject to a solid waste tax.*

III. Criteria for unregulated fill

Unregulated fill is excess soil that meets all the following field screening and contaminant concentration criteria:

- free from solid waste, debris, asbestos-containing material, visual staining, and chemical odor
- organic vapors less than 10 parts per million, as measured by a photoionization detector (PID)
- for petroleum-impacted soil, less than 100 mg/kg diesel range organics (DRO)/gasoline range organics (GRO)
- for contaminants detected in soil, less than the MPCA's Residential Soil Reference Values (SRVs) and Tier 1 Soil Leaching Values (SLVs)*

**Naturally-occurring concentrations of some metals, such as arsenic, selenium, or copper, sometimes exceed the SRV or SLV. Such soils are not considered impacted in the absence of a contaminant source or other field or laboratory indications of contamination.*

A list of current SRVs and SLVs can be found on the MPCA's website. For contaminants detected in soil that do not have established SRVs or SLVs, additional evaluation may be needed to determine whether the soil can be considered unregulated fill.

Some detections of DRO in soil may stem from the presence of natural organic material or non- petroleum contaminants in the soil, such as coal tars or other material containing polynuclear aromatic hydrocarbons (PAHs). Evaluation of DRO data should take into consideration the history of the property, including the known or likely presence of a petroleum source, the presence (or lack thereof) of other contaminants in the soil sample, and the type of soil. If positive DRO results are related to non- petroleum contaminants, risk-based criteria for the non-petroleum contaminants should be applied. If necessary, laboratory analytical methods are available (e.g., silica gel cleanup) to help determine if the DRO is from natural organic material in the soil.

IV. Placement of unregulated fill

Avoid sensitive areas when planning the placement of unregulated fill. The MPCA recommends the following Best Management Practices when planning where to place unregulated fill:

- Avoid placing unregulated fill at schools, playgrounds, daycares, and residential properties. Unregulated fill is most suitable for use at industrial or commercial properties.
- Avoid placing unregulated fill in gardens where food for human/animal ingestion will be grown.
- Observe a minimum ten-foot separation distance between unregulated fill and the water table.
- Avoid placing unregulated fill where contaminants may be transported by run-off to lakes, rivers, wetlands, or streams.

V. Sampling decisions

Base decisions on whether to sample soil for contamination prior to off-site reuse on the history of the source area, the nature of the source material, the extent to which the soil has been previously characterized, and other factors that are part of a due diligence assessment of the environmental condition of the source property.

If the soil originates from a site where known or potential sources of contamination are present, collect samples of the soil for field screening and laboratory analyses. Examples of sites where environmental due diligence may reveal known or potential sources of contamination include sites where contamination was previously identified, previously developed sites (commercial, industrial, recreational, or residential), agricultural properties, or land that may have been subject to dumping, spills, or historic filling activities.

If no known or potential sources of contamination are identified during environmental due diligence and subsequent field observations, then sampling of excess soil for laboratory analyses is not necessary.

VI. Sample type and frequency

When soil sampling is appropriate, base the frequency and type of samples on the potential sources of contamination, the depth, volume, and heterogeneity of the source material, and the availability of existing data. At a minimum, analytical parameters should include volatile organic compounds, PAHs, RCRA metals, DRO, and GRO. Include other contaminants of concern as appropriate, based on the history of the source location. Analytical data should be age-appropriate and representative of the source material.

Some soils even lightly impacted by heavy metals have the potential to leach at concentrations at or above the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit. As a rule-of-thumb, a TCLP analysis for RCRA metals should be conducted if the soil concentration of a metal is 20 times or greater the TCLP regulatory criteria.

A typical frequency for the field screening of potentially contaminated soil using a PID is one measurement for every ten cubic yards of soil. Remediation program guidance may be used as reference in determining appropriate sampling frequency based on soil volume. For example, soil sampling guidelines for the Petroleum Remediation Program are presented in guidance Document 4-04: http://www.pca.state.mn.us/publications/c-prp4-04.pdf. Flexibility in the number of samples may be warranted, depending on the site-specific circumstances. Use sound professional judgment, considering all the factors discussed above, when developing a sampling plan to determine whether excess soil meets the criteria for unregulated fill.

