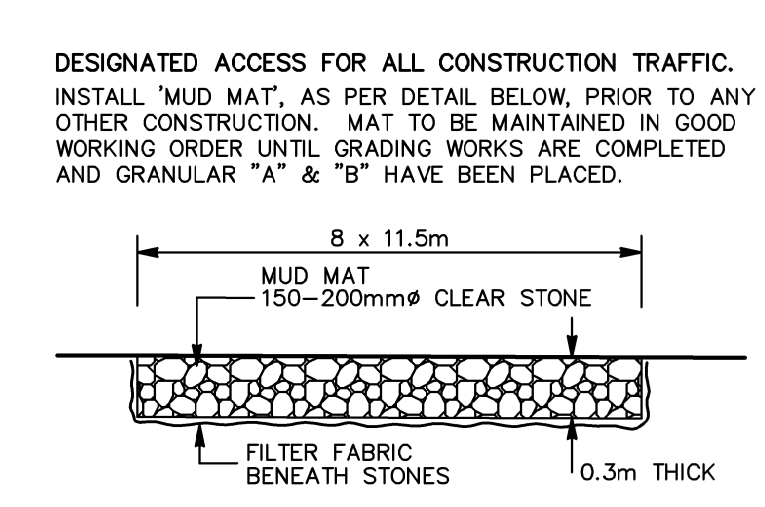
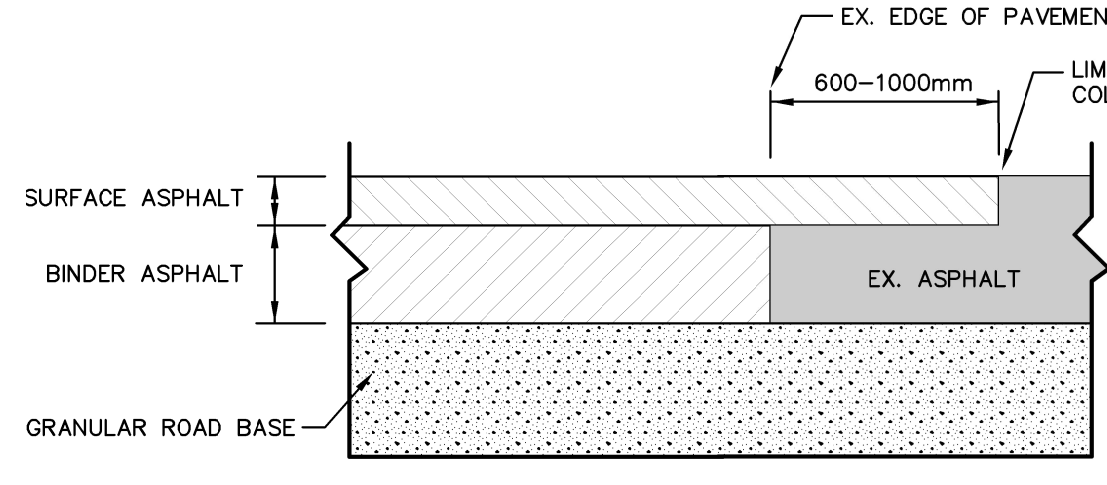


**CONSTRUCTION NOTES AND SPECIFICATIONS**

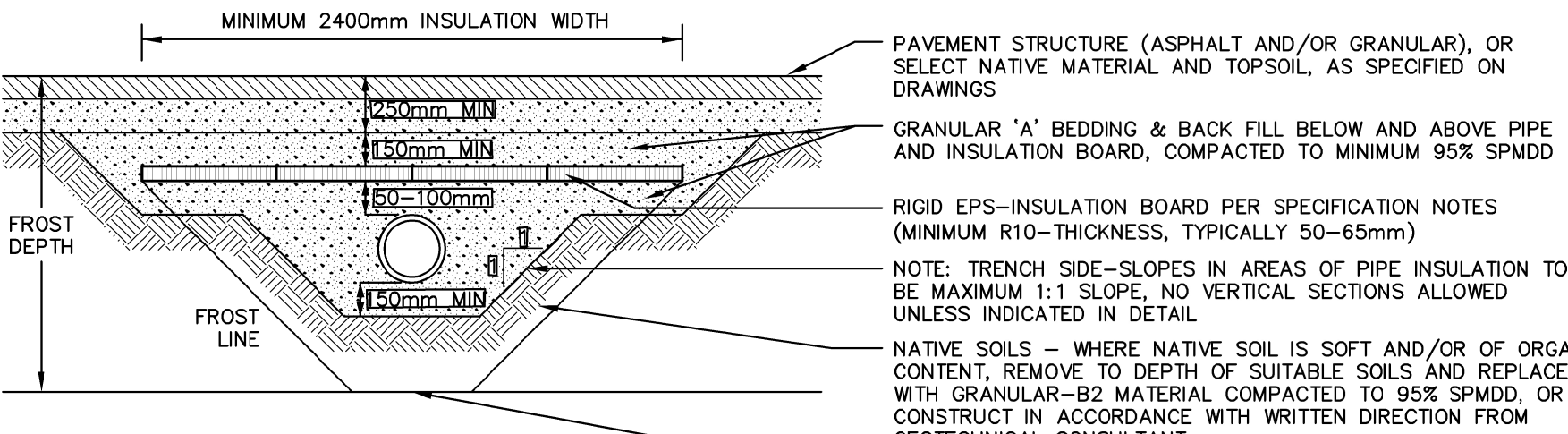
- GENERAL
  - THESE PLANS ARE NOT FOR CONSTRUCTION UNTIL SIGNED AND SEALED BY ENGINEER AND APPROVED BY THE LOCAL MUNICIPALITY.
  - THESE PLANS ARE TO BE USED FOR SERVINGS AND GRADING ONLY. ANY OTHER INFORMATION SHOWN IS FOR ILLUSTRATION PURPOSES ONLY. THESE PLANS MUST NOT BE USED TO SITE THE PROPOSED BUILDING.
  - NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.
  - THESE PLANS ARE NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE PERMISSION OF MTC CONSULTANTS INC.
- STORM SEWERS
  - PIPE BEDDING FOR RIGID PIPE TO BE CLASS "B" AS PER OPSD 802.010. PIPE BEDDING FOR FLEXIBLE PIPE TO BE AS PER OPSD 802.010. BEDDING MATERIAL AND COVER MATERIAL TO BE GRANULAR "A" TRENCH BACKFILL TO BE NATIVE MATERIAL REPLACED IN 300mm LIFTS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
  - STORM SEWERS AND SERVICES TO HAVE MINIMUM 1.2m COVER TO TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL INSTALL PIPE INSULATION AS PER DETAIL ON THIS SHEET. CONTRACTOR SHALL CONTACT DESIGN ENGINEER FOR PIPE INSULATION DETAIL IF PIPE COVER IS LESS THAN THE 0.500m.
  - UNDER NO CIRCUMSTANCES SHALL THE BUILDING FOUNDATION DRAINS BE CONNECTED DIRECTLY TO THE STORM SEWER SYSTEM.
  - ALL WEeping TILE DRAINAGE TO BE PUMPED TO THE STORM SEWER SYSTEM.
  - CONTRACTOR RESPONSIBLE FOR TESTING OF STORM SEWERS IN ACCORDANCE WITH OPSD 410 AND OPSD 409.
- WATERMANS
  - PIPE BEDDING FOR RIGID PIPE TO BE CLASS "B" AS PER OPSD 802.010. PIPE BEDDING FOR FLEXIBLE PIPE TO BE AS PER OPSD 802.010. BEDDING MATERIAL AND COVER MATERIAL TO BE GRANULAR "A" TRENCH BACKFILL TO BE NATIVE MATERIAL REPLACED IN 300mm LIFTS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
  - WATERMANS 100mm# AND LARGER SHALL BE PVC C900 CLASS 150 INSTALLED WITH MINIMUM 1.8 METRES OF COVER. FITTINGS 100mm# AND LARGER SHALL BE PVC CLASS 150 (DR18) CSA B137.2.
  - ALL METALLIC FITTINGS (EXCLUDING CURBMAN STOP AND BRASS FITTINGS) AND APPURTENANCES INCLUDING SADDLES, VALVES, MANHOLES, ETC ARE TO BE INSTALLED WITH AN APPROVED PETROLIUM SYSTEM CONSISTING OF PASTE, MASTIC AND TAPE. CONTRACTOR AT OWNERS EXPENSE IS TO BE RESPONSIBLE FOR OBTAINING THE MOST RECENT EDITION OF THE LOCAL MUNICIPALITY'S PROCEDURE FOR OFF-SITE WORKS BY THE OWNER AND FOR OBTAINING THE NECESSARY DESIGN APPROVALS AND SUPPLEMENTAL SPECIFICATIONS FOR MUNICIPAL SERVICES.
  - WATERMAN VALVES 100mm# AND LARGER SHALL BE AS PER AWWA C500 - A MUELLER A500-25 OR APPROVED EQUIVALENT (OPEN LEFT) INCLUDING VALVE BOX AND 2.3kg ANODE INCLUDING ANODE PROTECTION INSTALLED PER LOCAL MUNICIPALITY STANDARDS.
  - PVC WATERMAN SHALL HAVE TWO STRANDED COPPER AWB TRACER WIRE STRAPPED TO TOP AT 3 METRE INTERVALS. TRACER WIRE SHALL BE BROUGHT TO THE SURFACE AT ALL HYDRANTS AND CAD WELDED TO THE LOWER FLANGE OF THE HYDRANT.
  - HYDRANTS SHALL BE CANADA VALVE "CENTURY" OR APPROVED EQUIVALENT WITH 2-6mm HOSE CONNECTIONS INCLUDING 5.5kg ANODE.
  - MAIN STOPS, CURB STOPS AND COUPLINGS SHALL BE AWWA C500 - A MUELLER A500-25 OR APPROVED EQUIVALENT CONNECTION OR APPROVED EQUIVALENT.
  - SERVICE BOXES TO BE FERROUS EQUIPE TYPE FIGURE 222 SIZE NO. 8 OR APPROVED EQUIVALENT COMPLETE WITH ROD AND FLANGE. WATER CONNECTIONS MAY BE PLACED IN THE SAME TRENCH WITH A STORM OR SANITARY CONNECTION ONLY IF A MINIMUM VERTICAL SEPARATION OF 150mm IS MAINTAINED BETWEEN THE WATER SERVICE AND ANY OTHER PIPE. IN ACCORDANCE WITH SECTION 7.3.5 OF THE ONTARIO BUILDING CODE.
  - ALL WATERMANS AND SERVICES TO HAVE MINIMUM 1.8m COVER ON TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL CONTACT DESIGN ENGINEER FOR PIPE INSULATION DETAIL.
  - CONTRACTOR SHALL BE RESPONSIBLE FOR TESTING OF WATERMANS IN ACCORDANCE WITH OPSD 410 AND OPSD 409.
  - TRACER WIRE IS TO BE INSTALLED ON ALL NEW INSTALLATIONS OF PVC WATERMAN PIPE FOR LOCATING PURPOSES. A SILEX TO GAUGE T.W.U. COPPER WIRE IS TO BE INSTALLED ALONG THE PIPE STRAPPED TO THE PIPE AT 1.6 METRE INTERVALS. JOINTS IN THE WIRE BETWEEN VALVES ARE NOT PERMITTED.
  - CONTRACTOR SHALL TEST THE TRACER WIRE FOR CONDUCTIVITY. IF THE TRACER WIRE IS NOT CONTINUOUS FROM VALVE TO VALVE, THE CONTRACTOR SHALL AT THEIR OWN EXPENSE, REPLACE OR REPAIR THE WIRE.
- EROSION AND SEDIMENT CONTROL
  - CONTRACTOR TO INSTALL EROSION CONTROL MEASURES AS SHOWN PRIOR TO CONSTRUCTION AND MAINTAIN IN GOOD CONDITION UNTIL CONSTRUCTION IS COMPLETED. ALL DISTURBED GROUND SURFACES HAVE BEEN RESTORED EITHER BY PAVING OR RESTORATION OF VEGETATIVE COVER.
  - ALL SEDIMENT CONTROL FENCING TO BE INSTALLED PRIOR TO ANY AREA GRADING, EXCAVATING OR DEMOLITION COMMENCING.
  - EROSION CONTROL FENCING TO BE INSTALLED AROUND BASE OF ALL STOCKPILES. ALL STOCKPILES TO BE KEPT 2.5m MINIMUM FROM PROPERTY LINE.
  - EROSION PROTECTION TO BE PROVIDED AROUND ALL STORM AND SANITARY MHs AND CBL.
  - CONSTRUCTION ACCESS (MUD MAT) TO BE PROVIDED ON-SITE AT ALL LOCATIONS WHERE CONSTRUCTION VEHICLES EXIT THE SITE. PROPOSED EROSION FENCING TO BE INTO MUD MAT. CONTRACTOR TO ENSURE ALL VEHICLES LEAVE THE SITE VIA THE MUD MAT AND THAT THE MAT IS MAINTAINED IN A MANNER TO MAXIMIZE EFFECTIVENESS AT ALL TIMES.
  - ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS SITE DEVELOPMENT PROGRESSES. CONTRACTOR TO PROVIDE ALL ADDITIONAL EROSION CONTROL STRUCTURES.
  - EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN RESTORED.
  - NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THE ENGINEER AND THE LOCAL MUNICIPALITY'S DEPARTMENT OF PUBLIC WORKS.
  - CONTRACTOR TO CLEAN ROADWAY AND SIDEWALKS OF SEDIMENTS RESULTING FROM CONSTRUCTION TRAFFIC FROM THE SITE EACH DAY.
  - CONTRACTOR MUST REMOVE EROSION AND SEDIMENTATION FENCING PRIOR TO COMPLETION OF PROJECT. CONTRACTOR TO HAVE EROSION AND SEDIMENTATION FENCE INSPECTED. WHEN VEGETATION HAS ESTABLISHED, BUT PRIOR TO FENCE BECOMING OVERGROWN, ENGINEER'S REPRESENTATIVE TO DETERMINE IF VEGETATION HAS REACHED THE CRITICAL POINT AND WILL THEN INSTRUCT CONTRACTOR TO REMOVE FENCE.



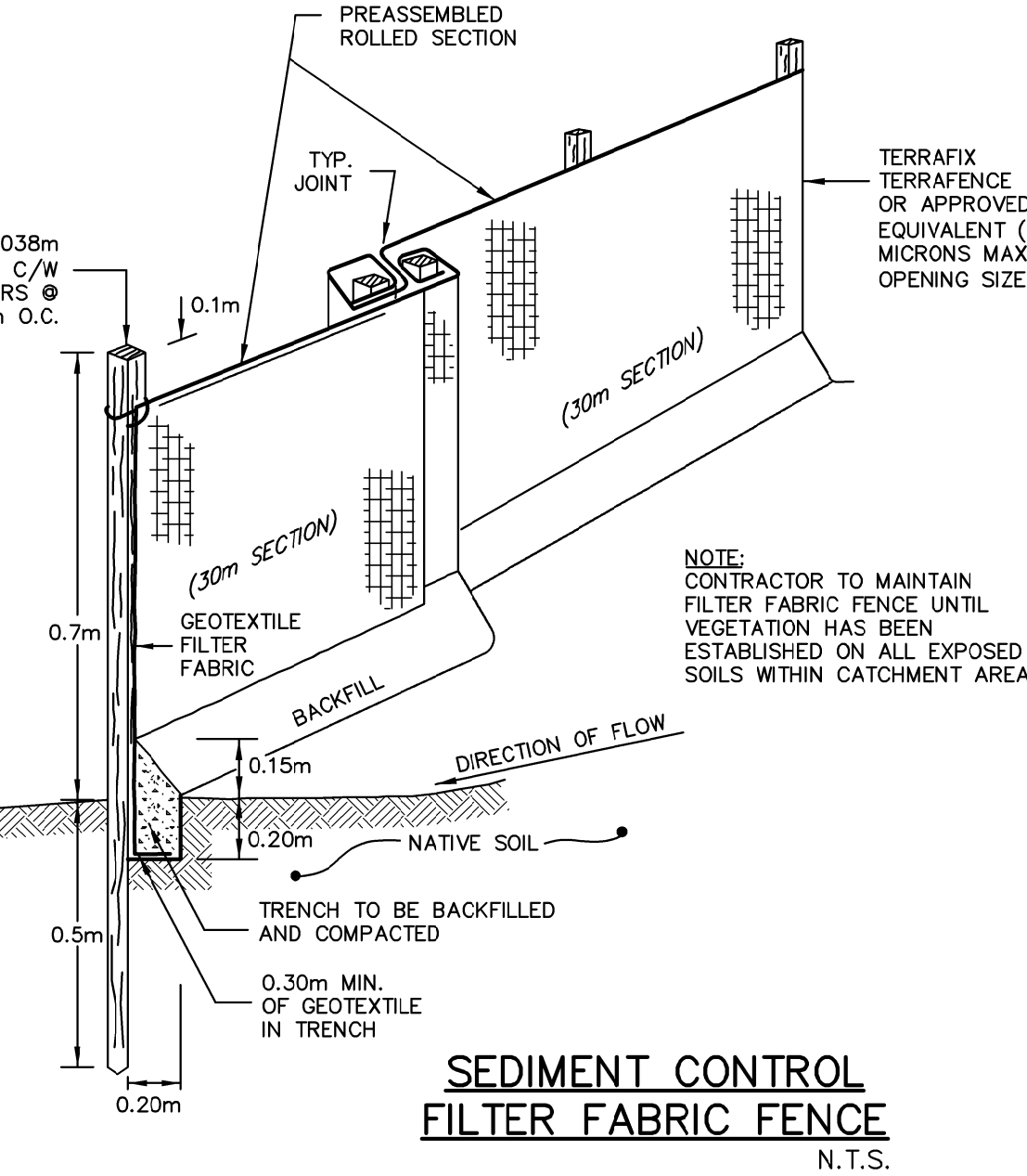
**CONSTRUCTION ACCESS DETAIL**  
N.T.S.



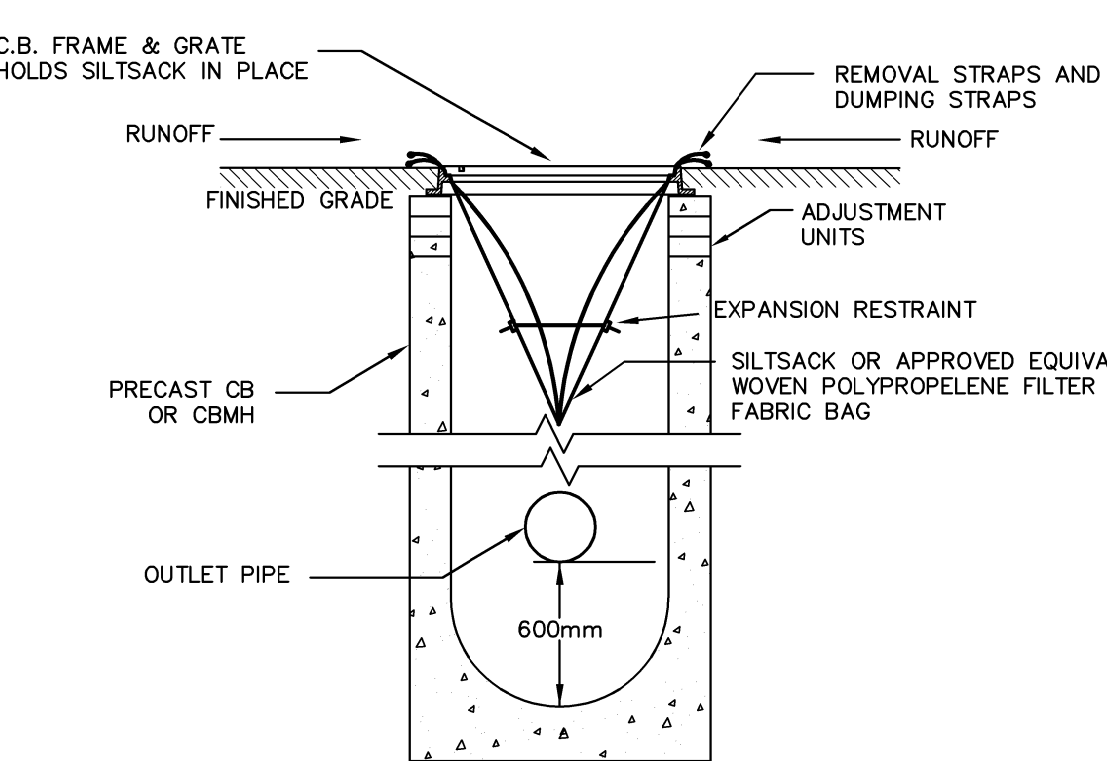
**ASPHALT JOINT DETAIL**  
N.T.S.



**SEWER PIPE INSULATION DETAIL**  
FOR SEWER PIPES HAVING LESS THAN 1200mm COVER AND MINIMUM 500mm COVER  
N.T.S.



**SEDIMENT CONTROL FILTER FABRIC FENCE**  
N.T.S.

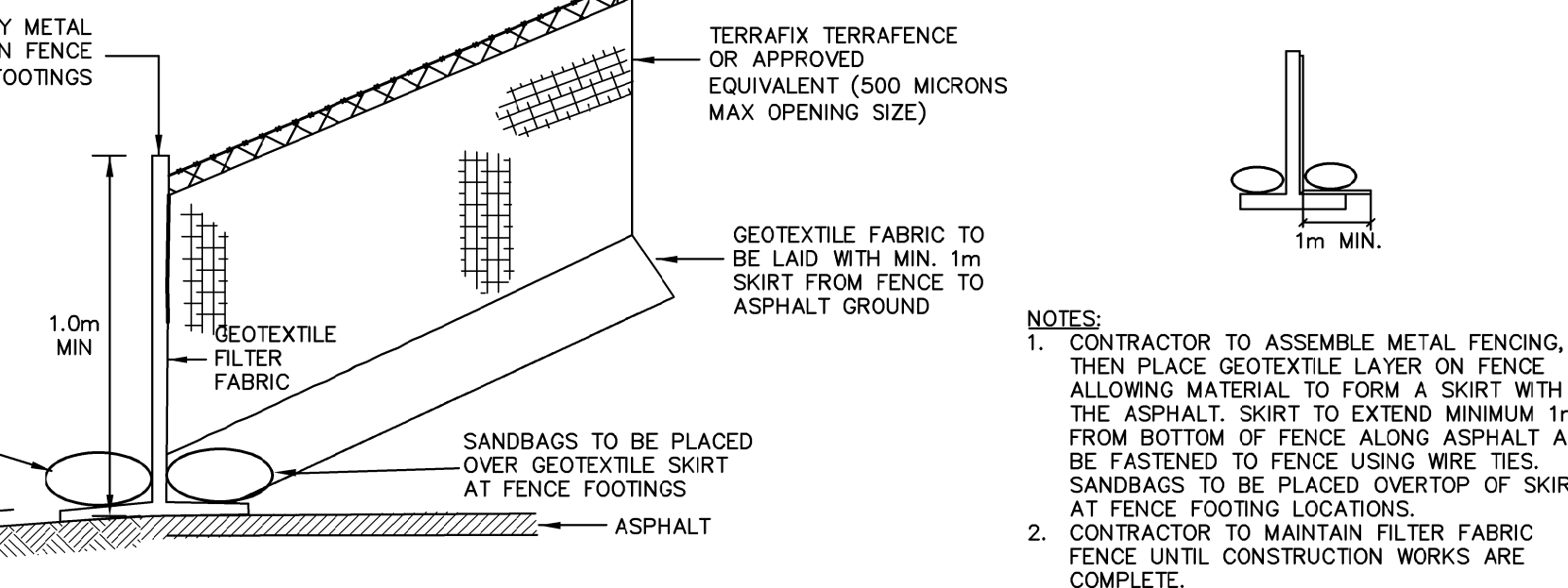


**TEMPORARY SILTSACK SILTATION CONTROL IN CB**  
N.T.S.

**PAVEMENT STRUCTURE**

PAVEMENT COMPONENT	PASSENGER CAR PARKING	DRIVEWAY/TIRE ROUTE (MEDIUM DUTY)
ASPHALT/IC HL3	40mm	40mm
CONCRETE HL8	50mm	80mm
GRANULAR "A" BASE	150mm	150mm
GRANULAR "B" SUBBASE	200mm	300mm

NOTE: PAVEMENT STRUCTURE TAKEN FROM GEOTECHNICAL INVESTIGATION BY JEP DATED FEBRUARY 2024. REFER TO GEOTECHNICAL REPORT FOR MORE DETAILS. REFER TO LANDSCAPE PLANS FOR PLAY AREA LIGHT DUTY ASPHALT PAVEMENT STRUCTURE DETAILS.



