



MORRISON HERSHFIELD

SCOPE OF WORK

ISSUED FOR TENDER

Loading Dock Repair Project National Gallery of Canada

380 Sussex Drive
Ottawa, Ontario

Presented to:

Mr. Justin Coughlan
Capital Project Officer

Facilities Planning and Management
National Gallery of Canada
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Project No.: 1701155.00

Date: March 7, 2018

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1. SCOPE OF WORK

This document outlines the scope of work to perform the repairs to the concrete slab-on-grade, replacement of the loading dock drainage system, replacement of one of the loading dock scissor lifts, refinishing of the steel components, application of a new slab coating and painting within the loading dock located at the National Gallery of Canada. The general scope of work includes the following:

A. Slab-on-Grade Repairs and Slab Coating Application (Lump Sum Repairs)

- .1 Install hoarding and dust protection as per the specification and as per proposed detailing in the drawings.
- .2 Provide negative air ventilation to the exterior to mitigate dust and odours to the interior. Contractor to supply install and maintain ventilation fan for duration of dust and odour work activities. Work area must be secured at end of each work day, accordingly ventilation apparatus shall be removable.
- .2 Remove and dispose of the entire top 75mm of the existing slab-on-grade. Existing reinforcing steel shall remain and will require abrasive blast cleaning to remove existing epoxy coating. Augment steel reinforcing as directed by consultant (unit rate).
- .3 Perform all required concrete repairs as directed by the Consultant in strict accordance with the contract documents and repair details. Note all concrete repairs (i.e. concrete removals, cleaning of reinforcing steel, installation of formwork and mixing/placement of new concrete) are to be completed as a lump sum item of work for each defined repair area as outlined in the contract documents. Should the work area exceed those indicated in the contract documents, the additional areas will be paid as per the Unit Rate basis.
- .4 Following all concrete removals review the condition of the existing reinforcing steel with the consultant. Clean all reinforcing steel exhibiting signs of surface corrosion (as directed by the consultant) and touch-up existing epoxy coating (as required).
- .6 Install new steel angle components at perimeter of scissor lift pits as shown on the drawings. Prepare and refinish steel components upon completion of work.
- .7 Form, place and cure new sloped concrete slab-on-grade. Slab shall slope to trench drain. Install control joint as per drawings. Contractor shall be responsible to reinstate existing slope and levels.
- .8 Form, place and cure new in-fill concrete slab-on-grade adjacent to steel stair near grid line 308. Level final finish floor surfaces to match new loading bay slab-on-grade. Prepare and coat new in-fill slab with new floor coating.
- .9 Prepare the new slab surface and apply a new slab coating over the entire new slab-on-grade. Coating shall extend up vertical wall as shown on the

drawings. Install coating and allow to cure prior to allowing traffic access to the loading area.

- .10 Upon completion of all work activities required for the project, Contractor shall clean and dust all surfaces within the work area and the area above the loading dock bays.

B. Slab-on-Grade Survey (Lump Sum) and Additional Concrete Repairs (Unit Rate)

Complete delamination survey in conjunction with the consultant of the existing and remaining slab-on-grade once topping is removed and complete all additional concrete repairs, as identified during the survey under the Unit Rate Work. Typical localized concrete repairs required are to be conducted as a Unit Rate Work and includes the following:

- Repair of through slab delamination,
 - Repair of vertical wall delaminations (base of wall to slab junction),
 - Crack repair.
- .1 Provide full access and perform a delamination survey of all work areas as indicated above. Mark all areas requiring repair directly on the surfaces with non-permanent markings. Review extent/limit of all repair locations with the consultant (lump sum work)
 - .3 Perform all required concrete repairs as directed by the consultant in strict accordance with the contract documents and repair details. Note all concrete repairs (i.e. concrete removals, cleaning of reinforcing steel, installation of formwork and mixing/placement of new concrete) is to be completed as a lump sum item of work.
 - .5 Following all concrete removals review the condition of the existing reinforcing steel with the consultant. Clean all reinforcing steel exhibiting signs of surface corrosion (as directed by the consultant) and touch-up existing epoxy coating (as required).
 - .6 Install formwork to match existing profiles using a high density concrete forming plywood to achieve a smooth finish. Mix, place and cure new concrete in strict accordance with the contract documents.