VII. Implementation

All parties are encouraged to use the best management practices described here to make informed decisions about the off-site reuse of unregulated fill. It is the responsibility of the property owners and other parties engaged in development and construction activities to make sure their activities include appropriate environmental due diligence and that excess soil and other materials generated by these activities are managed in an environmentally responsible manner.

Note that some local units of government may have local ordinances that restrict the off-site reuse of unregulated fill within their boundaries. Parties seeking to import unregulated fill should check with local regulators to determine if such ordinances are in effect in their project area.

Nothing in this guidance negates the need for compliance with any law, rule, or other legal obligation (including any environmental covenant) that applies to any development or construction activity, including the generation, management, transport, and reuse of excess soil.

Excavation of petroleum-contaminated soil and tank removal sampling

Petroleum Remediation Program

This document describes requirements for petroleum contaminated soil excavation performed at the time of tank system removal, installation, or upgrade. A tank system includes any element of the system, such as tanks, dispensers, and/or piping. Also defined are sampling requirements that must be conducted during any tank system removal (including both regulated and unregulated tank systems) when a petroleum release is evident.

Release reporting

Report any detection of petroleum contamination in soil or groundwater to the Minnesota duty officer, even if contaminant levels are lower than the action levels stated below.

Emergency conditions

Immediately contact the Minnesota duty officer if there is a recent release or there are vapor impacts, drinking water impacts, surface water impacts, non-aqueous phase liquid (NAPL), or an unstable environmental condition.

Additional information

Additional guidance related to release reporting, release response, and emergency conditions can be found in Reporting of petroleum releases, Light non-aqueous phase liquid management strategy, Recent releases at petroleum tank sites, and the Petroleum Remediation Program general policy.

I. General excavation requirements

A. Excavation prior to a limited site investigation

Excavate petroleum-contaminated soil prior to completing a limited site investigation (LSI) in the situations listed below. Otherwise, contaminated soil should remain in place until an LSI is completed.

1. Excavate all contaminated soil meeting any of the field screening criteria listed in Table 1 up to a maximum of 200 cubic yards, providing that groundwater is not impacted or likely to become impacted. Contaminated soil excavation in this scenario is intended to eliminate the need for an LSI. See subsection B below for more details. Soil sample collection and analysis procedures describes soil headspace screening and petroleum sheen test procedures. In certain situations, a site-specific risk scenario may justify excavating more than 200 cubic yards. Contact the Minnesota Pollution Control Agency (MPCA) for approval to exceed the 200 cubic yard limit.

Table 1. Field screening criteria

Petroleum product	Soil headspace screening level (ppmv*)	Visual evidence	Petroleum-saturated	Grossly contaminated (ppmv*)
Gasoline, ethanol-blended fuel, and aviation gasoline	40 or above	Visual evidence of petroleum staining	Positive sheen test result	200 or above
Diesel fuel, fuel oil, used or waste oils, jet fuel, kerosene	10 or above			

*ppmv (parts per million by volume)

2. If accessible, excavate up to 200 cubic yards of petroleum-saturated or grossly contaminated soil during tank removal, system installation, or system upgrade. Use the petroleum sheen test to determine if soil is petroleum saturated. Use soil headspace screening with a photoionization detector (PID) to determine if soil is grossly contaminated. Soil with PID readings of 200 parts per million by volume (ppmv) or above is considered grossly contaminated. Soil sample collection and analysis procedures describes soil headspace screening and petroleum sheen test procedures. In certain situations, a site-specific risk scenario may justify excavating more than 200 cubic yards. Contact the MPCA for approval to exceed the 200 cubic yard limit.

> **Excavation limits**
> The total excavation volume allowed under subsections 1 and 2 applied separately or in combination, cannot exceed 200 cubic yards without prior MPCA approval. This limit is not applicable to subsections 3, 4, or 5, where site-specific circumstances dictate excavation volume.

3. A recent release has occurred. Quick removal of contamination can prevent the expansion of a contaminant plume. See Recent releases at petroleum tank sites for more information.
4. An obvious emergency condition exists where soil excavation is an appropriate interim corrective action. Refer to the Petroleum Remediation Program general policy for more information on emergency conditions.
5. Excavate petroleum-contaminated soil if it is necessary to facilitate tank system installations (see Section II).