**SEDIMENT CONTROL FILTER FABRIC FENCE ON PAVED SURFACES**  
N.T.S.

- NOTE:**
- PROPERTY LINE IS APPROXIMATE ONLY AND SHOULD NOT BE USED FOR DETERMINING SETBACKS OR LAYOUT.
  - EXISTING TOPOGRAPHICAL INFORMATION PROVIDED BY SPECTRUM, VAN NOSTRAND & GIBSON LIMIT, DATED MAY 17, 2021 AND SITE PLAN BY BJC ARCHITECTS DATED APRIL 2024.
  - INVERTS DENOTED WITH "A" ARE TAKEN FROM AS-RECORDED PLAN AND PROFILE DRAWINGS AND ARE CONSIDERED APPROXIMATE ONLY. CONTRACTOR TO FIELD VERIFY AND REPORT ANY DISCREPANCIES TO ENGINEER.
  - THIS PLAN IS PART OF A SET OF PLANS WHICH COMPRISE OF THE FOLLOWING: C2.1, C2.2, C2.3 AND THE SMM REPORT.

05.	ISSUED FOR ADDENDUM #3	26.05.06
04.	ISSUED FOR TENDER	26.04.09
03.	ISSUED FOR PERMIT	26.04.02
02.	REISSUED FOR SPA	25.11.26
01.	ISSUED FOR SPA	25.03.18
No.	REVISION	DATE (YR.MM.DD)

Drawn	AXG
Checked	AXG
Checked	RNC
Print Date	2024.03.28

**BJC**  
architects + assoc. inc.

client  
**HALTON DISTRICT SCHOOL BOARD**

2020 GUELPH LINE SUBURBAN  
MILTON DISTRICT HIGH SCHOOL RENOVATION/ADDITION

386 WILLIAMS AVE. (MILTON)

drawing title  
**NOTES AND DETAILS PLAN**

reference  
project no.  
34772-200  
sheet number  
24-060  
sheet no.  
**2. 3. 1.**



## TENDER ADDENDUM NO. 3

May 6, 2026

**RE: Landscape Plans  
Milton District High School - Phase 2 Addition  
396 Williams Avenue, Milton, ON**

**Project No.: 24-060  
Aboud & Associates Inc., Project No.: 23-199A**

### 1.1 Drawing L-101:

Asphalt hatches in vehicle conditions have been removed from the landscape plan, refer to civil plans for asphalt restoration.

Coordination with a new electrical duct bank proposed near the Williams Avenue property boundary has necessitated the adjustment of tree protection barriers, removal of existing trees, and restoration with sod areas.

Overlapping sod hatches at the concrete sidewalk to the childcare building have been adjusted so that overlaps no longer exist.

### 1.2 Drawing L-201:

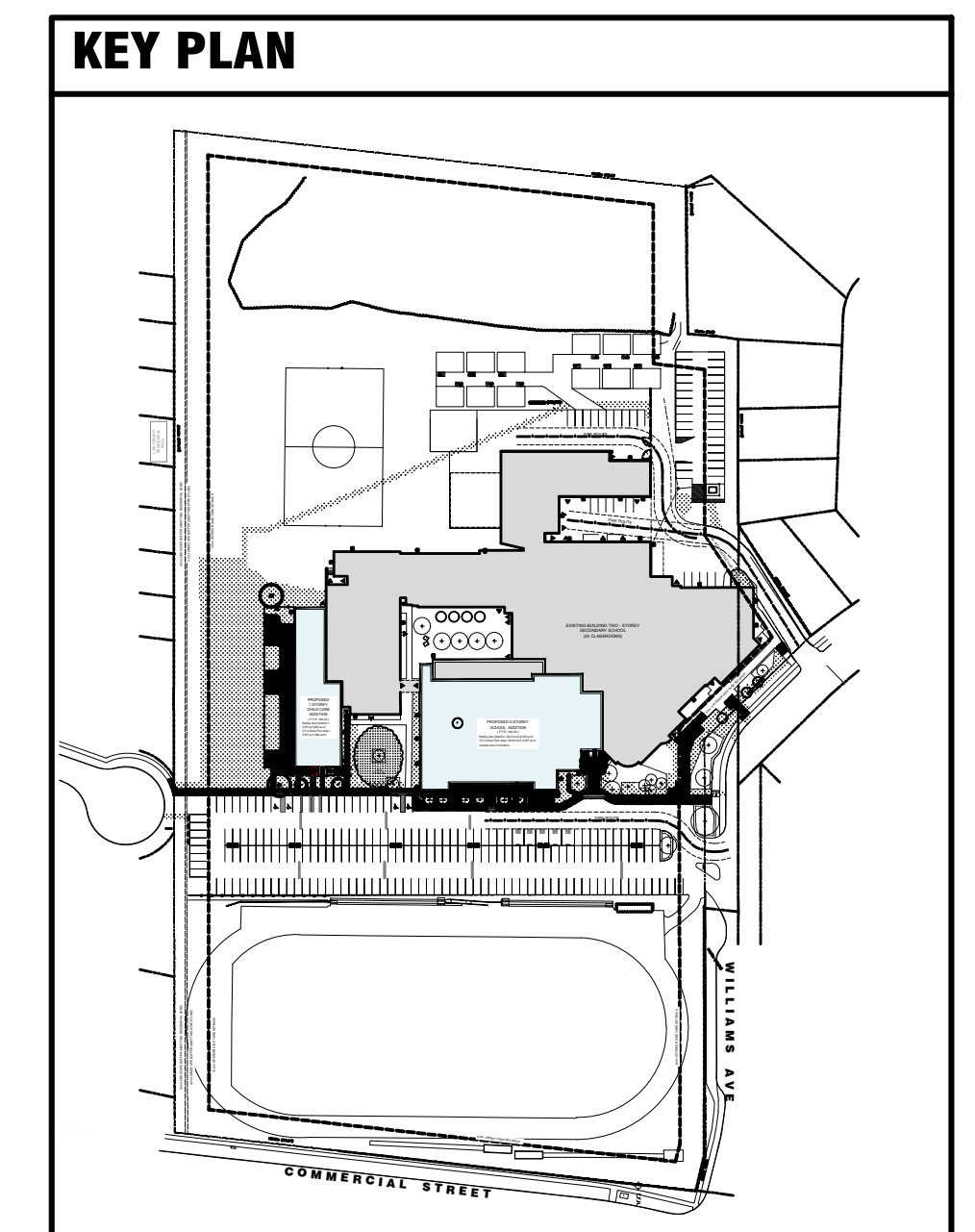
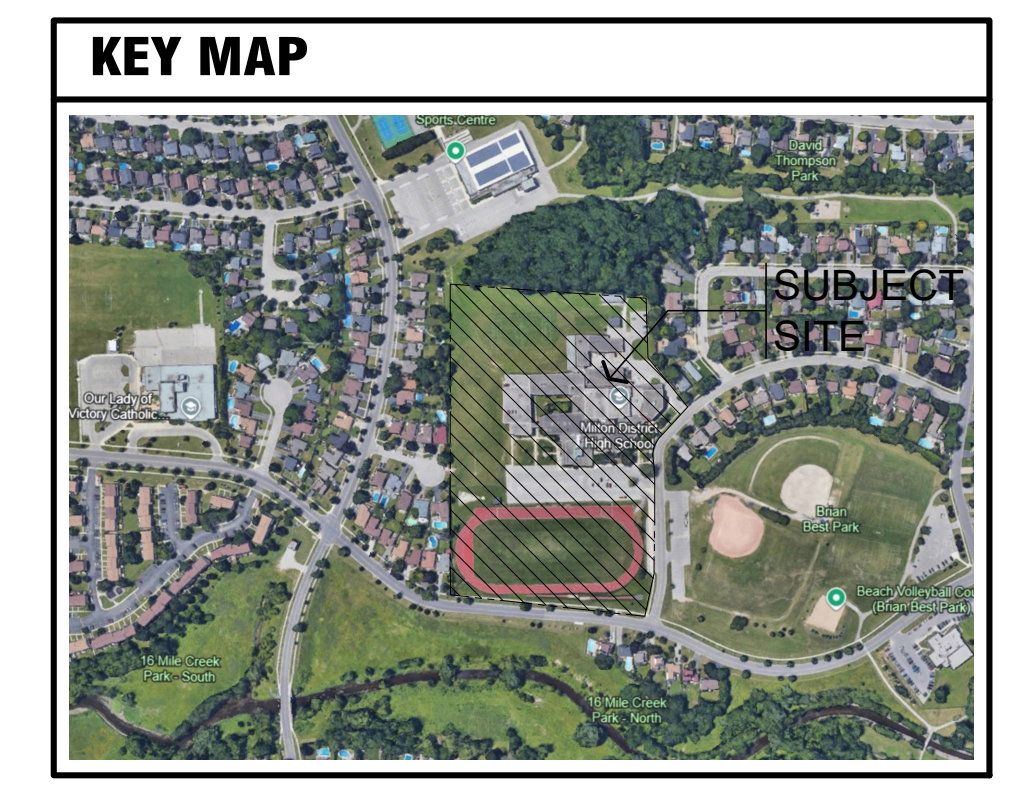
Has been added to the landscape drawing set and includes:

- General Landscape Notes
- General Landscape Maintenance Notes
- Sod Installation and Establishment Notes
- Tree Shrub and Perennial Installation Notes
- General Tree Preservation Notes
- Storage Shed Detail
- Bench Detail
- Bike Rack Detail

### 1.3 Drawing L-202:

Light Duty Asphalt (Childcare Play Spaces Only) Detail has been deleted.

**END OF ADDENDUM NO. 3**



**NOTES**

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The information and material herein reflect the best judgement of BJC architects + assoc. inc. in light of the information available to them at the time of preparation of these documents. They will not be held responsible for any errors or omissions, or for any reliance on or decisions to be made based on them, in the sole responsibility of such third party. BJC architects + assoc. inc. accepts no responsibility for any errors or omissions, or for any reliance on or decisions made or actions based on these documents by BJC architects + assoc. inc. 2025.

No.	REVISIONS	DATE
06	ISSUED FOR ADDENDUM #3	2026.05.04
05	ISSUED FOR TENDER	2026.04.14
04	ISSUED FOR PERMIT	2026.04.02
03	ISSUED FOR COORDINATION	2026.01.30
02	ISSUED FOR SPA	2025.12.18
01	ISSUED FOR COORDINATION	2025.10.23

**LEGEND**

- PROPERTY LINE
- AREA OF ADDITION REFER TO ARCHITECTURAL PLANS
- NEW PAINTED LINES REFER TO SEE PLAN
- NEW CONCRETE SIDEWALK REFER TO SEE PLAN
- NEW LIGHT DUTY ASPHALT (CARPARK PLAY SPACES ONLY)
- EXISTING DISBURSED SOILS WITH 500 C/M 150MM TOPSOIL
- EXISTING TREE TO BE REMOVED
- EXISTING TREE TO REMAIN
- NEW TREES
- NEW SHRUBS
- PLANT KEY
- SITE SCALING 1/4" CALIBRATED PLOTTED (REFER TO SEE PLAN)
- FIRE HYDRANT (REFER TO CIVIL)
- FIRE DEPARTMENT CONNECTION
- MAIN ENTRANCE
- BUILDING EXIT
- BARRETT CURB
- BIKE PARKING (FOOTWAY 1' BORDERS) BIKE BACK FOR D.C. 1-201
- EXISTING FENCE LINE
- NEW 152MM HEIGHT CHAIN LINK FENCE
- TEMPORARY TREE PROTECTION FENCING TOWN STD. 10-01.02

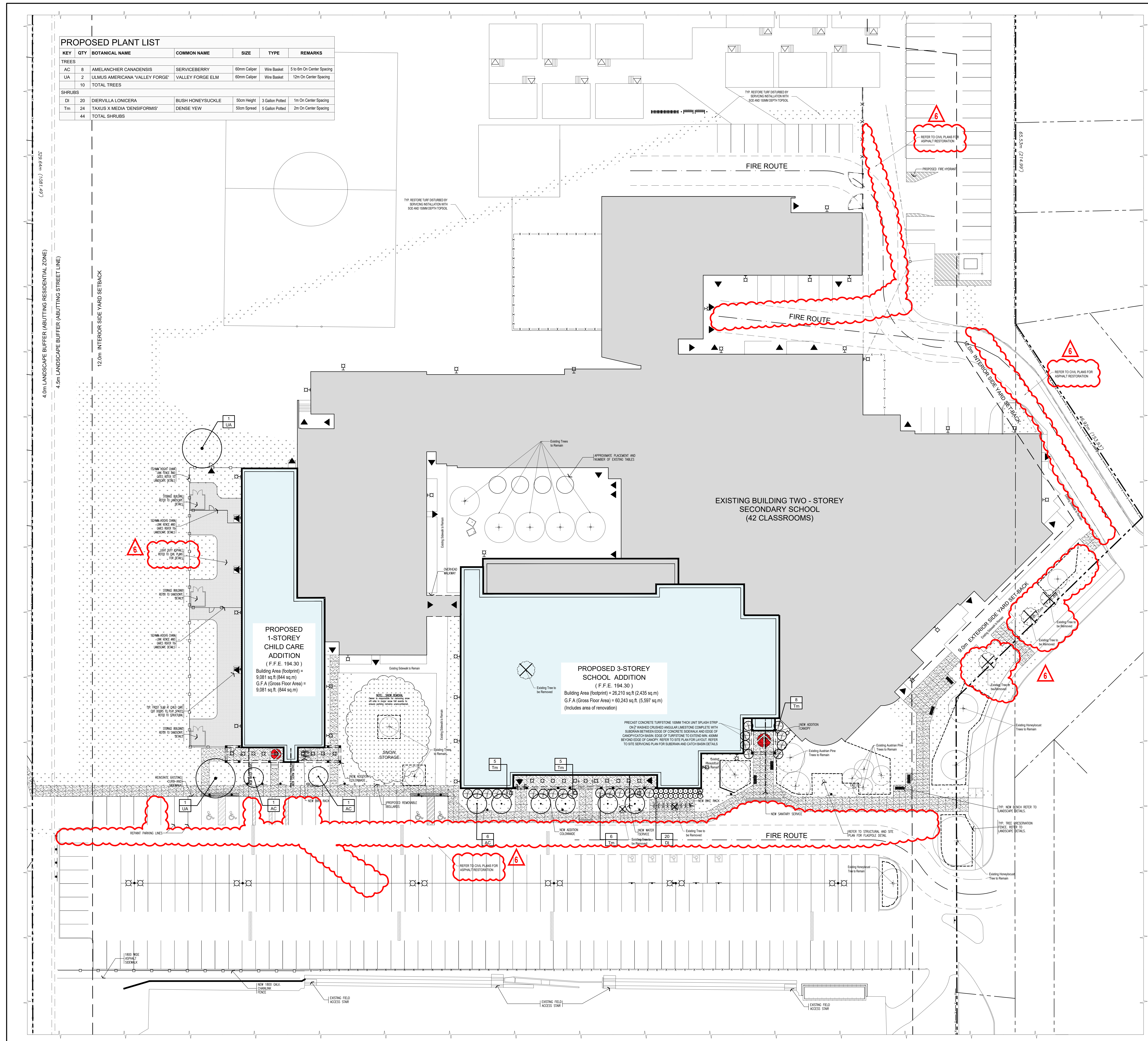
**DISCLAIMER**

THE LEGAL DESCRIPTION & PROPERTY INFORMATION USED FOR THIS DRAWING HAS BEEN TRANSFERRED FROM THE FOLLOWING DRAWINGS:

SKETCH SHOWING TOPOGRAPHY OF MILTON DISTRICT HIGH SCHOOL, TOWN OF MILTON REGIONAL MUNICIPALITY OF HALTON, DATE: MAY 13, 2021, JOB NO. 201-0096, FILE NAME: 42010096.DWG, PREPARED BY: SPEIGHT, VAN ACCORLAND & GIBSON, ADDRESS: 750 GERRARD ROAD, UNIT 10, 4th FL, TEL: 416-749-7864

**PROPOSED PLANT LIST**

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE	TYPE	REMARKS
<b>TREES</b>						
AC	8	AMELANCHIER CANADENSIS	SERVICEBERRY	60mm Caliper	Wire Basket	5 to 6m On Center Spacing
UA	2	ULMUS AMERICANA 'VALLEY FORGE'	VALLEY FORGE ELM	60mm Caliper	Wire Basket	12m On Center Spacing
<b>SHRUBS</b>						
DI	20	DIERVILLA LONICERA	BUSH HONEYSUCKLE	50cm Height	3 Galton Potted	1m On Center Spacing
Tm	24	TAXUS X MEDIA 'DENSIFORMIS'	DENSE YEW	50cm Spread	5 Galton Potted	2m On Center Spacing
<b>TOTAL TREES</b>						
<b>TOTAL SHRUBS</b>						



**client**  
HALTON DISTRICT SCHOOL BOARD

**project**  
MILTON DISTRICT HIGH SCHOOL RENOVATION/ADDITION

2050 GUELPH LINE, BURLINGTON, ONTARIO  
396 WILLIAMS AVE, MILTON, ONTARIO

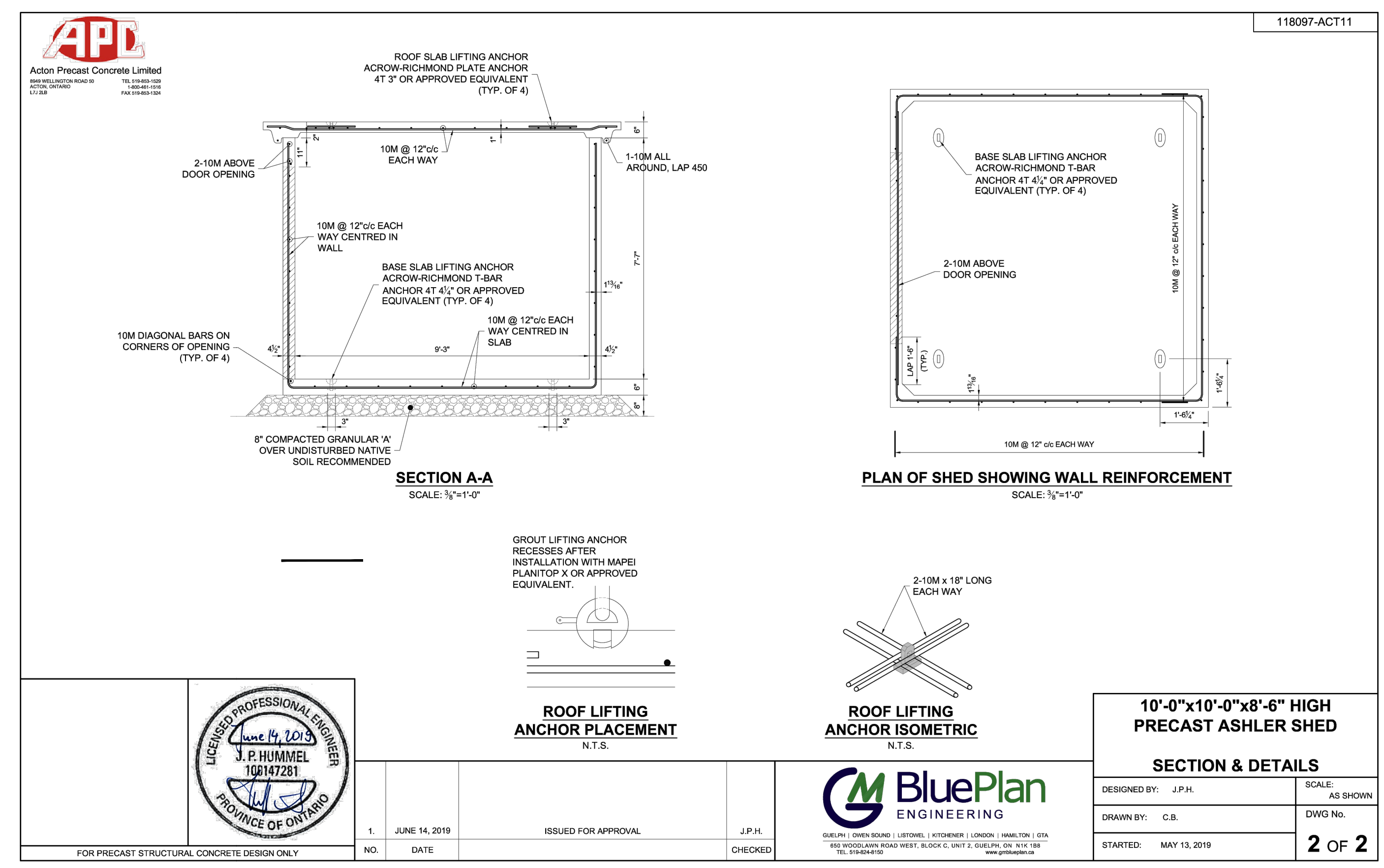
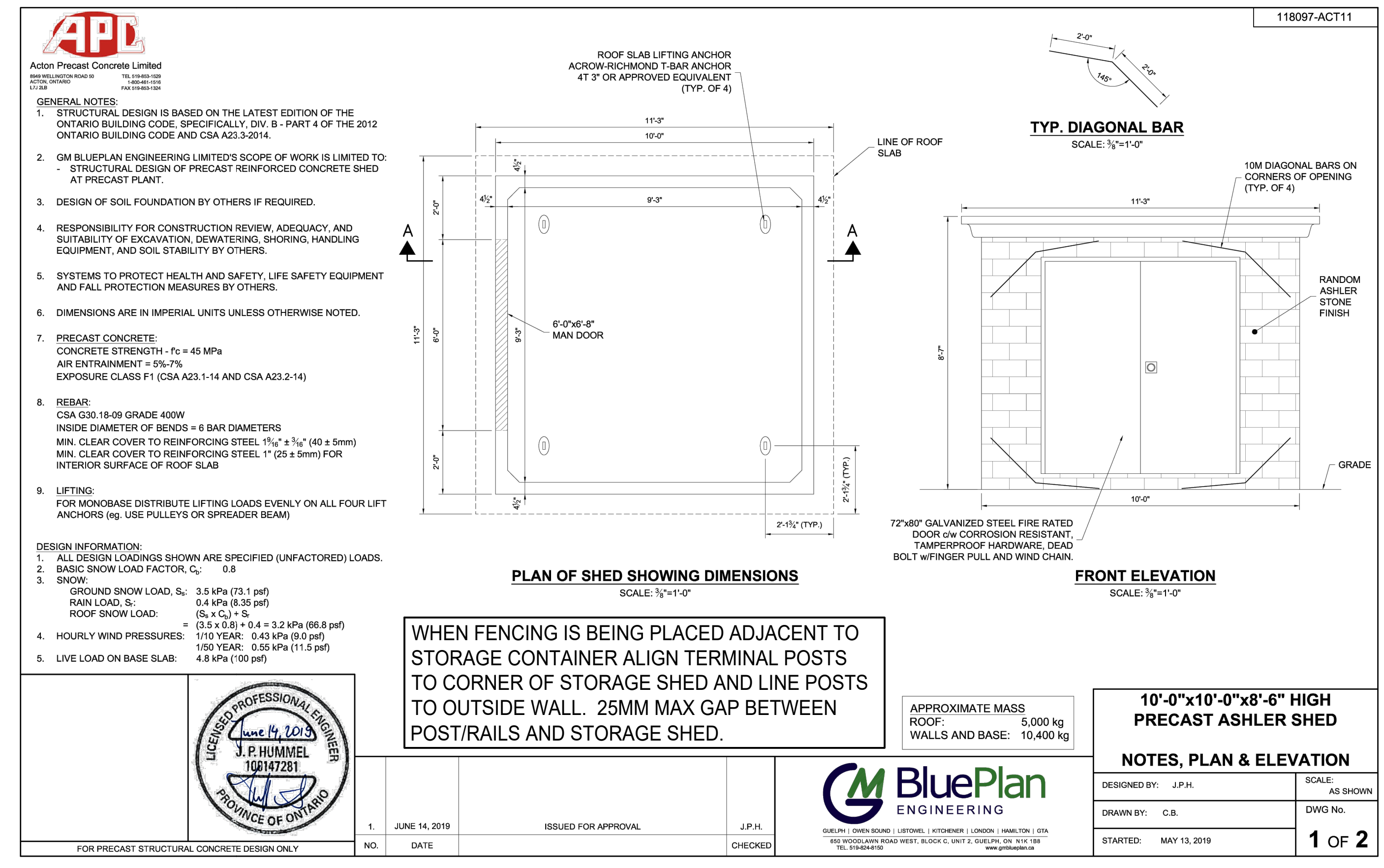
**drawing title**  
LANDSCAPE PLAN