C. Prepare and Refinish Existing and New Steel Components (Lump Sum)

Abrasively blast clean, prepare and paint existing and new steel components within the work area. Work includes:

- .1 Refinishing the two dock levelers and the embedded steel angles at the perimeter of the levelers. Paint scheme shall match existing.
- .2 Refinishing the existing loading dock scissor lift (one to remain) and the new perimeter steel angles. Top and edge of scissor lift shall be cleaned and re-painted. Perimeter steel angle will be replaced as part of the slab replacement work and re-painted upon completion.

- .3 Refinishing the steel access ladder and the bottom of the access stair (top surface of the embedded steel angle).

D. Paint Existing Concrete and Floor Markings (Lump Sum)

Supply and install new paint finish to existing concrete wall at perimeter of the loading area (above slab coating).

Supply and install line painting on slab-on-grade upon completion of work. Line painting shall match existing markings within loading area. Re-paint high visibility markings (yellow) at upper loading dock edge to match existing. Provide High visibility marking at perimeter of new solids interceptor.

E. Replacement and Installation of New Drainage System Components (Lump Sum)

Remove and dispose of existing drainage components identified for replacement. Supply and install new drains, new drain pipe and accessories, new trench drain and new solids interceptor as indicated on drawings (Lump Sum Work). Work includes the following:

- .1 Chipping and removal of existing drain in scissor pit.
- .2 Chip concrete and remove existing drain pipe, cleanouts and connections as indicated on the drawings. Work includes the preparation of the trench for new installations (i.e. sand, granular, compaction, etc.).
- .3 Chip concrete and prepare a new trench and drain location as indicated on the drawings to facilitate the installations of a new drain, drain pipe, cleanouts and connections as indicated on the drawings.
- .4 Chip concrete and excavate to facilitate installations of new solids interceptor as indicated on the drawings.
- .5 Install new drain pipe and accessories as shown on drawings.

F. Installation of New Loading Dock Scissor Lift (Lump Sum)

- .1 Install new prepackaged lift system complete with removable guards, auxiliary reservoir and power connections. New system shall fit within the limits of the existing scissor pit. Work includes submittal of shop drawings indicating material and sizes of all components. Existing perimeter angles shall be replaced and re-finished in conjunction with slab repair work (lump sum work).

2. LIST OF DRAWINGS

The following is the list of drawings that form part of this scope of work package and can be found in Appendix A:

- BE-00: Cover Sheet, dated March 2018.
- BE-01: Typical Floor Plan, dated March 2018.
- BE-02: Typical Concrete Details, dated March 2018
- BE-03: Detail Sheet, dated March 2018.
- M-01: Mechanical Plan Removals, dated March 2018
- M-02: Mechanical Plan, dated March 2018

3. GENERAL PROJECT NOTES

- 3.1 All work shall be completed within the strict timeframe indicated in Section 6. Schedule & Submissions.
- 3.2 All work covered by this scope of work shall be completed to the satisfaction of the Consultant. Any deficiencies to the new work or damage to existing building components shall be repaired or replaced at no additional cost to the owner.
- 3.3 Construction progress meetings shall be held on a weekly basis. A start-up meeting shall be called prior to commencement of Work, at a suitable time and location as approved by NGC and Consultant. Contractor and Contractor's site foreman (for this project) shall attend.
- 3.4 Maintain record drawing set on-site, along with all other contract documentation.
- 3.5 Workmanship shall be the best quality, executed by workers experienced and skilled in the respective duties for which they are employed. Do not employ any unfit person or anyone unskilled in their required duties. In cases of dispute decisions as to the quality or fitness of workmanship rest solely with the Consultant, whose decision is final.
- 3.6 No substitutions for the specified materials will be permitted without prior written approval of the Consultant. It is the contractor's responsibility to submit all technical performance data to the consultant for review and evaluation. Alternative products and systems will only be considered at the time of tendering. Following the tender close it is understood that the contractor will only use all specified products and systems.
- 3.7 Provide and maintain barricades, signage and construction hoarding to enclose the area of work at all times. Provide construction signage to redirect pedestrian traffic away from area of work. All construction signage to be utilized on this project must be provided in both English and French.