B. Situations requiring a limited site investigation

An LSI is necessary if:

1. Excavation of 200 cubic yards or less of did not remove petroleum-contaminated soils as described in item 5 below.
2. Groundwater is present in the excavation basin and has been in contact with petroleum-contaminated soil, or groundwater contamination is suspected.
3. Contamination intercepts a seasonally high water table, indicated by mottling on the excavation sidewalls, or bedrock.
4. Other known or suspected impacts exist, such as discharge of contaminated water to surface waters or sewers, vapor impacts to buildings or utilities, etc.
5. Residual soil contamination meets any of the field screening criteria in Table 1 or has a soil analytical result greater than 100 mg/kg gasoline range organics (GRO) or diesel range organics (DRO).
6. Post-excavation soil borings encounter contaminated groundwater (see subsection C below).

C. Post-excavation soil borings

Sites with sandy or silty sand soil (Unified Soil Classification System/American Society for Testing Materials) and water tables within 25 feet of the ground surface require a soil boring(s) to determine whether an LSI is necessary. Advance a soil boring directly through each suspected source area, such as former tank locations, dispensers, and piping runs, in the following situations:

a. Soil contamination is between 1 and 100 mg/kg GRO/DRO at a suspected source area excavation; or
b. Visual or other evidence of contamination remains in a suspected source area.

Collect and analyze soil samples following the procedures and analytical requirements described in Soil sample collection and analysis procedures. Collect and analyze groundwater samples following the procedures and analytical requirements described in Groundwater sample collection and analysis procedures.

An LSI is necessary if the boring(s) encounters contaminated groundwater.

An LSI may not be necessary if the boring(s) encounters soil contamination that does not intersect the water table and the groundwater sample is not contaminated and is not likely to become contaminated.

D. Returning contaminated soil to the excavation basin

When an LSI is necessary, return contaminated soil to the excavation basin **except** petroleum-saturated or grossly contaminated soil as described in Table 1. All petroleum-saturated or grossly contaminated soil **must** be disposed of or treated as described in subsection G.2 or G.3 below.

E. Field screening during excavations

Field screening includes completing soil headspace screening with a PID and the petroleum sheen test as described in Soil sample collection and analysis procedures. Collect and field screen soil samples frequently enough to verify the need for soil removal, with at least one sample for each 10 cubic yards of soil removed.

Field screen soil two feet below the following areas: pipefittings, joints, and any other area where there is evidence of a suspected release from the piping.

Label removed samples with the prefix "R", the sample ID, and the sample depth. Accurately show the sample locations on a scaled map. Carefully document successive PID readings vertically below the source of release, indicating the location and depth of each sample on a map of the excavation. *Example*: R-1(2’), R-1(4’), R-1(6’), R-2(4’), etc. Note: R-1 samples are from the same location but successively deeper.

F. Sampling requirements following soil removal

After the excavation is complete but before returning any soil to the excavation basin, collect soil samples for laboratory analysis from the bottom and sidewalls of the excavation, along removed piping runs, and beneath removed dispensers to document the contamination remaining in place.

Label soil and groundwater samples collected for laboratory analysis according to the sample type, location, and depth.

Collect and analyze soil samples following the procedures and analytical requirements described in Soil sample collection and analysis procedures as follows:

Sidewall samples: Remove at least one foot of exposed soil prior to collection to ensure a representative sample for laboratory analysis. Collect sidewall samples at a rate of one sample per 25 linear feet of sidewall; collect a minimum of four sidewall samples, one from each side, to document the contaminant levels remaining in place. Collect samples at the depth interval with the highest contaminant level detection in the removed soil, the “R” samples, near the bottom of the excavation basin. Label sidewall samples with the prefix “S”, the sample ID, and the sample depth. Accurately show the sample locations on a scaled map. *Example*: S-1(6’), S-2(8’), S-3(5’), etc.

Bottom samples: Remove at least one foot of exposed soil prior to collection to ensure a representative sample for laboratory analysis. Collect bottom samples from the bottom of the excavation basin at a rate of one bottom sample per 100 square feet of bottom area and beneath removed dispensers. Label bottom samples with the prefix "B", the sample ID, and the sample depth. Accurately show the sample locations on a scaled map. *Example*: B-1(7'), B-2(14'), B-3(10'), etc.

Note: Laboratory analysis to document remaining contamination is not generally required after removing contaminated surface soil as a corrective action (see Section IV).