**client reference number**  
24-060

**sheet no.**  
L-10100

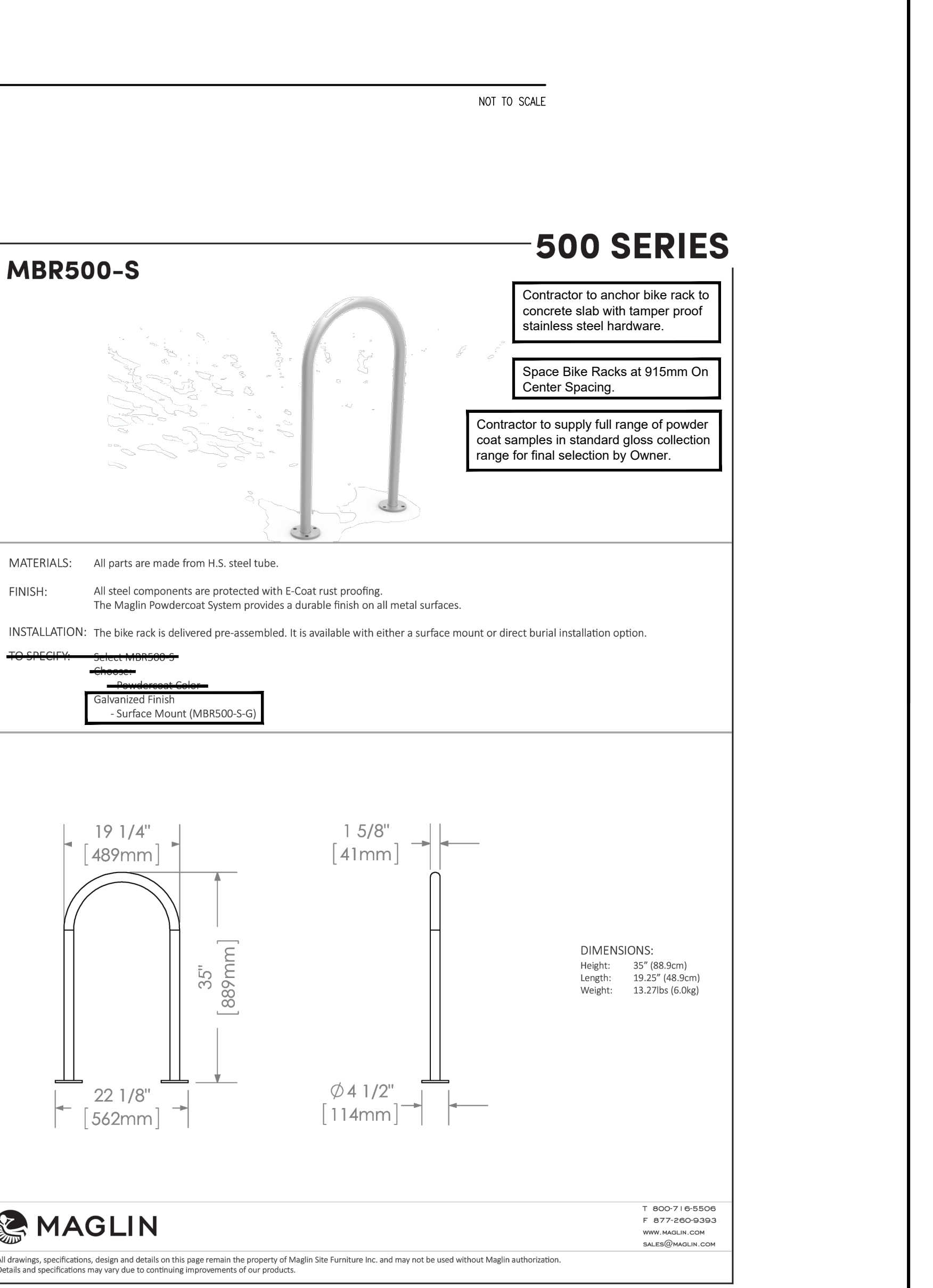
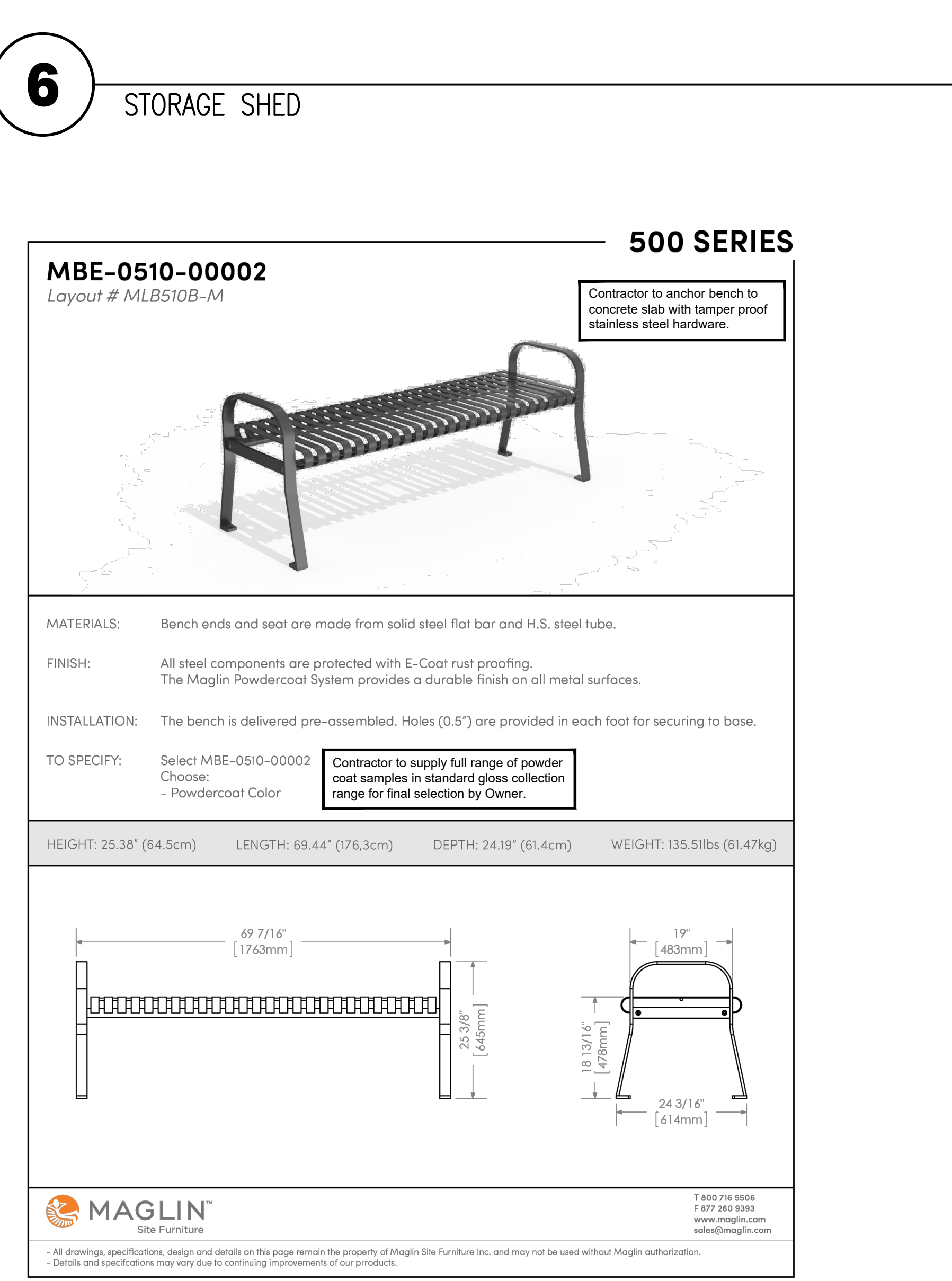
- Base information sources:
  - Topographic Sketch dated May 17, 2021 prepared by Spoitnik, Van Nostrand & Gibson Limited.
  - Site Plan dated April 16, 2020 prepared by B.C. Architects + Assoc. Inc.
  - Site Grading and Servicing dated April 16, 2020 prepared by MTE
  - All dimensions are in metric unless otherwise noted.
- These plans shall be read in conjunction with all details, notes, reports, written specifications, general conditions, any supplemental conditions and agreement which form the contract documents.
- These drawings shall not be used for construction purposes unless noted as "Issued for Construction" and signed by the Landscape Architect or Professional Engineer.
- Contractor shall review all drawings and verify actual field conditions to determine the total scope of work and all required coordination prior to submission of bids and commencement of the work. Report any discrepancies to the Landscape Architect, for action to the satisfaction of the Owner.
- Contractor shall locate all underground, at grade and overhead utilities prior to commencement of the work. All utilities not necessarily shown on these drawings, Above & Associates assumes no responsibility for the accuracy of any utilities shown in these drawings.
- Contractor shall perform all work in accordance with the most current Ontario Building Code, Occupational Health and Safety Act and it's regulations, as well as local municipal codes, regulations, and by-laws.
- Contractor shall identify the location of all interrelated construction access routes, parking and storage of materials in conformance with project location and access control plans for acceptance by the Owner. Construction, maintenance and removal/restoration of access, parking and storage facilities shall be included in the Contractor's bid price.
- Contractor shall submit shop drawings where indicated in these drawings. Shop drawings shall be certified by a Professional Engineer, licensed to practice in Ontario and reviewed by the contractor for dimensional correlation with the drawings and field conditions. Fabrication of elements on shop drawings shall not proceed until drawings have been reviewed and approved by a Professional Engineer and have been accepted for general design coordination by the Landscape Architect in writing. The cost of preparing shop drawings, as well as the services of a Professional Engineer, shall be included in the Contractor's bid price.
- Contractor proposed substitution of materials and products shall be submitted in writing for review by Landscape Architect and acceptance by Owner and Municipality.
- Material quantities on drawings shall take precedence over those in lists and schedules.
- Where traffic control is necessary, Contractor shall use the guideline of the Construction Safety Association of Ontario, municipal by-laws, the Highway Traffic Act and the Ontario Traffic Manual (Book 7). The cost of preparing, obtaining approvals and implementing traffic control plans shall be included in the Contractor's bid price, unless otherwise directed.
- Contractor shall erect temporary barriers, as required, to secure the work area. Contractor shall maintain temporary barriers in good repair and remove at the end of the work.
- Contractor shall erect temporary barriers, as required, to secure the work area. Contractor shall maintain temporary barriers in good repair and remove at the end of the work.
- Contractor is responsible for protecting and/or reinstating site elements indicated in these drawings.
- Contractor is responsible for restoration of adjacent surfaces and existing site elements damaged by the Contractor in the performance of the work, including but not limited to roads, driveways, utilities, buildings, curbs, sidewalks, retaining walls, fencing, turf, lawns and other site vegetation. Restoration work shall be performed by the Contractor at no cost to the Owner and be completed in conformance with applicable Provincial, Municipal or Agency standards and requirements, to the satisfaction of the Owner/Agency of the damaged element.
- Where new paving or earthwork meets existing, smoothly blend the grade of existing with new.
- Contractor or Owner to request in writing (email) Project Landscape Architect after general review services at substantial performance of landscape work between May 1st and October 31st. Requests for review after October 31st will be considered after May 1st the following spring.
- All work and materials are to be warranted by the Contractor for twenty-four (24) months from date of initial acceptance of all installed by Municipal Staff and Project Landscape Architect.
- The Contractor shall be retained by the Owner to perform maintenance, as described in these drawings for all the installed trees, shrubs, perennials, turf, and seeding during the warranty period.
  - OR
  - The Owner shall provide maintenance themselves or retain a separate Contractor to perform the maintenance as described in these drawings for all installed trees, shrubs, perennials, turf and seeding during the warranty period.
- Unless identified by a warranty maintenance requirement, after substantial performance, it is the Owner's responsibility to inspect and maintain all safety devices, signs, guards, fences, handrails, surfaces, structures, and stormwater drainage system so they may function for their intended use and without harm to all users of the site.

- Plant Characteristics, Rootballs, Rootball Standards including minimum rootball diameters specified on these plans are to be in accordance with the Canadian Nursery Landscape Association Canadian Standards for Nursery Stock, current edition.
- Planting shall only be done when weather conditions are suitable for planting the materials specified in accordance with locally accepted practice. Install plant materials during the planting time as described below unless otherwise approved in writing by the Landscape Architect. In the event that the Contractor request planting outside of the dates of the planting season, approval of the request does not change the requirements of the warranty.
- April 1 - June 30 and September 1 - October 31
- Transportation of plants shall be restricted to closed vans or trucks covered with mesh tarpaulin or similar material, to protect the leaves or needles from windburn or desiccation. This may be supplemented by spraying the foliage with an antidesiccant prior to shipping.
- Plant material shall at no time be dropped or handled roughly.
- Protect plant materials from frost, excessive heat, wind and sun following delivery.
- Immediately store and protect plant material, which will not be installed within 1 hour after arrival at site in storage location, approved by the Landscape Architect.
- Protect stored plant material from frost, wind and sun and as follows: For pots and containers, maintain moisture level in containers.
- For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.
- Topsoil or plantings shall not be placed or installed when in a frozen condition, under adverse field conditions such as high wind, frozen soil or soil covered with snow, ice, or standing water.
- The Landscape Architect and Municipal Staff has the right to reject any and all plant material that does not conform to the requirements of this specification as they receive at any previous approval.
- When a plant has been rejected, immediately remove it from the area of the work and replace it with a plant of the required species, size and quality of the highest planting grade consistent with these specifications. Replacement plant material shall meet all the requirements of this specification. Rejected plants shall be replaced at no cost to the Owner.
- Acceptance shall not be given for the planting work until all plants rejected during the course of the work are replaced.
- Any plant that has the following characteristics shall be cause for rejection:
  - Only nursery grown plants will be accepted.
  - Any plant that has a canopy with 25% or more dead or removed limbs.
  - Evidence of damage to plant material, which diminishes the aesthetic character, biological integrity, or structural integrity of the plant or group of plants.
  - Evidence of improper digging, inadequate protection following digging; carelessness while in transit; evidence of desiccation or wind-related damage; cold damage; improper handling or storage; root damage that has dried to the point of leaf wilt; cracked, loose, damaged or distorted root balls.
  - Evidence of improper digging, inadequate protection following digging; carelessness while in transit; evidence of desiccation or wind-related damage; cold damage; improper handling or storage; root damage that has dried to the point of leaf wilt; cracked, loose, damaged or distorted root balls.
  - Plants with undersized root balls and containers, knined or grinding roots, matted roots on the top, and edges of the container, excessive surface discoloured roots, root balls and containers with no structural roots in the top 75mm of the soil.
  - Plants balled with synthetic, breakable or brittle material.
  - Any tree that is of a species that characteristically has a dominant central leader, and if the leader is dead or broken, the tree will not have a form consistent with the species.
  - Any tree that has open wounds (not completely healed over) that penetrates the cambium into the wood or trunk or major limbs the removal of which would result in the loss of 25% or more of the surface area of the tree.
  - Topsoil shall be loose, friable, fertile loamy material that is free from subsoil, weeds, roots, vegetation and other deleterious material greater than 25mm diameter in the greatest dimension. The topsoil shall also be certified by an OMAFRA Accredited Soil Testing Laboratory in Ontario to meet the following requirements:
    - Topsoil texture shall be loam, sandy loam to loam:
      - Sand content between 20-75%
      - Silt content between 5-30%
      - Clay content between 5-30%
    - Herbicides - No detectable levels
    - Organic Matter content between 4-15%
    - Phosphorus 10-60 (ppm)
    - Potassium 80-250 (ppm)
    - Calcium <200 (ppm)
    - Magnesium 100-300 (ppm)
    - Chloride <100 (ppm)
    - Sodium <20 (ppm)
    - Sodium Adsorption Ratio <15
    - Soil shall not have contaminants that adversely affect plant growth.
    - The cost to amend existing on-site topsoil to be reused shall be paid for by the Owner.
    - The cost to amend imported topsoil supplied by the Contractor to meet Agronomist written recommendations shall be paid for by the Contractor.
- Water shall not have contaminants or impurities that would adversely affect the germination and growth of vegetation Proposed plants which cover or under any utility shall be relocated by the Contractor following the review by the Landscape Architect, to the satisfaction of the utility provider.
- Much shall be shredded hardwood or softwood as specified in the planting details. Free from roots, leaves, twigs, stumps, stones, fungus, catgrass, rizzomes, or any material detrimental to plant growth. Material shall be mulching grade, uniform in size and foreign matter. Much that has become saturated with water and presents an anaerobic odor shall be rejected.
- Anti-Desiccant (if used) shall be emulsion type, film-forming agent similar to Dowcor by Dow Chemical Company, or Wilt-Proof by Nursery Specialty Products, Inc., Croton Falls, New York, designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and use in accordance with manufacturer's instructions. Submit manufacturer's product data for approval.
- Contractor to examine the surface grades and soil conditions with any circumstances that might be detrimental to plant growth, such as deposits of construction-related waste or soil contamination, storage of material or equipment, soil compaction or poor drainage. Contractor to examine the grading, verify all elevations, and notify the Landscape Architect in writing of any unsatisfactory conditions.
- Contractor to inspect each plant delivery and report to installation for damage of other characteristics that may cause rejection of the plant.
- Excavate pits, beds, and trenches on vertical sides and with bottom of excavation slightly raised at center to provide proper drainage. When conditions detrimental to plant growth are encountered, such as fill, adverse drainage conditions, or obstructions, notify the Consultant before planting. Dispose of subsoil removed from planting excavations. Do not mix with planting soil or use as backfill. Plants to be planted in prepared planting soil may utilize the soil removed from the planting hole as backfill around the root ball.
- Set edge of the root ball at the elevation of the proposed finish. Consult the grading plan and utilize a builder's level or transit to determine the grade at the tree grade. For trees on sloped surfaces, set the edge of the root ball at the average grade around the tree. Set the plant plumb and in the location indicated on the tree plan. The root ball and tree graft, if applicable, shall be visible at the top of the root ball, above the grade. Do not place soil on top of the root ball and remove soil pushed above root flare by mechanical pottling/ball & burlapping process during transportation by the nursery.
- When set, brace root ball by tamping backfilled soil around the root flare of the root ball. Place additional backfill around base and sides of ball in 150mm lifts. Work each lift to settle backfill and eliminate voids and air pockets. When excavation is approximately two-thirds full, water thoroughly before placing remainder of backfill. Ropes or strings on top of ball shall be cut and removed. Burlap or cloth wrapping shall be cut and removed from the top of the root ball. The top horizontal ring of support wire baskets shall be cut in four places and the top half of the wire basket cut down into the soil.
- Wire stakes to be required, caliper trees shall be supported by wooden stakes driven outside the ball in line with the direction of the prevailing wind. Tree type and installation method to be per planting detail. Stakes shall be 50mm x 50mm hardwood stakes free of knots and of lengths appropriate to the size plant and support for the tree.
- Tree guard type and installation per planting detail.
- Maintain all trees and shrubs in a plumb position throughout the warranty period. Straighten tall trees including those not staked. Plants to be straightened shall be excavated and the root ball moved to a plumb position, and then re-backfilled. Do not straighten plants by pulling the trunk with guys.
- Do not apply any fertilizer to plantings during the first year after transplanting, unless soil tests determine that fertilizer or other chemical additives are required. If required, fertilizers shall be applied according to the manufacturer's instructions and standard horticultural practices. Pruning shall be done with clean, sharp, rust-free tools. Cuts shall be made flush, leaving no stubs as per ANSI A300 - current edition. No tree paint or sealants shall be used.
- Dead wood, suckers, and broken and badly bruised branches shall be removed. Do not prune plant material that has been severely damaged due to transit or handling until viewed by the Landscape Architect.
- Pruning of broken or dead branches shall be done after planting. Form-corrective pruning may occur when tree has hardened until break-in the spring. If corrective pruning details fall outside the construction schedule, it shall remain a punch list (warranty) item. The Contractor shall be responsible for completing this off-season punch list (warranty) item.
- Much top of root balls and planting beds, covering the entire planting bed area. Leaving a much free zone at stem/trunk as indicated in planting details.
- Water each plant on the day of installation to saturate the soil around the roots and wash the soil on the root. After the soil has drained, reset any settled plants or grades around the plant, adding soil if required.



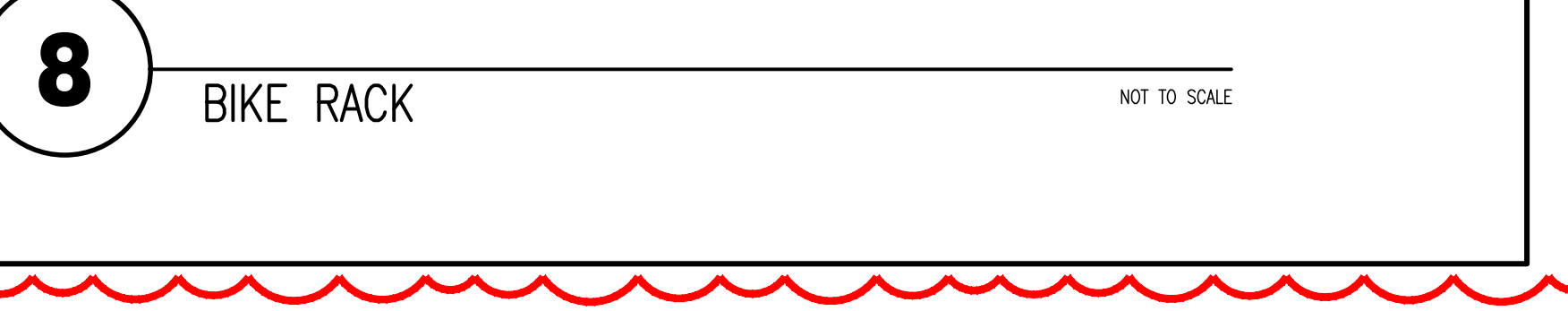
- ### 1 GENERAL LANDSCAPE NOTES
- Perform following maintenance operations from time of planting trees, shrubs, and perennials to end of warranty period two (2) years following substantial performance of the work.
    - Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion. In a typical loam soil, optimum soil moisture in planting beds at root depth is 65% of field capacity. Guidelines during a typical growing season are as follows:
      - Deep root water newly planted plants once per week for the first three weeks, such that the water penetrates to a minimum depth of 300mm.
      - Deep root or surface water trees and shrubs a minimum of every ten (10) days between May 15 and September 15.
      - Deep root or surface water perennials (21 days between September 15 and September 15).
      - Freeze up.
      - Water evergreen plants thoroughly in late fall prior to freeze-up to saturate soil around root system.
      - Soil moisture to be monitored throughout the growing season:
        - Watering schedule to be increased when plant materials are reaching the permanent wilting point.
        - Watering schedule to be reduced when sufficient volume of rainfall has occurred to saturate the soil as required.
      - Replace or reseed damaged, missing or disturbed mulch.
      - If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Consultant prior to application.
      - Control outbreaks of perennial weeds as directed by Consultant, and annual weeds by mechanical or chemical means utilizing acceptable integrated pest management practices to meet acceptance/success targets.
        - If chemical means are used, comply with all municipal, provincial, and federal legislation and regulations.
      - Remove dead or broken branches from plant material using clean sharp horticultural tools using current arboricultural practices.
      - Keep trunk protection and guy wires in proper repair and adjustment.
      - Provide adequate protection from frost, wind and rodent damage.
      - Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings, unless otherwise directed by Consultant.
      - Remove trunk protection, tree supports and level watering saucers at end of warranty period, unless otherwise directed by Consultant.
    - After establishment period is complete and soil is accepted, the Owner shall retain the installing Landscape Contractor, a third-party Landscape Maintenance Contractor, or perform the maintenance work to end of warranty period two (2) years following substantial performance of the work.
      - Maintenance level "Moderate" in accordance with the Canadian Landscape Standard. The main objective is a generally neat, moderately groomed appearance, with some tolerance for the effects of wear and tear, moderate traffic and natural processes.
        - Mow turf to a height of 75-100mm ("3"-4"). Mowing should be performed as necessary to avoid the removal of any more than one third of the grass blade length at any one time.
        - Supplemental watering shall be carried out when required and with sufficient quantities of water to prevent turf and underlying soil from drying out.
        - If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Consultant prior to application.
        - Control outbreaks of perennial weeds and annual weeds by mechanical or chemical means utilizing acceptable integrated pest management practices to meet acceptance/success targets.
        - If chemical means are used, comply with all municipal, provincial, and federal legislation and regulations.
    - Submit monthly written reports in during the growing season (April - September) to Consultant identifying:
      - Maintenance work carried out.
      - Watering method, quantity of water used, water source.
      - General development and condition of plant material.
      - Preventative or corrective measures required which are outside Contractor's responsibility.