- 3.8 Take precautions to protect openings made in the building from entry of elements and of persons during the construction and to protect existing structure and finishes from damage resulting from construction work. Work damaged or defaced due to failure to provide such protection shall be removed and replaced, or repaired, as directed by the Consultant at no additional cost to the owner.
- 3.9 The Contractor shall provide all necessary means to protect the base building, interior finishes, permanent installations and landscaping from damage for the duration of the project. Make good all items damaged during construction at no additional cost to the owner.
- 3.10 Make no holes in any structural component without written approval by the Consultant.
- 3.11 Work will be reviewed by the Consultant to evaluate general conformance with the Contract Documents. The Contractor is responsible to maintain quality control over all aspects of the Work.
- 3.12 Contractor is responsible to keep the site in a clean and orderly condition at all times. Clean-up the site to the satisfaction of the National Gallery project officer at the end of each working day. Upon completion of work, perform final cleaning of all new and existing building elements affected by the work to the satisfaction of the National Gallery project officer.
- 3.13 Maintain operational all fire exits and maintain access to all exterior fire hydrants, gas valves and standpipe connections.
- 3.14 Contractor to confirm as-built dimension for fit and clearance prior to preparation of quotation and fabrication of new fixed dimensioned components.
- 3.15 Unless stated otherwise by the consultant, prepare a mock-up of each major element of work, or repair type for review and acceptance by the consultant. Allow 48hrs minimum for review of mock-up by the consultant prior to proceeding with the remaining work.
- 3.16 Submit one (1) copy of requested shop drawings, product data sheets and samples to the consultant's office, for review and approval. The consultant will review all submissions for general conformance to the contract documents.
- 3.17 Work not indicated on a part of the drawings, but reasonably implied to be similar to that shown at corresponding places shall be repeated.
- 3.18 All work and material must be performed in strict accordance with the following codes and standards:
 - .1 Ontario Building Code (OBC) 2012.
 - .2 National Building Code of Canada (NBC) 2015
 - .3 Occupational Health and Safety Act and Regulations for Construction Projects.

- .4 CAN/CSA-A23.1-04/A23.2-09, Concrete Materials and Methods of Concrete Construction/ Methods of Test for Concrete.
- .5 CAN/CSA-S269.2-M87 (R2003), Access Scaffolding for Construction Purposes
- .6 CAN/CSA-S269.3-M92 (R2003), Concrete Formwork.

4. MATERIAL SPECIFICATIONS AND EXECUTION

Refer to Appendix B for material specifications. The following technical specification sections are included in Appendix B:

- .1 Section 01527 – Temporary Hoarding
- .2 Section 02155 – Concrete Removal
- .3 Section 03100 – Concrete Formwork
- .4 Section 03200 – Concrete Reinforcement
- .5 Section 03300 – Cast-in-Place Concrete
- .6 Section 03350 – Abrasive Blast Cleaning
- .7 Section 07180 – Slab-on-Grade Coating
- .8 Section 09912 – Painting
- .9 Section 11130 – Elevating Docks
- .10 Section 22318 – Drainage Waste and Vent Piping