Collect and analyze groundwater samples following the procedures and analytical requirements described in Groundwater sample collection and analysis procedures:

Groundwater samples: When groundwater is present in an excavation basin, collect one sample per basin to assess groundwater contamination. A sample is not required if obvious evidence of contaminated groundwater exists such as visible or measurable petroleum product on the water, including petroleum sheen.

Following sampling, provide an excavation map showing soil and groundwater sample locations, site features, the two-dimensional extent of the final excavation footprint at the ground surface, and the final excavation depth contours using a contour interval of 1 to 2 feet.

G. Post-excavation petroleum-contaminated soil management

1. **On-site storage**

   Stockpile contaminated soil on an impervious surface or on minimum 40-mil plastic. Cover the stockpile at the end of each day with minimum 6-mil reinforced plastic or 10-mil unreinforced plastic. Securely anchor the stockpile cover with clean soil or other suitable material. Obtain local government and MPCA approval prior to moving contaminated soil for off-site storage. Storage at land treatment sites must be in accordance with Minn. R. 7037.0810. Improper storage of contaminated soil may cause an additional release to the environment and result in a reduction in Petrofund reimbursement.

2. **Soil treatment or disposal**

   See Treatment and disposal of petroleum-contaminated soil for options and specific stockpile sampling requirements.

H. Excavation report

Complete a General excavation report worksheet when petroleum contamination is encountered during a tank system excavation prior to an LSI, even if no soil is removed for off-site treatment or disposal. If an LSI will not be completed, submit the General excavation report worksheet for MPCA review. If an LSI will be completed, include the General excavation report worksheet as an appendix in the Investigation report. The reporting deadline is 10 months from the date the MPCA issues a Petroleum Storage Tank Release letter. The MPCA establishes shorter deadlines for high-priority sites.

I. Endangering structures

Do not allow excavations to endanger structures, including buildings, roads, utility lines, monitoring wells, etc. Excavations must comply with Occupational Safety and Health Administration (OSHA) standards.

II. Excavation during tank system replacement or removal

A. Planning ahead

It is recommended to gather at least two competitive bids prior to hiring a contractor in order to satisfy the Petrofund competitive bidding requirement in case petroleum contamination is encountered during excavation.

Bid forms are available from the Minnesota Department of Commerce Petrofund program, or by calling 651-539-1515 or 800-638-0418.

Note: Removals and installations of regulated tanks must be performed by MPCA-certified tank contractors.

Prior to beginning any tank work, plan for petroleum-contaminated soil storage and treatment or disposal (see Section I.G). Obtain local government and MPCA approval prior to moving contaminated soil for off-site storage.

Arrange for an environmental consultant with appropriate equipment to field screen soil and collect soil samples for laboratory analysis during and after excavation as described in Sections I and III.

B. Replacement or removal of underground storage tanks

Report any detection of petroleum contamination in soil or groundwater to the Minnesota duty officer, even if contaminant levels are lower than the action levels stated in Table 1.

Conform to section I.A above, by removing and separating contaminated soil meeting any of the field screening criteria in Table 1, up to 200 cubic yards. Petroleum-saturated or grossly contaminated soil must be excavated if accessible. Contact the MPCA for approval to exceed the 200 cubic yard limit. For tank replacement(s), see Table 2 on the following page for allowable soil excavation based on tank volume.

Screen soil from around removed tanks, piping, and dispensers. Collect sidewall and bottom samples from the tank basin, piping, and dispenser areas if the excavation removed all contaminated soil meeting the criteria in Table 1 and groundwater is not likely to be impacted. Analyze soil samples following the procedures and analytical requirements described in Soil sample collection and analysis procedures.

An LSI is necessary if groundwater is likely to be impacted or test pits indicate the volume of contaminated soil remaining after removing the allowable volume based on Table 2 exceeds 200 cubic yards. Do not remove additional soil beyond the volume allowed for the tank installation at this phase of work, unless it is petroleum saturated or grossly contaminated as described in Table 1.

Refer to Appendix A for a flowchart detailing petroleum-contaminated soil management during UST removals or installations. If the site is a closed petroleum release site, refer to Assessment of petroleum contamination at closed leak sites.