- ### 4 TREE SHRUB AND PERENNIAL INSTALLATION NOTES
- #### GENERAL TREE NOTES
- All arboricultural work performed on trees such as pruning of branches and root work shall be conducted by an ISA Certified Arborist.
  - Prune and mitigate limbs and roots damaged by wind and ice in accordance with ANSI A300 - Tree Care Standards.
  - Tree Protection Fences to be erected prior to the commencement of any construction or grading, and maintained throughout the duration of the work.
  - Tree Protection Zone is defined by Tree Protection Fence shown on the drawings.
  - No construction or activities including the following to occur within Tree Protection Zone: equipment, parking, access, storage of supplies, disposal of fill, and mulching.
  - Tree removals (if required) will be undertaken in compliance with the Migratory Birds Convention Act. Efforts will be made to remove vegetation outside the General Nading period (April 1 - Aug 31) for regions C1 and C2 of Ontario. In the event vegetation must be removed within the General Nading Period, a qualified arbor biologist is to review the site prior to removal to ensure compliance with the Migratory Birds Convention Act.
  - Any soils and vegetation within tree protection zone damaged by the Contractor shall be restored to the satisfaction of the Municipality by the Contractor at no additional cost to the Owner.
- #### CONSTRUCTION WITHIN MINIMUM TREE PROTECTION ZONES
- An ISA Certified Arborist must be present on site during construction activities within MTPZ to confirm and/or modify mitigation measures for trees to be preserved.
  - Use trenchless methods (e.g. horizontal directional drilling) to install underground services (e.g. sanitary sewers and water lines) within Minimum Tree Protection Zones.
- #### EXISTING UNDERGROUND SERVICES WITHIN TREE PROTECTION ZONES
- Existing sanitary/sewer systems and water mains to be discontinued within tree protection zones will be filled (as needed) and abandoned.
  - Excavation and access for construction equipment will be conducted outside of tree protection zones.
- #### FINISH GRADING WITHIN TREE PROTECTION ZONES
- Where finish grading of cuts and fills, and including swales occurs within tree protection zones, the following steps are required:
- #### Grade Out:
- Excavate by hand or Air-spade technology to a maximum depth of 100mm.
  - Roots encountered are to be assessed by the Project Arborist to determine the extent of roots to be pruned. Based on findings, other treatments may be required (e.g. crown reduction, tree removal), and which may require approval from the City.
  - Based on root findings, local, minor adjustments to grading within the tree protection zone may be required based on field consultation between the Project Arborist and Project Engineer.
  - No access by heavy equipment into tree protection zone is permitted. Fine grading to be carried out using light equipment and/or hand.
- #### Grade Fill:
- Apply topsoil to meet grade requirements to a maximum of 150mm.
  - No topsoil to be added onto trunk base or above-ground section of trunk base flare.
  - Based on local conditions (e.g. surface drainage), local, minor adjustments to grading within the tree protection zone may be required based on field consultation between the Project Arborist and Project Engineer.
- #### TREES OWNED BY OTHERS
- Trees owned by others require permission (i.e. written consent) from the land owner(s) prior to activities that may damage or destroy trees. Trees owned by others are Off-site Trees and Shared Trees.
  - Off-site Trees: Trees on property adjacent to the subject property.
  - Shared (Boundary) Trees: Trees whose trunk including the basal trunk flare growing on the boundary between the subject property and adjoining property (from Ontario Forestry Act).
- The Provincial Forestry Act, R.R.O. 1990 (Section 19):
- (1) Every tree whose trunk is growing on the boundary between adjoining lands is the common property of the owners of the adjoining lands, 1990, c. 18, Sched. 1, s. 21.
  - (2) Every person who takes or destroys a tree growing on the boundary between adjoining lands without the consent of the land owners is guilty of an offence under the Act, 1990, c. 18, Sched. 1, s. 21.
- #### ROOT SENSITIVE EXCAVATION
- A preliminary excavation at the limit of work is recommended to determine the potential magnitude of the impacts posed by the planned work. For excavation in turf or permeable surfaces, the final excavation limit should be marked in the field and arborist supervised excavation shall be performed using air-spade, dry-vac, truck, hydro-vac truck or hand tools. For excavation of existing impermeable surfaces, the impermeable top layer may be broken up by machine to allow access to the permeable base layers. The permeable base layers may not be excavated further to expose existing roots, in which case this excavation shall be performed using air-spade, dry-vac, truck, hydro-vac truck or hand tools. For excavation of existing impermeable surfaces, the impermeable top layer may be broken up by machine to allow access to the permeable base layers. All roots exposed must be documented by the supervising arborist. Every effort should be made to preserve as many exposed roots as possible. Roots to be preserved for pruning should be clearly cut with a hand saw, secateurs, chainsaw or other cutting tool such as a hand saw, secateurs, chainsaw or other cutting tool. The disturbance of the roots are to be expected once mechanical excavation begins. All root pruning is to be performed by the arborist only, as per guidelines below.
  - When root sensitive excavation is performed in regards to the installation of a deep site feature such as a foundation, roots of less than 5cm diameter can be cut sharply, if necessary, unless an abundance of smaller roots are involved. If roots of 5cm diameter or greater or an abundance of smaller roots are exposed in the excavation areas inside or just outside the Tree Protection Zone (TPZ) of tallow trees they should be preserved.
  - When root sensitive excavation is performed in regards to the installation of site features such as post holes, all roots exposed under 5cm diameter may be cut sharply, if necessary, unless an abundance of smaller roots are involved. If roots of 5cm diameter or greater or an abundance of smaller roots are exposed in the excavation areas inside or just outside the TPZ of tallow trees they should be preserved.
  - When root sensitive excavation is performed in regards to the installation of site features such as driveways, walkways, curbs, etc. roots of less than 5cm diameter can be cut sharply, if necessary, unless an abundance of smaller roots are involved. If roots of 5cm diameter or greater or an abundance of smaller roots are exposed in the excavation areas inside or just outside the TPZ of tallow trees they should be preserved.
  - When root sensitive excavation is performed in regards to the installation of utilities such as water lines or sewers, every effort should be made to preserve as many exposed roots as possible by installing the utilities underneath the roots without pruning. If roots of 5cm diameter or greater are uncovered they should be preserved.



- ### 2 GENERAL LANDSCAPE MAINTENANCE NOTES
- Soil shall be a No. 1 Commercial Grade Turfgrass Nursery Sod, Kentucky Bluegrass/Fine Fescue according to the Classifications and Use of Turfgrass Sod for Ontario.
    - Soil shall be seeded and established in nursery sod fields as a turfgrass sod.
      - There shall be no more than 5 broadleaf weeds per 40 m<sup>2</sup> of sod and up to 20% non-specified grass seed.
      - Soil shall be of sufficient density that no surface soil is visible. The surface height shall be 30 mm minimum and 70 mm maximum.
      - The soil portion of the sod shall be a good mineral type soil with a thickness of 10 mm minimum and 15 mm maximum.
    - Each sod piece shall be well permeated with roots, individual sod pieces shall be in such condition so that each may be lifted, rolled, transported, and placed without breaking or tearing and without loss of soil under normal handling conditions.
    - Soil shall contain sufficient moisture to maintain its vitality during transportation and placement.
    - Topsoil shall be loose, friable, fertile loamy material that is free from subsoil, weeds, roots, vegetation and other deleterious material greater than 25mm diameter in the greatest dimension. The topsoil shall also be certified by an OMAFRA Accredited Soil Testing Laboratory in Ontario to meet the following requirements:
      - Topsoil texture shall be loam, sandy loam to loam:
        - Sand content between 20-75%
        - Silt content between 5-30%
        - Clay content between 5-30%
      - Herbicides - No detectable levels
      - Organic Matter content between 4-15%
      - Phosphorus 10-60 (ppm)
      - Potassium 80-250 (ppm)
      - Calcium 1000-1000 (ppm)
      - Magnesium 100-300 (ppm)
      - Chloride <100 (ppm)
      - Sodium <20 (ppm)
      - Sodium Adsorption Ratio <15
      - Soil shall not have contaminants that adversely affect plant growth.
      - The cost to amend existing on-site topsoil to be reused shall be paid for by the Owner.
      - The cost to amend imported topsoil supplied by the Contractor to meet Agronomist written recommendations shall be paid for by the Contractor.
    - Water shall not have contaminants or impurities that would adversely affect the germination and growth of vegetation.
    - Soil shall not be separated from its mineral soil base and not damaged during transportation, handling and placement.
    - Surface litter and debris shall be removed immediately prior to topsoil or sod placement.
    - Topsoil or sod shall not be placed when in a frozen condition, under adverse field conditions such as high wind, frozen soil or soil covered with snow, ice, or standing water.
    - Topsoil shall be placed, spread and leveled as required to match grades as indicated in the grading drawings prepared by the Project Civil Engineer and allow for positive drainage away from pathways and structures.
    - Minimum consistent depth for topsoil in areas to be sodded after settlement shall be 200mm deep.
    - At the time of sodding, all surface areas designated for sodding shall be free of erosion and shall have a fine graded uniform surface. The surface shall be uniformly cultivated to a minimum depth of 50 mm, and shall not have surface materials greater than 25 mm in size, such as stones and clods and weeds or other unwanted vegetation.
    - Soil shall be placed in locations and as specified in the landscape drawings.
      - Woods shall not be left between the soil portion of the sod and the underlying ground surface.
      - Soil shall be securely placed lengthwise across the face of slopes and parallel to the centreline of ditches.
      - End joints of adjacent sod pieces shall be staggered.
      - The edges of adjacent sod pieces shall be placed tightly against one another without overlapping.
      - Soil shall be counter-sloped to existing grade level at all edges.
      - Bad joints will be used where new sod blends with existing grass; lap joints will not be permitted.
      - Joints shall be tamped to a uniform surface.
      - Where required, sod should be tamped to the grade to avoid movement.
    - Soil shall be maintained by the Contractor as part of base price during the establishment period (30 Days) following completion of placement. During this period, the placed sod shall be kept healthy, actively growing, and green in colour. This requirement shall be suspended during the winter dormant period (defined as November 15 to April 15 inclusive) during the establishment period the Contractor will:
      - Install temporary barriers or signage to be maintained where required to protect newly established sod.
      - Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion. In a typical loam soil, optimum soil moisture in planting beds at root depth is 65% of field capacity.
      - Mow to a height of 60mm (2.5") when turf reaches height of 80mm (3") at least twice during the establishment period.
      - If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Consultant prior to application.
      - Control outbreaks of perennial weeds and annual weeds by mechanical or chemical means utilizing acceptable integrated pest management practices to meet acceptance/success targets.
      - If chemical means are used, comply with all municipal, provincial, and federal legislation and regulations.

- ### 5 GENERAL TREE PRESERVATION NOTES
- When root sensitive excavation is performed in regards to the installation of a deep site feature such as a foundation, roots of less than 5cm diameter can be cut sharply, if necessary, unless an abundance of smaller roots are involved. If roots of 5cm diameter or greater or an abundance of smaller roots are exposed in the excavation areas inside or just outside the Tree Protection Zone (TPZ) of tallow trees they should be preserved.
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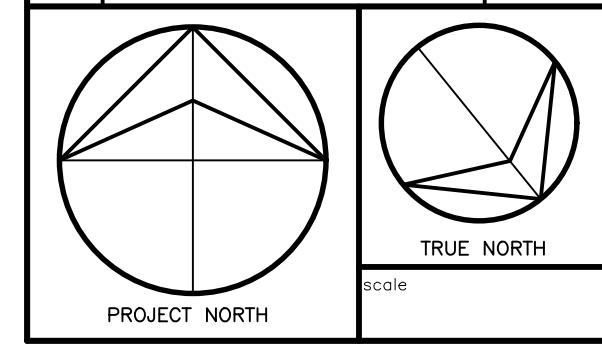


- ### 3 SOD INSTALLATION AND ESTABLISHMENT NOTES
- Soil shall be a No. 1 Commercial Grade Turfgrass Nursery Sod, Kentucky Bluegrass/Fine Fescue according to the Classifications and Use of Turfgrass Sod for Ontario.
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      - Soil shall be of sufficient density that no surface soil is visible. The surface height shall be 30 mm minimum and 70 mm maximum.
      - The soil portion of the sod shall be a good mineral type soil with a thickness of 10 mm minimum and 15 mm maximum.
    - Each sod piece shall be well permeated with roots, individual sod pieces shall be in such condition so that each may be lifted, rolled, transported, and placed without breaking or tearing and without loss of soil under normal handling conditions.
    - Soil shall contain sufficient moisture to maintain its vitality during transportation and placement.
    - Topsoil shall be loose, friable, fertile loamy material that is free from subsoil, weeds, roots, vegetation and other deleterious material greater than 25mm diameter in the greatest dimension. The topsoil shall also be certified by an OMAFRA Accredited Soil Testing Laboratory in Ontario to meet the following requirements:
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      - Magnesium 100-300 (ppm)
      - Chloride <100 (ppm)
      - Sodium <20 (ppm)
      - Sodium Adsorption Ratio <15
      - Soil shall not have contaminants that adversely affect plant growth.
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      - The cost to amend imported topsoil supplied by the Contractor to meet Agronomist written recommendations shall be paid for by the Contractor.
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      - Soil shall not be separated from its mineral soil base and not damaged during transportation, handling and placement.
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      - Topsoil or sod shall not be placed when in a frozen condition, under adverse field conditions such as high wind, frozen soil or soil covered with snow, ice, or standing water.
      - Topsoil shall be placed, spread and leveled as required to match grades as indicated in the grading drawings prepared by the Project Civil Engineer and allow for positive drainage away from pathways and structures.
      - Minimum consistent depth for topsoil in areas to be sodded after settlement shall be 200mm deep.
      - At the time of sodding, all surface areas designated for sodding shall be free of erosion and shall have a fine graded uniform surface. The surface shall be uniformly cultivated to a minimum depth of 50 mm, and shall not have surface materials greater than 25 mm in size, such as stones and clods and weeds or other unwanted vegetation.
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        - Control outbreaks of perennial weeds and annual weeds by mechanical or chemical means utilizing acceptable integrated pest management practices to meet acceptance/success targets.
        - If chemical means are used, comply with all municipal, provincial, and federal legislation and regulations.

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10'-0" x 10'-0" x 8'-6" HIGH PRECAST ASHLER SHED	
DESIGNED BY: J.P.H.	SCALE: AS SHOWN
DRAWN BY: C.B.	DWG. NO.: 118097-ACT11
STARTED: MAY 13, 2019	1 OF 2

SECTION & DETAILS	
DESIGNED BY: J.P.H.	SCALE: AS SHOWN
DRAWN BY: C.B.	DWG. NO.: 118097-ACT11
STARTED: MAY 13, 2019	2 OF 2



**BIG architects + assoc. inc.**

client: HALTON DISTRICT SCHOOL BOARD

2050 GUELPH LINE, BURLINGTON, ONTARIO

project: MILTON DISTRICT HIGH SCHOOL RENOVATION/ADDITION

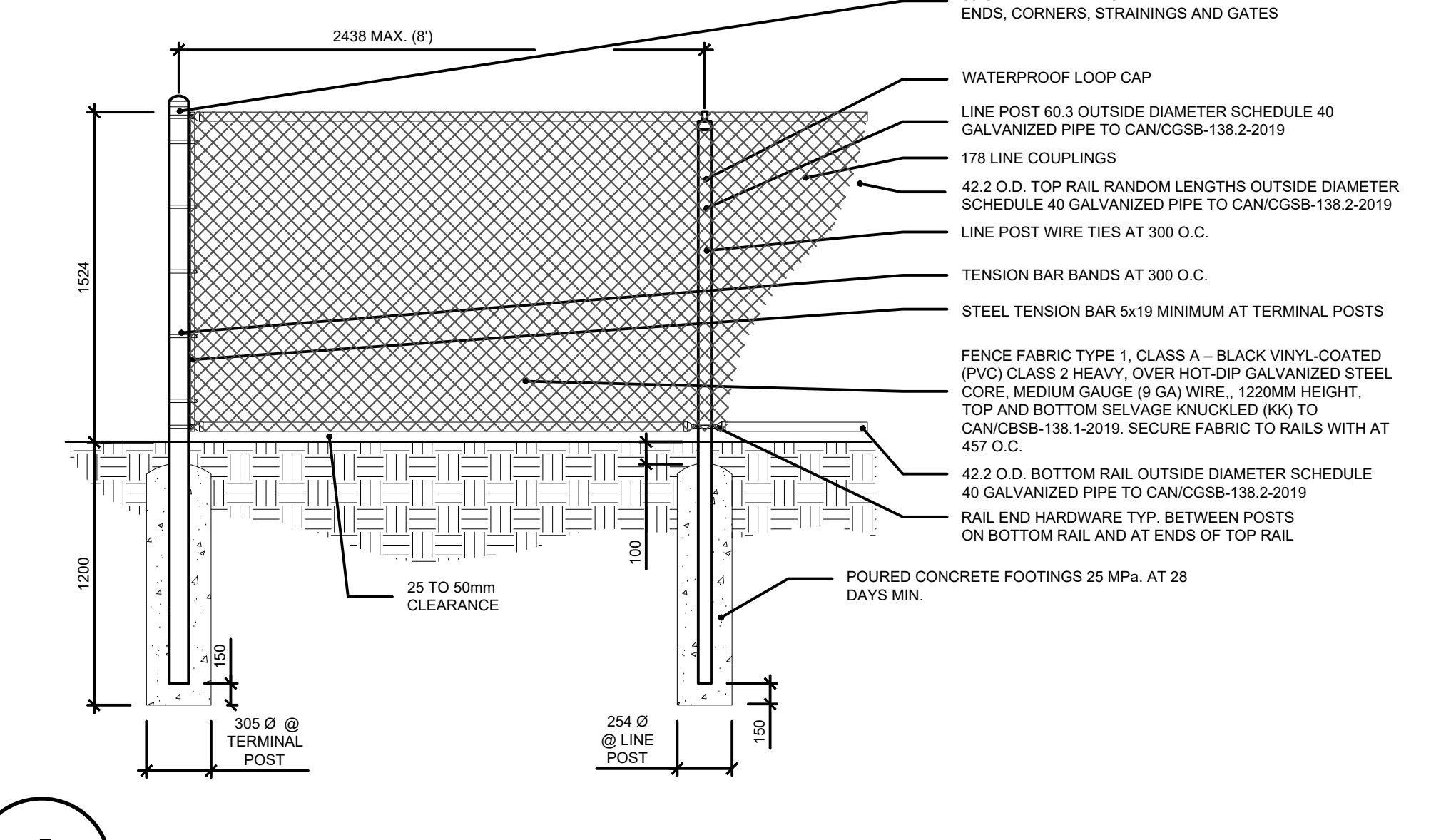
306 WILLIAMS AVE., MILTON, ONTARIO

drawing title: LANDSCAPE DETAILS & NOTES

revision: 24-060 client reference number: 118097-ACT11

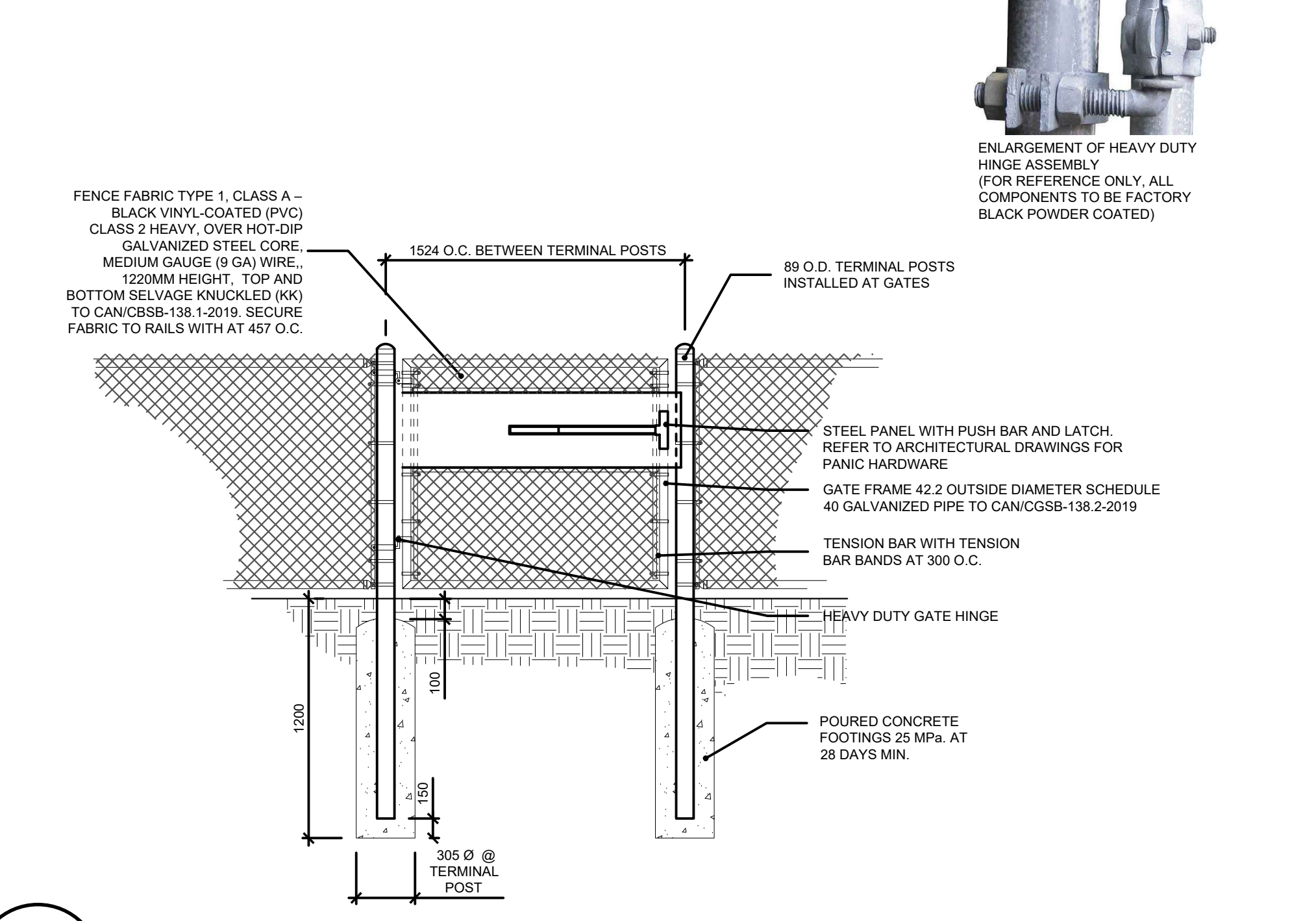
sheet no: L-20100

- NOTES:**
- 1.1. **References:**
    - 1.1. ASTM A334/A334M-12 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
    - 1.2. ASTM A123/A123M-17 Standard Specification for Zinc Hot Dip Galvanized Coatings on Iron and Steel Products
    - 1.3. ASTM A663/A663M-21 Standard Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
    - 1.4. Chain link fence fabric shall be in accordance with CAN/CSG58-138.1
    - 1.5. Chain link fence framework shall be in accordance with CAN/CSG58-138.2
    - 1.6. Gate components shall be in accordance with CAN/CSG58-138.4
  2. All chain link fence components shall be galvanized steel in accordance with the above referenced standards. Chain link fabric shall be black vinyl-coated (PVC) over galvanized steel core.
  3. All posts, rails, and fittings shall be factory black powder-coated over galvanized steel.
  4. All coatings shall be continuous, uniform in appearance, and free from defects, blisters, or excessive roughness. The average mass per unit area of zinc coating shall not be less than 550 g/m<sup>2</sup> (1.8 oz/ft<sup>2</sup>) of uncoated base metal surface, as determined from the average results of the two specimens and not less than 400 g/m<sup>2</sup> (1.6 oz/ft<sup>2</sup>) for either of the test specimens.
  5. Plastic couplings, fittings or any other plastic components will not be accepted.
  6. The fence shall be so installed that on completion it is truly on the line as specified. The top of the fence shall follow approximately the profile of the natural ground or the grade levels as specified.
  7. Manually fastened black vinyl-coated wire less shall attach one strand of chain link fabric to the line posts, top and bottom rails by hooking or twisting (two complete turns) one end of the line to the fabric and tightly wrapping the line around the post or rail having the remaining end of the secured to the fence fabric with two turns drawing the line tight. Power fastener wire ties shall be installed as per manufacturers instructions. The end of the tie shall be positioned on post or rail so that it is parallel to the chain link fabric. The end of wire ties shall not protrude beyond the vertical plane of chain link fabric. Ties shall be down tight to posts or rails after twisting.



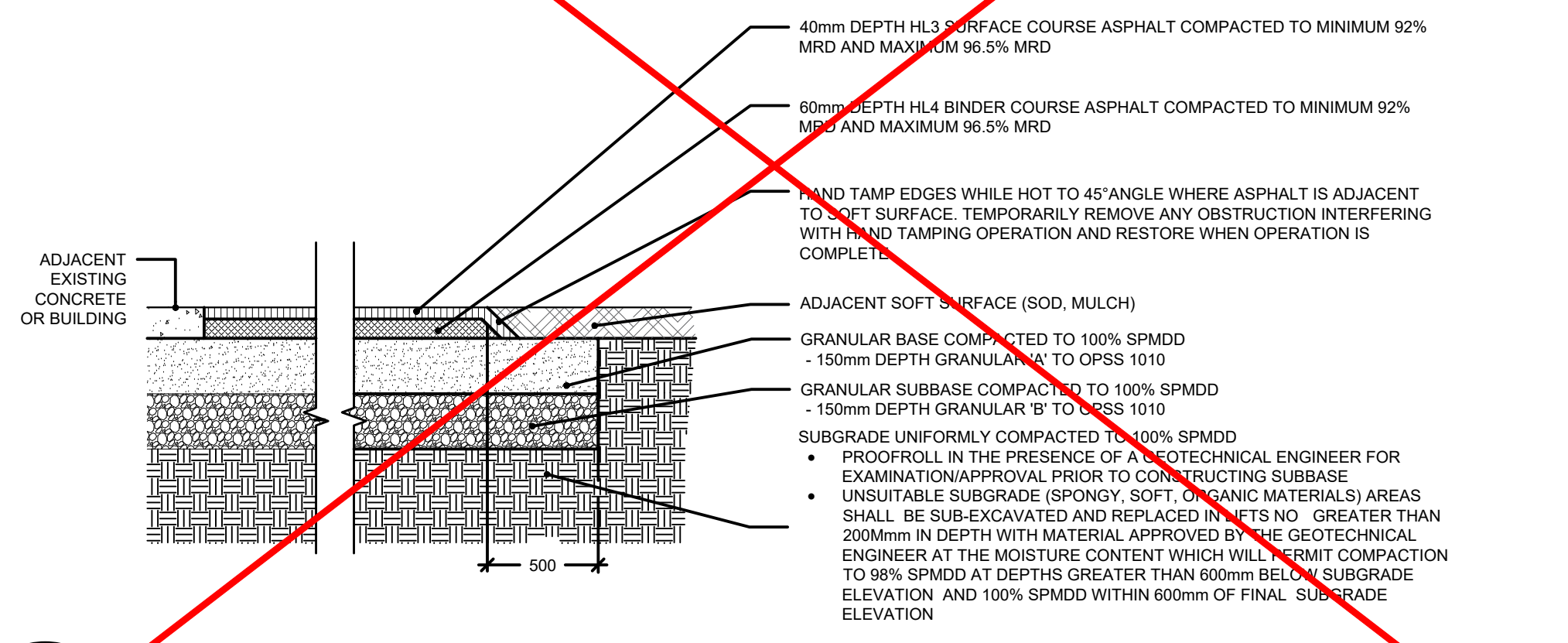
**1** 1524MM HEIGHT CHAIN LINK FENCE NOT TO SCALE

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    - 1.5. Chain link fence framework shall be in accordance with CAN/CSG58-138.2
    - 1.6. Gate components shall be in accordance with CAN/CSG58-138.4
  2. All chain link fence components shall be galvanized steel in accordance with the above referenced standards. Chain link fabric shall be black vinyl-coated (PVC) over galvanized steel core.
  3. All posts, rails, and fittings shall be factory black powder-coated over galvanized steel.
  4. All coatings shall be continuous, uniform in appearance, and free from defects, blisters, or excessive roughness. The average mass per unit area of zinc coating shall not be less than 550 g/m<sup>2</sup> (1.8 oz/ft<sup>2</sup>) of uncoated base metal surface, as determined from the average results of the two specimens and not less than 400 g/m<sup>2</sup> (1.6 oz/ft<sup>2</sup>) for either of the test specimens.
  5. Plastic couplings, fittings or any other plastic components will not be accepted.
  6. The fence shall be so installed that on completion it is truly on the line as specified. The top of the fence shall follow approximately the profile of the natural ground or the grade levels as specified.
  7. Manually fastened black vinyl-coated wire less shall attach one strand of chain link fabric to the line posts, top and bottom rails by hooking or twisting (two complete turns) one end of the line to the fabric and tightly wrapping the line around the post or rail having the remaining end of the secured to the fence fabric with two turns drawing the line tight. Power fastener wire ties shall be installed as per manufacturers instructions. The end of the tie shall be positioned on post or rail so that it is parallel to the chain link fabric. The end of wire ties shall not protrude beyond the vertical plane of chain link fabric. Ties shall be down tight to posts or rails after twisting.

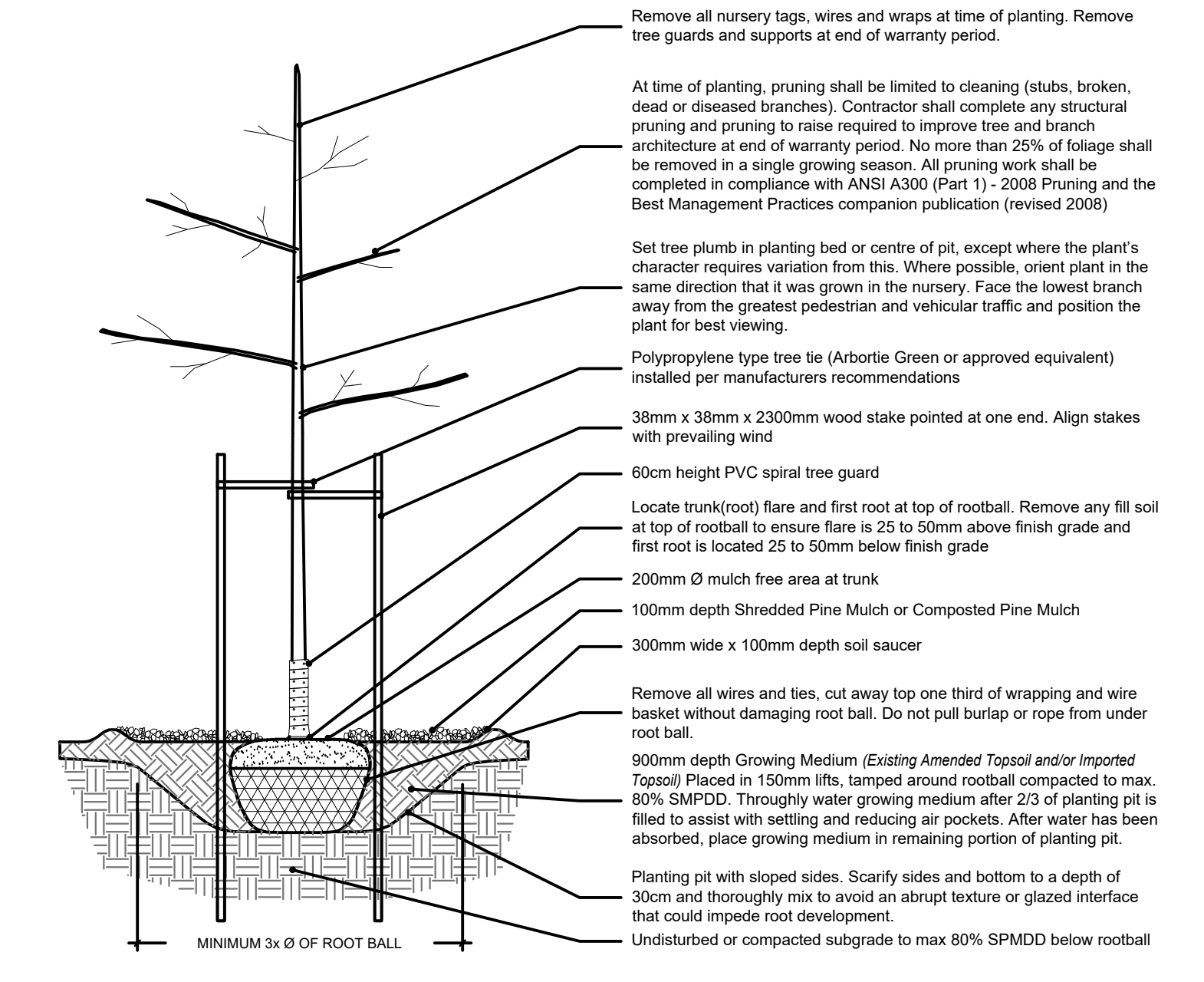


**2** 1524MM HEIGHT CHAIN LINK FENCE SWING GATE WITH PANIC PUSH BAR NOT TO SCALE

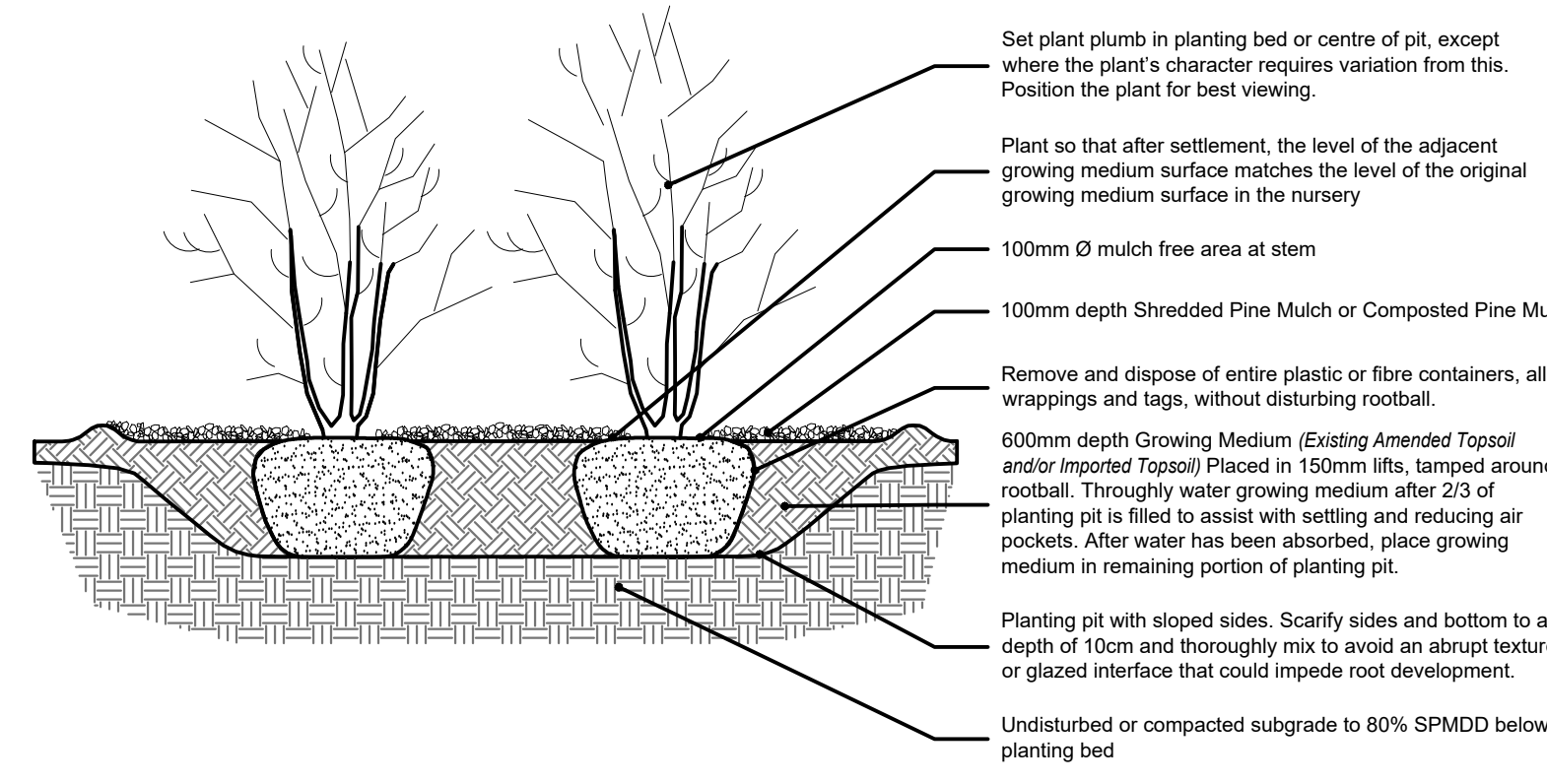
- NOTES:**
1. ALL DIMENSIONS ARE IN MILLIMETERS. DO NOT SCALE DRAWING.
  2. THE GRANULAR BASE MATERIALS ON SITE MAY BE REUSED FOR NEW PAVING INSTALLATIONS, PROVIDED THAT MATERIAL IS INSPECTED AND APPROVED IN WRITING BY A GEOTECHNICAL ENGINEER.
  3. ALL MATERIALS SHALL CONFORM TO QPSS 1001, QPSS 1010 AND QPSS 1010.
  4. ASPHALT MATERIALS SHALL CONFORM TO QPSS 1150.
  5. TACK COAT SHALL BE APPLIED TO GRANULAR BASE COURSE WITH AN EQUAL VOLUME OF WATER, CONFORMING TO QPSS 1150.
  6. MIX, HANDLE, PLACE AND COMPACT ASPHALT IN ACCORDANCE WITH QPSS 110.
  7. SPECIFIED DEPTH AND COMPACT SHALL BE MAINTAINED THROUGHOUT SETTLEMENT. SPECIFIED DEPTH OF ASPHALT AND GRANULAR BASES SHALL BE MAINTAINED THROUGHOUT SETTLEMENT.
  8. ENSURE THAT THERE IS A SMOOTH TRANSITION BETWEEN HARD AND SOFT SURFACES (ASPHALT TO SOIL AND ASPHALT TO ASPHALT).
  9. CONTRACTOR SHALL PROVIDE GEOTECHNICAL ENGINEER'S WRITTEN APPROVAL OF MATERIALS, COMPACTION AND DENSITY TESTING RESULTS, AS WELL AS VERIFICATION OF DEPTH, FINISH, SUBGRADE, GRANULAR SUBBASE, ASPHALT BINDER COURSE, AND ASPHALT SURFACE COURSE PRIOR TO PROCEEDING TO EACH SUBSEQUENT COURSE.



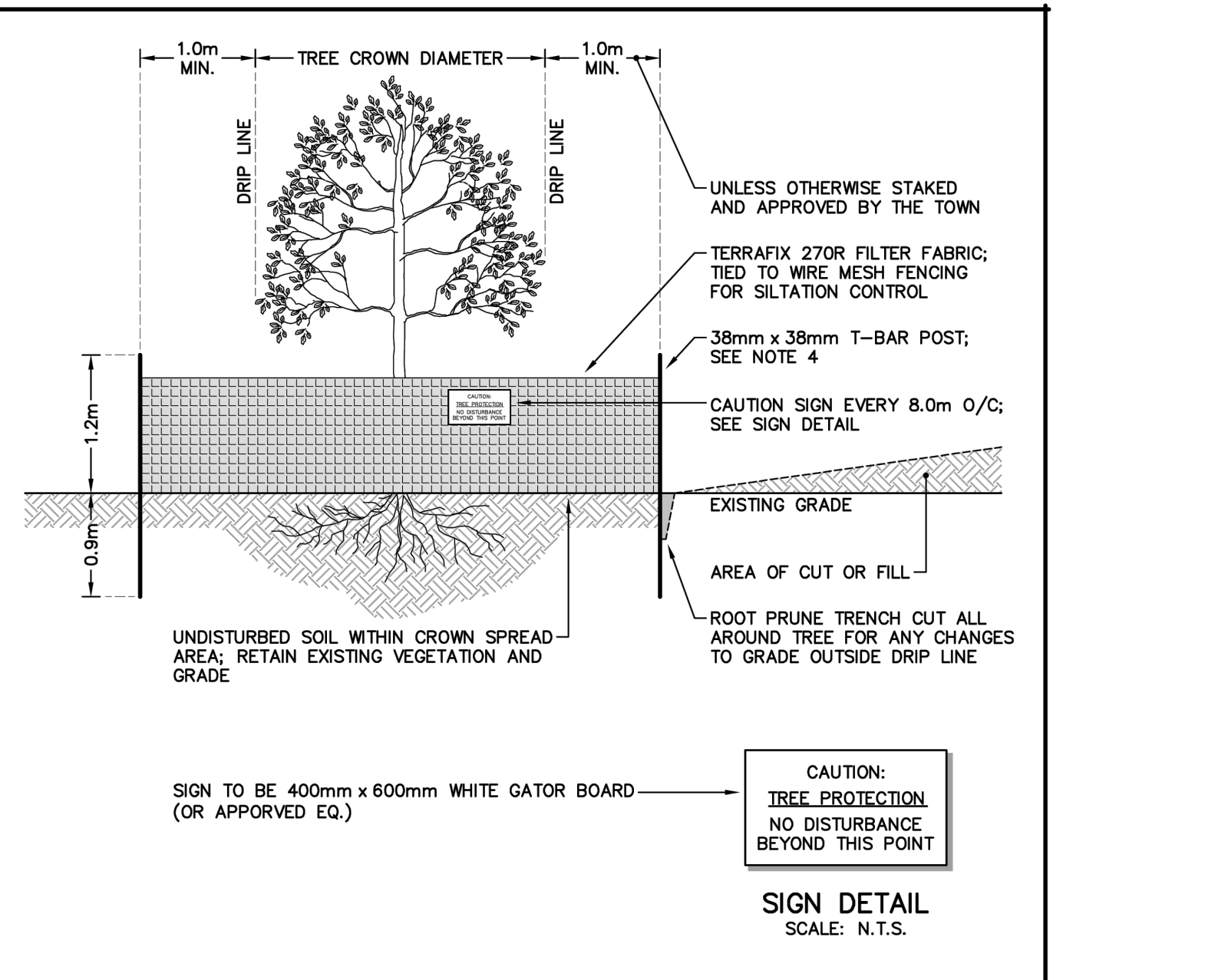
**3** LIGHT-DUTY ASPHALT (CHILDCARE PLAY SPACES ONLY) NOT TO SCALE



**4** TYPICAL TREE PLANTING DETAIL - INDIVIDUAL SAUCER NOT TO SCALE



**5** TYPICAL SHRUB PLANTING DETAIL - CONTINUOUS BED NOT TO SCALE



- NOTES:**
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH QPSS 220.010.
  2. TREE PROTECTION FENCING AND ASSOCIATED FILTER FABRIC IS TO BE MAINTAINED IN GOOD WORKING ORDER THROUGHOUT CONSTRUCTION PERIOD. UNTIL APPROVAL TO REMOVE THE FENCING IS OBTAINED FROM THE TOWN OF MILTON.
  3. EXISTING TREES SHALL BE PROPERLY PROTECTED AT OR OUTSIDE OF THE DRIP LINE WITH WIRE MESH FENCING AS PER THE APPROVED LANDSCAPE PLAN UNTIL SUBSTANTIAL PERFORMANCE OR REPLACEMENT WITH A PERMANENT FENCE.
  4. STEEL T-BARS TO BE SPACED 2.5m O/C MIN.
  5. EXISTING GRADE WITHIN DRIP LINE OF ALL TREES IS TO BE PRESERVED.
  6. PRUNE DEAD WOOD ONLY AS DIRECTED BY THE TOWN. DO NOT PRUNE LEADERS.
  7. WATERING AND FERTILIZING PROGRAM SHALL BE MAINTAINED TO THE SATISFACTION OF THE TOWN.
  8. THE COST OF REPLACING DEAD AND/OR SEVERELY DAMAGED TREES, AS DETERMINED BY THE TOWN, SHALL BE BORNE BY THE DEVELOPER AND/OR GENERAL CONTRACTOR. THE SPECIES AND SIZE(S) MUST BE APPROVED BY THE TOWN.
  9. EXISTING POSTS DRAINAGE AWAY FROM THE FENCED AREA.
  10. NO STORAGE OF MATERIALS OR GRADE CHANGE IS PERMITTED WITHIN THE FENCED AREA.

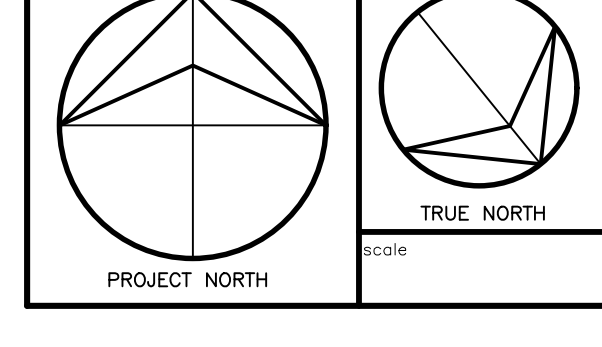
**TREE PROTECTION FENCING**

Scale: 1:50  
Date: 2024/SEP  
Project No: 10-01.02  
MILTON

**6** TREE PROTECTION FENCING NOT TO SCALE

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No.	REVISIONS	DATE
06	ISSUED FOR ADDENDUM #3	2026.05.04
05	ISSUED FOR TENDER	2026.04.14
04	ISSUED FOR PERMIT	2026.04.02
03	ISSUED FOR COORDINATION	2026.01.30
02	ISSUED FOR SPA	2025.12.18
01	ISSUED FOR COORDINATION	2025.10.23



PROJECT OF LANDSCAPE ARCHITECTURE

DATE: 2026.05.04 MGN

SCALE: 1:50

DATE: 2026.05.04

**BJC**

architects + assoc. inc.

client: HALTON DISTRICT SCHOOL BOARD

2050 GUELPH LINE BURLINGTON ONTARIO

project: MILTON DISTRICT HIGH SCHOOL RENOVATION/ADDITION

396 WILLIAMS AVE. MILTON ONTARIO

drawing title: LANDSCAPE DETAILS

reference: project no: 10-060 client reference number

sheet no: L-20200

**Halton District School Board  
Request for Tender – 26-056**

**School Addition and Child Care Renovations  
at Milton District High School**

**ADDENDUM No. S01**

**May 8, 2026**

---

The following amendments/clarifications to the Tender Documents are considered to form part of this Tender.

No consideration will be given for extras and/or changes due to the Bidder not being familiar with the contents of this Addendum.

Bidders are to acknowledge this Addendum by signing and enclosing this addendum of this document with their submission.

The following Addendum has been issued to make clarifications, revisions, additions and/or deletions to the various areas of the Request for Tender.

This addendum shall be incorporated in the specifications and drawings and shall form part of the contract documents:

---

**1. AMENDMENTS TO DRAWINGS:**

**A. Refer to Cover page loading summary notes [S0.0] and amend the following:**

- Under Submittals notes revise Note 1 to include the following:
  - o Concrete formwork
  - o Concrete mix design
  - o Reinforcing steel
  - o Structural steel
  - o Misc. metals
  - o OWSJ
  - o Steel deck
  - o Precast concrete
  - o Cold formed steel
  - o Temporary shoring

- Under Roof Loads
  - o Add +1kPa at roof pavers
- Under composite deck – new
  - o Revise deck thickness to be 100 thick
- Daycare to be designed for future second floor loads – consider max from 250 precast floor or roofing. Assume 4.8kPa live load at daycare slabs or SPU live loads.

**B. Refer to Foundation Plan [S1.0] and amend the following:**

- Provide foundation supporting block wall at existing Stair B near gridline 4 and G1. Foundation SF3 is to support block wall in between stair rises. Temporarily remove stair to suit new block wall construction. Reinstate stairs.
- Remove foundation wall between columns along gridline 4c between grids J and K.
- Mechanical room 133 on 1<sup>st</sup> floor is supporting AHU-1 (36kN, 8100lbs) on the slab on grade. Also provide house keeping pad. Refer to mechanical for location
- Mechanical room 133 houses tanks – refer to typical sump detail. Drop footings to suit tanks as needed. Refer to mechanical for exact location.
- Provide slab removal and replacement at entry between 10 a and 10e through building to suit new services.
- Refer to column line near grid Ha between grid 9 and 10c. Field verify exact column locations in existing building.
  - o Shift column and pier line to be centred on gridline Ha
  - o Match top of pier to existing pier.
  - o Refer to new section 1/S4.1 on SK-S1 attached.
- Refer to electrical room. Where new service is being brought into the building provide slab repairs and wall infill as needed.
- At entry vestibule additional column between double doors near gridline K1 and start of skylight frame. Provide Columns: HSS 127x76x13 c/w Pier 2 and Footing F1. Total of 2 additional columns, piers and footings.
- At slab on grade where WWF mesh reinforcing is noted, instead provide 1.8kg/m<sup>3</sup> of macro-synthetic fibres.

**C. Refer to Daycare Addition Foundation Plan & Sections [S1.1] and amend the following:**

- Provide slab on grade repairs as needed at existing building opening to connect to the new addition. Near grid 2 between grid G1b and G1c. Refer to typical slab repair detail on S2.0.
- Refer to ramp slabs at West side of building near grid 1w and L2. Extend ramp to match architectural and civil locations.

- Refer to part height walls. Provide slab thickening with rebar. Provide 15M @400 reinforcing in part height walls. Refer to new detail 8/S1.1 on SK-S1 attached.
- Refer to all sections. Follow U/S of footings on plans not what is noted on sections.
- At slab on grade where WWF mesh reinforcing is noted, instead provide 1.8kg/m<sup>3</sup> of macro-synthetic fibres.

**D. Refer to Foundation Sections & Details [S2.0] and amend the following:**

- Refer to all sections. Follow U/S of footings on plans not what is noted on sections.
- Refer to elevator pit section 7.
  - o Increase dimension for pit depth to be -1650 from top of slab. Infill between elevator pit slab and footing with concrete.
- Refer to section 16/S2.0 on SK-S1 attached for flagpole base.
- Only provide fibre reinforcing in slabs on grade.
- 6mm poly bond break required at foundation wall and slab junctions, typical.

**E. Refer to Addition Second Floor Framing Plan [S3.0] and amend the following:**

- Beams along gridline 10a between G1 and J (4 beams) provide 10mm stiffener plates at 600 spacing along length of beams.
- Refer to column line near grid Ha between grid 9 and 10c. Field verify exact column locations in existing building.
  - o Shift column and beam line to be centred on gridline Ha
  - o Shift columns to align with existing building columns. GC to confirm exact locations of columns on site and coordinate with architect and structural engineer.
  - o Revise W530x74 beam between grid 9 and 9b to be a W410x85.
  - o Refer to revised partial plans and section 1/S4.1 on SK-S1 attached.
  - o Where ducts interfere with beam provide provision to reinforce beam and put ducts through the beam. Refer to Reinforced Opening in Steel Beam detail on SK-S1 attached.
  - o C4 columns will now extend up to third floor framing. Provide solid slabs to notch precast around columns as required.
- Refer to precast cantilevers along gridline 6a
  - o Eliminate precast cantilever between H and J as well as between K and L.
  - o Window protrusions are not at slab level. Instead provide hot rolled steel members to support bump outs. Refer to section 3/S4.5 on SK-S1 attached similar at both bump-out areas. Refer to arch for exact elevations/locations.
- Refer to wall along gridline 4b between L and P. Provide continuous beam lintel to suit ducts through the wall. Provide SL W200x31+225 Plate
- New block wall at stair B is to have 2-15M bond beam at landing levels.