Table 2. Allowable contaminated soil removal during UST replacement

Table 2A		Table 2B	
New tank size (gallons)	**For each tank to be installed add: (cubic yards)**	**Old tank size (gallons)**	**For each tank to be removed subtract: (cubic yards)**
550	30	550	3
1,000	40	1,000	5
2,000	70	2,000	10
3,000	90	3,000	15
4,000	110	4,000	20
5,000	130	5,000	25
6,000	140	6,000	30
8,000	170	8,000	40
10,000	210	10,000	50
12,000	240	12,000	60
15,000	260	15,000	75
20,000	320	20,000	100
25,000	400	25,000	125

Note: For new pipe trenching, allow one-third cubic yard for every linear foot of contaminated trench.

Example 1: Two 10,000-gallon tanks are being installed in the old tank basin, where one 4,000-gallon tank and one 6,000-gallon tank were removed.

(210 + 210) - (20 + 30) = 370

Remove up to 370 cubic yards of contaminated soil.

Example 2: Two 10,000-gallon tanks are being installed in the old tank basin, where one 4,000-gallon tank and one 6,000-gallon tank were removed. Test pits indicate the removal of an additional 130 cubic yards of petroleum-contaminated soil would remove all the soil contamination meeting the field screening criteria in Table 1 and groundwater impacts are not likely.

(210 + 210) - (20 + 30) + 130 = 500

Remove up to 500 cubic yards of contaminated soil.

C. Replacement or removal of aboveground storage tanks

Excavation requirements at aboveground storage tank (AST) sites are similar to those for UST sites. Contaminated surface soil at AST sites often occurs at loading and transfer areas, valve locations, piping runs, and from tank releases. Contaminated surface soil poses a risk to surface water, groundwater, and human health via direct contact, and requires corrective action.

Contaminated surface soil

Excavating contaminated surface soil when upgrading or installing AST systems is not equivalent to excavating contaminated surface soil when completed as a corrective action (Section IV). Excavation during an upgrade or installation occurs before an LSI, with removal criteria based solely on field evidence (Table 1). When addressing a release by excavation alone during an AST replacement or removal (Section I.A.1), field screening and soil sampling are required as described in Section I.

Conform to Section I.A above, by removing and separating contaminated soil meeting any of the field screening criteria in Table 1, up to 200 cubic yards. Petroleum-saturated or grossly contaminated soil must be excavated if accessible. Contact the MPCA for approval to exceed the 200 cubic yard limit.

If excavation encounters contaminated surface soil (meeting field-screening criteria in Table 1) during an AST upgrade or new system installation, remove up to two feet of contaminated soil below piping, dispenser areas, loading and transfer areas, and the footprint of the new AST containment berm up to 200 cubic yards.

If the contaminated soil appears to pose a human or environmental risk and the upgrade or installation will make the soil inaccessible, additional removal beyond the limits stated above may be appropriate prior to an LSI. Obtain MPCA approval before excavating beyond the stated limits or exceeding the 200 cubic yard limit.

If contaminated surface soil exists in areas of the site other than those listed above, removal or other corrective actions may be necessary but should wait until an LSI is conducted. Conduct soil removal prior to an LSI if excavating up to 200 cubic yards completely addresses the release and eliminates the need for an investigation at the site, as described in Section I.A.1 and I.A.2.

III. Soil sampling requirements during tank or tank system component removal

The following requirements apply when there is evidence of a release from a tank system, regardless of tank regulation status, e.g., federal, state, or unregulated. For sampling requirements when there is no evidence of a release, refer to Site assessment for underground storage tanks with no apparent contamination and Out -of - service above-ground storage tank systems. The requirements below are in addition to the sampling requirements described above in Section I.F, which include excavation sidewall and bottom sampling.

A. Sample collection requirements

Collect soil samples for soil analysis according to the requirements in Tables 3 and 4. Collect samples following the methods and procedures described in Soil sample collection and analysis procedures. Note: AST sampling is required in any circumstance when a release has occurred or visible contamination is present, including tank facility upgrades and tank decommissioning.

Table 3. Underground storage tank sampling requirements

Sample location	Sampling specifics
Tanks	
One tank, any size, in an individual tank basin	Two samples; one sample directly below each end of the tank
More than one tank, less than 10,000 gallons, in a single tank basin	One sample directly below the center of each tank
More than one tank, 10,000 gallons or larger, in a single tank basin	Two samples; one sample directly below each end of each tank
Tank system components	
Dispensers	One sample below each removed dispenser
Piping	One sample below each suspected point of release, or every 20 feet if the release point is unknown

Collect additional samples needed to adequately characterize the excavation(s) as described in Section I.E.