- Entry vestibule frame. Provide additional column between double doors near gridline K1 and start of skylight frame. Provide Columns HSS 127x76x13.
- Acid Neutralizer tanks near grid G2 and 4c. Coordinate location with mechanical and provide openings in floor structure as required to suit tanks.

**F. Refer to Addition Third Floor Framing Plan [S3.1] and amend the following:**

- Brick shelf angle at 3<sup>rd</sup> floor is to be a continuous angle.
- W200x31 beam along gridline L between 4a and 4b and between 8 and 9. Provide flush beams. See typical flush beam details.
- Mechanical room 304 near grid 7 and L has AHU #3 (44kN, 9900 lbs). Slab to support unit and house keeping pad. Refer to mechanical for exact location
- Refer to block wall near grid Ha between grid 9 and 10c. Field verify exact column locations in existing building.
  - o Revise block wall to be beam and columns similar to plan below.
  - o Shift column and beam line to be centred on gridline Ha
  - o Shift columns to align with existing building columns. GC to confirm exact locations of columns on site and coordinate with architect and structural engineer.
  - o W410x85 at gridline 9
  - o W410x46 as next 3 beams.
  - o C4 (HSS203x203x9.5) to be continuous from footings to underside of third floor framing.
  - o Refer to revised partial plan and section 1/S4.1 on SK-S1 attached.
  - o Where ducts interfere with beam provide provision to reinforce beam and put ducts through the beam. Refer to Reinforced Opening in Steel Beam detail on SK-S1 attached.
  - o Provide block wall at grid H.
- Roof hatch opening in room 311. Provide support for ship ladder point load on new composite floor slab. 5kN DL and 15kN LL.
- Grid 4a between L and M provide continuous lintel for mechanical ducts. Provide W410x39 steel lintel with plate.
- Grid 8 between K and L provide continuous lintel for mechanical ducts. Provide W410x39 steel lintel with plate.

**G. Refer to Addition Roof Framing Plan [S3.2] and amend the following:**

- Revise AHU #2 name to RTU #2 and revise weight to 50kN (11250lbs)
- MAU #2 is near grid L and 9b. Provide framing under unit and opening.
- Roofs are sloping. Refer to architectural for slopes. Slope steel roof structure as required. Top of steel will vary to match slopes

- Joists top and bottom chord can be sloped. Refer to joist depths noted on drawings.
- Provide channel framing typical to undersides of units at penthouse louvre openings.
- Provide W200x31 +PL full width lintel at elevator.
- Mechanical units elsewhere on the existing buildings. Provide allowance for opening of ceiling to allow for structural consultant to measure and design structure reinforcing as needed. 5 additional units provide \$10k allowance per unit for a total of \$50k.
- Coordinate with mechanical for ducts through webs of joists.

**H. Refer to Daycare Roof Framing Plan [S3.3] and amend the following:**

- Daycare roof framing is designed for future second floor loads. Precast slabs to account for future 250 precast floor loads and 4.8 kPa live loads as well as current roof and SPU loads.
- Existing glazing between grid 1 and 2 on G1b is to be infilled. Provide block infill to suit existing. Lintel is to remain.
- New opening along gridline 1 near G for louvre is required. Provide SL W200x31 with PL for brick support.
- Provide openings for rain water leaders in W200x52 beams on canopy framing. Refer to mech/arch for locations and Reinforced Pipe Opening in Steel Beam detail on SK-S1 attached.

**I. Refer to Sections [S4.2] and amend the following:**

- Section 2, 3 and 4/S4.2
  - o Beams at underside of third floor framing into cafeteria has non load bearing block infill below. Eliminate angle lateral clips and provide 2-15M bars in bond beam in second course from the top of the wall instead.
- Section 3/S4.2
  - o Provide W200x31 steel lintel under third floor framing beam to support window bump out

**J. Refer to Sections [S4.3] and amend the following:**

- Vestibule frame
  - o Eliminate HSS 102 stub members.
  - o Revise slanted members at gable end to have one top member.

**K. Refer to Details [S5.0] and amend the following:**

- Typical brick shelf detail
  - o Revise brick shelf to 190x195x10 LLH Plate. Typical at other sections where brick shelf is referenced
  - o Alternate option of ferro fast bracket may be used
- Refer to typical elevator bond beam
  - o Can provide bond beam in masonry block instead of poured beam.

**L. Refer to all Section pages [S4.0-S4.5] and amend the following:**

- Wall reinforcement is not shown for clarity. Refer to masonry notes typical wall reinforcing applies.
- Footings are not shown accurately refer to foundation plans and sections for foundation information.
- Refer to plans for lintel sizes.
- Any cold form to be min 22 gauge provide engineered stamped cold form shop drawings.

**M. Miscellaneous amendments:**

- Provide engineered shop drawing for hoarding of temporary corridor. Designed to suit construction loading and pedestrian safety.
- Provide engineered shoring for brick removals to suit new through wall flashing details.
- Provide new house keeping pads in existing mechanical rooms. Refer to mechanical for exact locations.
- Refer to architectural for block wall infill extents and requirements. Match existing wall composition.

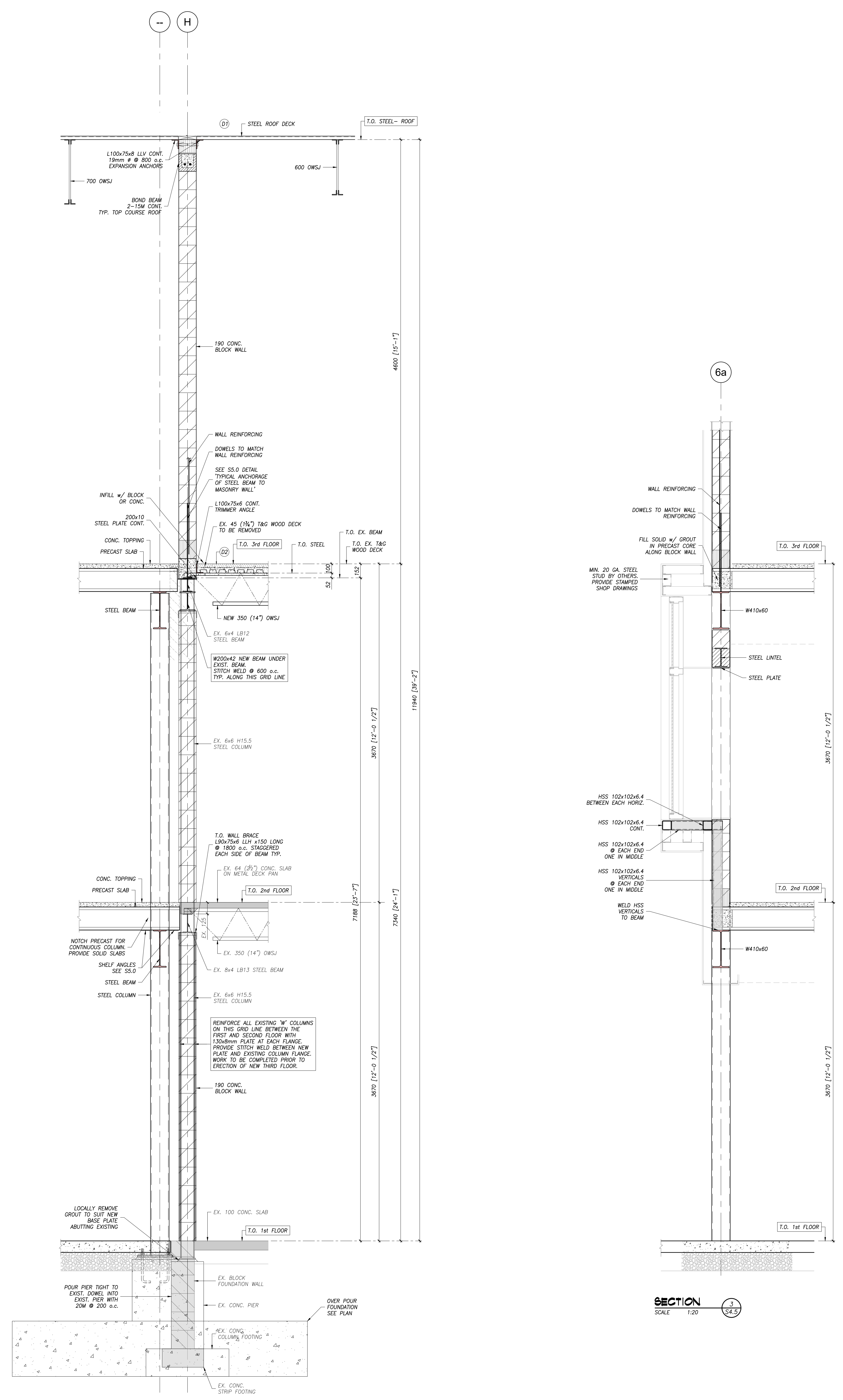
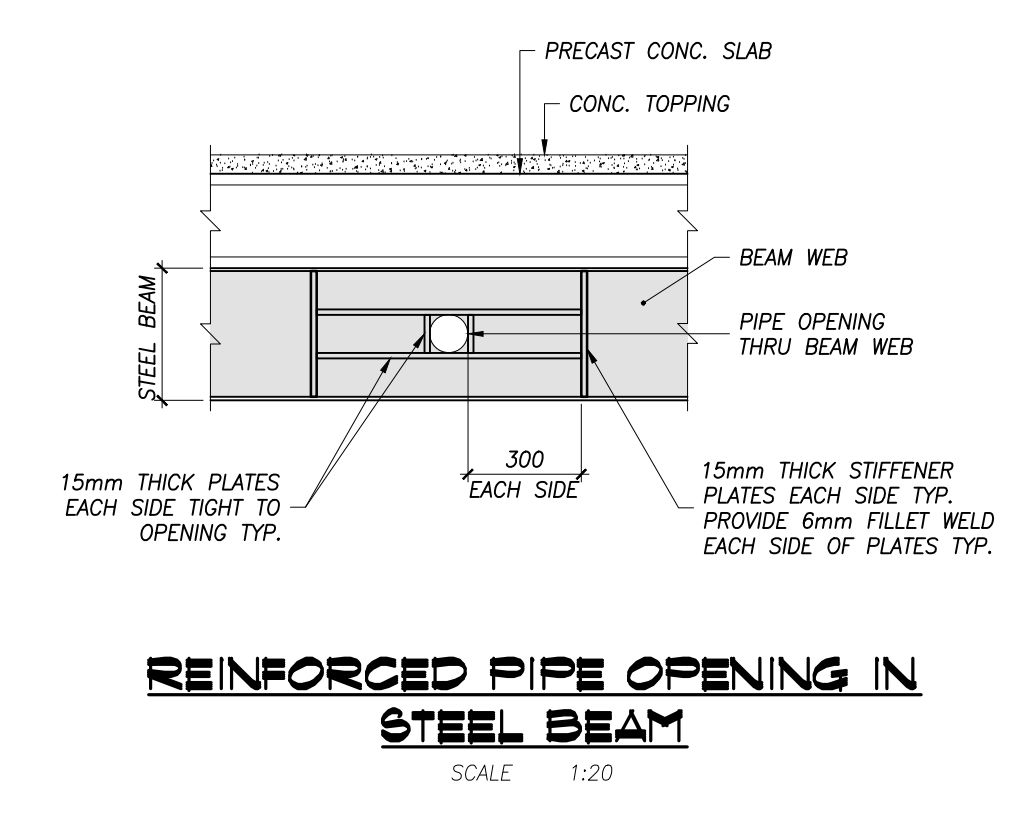
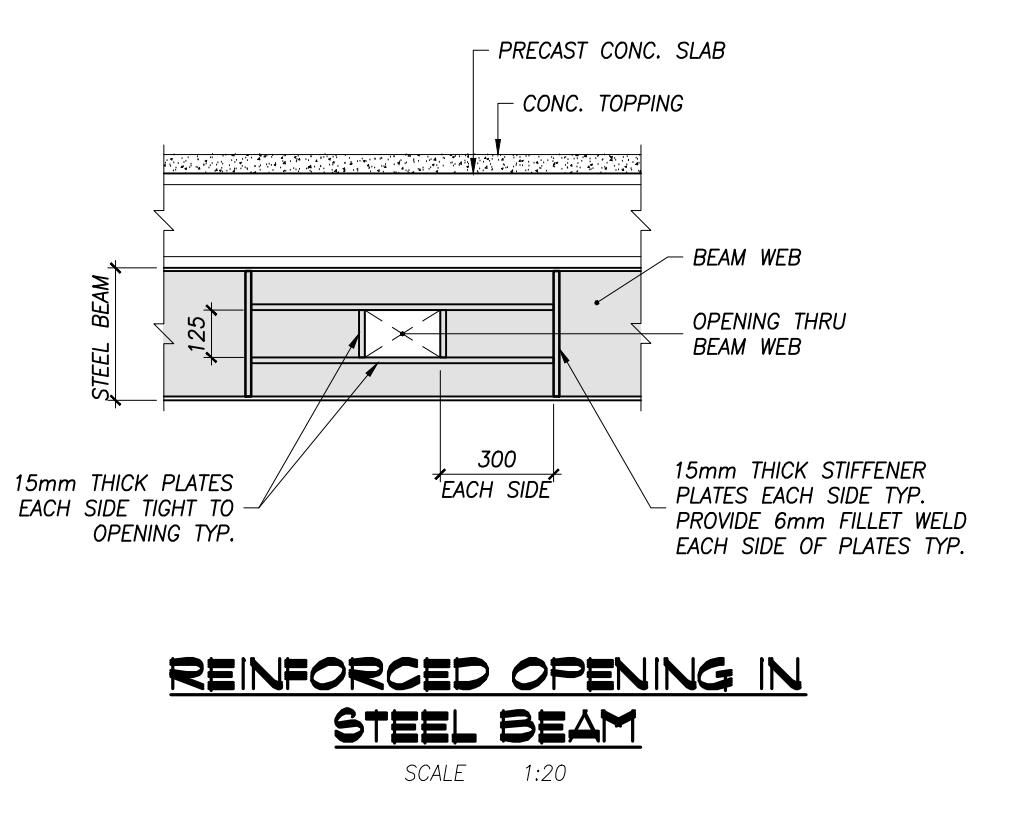
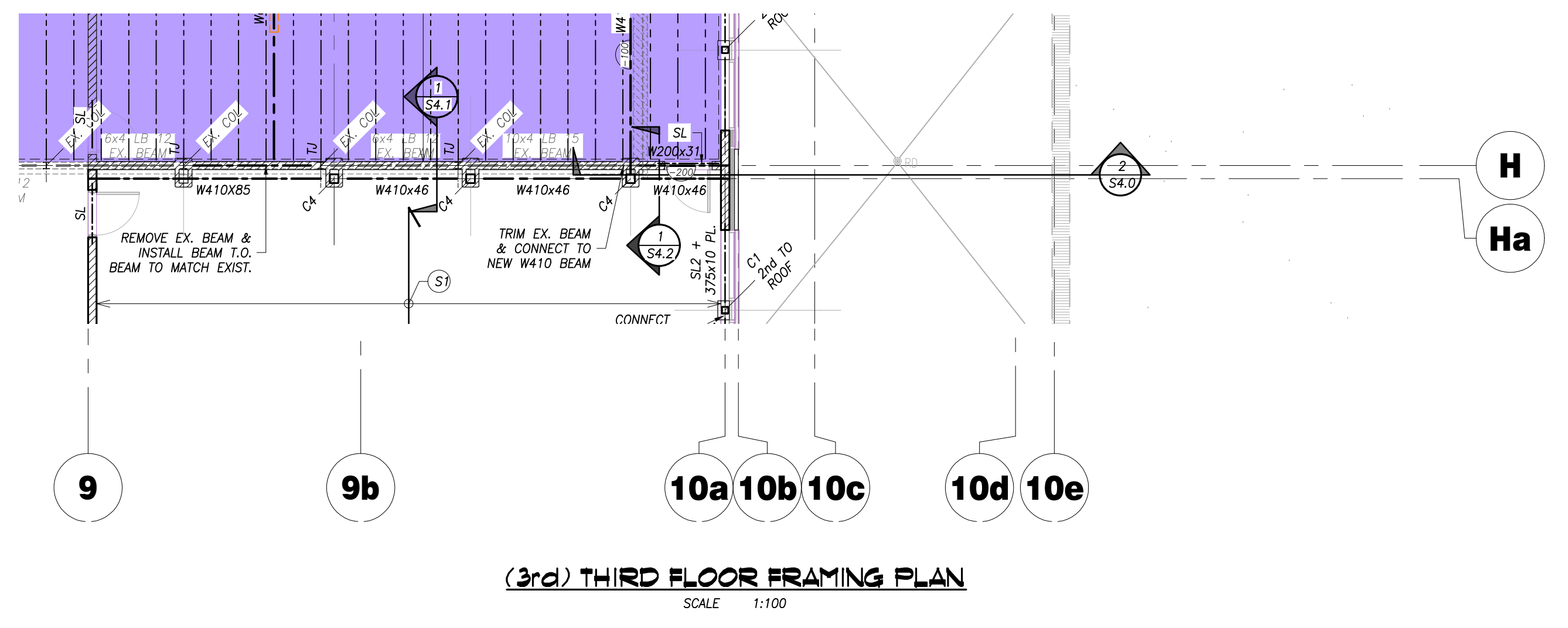
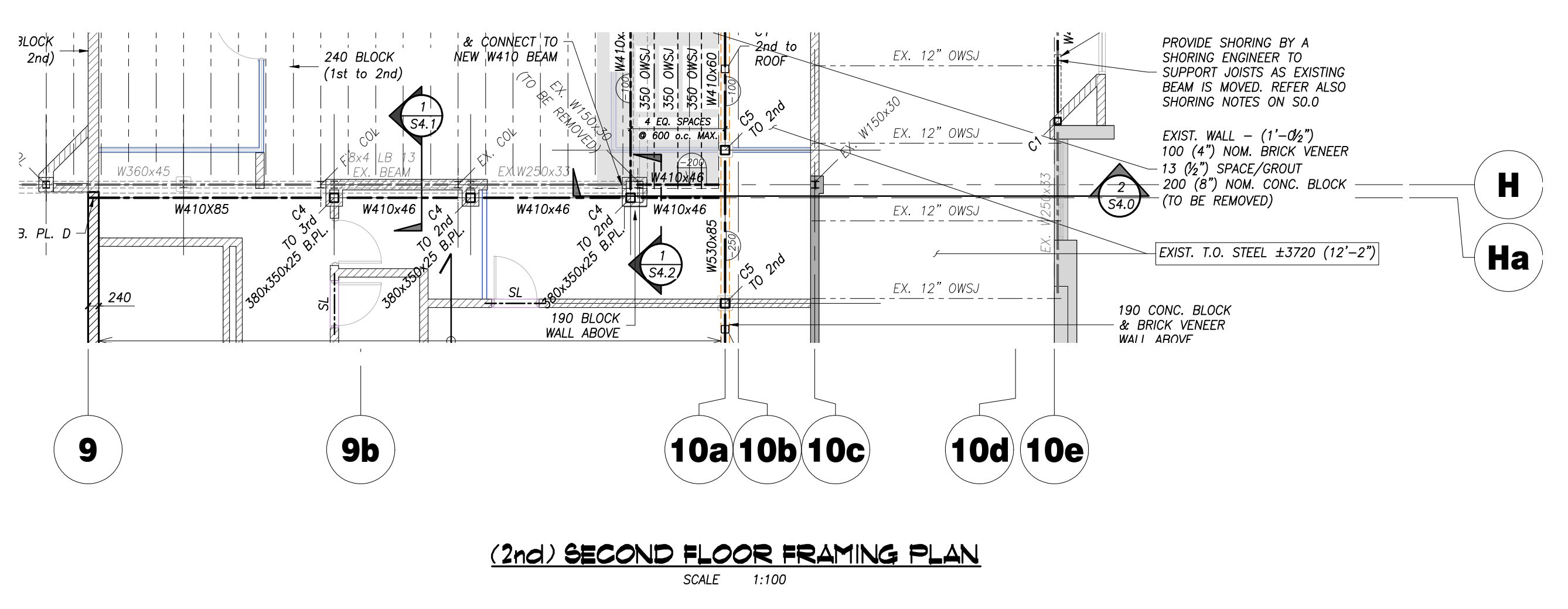
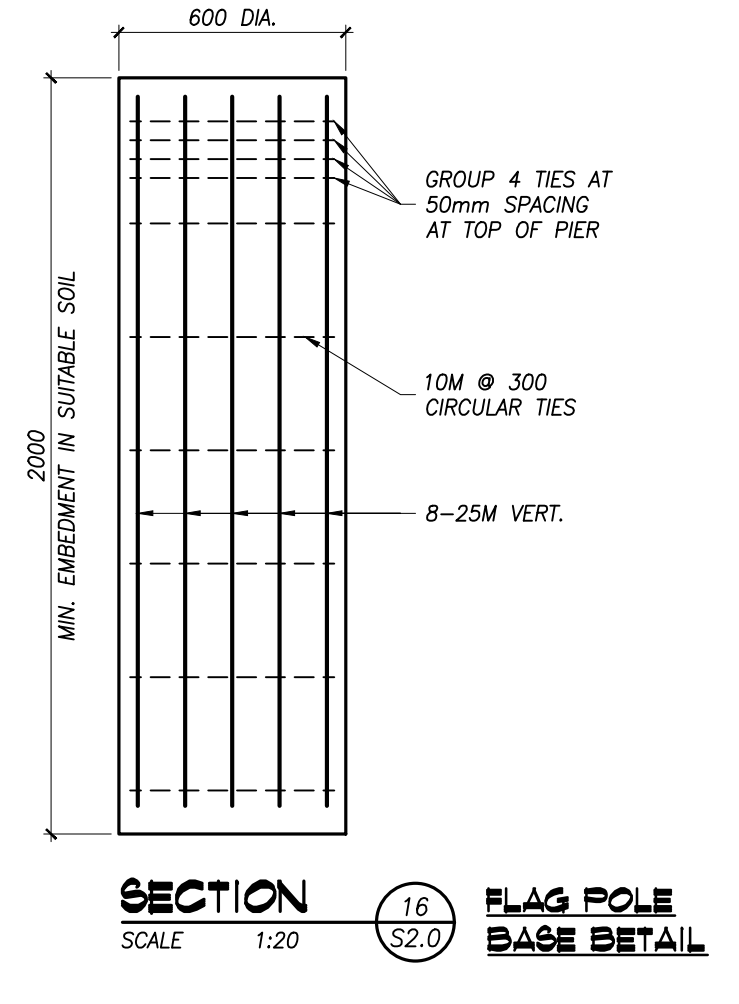
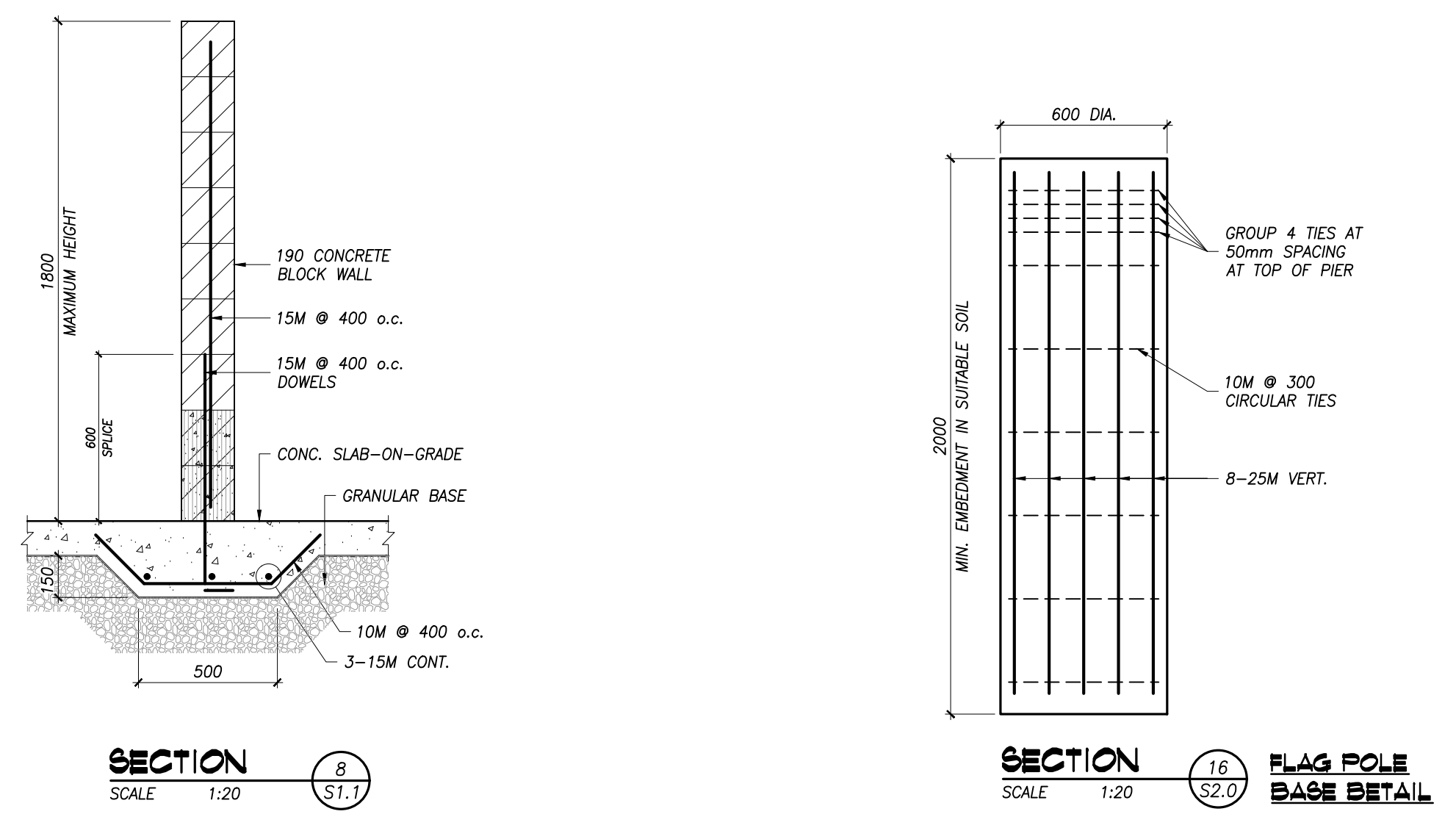
**2. ATTACHMENTS TO THIS DOCUMENT:**

- SK-S1

Sincerely,

Per: Harjot Dev, P.Eng.  
Kalos Engineering Inc.