Table 4. Aboveground storage tank sampling requirements

Sample location	Number of samples	Sampling specifics
Tanks (type and size)		
Vertical tank up to 15-foot diameter	One sample	Two feet below the center of the tank
Vertical tank greater than 15-foot diameter	Divide tank bottom surface area in square feet by 113 square feet and round to the nearest whole number (example below*)	Two feet below the tank, evenly spaced
Horizontal tank up to 10,000 gallons	One sample	Two feet below the center of tank
Horizontal tank greater than 10,000 gallons	Two samples	Two feet below each end of the tank
***Example:** 27-foot diameter tank: 573/113 = 5.07. Round to the nearest whole number, 5. Five soil samples are required.*		
Tank system components		
Transfer area(s)	One sample in each transfer area	Two feet below the loading rack
Piping[1]	One sample below each suspected point of release, or every 20 feet if the release point is unknown	Two feet below the sampling location
Visible contamination	One sample from each distinct stained area	Submit sample from the most heavily stained soil
Collect additional samples needed to adequately characterize the release(s).		

[1] Field screen soil two feet below the following areas: pipefittings, joints, and any other area where there is evidence of a suspected release from the piping.

B. Analytical requirements

Analyze soil samples following the procedures and analytical requirements described in Soil sample collection and analysis procedures. Meet all analytical requirements, including volatile organic compounds (VOCs), as well as metals and polychlorinated biphenyls (PCBs) when applicable to the product type.

IV. Excavation as corrective action after a limited site investigation

Soil excavation can be an appropriate corrective action to address actual or potential impacts where risks are high, such as drinking water or surface water impact, vapor intrusion, or direct human contact. Corrective action design and implementation describes the design, implementation, and reporting of soil excavation as a corrective action. If excavating soil as a corrective action after an LSI, report the results in a Corrective action excavation report.

Two scenarios for excavation as corrective action following an LSI include: excavation of an LNAPL body and excavation of contaminated surface soil. The general excavation requirements for field screening, soil sampling, and management of petroleum-contaminated soil described in Section I are applied to these two scenarios with exceptions noted below.

A. Excavation of an LNAPL body

Excavation of an LNAPL body can be a cost-effective method for reducing or eliminating long-term risks if the LNAPL body is accessible given depth, soil types, groundwater occurrence, and the absence of obstructions such as buildings or utilities. Excavation of the LNAPL body can result in nearly complete removal of the contaminant source mass and, depending on the site-specific risk scenario, expedite subsequent site closure. Consider source removal by excavation as an option when remediation is necessary.

Field screen overburden soil to assure that no portion of it is contaminated with LNAPL. Screen soil near the lateral and vertical extents of the LNAPL body to confirm the final excavation extent. Screening can be

accomplished using direct evidence of LNAPL, including visual observation for staining and sheen and/or use of the petroleum sheen test. Use soil headspace screening to pre-screen soil, but positive detections are not sufficient evidence of LNAPL impacts. If soil headspace is used to pre-screen soil, confirm LNAPL impacts using other, more direct methods. The MPCA considers other screening methods, such as ultraviolet black box or mobile laboratory, on a case-by-case basis. Contact the MPCA for approval to excavate beyond the approved extent or to exceed the approved volume.