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01	ISSUED FOR ADDENDUM 3	2026	05/08
No.	REVISIONS	DATE	BY
			MM/DD
PROJECT NORTH		TRUE NORTH	
AS NOTED			

Author	AL
Checked	WJ/JP
Print Date	2026/05/08 5:48 PM



client  
**HALTON DISTRICT SCHOOL BOARD**

2050 GUELPH LINE BURLINGTON ONTARIO

project  
**MILTON DISTRICT HIGH SCHOOL RENOVATION/ADDITION**

396 WILLIAMS AVE. MILTON ONTARIO

drawing title  
**ADDEMDUM DETAILS**

reference  
project no. 24-060 client reference number  
sheet no. **SK-51**

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*This addendum forms part of the Bid Documents and amends the original Drawings and Specifications. Ensure that all parties submitting bids are aware of all items included in this Addendum.*

**ADDENDUM #3**

**Mechanical:**

1. The following drawings attached to the Addendum supersede the drawings included in the tender documents and will form part of this Tender Package.

M-101, M-102, M-202, M-203, M-204, M-205, M-206, M-207, M-208, M-209, M-210,  
M-211, M-212, M-216, M-217, M-218, M-305, M-306, M-307, M-308, M-309, M-401,  
M-403, M-404, M-405, M-406, M-701, M-702, M-801, M-802, M-803, M-804

2. The attached Specification Section 23 25 13 Water Treatment for Closed Loop Hydronic forms part of the Tender Documents

**Electrical:**

1. The following revised drawings supersede the previous version submitted with the tender documents and will be part of the final tender documents.

E-100, E-102, E-300, E-301, E-302, E-303, E-400, E-402, E-403, E-502, E-503, E-600, E-701  
E-800

2. The attached Section 27 05 28 Cabling and Raceway for Communication Systems forms part of the Tender Documents.

**END OF ADDENDUM #X**

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**PART 1 - GENERAL**

**1.1. RELATED DOCUMENTS**

- 1.1.1.1. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, and other applicable Specification Sections.

**1.2. SUMMARY**

- 1.2.1. Products specified in this section include the following:

- 1.2.1.1. Chemical Inhibitors for Water and Glycol
- 1.2.1.2. Chemicals for Inhibitors and cleaning
- 1.2.1.3. Pot Feeder and Accessories
- 1.2.1.4. Filtration cartridge housing
- 1.2.1.5. Piping, fittings and Accessories
- 1.2.1.6. Glycol Feed System (where applicable to the project)

- 1.2.2. Provide a Chemical Services Provider (CSP) to perform the services described below.

- 1.2.3. Provide water treatment products and services including:

- 1.2.3.1. Chemicals for cleaning, passivation, and treatment of each system.
- 1.2.3.2. On-going treatment, chemicals, testing, certification, and reports to demonstrate effective water treatment is maintained at all times.
- 1.2.3.3. Start-up and operation of chemical treatment equipment.

- 1.2.4. Provide a complete chemical water treatment program during construction for all new and reused piping networks. This program shall begin from the point each system is filled during construction and extend until Substantial Completion or final Client acceptance of each system, whichever occurs later. The program shall include water analysis chemicals, testing equipment, consulting and service for the following systems:

- 1.2.4.1. Heating Hot Water System
- 1.2.4.2. Chilled Water System
- 1.2.4.3. Dual Temperature Water System
- 1.2.4.4. Glycol System
- 1.2.4.5. All other closed loop systems

- 1.2.5. Attend project meetings as required to plan, schedule and coordinate above activities with other project contractors and the Client.

- 1.2.6. Provide recommended testing procedures and chemical treatment schedule for Client's personnel. This information shall be submitted to the Client in a Program Administration Manual.
-

### 1.3. SUBMITTALS

#### 1.3.1. Product Data:

1.3.1.1. Include rated capacities; water-pressure drops; shipping, installed, and operating weights; and complete data on furnished products listed below:

- 1.3.1.1.1. Pot Feeders
- 1.3.1.1.2. Filtration cartridges and housing
- 1.3.1.1.3. Glycol Feed System
- 1.3.1.1.4. Flow Indicators
- 1.3.1.1.5. Valves
- 1.3.1.1.6. Product specifications and MSDS's for each chemical used
- 1.3.1.1.7. Cleaning Procedures
- 1.3.1.1.8. Passivation Procedures
- 1.3.1.1.9. Chemical Treatment Procedures

#### 1.3.2. Shop Drawings

- 1.3.2.1. Shop Drawings to include detailed equipment assemblies indicating dimensions, weights, loads, required clearances, method of field assembly, components, and the location and size of each field connection as necessary to assist the mechanical contractor with proper system installations
- 1.3.2.2. Service Reports as indicated under Part 2 below.

### 1.4. QUALITY ASSURANCE

- 1.4.1. Manufacturers and Products: The products and manufacturers specified in this Section establish the standard of quality for the Work.
  - 1.4.2. Subject to compliance with all requirements, provide specified products from the manufacturers indicated in the Standard of Acceptance
  - 1.4.3. Products in this section shall be built, tested, and installed in compliance with the specified quality assurance standards; latest editions, unless noted otherwise.
  - 1.4.4. American Society for Testing and Materials (ASTM)
    - 1.4.4.1. D859 – Test Method for Silica in Water
    - 1.4.4.2. D1067 – Test Methods for Acidity/Alkalinity in Water
    - 1.4.4.3. D1068 – Test Methods for Iron in Water
    - 1.4.4.4. D1126 – Test Method for Hardness in Water
    - 1.4.4.5. D3370 – Practices for Sampling Water from Closed Conduits
    - 1.4.4.6. D4012 - Test Method for Adenosine Triphosphate (ATP)
    - 1.4.4.7. Content of Microorganisms in Water
-

- 1.4.4.8. D5465 - Practice for Determining Microbial Colony Counts from Waters Analyzed by Plating Methods
  - 1.4.5. Conform to all applicable Codes, Regulations, and Municipal requirements for the use and disposal of chemicals (including cleaning compounds) and waste to public sewer systems.
  - 1.4.6. Wastewater shall be discharged to the sanitary sewer only if it has a pH between 5.0 and 10.0 and meets the requirements of the locality where the work takes place. Glycols (of any type) shall not be discharged to the sanitary sewer.
  - 1.4.7. Wastewater containing any chemical or sediment is prohibited from discharge to the storm water system. No chemical shall contain Chromates or Inorganic Phosphates.
- 1.5. DELIVERY, STORAGE, AND HANDLING**
- 1.5.1. Package for delivery to best protect finished surfaces while using the least amount of single-use packaging as possible. Deliver equipment and components adequately packaged for lifting, skidding, or rolling into final position, according to manufacturer's instructions. If possible, package and ship products using reusable blankets and fabrics, or reusable cardboard and crate systems.
  - 1.5.2. Store materials and equipment raised off the floor on pallets and protected with coverings to prevent damage due to weather and construction activities. Store in areas that prevent damage due to freezing and extreme temperatures or sunlight. Arrange coverings to provide air circulation to avoid damage from condensation or chemical build-up. Protect from damage, dirt and debris at all times.
  - 1.5.3. Store chemicals in curb protected area. Such secondary containment areas must have the capacity to hold the volume of the largest container or 10% of the combined containers, whichever larger. If room has no floor drains, then the room itself may be considered sufficient secondary containment. If the room is considered the secondary containment ensure there is a lip at the door so no liquids can exit the room in the event of a leak. Verify field conditions before storing any chemicals
  - 1.5.4. Provide temporary containment areas when permanent containment areas do not exist. Remove temporary containment at the end of construction.
- 1.6. WARRANTY**
- 1.6.1. Provide a complete warranty for parts and labor for a minimum of one year from the date of Substantial Completion. This warranty does not include ongoing chemical treatment or monitoring.
- 1.7. STANDARDS OF ACCEPTANCE - CHEMICAL SERVICE PROVIDERS (CSPS)**
-

1.7.1. Rochester Midland Corporation ([nstavropoulos@rochestermidland.com](mailto:nstavropoulos@rochestermidland.com)) Phone:  
905.619.6738)

1.7.1.1. No alternatives will be accepted

## 1.8. STANDARDS OF ACCEPTANCE - CHEMICAL TREATMENT HARDWARE

1.8.1. Neptune

1.8.2. Axiom

1.8.3. Griswald

## PART 2 - PRODUCTS

### 2.1. CHEMICAL TREATMENT EQUIPMENT

#### 2.1.1. Piping

2.1.1.1. Chemical feed piping, schedule 80 black steel, crosses at all changes in direction with unconnected ports plugged.

#### 2.1.2. Chemical By-Pass Feeder - Domed Bottom

2.1.2.1. The feeder shall be constructed of min 10 ga carbon steel with interior and exterior epoxy coating.

2.1.2.2. Capacity 17.5 liter (5 gallon) for heating systems smaller than 5,000 gallon water content, 45 liter (12 gallon) for heating systems larger than 5,000 gallon water content.

2.1.2.3. The feeder will be rated for a minimum of 350 psig at 250 degrees F.

2.1.2.4. Tank shall be provided with a wide mouth of not less than 100 mm (4") inside diameter so that chemicals can be introduced without the need of a funnel.

2.1.2.5. Four ¾" access ports for flow, vent, and drain.

2.1.2.6. The enclosure shall be a grooved end cap. The retaining bolts are removable by a small adjustable wrench. Rotating cap closures or closures requiring special wrenches shall not be considered equal.

2.1.2.7. The feeder will include heavy legs, minimum 3/16" thick, welded to the sides of the vessel, with holes in the feet to allow floor mounting with anchor bolts.

#### 2.1.2.8. Options

2.1.2.8.1. Stainless steel basket with 1/8" perforations to hold solid chemicals

2.1.2.8.2. Isolation valve kit includes two ¾" ball valves with integral ¼" drain/vent valves and an integral vent valve to bleed off air or release pressure.

2.1.2.8.3. 250 mm x 250 mm (10"x10" funnel package c/w ball valve

2.1.2.9. Standard of Acceptance: Neptune, Griswald

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2.1.3. Filtration Cartridges and Housing

- 2.1.3.1. Side stream type, complete with necessary shut off valves, drain and air release valves, and system connections. Include one borosilicate sight glass window downstream of the filter to provide flow visibility.
- 2.1.3.2. All 304 stainless steel filter housing with a mounting bracket, including brass head and two EPDM O rings, brass drain valve with barb fitting and cap
- 2.1.3.3. The housing is rated for a max pressure of 300 psi and a water temperature of 93 deg C. Size capacity at 5% of total system flow.
- 2.1.3.4. It also features a corrosion resistant brass sight flow indicator that indicates water flow through the hydronic water filter. Sight flow indicator shall include EPDM O-rings, two tempered borosilicate glass windows, 304SS cage, TPX ball, and cork washers (non-wetted part).
- 2.1.3.5. The hydronic heating water filter also features 3/4" female NPT ports and brass inlet and outlet ball valves.
- 2.1.3.6. Manual balancing valve shall be of brass construction and shall include an integral air vent, memory stop, shall be able to provide flow metering, flow balancing, and filter cartridge isolation. Three brass nipples shall each be 3" in length.
- 2.1.3.7. Filter cartridge shall be a cotton wound filter cartridge with tin core (5 micron).
- 2.1.3.8. Standard of Acceptance; Neptune, Griswald, Axiom, RainFresh

2.1.4. Pulse Water Meter

- 2.1.4.1. Multi-jet principle, suitable for cold or hot water models. Wetted materials: brass; couplings: brass.
- 2.1.4.2. The impeller is centered in a ring of jets, with inlet jets on one level and outlet jets on another. A gear train drives the register totalizer dials. For pulse output, one of the pointers is replaced by a magnet, which is detected by an encapsulated sensor attached to the outside of the lens. Pulse rate is determined by the dial on which the magnet is placed, and by the number of sensors (single or double).
- 2.1.4.3. Changing the pulse rate requires no special tools and can be done in the field.
- 2.1.4.4. Accuracy: +/-2% of nominal flow
- 2.1.4.5. Electrical rating: 0.01A @ 24VAC/DC
- 2.1.4.6. Select meter size to suit anticipated flow. 20 mm (3/4") for 20 gpm or less, 25 mm (1") for flows up to 50 gpm.
- 2.1.4.7. Standard of Acceptance: Neptune, Dwyer

2.1.5. Automatic Glycol Fill Tank

- 2.1.5.1. Applications: HVAC systems using bladder and compression tanks up to 90 psi (621 kPa) cold-fill pressure
  - 2.1.5.2. Role: providing glycol make-up automatically upon a drop in system pressure
-

- 2.1.5.3. Description: The Glycol Auto-Fill Units provides automatic glycol make-up for HVAC systems. The specially molded mixing tank offers a compact package with built-in housing for controls and make-up pump
  - 2.1.5.4. Materials: Polypropylene (holding tank), bronze (pump, isolation and check valves), stainless steel/brass (fill ball valves)
  - 2.1.5.5. Performance range
    - 2.1.5.5.1. Suitable for all bladder and compression tanks up to 90 psi (621 kPa) cold-fill pressure
    - 2.1.5.5.2. Higher cold-fill pressures available
    - 2.1.5.5.3. Temperature: Max fluid temp 140°F (60°C); max ambient temp 104°F (40°C)
  - 2.1.5.6. The unit shall monitor and maintain the minimum system pressure at all times.
  - 2.1.5.7. Low mixture cut-out level switches shall monitor the status of the mixing tank
  - 2.1.5.8. Level switches shall be 24 volt maximum to ensure intrinsic electrical safety
  - 2.1.5.9. Fill pressure: 45 psi (300 kPa)
  - 2.1.5.10. Standard of Acceptance: Armstrong GLA series.
- 2.1.6. Glycol Fluid
- 2.1.6.1. Fluid: 40% food-grade polypropylene glycol, pre-mixed.
  - 2.1.6.2. Standard of Acceptance: DOW PuraGuard™ Propylene Glycol USP/EP, with a suitable inhibitor package
  - 2.1.6.3. Unless noted otherwise by the consultant or noted otherwise on the drawings, carry the cost to supply 500 gallons (1,750 liters) of pre-mixed polypropylene fluid.

## 2.2. CLEANING COMPOUNDS

- 2.2.1. Alkaline phosphate or non-phosphate detergent/surfactant/specific to remove organic soil, hydrocarbons, flux, pipe mill varnish, pipe compounds, iron oxide, and like deleterious substances, with or without inhibitor, suitable for system wetted metals without deleterious effects.
  - 2.2.2. All chemicals to be acceptable for discharge to sanitary sewer. Provide chemicals that comply with provincial regulations.
  - 2.2.3. Chemical inhibitor shall be polymer based and contain azole in an amount appropriate for the percentage of internal copper surface area of the system piping. Provide products with PTSA (p-Toluenesulfonic acid) florescent tracer dyes. Molybdenum shall not be used as a tracer. Optionally, for hot water heating systems only, nitrite/azole based inhibitors may be used. Inhibitor will not cause or enhance bacteria/corrosion problems or mechanical seal failure due to excessive total dissolved solids. Shot feed manually. Maintain inhibitor residual as determined by water treatment laboratory, taking into consideration residual and temperature effect on pump mechanical seals.
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- 2.2.4. PH Control: Inhibitor formulation shall include adequate buffer to maintain pH in the range recommended by the boiler manufacturer.
- 2.2.5. No chemicals shall contain chromates or inorganic phosphates.
- 2.2.6. Utilize non-oxidizing biocides in the event sterilization is required.
- 2.2.7. Adjust chemical concentrations as required to achieve the required performance.

### **2.3. PERFORMANCE REQUIREMENTS**

- 2.3.1. Cleaning activities shall remove oil, grease, silt, and rust from system. Cleaned metal surfaces shall be well passivated.
- 2.3.2. The water treatment programs proposed by the CSP shall maintain corrosion rates below 0.5 mils per year for mild steel and 0.1 mils per year for copper and/or brass, with no pitting allowed.
- 2.3.3. Suspended solids: Nil. Total Iron Concentration: 0.5 mg/L Fe maximum. Total Copper Concentration: 0.2 mg/L Cu maximum.
- 2.3.4. Heat exchanger fouling and capacity reduction shall not exceed that allowed by fouling factor 0.0005
- 2.3.5. These rates shall be verified with corrosion coupons provided by the CSP Coupons shall be analyzed in the CSP's analytical laboratory every three months, more often if required, to assure these levels are not exceeded.
- 2.3.6. Microbiological growth levels shall be maintained below 10,000 cfu's aerobic bacteria and 10 cfu's anaerobic bacteria. The CSP shall perform detailed microbiological culturing at the CSP's company's analytical laboratory monthly, more often if required, to assure these levels are not exceeded
- 2.3.7. Inhibitor shall be stable at equipment skin surface temperatures and bulk water temperatures of not less than 121 degrees C (250 degrees F) and 52 degrees C (125 degrees Fahrenheit) respectively.

### **2.4. FLUSHING OF NEW AND REUSED PIPING**

- 2.4.1. Flush and clean all new and reused piping.
  - 2.4.2. Before adding cleaning chemicals to the closed system and subsequent flushing, all air handling coils and fan coil units should be isolated by closing the inlet and outlet valves and opening the bypass valves. This is done to prevent dirt and solids from lodging the coils.
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- 2.4.3. System is operated with a minimum pressure of 35 kPa at highest point and expansion tank level is maintained at 1/3 to ½ full.
- 2.4.4. Do not valve in or operate system pumps until after system has been cleaned.
- 2.4.5. Provide a copy of recommended cleaning procedures and chemicals for review by Consultant.
- 2.4.6. Prior to chemical cleaning, the systems shall be inspected to ensure removal of heavy debris and excessive dirt and oil. Temporary strainers shall be installed on the suction side of each pump.
- 2.4.7. Provisions shall be made for temporary connections between the supply and return mains in the system to permit circulation of the cleaner. A 1" pipe connection shall be provided on the suction side of the circulating pumps for introduction of the cleaning solution.
- 2.4.8. Each system shall be flushed to remove loose dirt and shall be hydrostatically tested to ensure that there are no leaks. Rotation of pumps shall be checked.
- 2.4.9. The contractor shall introduce a neutral pH cleaner and rust remover into each system at a dosage recommended by the water treatment supplier. The cleaner shall not attack carbon steel, copper, stainless steel, bronze, brass, aluminum, plastics or natural and synthetic rubbers. "Flash rusting" shall not occur after cleaning.
- 2.4.10. The cleaner shall be circulated at a temperature of 20°C to 80°C for a period of not less than 72 hours. PH adjustment shall be carried out by the water treatment supplier's representative.
- 2.4.11. Each system shall be drained, refilled with fresh water, recirculated for a period of 12 hours, drained a second time, and immediately refilled and treated with the recommended corrosion inhibitor.
- 2.4.12. The water treatment company shall provide the loan of a drum pump and dolly to facilitate the introduction of the cleaner into the system.
- 2.4.13. After chemical cleaning is satisfactorily completed, open the inlet and outlet valves to each coil and close the by-pass valves. Also, clean all strainers.
- 2.4.14. Provide and later remove all temporary bypasses, drains, vents, etc. required to flush and clean the system. Temporary components for flushing and cleaning are not indicated on the drawings.

**2.5. TREATMENT PROGRAM – CHEMICAL TREATMENT AND PASSIVATION**

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- 2.5.1. Provide passivation and chemical treatment per the approved chemical treatment procedures. Chemically treat new and reused piping networks using chemicals and treatment procedures compatible with the system being cleaned and the chemical treatment chemicals in existing piping systems being connected to. Test existing piping systems or otherwise determine chemical treatment in existing piping and validate compatibility. Note that existing systems may be silica based, adjust water treatment program accordingly.
- 2.5.2. When connecting into active existing systems, treat piping networks installed or reused by the project and verify by lab analysis that the treatment levels per the treatment plan have been attained prior to connecting into the existing active system. Submit validating report for approval.
- 2.5.3. Do not connect into existing active system until report is approved by Client.
- 2.5.4. Provide temporary valves, piping, and accessories as required to treat the project's piping prior to connection to the active system.
- 2.5.5. Provide passivation/chemical treatment at system startup or immediately upon operation of a system for temporary cooling and heating, whichever comes first.
- 2.5.6. Provide chemical treatment immediately after each system has been cleaned and flushed. Thereafter immediately begin the approved water treatment maintenance program to passivate and prevent corrosion, scale, and organic growth and to maintain treatment chemical levels. Note that systems or parts of systems will not typically be started at the same time; adjust treatment strategy accordingly.

### **PART 3 - EXECUTION**

#### **3.1. CHEMICAL SERVICE PROVIDER (CSP) SERVICES**

- 3.1.1. The CSP shall provide all cleaning and treatment chemicals, basic services, testing, equipment and materials necessary for a complete water treatment program.
  - 3.1.2. The CSP shall perform an analysis of the supply water to determine the type and quantities of chemical treatment needed to maintain the required water quality to prevent corrosion, scaling, and biological growth. The CSP will at minimum provide weekly site visits to verify proper water treatment for the first month after any system or part of a system is treated. Provide monthly visits thereafter, or more often if required to assure performance requirements are being met, to analyze water samples, inspect equipment, and add additional chemicals as required to maintain proper water treatment, until final written Client acceptance of the respective system.
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- 3.1.3. At each site visit CSP shall analyze each system for corrosion inhibitors, pH, total iron, total copper, bacteria levels (provide monthly analytical laboratory analysis), and conductivity; inspect loss from corrosion (provide analytical laboratory analysis every three months), record make-up meter readings, and perform any other tests necessary to validate that corrosion, scale, and organic growth is being prevented.
- 3.1.4. Reports:
- 3.1.4.1. Submit a written startup test report for each system placed into service. A service report shall be prepared on site by the CSP, submitted at the time of each service visit (with copies immediately provided to the Client), which shall include all required test results and recommendations.
  - 3.1.4.2. Additionally, provide final reports for approval to the Client regarding each site service visit, certified by a representative of the CSP, within one week of any water treatment activity. Such reports shall include the results of any field or lab tests. Reports shall clearly state if the required water quality and maximum corrosion rates are being achieved.
  - 3.1.4.3. At a minimum, each report shall include the following information:
    - 3.1.4.3.1. System Treated
    - 3.1.4.3.2. Date
    - 3.1.4.3.3. Conductivity
    - 3.1.4.3.4. pH
    - 3.1.4.3.5. Total Iron
    - 3.1.4.3.6. Total Copper
    - 3.1.4.3.7. Bacteria(cfu) (monthly analytical laboratory analysis)
    - 3.1.4.3.8. Corrosion Rates (three month analytical laboratory analysis)
    - 3.1.4.3.9. Make-up Water Quantity since Last Visit
    - 3.1.4.3.10. Corrosion Inhibitor level (ppm)
    - 3.1.4.3.11. Silica level (ppm)
- 3.1.5. Conduct final on-site system turn over meeting with Client and Consultant or Commissioning Agent (as applicable to the project). Present final validation report demonstrating that performance requirements have been achieved and that each system is currently properly treated.
- 3.1.6. Train Owner's maintenance personnel in water treatment procedures.
- 3.1.7. Program Administration Manual:
- 3.1.7.1. The CSP shall provide the Owner with two (2) Program Administration Manuals including sections covering program control, testing requirements, in plant logs, safety data and system information. Each section shall include the following:
-

- 3.1.7.1.1. *Program Control*: Include a complete program outline with chemical descriptions, control ranges, and required action for “out of range” situations. Also include complete ordering instructions with applicable account numbers and phone numbers.
- 3.1.7.1.2. *Testing Requirements*: This section will include basic testing practices as well as detailed test instructions for each test to be performed.
- 3.1.7.1.3. *In-Plant Logs*: Include detailed testing log sheets for each system to be tested including room to record one (1) month’s data on one (1) sheet and a section to log chemical inventory.
- 3.1.7.1.4. *Safety Data*: Include the CSP’s 24-hour toll free safety hotline number as well as MSDS sheets for each chemical used.
- 3.1.7.1.5. *System Information*: Include any equipment manuals and related information.

### 3.2. INSTALLATION AND TREATMENT

- 3.2.1. Install all required components, and chemically passivate/treat and maintain the system as described in Part 2.
- 3.2.2. Use and dispose of chemicals and wastewater (including from existing piping networks) per the Quality Assurance section of this specification. All costs of disposal shall be borne by the contractor.
- 3.2.3. Provide and install all chemicals and all incidental components.
- 3.2.4. Install equipment at locations shown on the Drawings. Follow the manufacturer’s installation and startup instructions.
- 3.2.5. Passivate and chemically treat each system immediately after it has been cleaned and flushed.
- 3.2.6. Install pot feeders and filtration cartridges with openings no higher than 1,200 mm (4 ft) above finished floor. Pipe pot feeder drain to nearest floor drain (where glycol is not present).
- 3.2.7. The treatment program shall begin at system start-up or immediately upon first operation of the system by the contractor for temporary heating and cooling, whichever comes first. Continue the program until Substantial Completion.

### 3.3. INSTALLATION OF PREMIXED INHIBITED GLYCOL SYSTEM

- 3.3.1. Following system flushing and cleaning, drain the entire piping system. Add premixed glycol/inhibitor solution into the system. Circulate system fluid, adding additional premixed glycol/inhibitor as required until all air is purged from the system.
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- 3.3.2. Sample fluid, measure concentration of glycol and inhibitor. Drain system fluid as required and add additional pre-mixed solution to achieve the design concentration of glycol and the manufacturer's recommended concentration of inhibitor. Submit report of activities, including volumes of all fluids used.

#### **3.4. INSTALLATION OF GLYCOL FEED SYSTEM**

- 3.4.1. Level and bolt Glycol Feed System to the floor within the containment area. Support all piping and conduits independent of the Glycol Feed Unit.
- 3.4.2. Make all connections to power supply and BAS.
- 3.4.3. Ensure that the discharge of all PRVs, vents and reliefs from systems containing glycol are returned to the glycol feed tank and not drained to the sanitary system.
- 3.4.4. Start-up and adjustments: by the equipment manufacturer.

#### **3.5. GLYCOL TREATMENT CONTROL LIMITS**

- 3.5.1. Maintain control limits specified in following schedule:
  - 3.5.1.1. Propylene Glycol concentration, % vol: 40 ±2
  - 3.5.1.2. pH at 25°C: 8.5 minimum
  - 3.5.1.3. reserve alkalinity based on 100% glycol: 9.0 minimum
  - 3.5.1.4. Provide basic water test equipment complete with reagents for chemicals supplied and specific test for determination of pH and treatment residual. Include required specialized or supplementary equipment.

#### **3.6. FIELD QUALITY CONTROL**

- 3.6.1. The CSP shall:
    - 3.6.1.1. Verify that systems and equipment have been properly cleaned, flushed, and filled with water, and are fully operational before introducing operational chemicals for water-treatment systems.
    - 3.6.1.2. Introduce and maintain chemical treatment to achieve the specified performance requirements.
    - 3.6.1.3. Submit a written startup test report for each system placed into service.
    - 3.6.1.4. Provide validation testing and required reports.
    - 3.6.1.5. Attend final on-site system turn over meeting with Client and Consultant or Commissioning agent (as applicable to the project). Present final validation report demonstrating that performance requirements have been achieved and that each system is currently properly treated.
-



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## **PART 1 - GENERAL**

### **1.1. SUMMARY**

1.1.1. This Section includes requirements for communications rough-in infrastructure and cabling pathways, including:

- 1.1.1.1. Cable tray for communications cabling.
- 1.1.1.2. Conduit, raceway, sleeves, and pathway systems between communications outlets/back boxes and the nearest accessible cable tray.
- 1.1.1.3. Outlet boxes, back boxes, mud rings, device rings, pull boxes, junction boxes, blank plates, and related rough-in accessories.
- 1.1.1.4. Rough-in for data, IT, PA, speaker, call switch, clock, display, or other low-voltage communications devices shown on the Drawings.
- 1.1.1.5. Coordination with IT contractor, PA contractor, communications contractor, electrical contractor, architectural ceiling layouts, millwork, furniture, and other trades.
- 1.1.1.6. CAT5e cabling installation from each outlet/device location to the applicable telecommunications room, cabinet, rack, patch panel, or PA/IT head-end location.
- 1.1.1.7. Labelling, testing, and as-built documentation for installed CAT5e cabling.

1.1.2. This Section is intended to define the rough-in and cabling requirements only. Active IT equipment, PA head-end equipment, programming, software configuration, servers, switches, amplifiers, and final system commissioning by the PA/IT vendor are excluded unless specifically noted otherwise.

### **1.2. RELATED SECTIONS**

1.2.1. Division 26 – Electrical raceways, boxes, grounding, bonding, firestopping, and general electrical requirements.

### **1.3. REFERENCES**

1.3.1. Comply with the latest applicable editions of the following:

- 1.3.1.1. Ontario Electrical Safety Code / CSA C22.1.
  - 1.3.1.2. CSA C22.2 No. 214 – Communications Cables.
  - 1.3.1.3. ANSI/TIA-568 – Telecommunications Cabling Standard.
  - 1.3.1.4. ANSI/TIA-569 – Telecommunications Pathways and Spaces.
  - 1.3.1.5. ANSI/TIA-606 – Administration Standard for Telecommunications Infrastructure.
  - 1.3.1.6. ANSI/TIA-607 – Telecommunications Grounding and Bonding.
  - 1.3.1.7. CAN/ULC-S115 – Firestop Systems.
  - 1.3.1.8. Manufacturer's written installation instructions.
-

- 1.3.2. Where there is a conflict between standards, codes, drawings, specifications, manufacturer instructions, or PA/IT vendor requirements, the most stringent requirement shall apply.

#### 1.4. DEFINITIONS

- 1.4.1. A. "Rough-in" includes all boxes, conduits, raceways, sleeves, pull strings, cable tray, supports, fittings, cover plates, bushings, firestopping, and accessories required to allow complete installation of the CAT5e cabling and final devices.
- 1.4.2. B. "Outlet" means any data, PA, speaker, clock, call switch, wall station, wireless access point, display, or similar low-voltage communications device location shown on the Drawings or required by the PA/IT contractor.
- 1.4.3. C. "PA Contractor" means the contractor/vendor responsible for PA system devices, equipment, programming, termination requirements, and device-specific installation details.
- 1.4.4. D. "IT Contractor" means the contractor/vendor responsible for IT equipment, network devices, switches, racks, patching requirements, and IT-specific device coordination.

#### 1.5. SUBMITTALS

- 1.5.1. Submit product data for:

- 1.5.1.1. .1 Cable tray and fittings.
- 1.5.1.2. .2 Conduit, raceway, fittings, bushings, sleeves, pull boxes, and supports.
- 1.5.1.3. .3 Back boxes, outlet boxes, mud rings, device rings, and cover plates.
- 1.5.1.4. .4 CAT5e cables.
- 1.5.1.5. .5 CAT5e jacks, connectors, patch panels, and faceplates, where applicable.
- 1.5.1.6. .6 Cable supports, J-hooks, Velcro cable ties, and related support accessories.

- 1.5.2. Submit rough-in coordination drawings prior to installation, showing:

- 1.5.2.1. Cable tray routing, size, elevation, and support method.
  - 1.5.2.2. Conduit/raceway routing from outlets to cable tray.
  - 1.5.2.3. Outlet/back box locations, mounting heights, and box types.
  - 1.5.2.4. PA device rough-in locations coordinated with PA contractor requirements.
  - 1.5.2.5. IT/data device rough-in locations coordinated with IT contractor requirements.
  - 1.5.2.6. Ceiling-mounted device locations coordinated with reflected ceiling plans, lighting, diffusers, speakers, sprinklers, cameras, access panels, structure, and ceiling grid.
  - 1.5.2.7. Wall-mounted device locations coordinated with architectural elevations, millwork, door swings, marker boards, casework, and furniture.
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- 1.5.3. Submit cable test reports for all CAT5e cables.
- 1.5.4. Submit as-built drawings showing final cable tray routing, conduit/raceway routing, outlet locations, cable IDs, and termination locations. The attached specification requires as-built drawings to include pathway changes and cable routes from telecommunications rooms to workstations, and also requires test reports identifying each tested cable.

## 1.6. COORDINATION

- 1.6.1. Coordinate all rough-in work with the General Contractor, Electrical Contractor, IT Contractor, PA Contractor, ceiling contractor, millwork contractor, furniture supplier, and other affected trades.
- 1.6.2. Prior to rough-in, confirm with the IT Contractor and PA Contractor:
  - 1.6.2.1. Exact device locations.
  - 1.6.2.2. Mounting heights.
  - 1.6.2.3. Back box sizes and depths.
  - 1.6.2.4. Required number of CAT5e cables per device.
  - 1.6.2.5. Whether device requires single-gang, double-gang, 4-inch square, deep box, surface box, ceiling box, or special back box.
  - 1.6.2.6. Whether conduit requires direct homerun to the telecommunications room, or stub-up/stub-out to cable tray.
  - 1.6.2.7. Cable entry side, connector orientation, device mounting plate, and clearance requirements.
- 1.6.3. Do not proceed with rough-in until device locations have been coordinated and reviewed. The attached specification specifically requires the contractor to mark out the work, coordinate with other trades, review the work prior to rough-in, and prepare dimensioned room layouts prior to rough-in.
- 1.6.4. Where equipment is shown as “rough-in only,” obtain accurate rough-in requirements from the IT Contractor, PA Contractor, or Consultant before proceeding.
- 1.6.5. Outlet locations shown on Drawings are diagrammatic. Adjust final rough-in locations to suit site conditions, architectural layouts, millwork, furniture, and PA/IT contractor requirements, without compromising accessibility, code compliance, or system performance.
- 1.6.6. Any rough-in installed in the wrong location due to lack of coordination shall be relocated at no additional cost

## PART 2 - PRODUCTS

### 2.1. CABLE TRAY

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- 2.1.1. Provide communications cable tray where shown on Drawings and where required for routing CAT5e cabling.
- 2.1.2. Cable tray shall be galvanized steel wire basket tray or ladder-type tray, as indicated on Drawings or approved by Consultant.
- 2.1.3. Cable tray shall be complete with:
  - 2.1.3.1. Factory bends, tees, crosses, reducers, and offsets.
  - 2.1.3.2. Splice plates and bonding jumpers.
  - 2.1.3.3. End caps.
  - 2.1.3.4. Drop-out fittings where cables exit tray.
  - 2.1.3.5. Wall brackets, trapeze supports, rods, anchors, and accessories.
  - 2.1.3.6. Protective bushings or grommets where cables enter or leave tray.
- 2.1.4. Cable tray shall be sized to accommodate installed cabling plus a minimum 25% spare capacity unless otherwise noted.
- 2.1.5. Cable tray and metallic pathways shall be bonded in accordance with Division 26 and Division 27 grounding requirements.

## **2.2. CONDUIT AND RACEWAY**

- 2.2.1. Provide conduit or raceway from each communications outlet/back box to the nearest accessible communications cable tray unless otherwise noted.
- 2.2.2. Minimum conduit size shall be 21 mm (3/4 inch) unless larger size is required by cable quantity, PA/IT contractor requirements, or Drawings.
- 2.2.3. Use EMT conduit for indoor concealed or exposed dry locations unless otherwise noted.
- 2.2.4. Use rigid steel conduit where subject to physical damage.
- 2.2.5. Use surface metal raceway only where concealed conduit is not practical and where approved by Consultant.
- 2.2.6. Provide fittings, couplings, connectors, bushings, locknuts, supports, and accessories suitable for the installation condition.
- 2.2.7. Provide insulated bushings at all conduit ends used for communications cabling.
- 2.2.8. Provide pull string in each conduit and raceway.
- 2.2.9. Do not share communications conduits with power wiring.

## **2.3. OUTLET BOXES AND BACK BOXES**

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- 2.3.1. Provide outlet boxes and back boxes for all communications device locations.
- 2.3.2. Minimum box size shall be 4-inch square, 54 mm deep, complete with appropriate mud ring, unless otherwise required by device manufacturer, PA contractor, IT contractor, or Drawings.
- 2.3.3. Provide larger or deeper boxes where required to suit:
  - 2.3.3.1. CAT5e cable bend radius.
  - 2.3.3.2. Device mounting plate.
  - 2.3.3.3. PA speaker/call switch/clock/display device.
  - 2.3.3.4. Multiple cables.
  - 2.3.3.5. Future spare cabling.
  - 2.3.3.6. Surface raceway connection.
- 2.3.4. Provide single-gang or multi-gang rings as required for final faceplates and device mounting.
- 2.3.5. Provide blank cover plates for rough-in boxes where final devices are not installed under this Contract.
- 2.3.6. Back boxes for PA devices shall be coordinated with the PA Contractor prior to installation. Provide all rough-in boxes, conduit, raceway, and pull strings required for PA system device installation.

#### 2.4. **CAT5E CABLING**

- 2.4.1. Provide CAT5e, 4-pair, UTP, solid copper communications cable.
- 2.4.2. Cable shall be CSA certified and suitable for the installed location.
- 2.4.3. Use CMP/FT6 cable in plenum spaces and where required by code, AHJ, or Contract Documents.
- 2.4.4. Use CMR/FT4 cable only where permitted by code, AHJ, and Contract Documents.
- 2.4.5. Cable jacket colour shall be coordinated with the Owner/Consultant. Unless otherwise noted, provide blue jacket for data/communications cabling.
- 2.4.6. All CAT5e cable shall be installed as continuous homerun cable from outlet/device location to the designated telecommunications room, rack, cabinet, patch panel, or PA/IT termination point.
- 2.4.7. Splices are not permitted.

#### 2.5. **CABLE SUPPORTS**

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- 2.5.1. Provide independent low-voltage cable supports where cabling is installed outside conduit or cable tray.
- 2.5.2. Supports shall be J-hooks or approved low-voltage cable support devices designed for communications cabling.
- 2.5.3. Do not support communications cabling from ceiling grid, ceiling support wires, piping, ductwork, sprinkler piping, electrical conduit, or mechanical/electrical equipment.
- 2.5.4. Use Velcro-type cable ties only. Plastic tie-wraps are not permitted for communications cabling.

### **PART 3 - EXECUTION**

#### **3.1. GENERAL INSTALLATION REQUIREMENTS**

- 3.1.1. Install all communications rough-in and cabling in a neat, organized, and professional manner.
- 3.1.2. Install pathways and cabling in accordance with OESC, TIA standards, manufacturer's instructions, and PA/IT contractor requirements.
- 3.1.3. Maintain the integrity of cable jacket, pair twist, bend radius, and cable geometry.
- 3.1.4. Do not kink, crush, deform, sharply bend, or over-tighten CAT5e cabling.
- 3.1.5. Do not install communications cabling where it will interfere with removal of ceiling tiles, access panels, light fixtures, mechanical equipment, or other building systems.
- 3.1.6. The attached specification requires communications cabling to be independently supported and not supported from mechanical or electrical fittings. It also requires at least 75 mm clear vertical space above ceiling tiles where cabling is installed above ceiling tiles.

#### **3.2. ROUGH-IN INSTALLATION**

- 3.2.1. A. Provide complete rough-in infrastructure for all communications and PA/IT devices shown on Drawings.
- 3.2.2. B. Rough-in shall include:
  - 3.2.2.1. Back box or outlet box.
  - 3.2.2.2. Mud ring or device ring.
  - 3.2.2.3. Conduit or raceway from box to cable tray.
  - 3.2.2.4. Pull string.
  - 3.2.2.5. Bushings.

- 3.2.2.6. Cover plate or blank plate.
  - 3.2.2.7. Labels.
  - 3.2.2.8. Firestopping.
  - 3.2.2.9. Supports and accessories.
- 3.2.3. Install boxes plumb, level, and flush with finished surfaces.
- 3.2.4. Coordinate mounting heights with architectural drawings and PA/IT contractor requirements.
- 3.2.5. Where mounting heights are not indicated, confirm with Consultant prior to installation.
- 3.2.6. For ceiling-mounted devices, coordinate exact location with ceiling grid, reflected ceiling plan, light fixtures, diffusers, sprinklers, speakers, cameras, and access panels.
- 3.2.7. For wall-mounted PA/IT devices, coordinate box location with architectural elevations, doors, millwork, marker boards, casework, furniture, and accessibility requirements.
- 3.2.8. Provide conduit stub from each outlet/back box to accessible ceiling space or cable tray. Where the cable tray is located above accessible ceiling, extend conduit to within 300 mm of cable tray and terminate with insulated bushing unless otherwise required.
- 3.2.9. Where ceilings are inaccessible, provide continuous conduit from the outlet/back box to an accessible cable tray, pull box, junction box, or telecommunications room.

### **3.3. CONDUIT AND RACEWAY INSTALLATION**

- 3.3.1. Install conduit and raceway parallel or perpendicular to building lines.
  - 3.3.2. Secure conduit and raceway independently from other building services.
  - 3.3.3. Provide pull boxes where required to maintain cable pulling tension and bend radius.
  - 3.3.4. Do not exceed two 90-degree bends between pull points unless specifically approved.
  - 3.3.5. Install insulated bushings at conduit ends.
  - 3.3.6. Provide pull strings in all empty conduits.
  - 3.3.7. Conduit entering cable tray shall be arranged to avoid sharp bends and cable damage.
  - 3.3.8. Route conduit and raceway to minimize exposed cabling between outlet boxes and cable tray.
  - 3.3.9. Surface raceway shall be installed straight, level, and tight to finished surfaces. Coordinate colour and finish with Architect/Owner.
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- 3.3.10. Do not run surface raceway across architectural feature walls or finished millwork without approval.

#### **3.4. CABLE TRAY INSTALLATION**

- 3.4.1. Install cable tray level, straight, and properly supported.
- 3.4.2. Coordinate tray routing with mechanical ductwork, piping, sprinkler systems, lighting, structural members, and access requirements.
- 3.4.3. Maintain working access to cable tray for future cabling.
- 3.4.4. Install cable tray with adequate clearance to allow cable placement without exceeding bend radius.
- 3.4.5. Provide drop-outs, waterfalls, bushings, or other protective fittings where cables leave tray.
- 3.4.6. Do not route cable tray above equipment requiring regular maintenance access unless approved.
- 3.4.7. Bond metallic cable tray in accordance with applicable grounding and bonding requirements.
- 3.4.8. Maintain required separation from power conductors and electrical equipment. The attached specification includes minimum separation distances from electrical and heat sources for communications cabling depending on power source and pathway type.

#### **3.5. CAT5 CABLING INSTALLATION**

- 3.5.1. Provide CAT5e cable to each outlet/device location shown on Drawings or required by the PA/IT contractor.
  - 3.5.2. Provide the number of CAT5e cables per outlet/device as shown on Drawings. Where the number of cables is not indicated, confirm with Consultant and PA/IT contractor prior to rough-in.
  - 3.5.3. Install CAT5e cabling from each device/outlet location to the designated telecommunications room, rack, cabinet, patch panel, or PA/IT head-end location.
  - 3.5.4. All cables shall be continuous, without splices.
  - 3.5.5. Maximum horizontal cable length shall not exceed 90 m from termination point to termination point. The attached specification requires notification before installation where the 90 m maximum horizontal cable length cannot be met.
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- 3.5.6. Maintain manufacturer's minimum bend radius. Where not specified, maintain minimum bend radius of four times the cable diameter.
- 3.5.7. Do not exceed manufacturer's maximum pulling tension.
- 3.5.8. Install cables neatly in cable tray and organize into manageable bundles.
- 3.5.9. Use Velcro cable ties only. Do not use plastic tie-wraps.
- 3.5.10. Provide minimum 3 m slack at each end of each CAT5e cable unless otherwise noted.
- 3.5.11. Coil slack neatly in cable tray or telecommunications room. Do not leave loose cable coils resting on ceiling tiles.
- 3.5.12. Protect exposed cabling during construction. Damaged cables shall be replaced at no additional cost.
- 3.5.13. Do not install cabling on top of ceiling tiles, light fixtures, ductwork, piping, conduits, or sprinkler piping.
- 3.5.14. Cabling shall not obstruct ceiling tile removal.

### **3.6. PA SYSTEM ROUGH-IN AND CABLING COORDINATION**

- 3.6.1. Provide rough-in infrastructure for PA system devices, including speakers, call switches, clocks, wall stations, displays, head-end interfaces, and other devices shown on Drawings.
  - 3.6.2. Coordinate with PA Contractor prior to installation to confirm:
    - 3.6.2.1. Device type.
    - 3.6.2.2. Back box size and depth.
    - 3.6.2.3. Mounting height.
    - 3.6.2.4. Mounting orientation.
    - 3.6.2.5. Cable quantity.
    - 3.6.2.6. Cable routing.
    - 3.6.2.7. Termination requirements.
    - 3.6.2.8. Final faceplate/device requirements.
  - 3.6.3. Provide CAT5e cabling for PA devices where required by the PA Contractor and Drawings.
  - 3.6.4. Leave cables neatly coiled and labelled at PA device rough-in locations where final device installation is by others.
  - 3.6.5. Where PA Contractor requires proprietary back boxes or mounting brackets, coordinate prior to rough-in and provide compatible rough-in infrastructure.
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- 3.6.6. Where PA cabling is to be terminated by PA Contractor, provide cable slack, labels, and test results as required for turnover.

### **3.7. OUTLET AND DEVICE BOX REQUIREMENTS**

- 3.7.1. Provide separate communications outlet boxes from power outlet boxes unless specifically detailed otherwise.
- 3.7.2. Where communications and power outlets are located adjacent to each other, align boxes and cover plates.
- 3.7.3. Maintain separation between power and communications wiring in accordance with code and TIA requirements.
- 3.7.4. Provide barriers where communications and power are installed in the same multi-service raceway.
- 3.7.5. Provide blank covers for all unused rough-in boxes.
- 3.7.6. Verify jack/device orientation with Consultant or PA/IT contractor prior to final installation. The attached specification requires verification of jack position prior to installation.

### **3.8. FIRESTOPPING AND PENETRATIONS**

- 3.8.1. Firestop all penetrations through fire-rated walls, floors, shafts, and assemblies.
- 3.8.2. Firestopping shall maintain the fire-resistance rating of the assembly penetrated.
- 3.8.3. Use listed firestop systems suitable for the penetrating item and construction type.
- 3.8.4. Do not leave open sleeves, conduits, or cable tray penetrations unsealed.
- 3.8.5. Provide smoke sealing where required by code or AHJ.

### **3.9. IDENTIFICATION**

- 3.9.1. Label each CAT5e cable at both ends.
- 3.9.2. Label each outlet/back box and faceplate with corresponding cable ID.
- 3.9.3. Label pull boxes and junction boxes used for communications cabling.
- 3.9.4. Cable identification shall match as-built drawings and test reports.
- 3.9.5. Labels shall be machine printed. Handwritten labels are not acceptable.

### **3.10. TESTING**

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3.10.1. Test all CAT5e cables after installation and termination.

3.10.2. Testing shall include, as a minimum: 1. Wiremap

3.10.2.1. Continuity.

3.10.2.2. Pair polarity.

3.10.2.3. Shorts.

3.10.2.4. Opens.

3.10.2.5. Split pairs.

3.10.2.6. Cable length.

3.10.2.7. CAT5e performance certification.

3.10.3. Submit test reports for review prior to substantial completion.

3.10.4. Replace and retest failed cables at no additional cost.

3.10.5. The attached specification requires cable test reports identifying each cable, successful test date, technician signature, and electronic test results.

### **3.11. AS-BUILT DOCUMENTATION**

3.11.1. Maintain updated as-built drawings during construction.

3.11.2. As-built drawings shall show:

3.11.2.1. Final outlet locations.

3.11.2.2. Final cable tray routing.

3.11.2.3. Final conduit and raceway routing.

3.11.2.4. Pull box locations.

3.11.2.5. Telecommunications room/rack/cabinet termination locations.

3.11.2.6. Cable IDs.

3.11.2.7. PA/IT device rough-in locations.

3.11.2.8. Deviations from Contract Drawings.

3.11.3. 3.11.3. Submit final as-built drawings and cable test reports prior to project close-out.

### **3.12. CLEANING AND PROTECTION**

3.12.1. Keep cable tray, conduits, boxes, and raceways clean and free of debris.

3.12.2. Remove abandoned cable, scrap cable, packaging, and waste material from site.

3.12.3. Protect rough-in boxes and raceways from damage during construction.

3.12.4. Replace damaged cables, boxes, conduits, raceways, cable tray, or accessories at no additional cost.

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