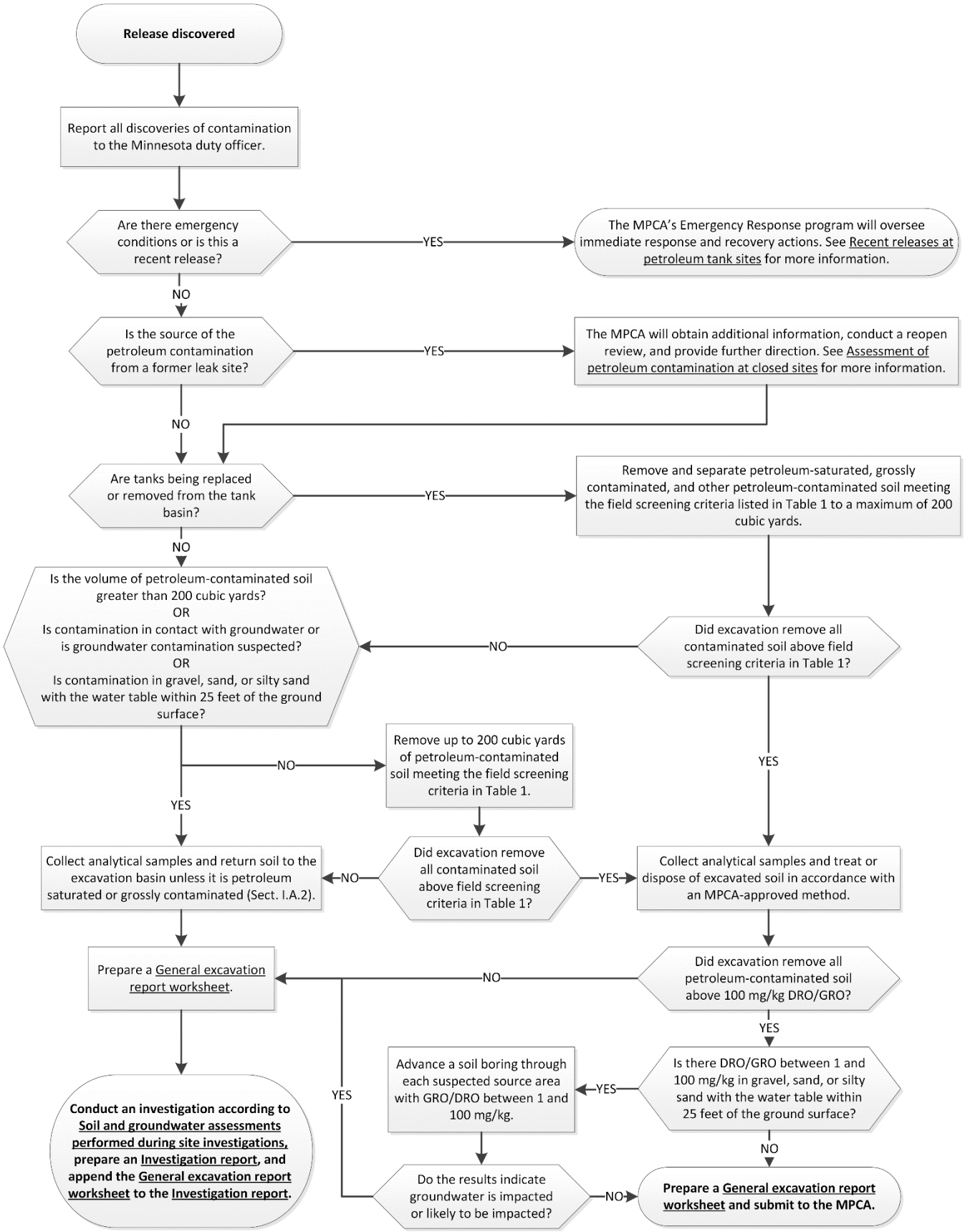
Remove and segregate all LNAPL-impacted soil for treatment or disposal. Collect final excavation sidewall and bottom samples for laboratory analysis as described in Section I unless the excavation is solely to address LNAPL migration risk. Re-use clean overburden soil to backfill the interval from which it was originally removed and import clean fill to backfill the interval from which the targeted LNAPL-impacted soil was removed. If the LNAPL body is present in fine-grained soil, imported fill should consist of fine-grained soil.

See Corrective action design and implementation for additional considerations regarding LNAPL body excavation design and implementation.

B. Excavation of contaminated surface soil

Excavate contaminated surface soil following an approved corrective action design based on petroleum sheen test and soil analytical results. Field screening during surface soil excavation is generally limited to the petroleum sheen test. Screen soil at the edges of the approved excavation extent using the sheen test to determine if additional excavation is necessary. Contact the MPCA for approval to excavate beyond the approved extent or to exceed the approved volume.

Post-excavation soil sampling is not required to document contamination remaining in place after a surface soil excavation. Sampling of the removed soil may be required prior to soil treatment or disposal approval. Backfill excavated areas with clean fill to restore the site to its original surface grade.

See Risk evaluation and site management decision at petroleum release sites for additional information regarding the contaminated surface soil pathway. Refer to Soil and groundwater assessments performed during site investigations for information on completing a surface soil assessment.

Appendix A. Tank replacement or removal flowchart.