5. SAFETY

5.1 Construction Safety Measures

- .1 Observe construction safety measures of the National Building Code 2015 Part 8, Provincial Government, Workplace Safety and Insurance Board, and municipal authority provided that in any case of conflict or discrepancy more stringent requirements shall apply.
- .2 Comply with the requirements of the Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 For the purpose of the Occupational Health and Safety Act the Contractor will, with respect to the work, be designated the 'constructor' as therein defined, and the Contractor shall assume the responsibilities of the constructor as set out in the Act and its Regulations, including the implementation of such precautions and safeguards as will protect all workers and other persons from any adverse effects caused by designated substances and/or hazardous materials originating at, or brought onto the site.
- .4 If the Contractor encounters any of the designated substances defined in the Occupational Health and Safety Act he shall stop all work and notify the Consultant prior to undertaking any further work.
- .5 Supply and maintain a health and safety plan throughout the duration of the Contract. Train and indoctrinate all personnel who will be involved in the work. Perform all work in a workmanlike manner with due regard for the safety of workers and public.
- .6 Provide full hoarding and enclosures as made necessary by the work to protect the public, workers, and public and private property from injury or damage. Provide fenced enclosures to all work areas.
- .7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets (MSDS) acceptable to Labour Canada and Health and Welfare Canada.
- .8 Deliver copies of MSDS data sheets for all materials to the National Gallery project officer and the Consultant a minimum of 7 days, prior to the delivery of materials to the site.

6. SCHEDULE & SUBMISSIONS

The loading dock bay work is to begin on site by June 9, 2018. Pre-construction activities can be completed before in coordination with the NGC. Substantial completion of this project shall be completed no later than July 27, 2018. Final project completion shall be by August 2, 2018. The project schedule is strict and no deviations will be accepted by the NGC.

The loading dock area will be completely vacated and closed-off to traffic for a period of 8 weeks during which the construction activities are to take place. Contractor is to provide the NGC with the construction schedule for coordination of preconstruction activities requiring temporary access to the loading dock 2 weeks in advance of these activities. Block and barricade entrance to loading dock and maintain construction signage for the duration of the work. Temporarily cover, remove or otherwise conceal existing directional signage. Reinstate all existing markings and signage upon completion of work.

Submit to the consultant within seven (7) working days after contract award the following information:

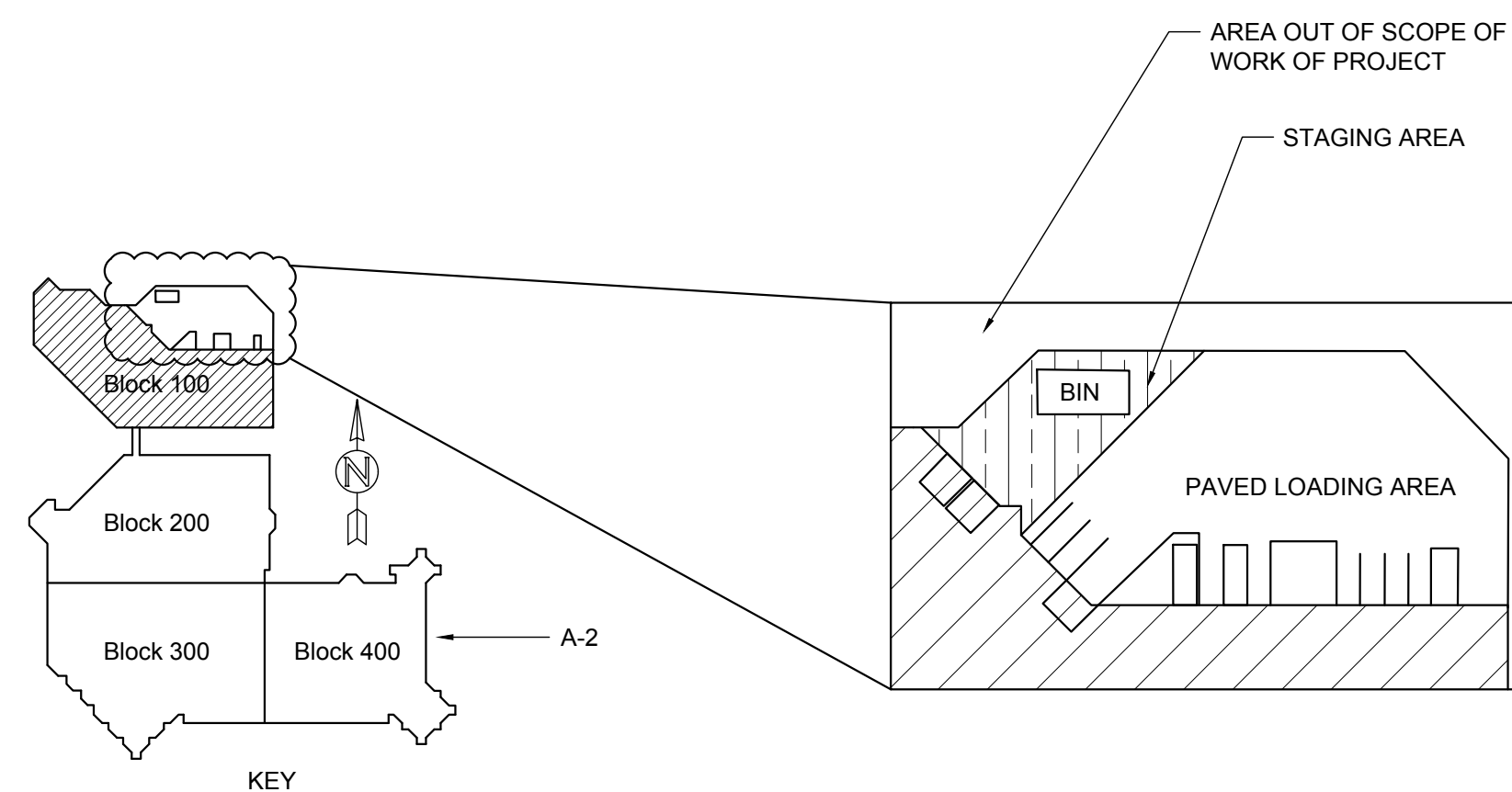
1. Submit names, telephone numbers and email address of all staff members who will be directly involved in this project, such as: Project manager and site superintendent, who will be in charge of the work, and work crew personnel.
2. A schedule showing anticipated progress stages and final completion of the work within time period quoted in the Bid Form. Schedule to include dates for the following:
 - .1 Submission of shop drawings, material lists, MSDS sheets and samples.
 - .2 Start and completion dates for all major areas and elements of work including, but not limited to the following; mobilization, delamination survey, removals and structural concrete repair work. Provide the above noted breakdown for all defined areas of work.
 - .3 Substantial completion and total completion.
 - .4 Submit an updated and revised schedule with each claim for payment.

APPENDIX A: DRAWINGS

2018 LOADING DOCK REPAIRS NATIONAL GALLERY OF CANADA

DO NOT SCALE DRAWING. DIMENSIONS TO BE VERIFIED ON SITE. DRAWING TO BE READ IN CONJUNCTION WITH WRITTEN SPECIFICATION.

KEYPLAN



LIST OF DRAWINGS:

- BE-00 COVER SHEET
- BE-01 TYPICAL FLOOR PLAN
- BE-02 TYPICAL CONCRETE DETAILS
- BE-03 DETAIL SHEET
- M-01 MECHANICAL PLAN - REMOVALS
- M-02 MECHANICAL PLAN
- WORK AREA IN BLOCK 100

ENGINEER'S STAMP

ISSUE	DESCRIPTION	DATE
2	ISSUED FOR TENDER	03/07/2018
1	ISSUED FOR 90% CLIENT REVIEW	02/23/2018



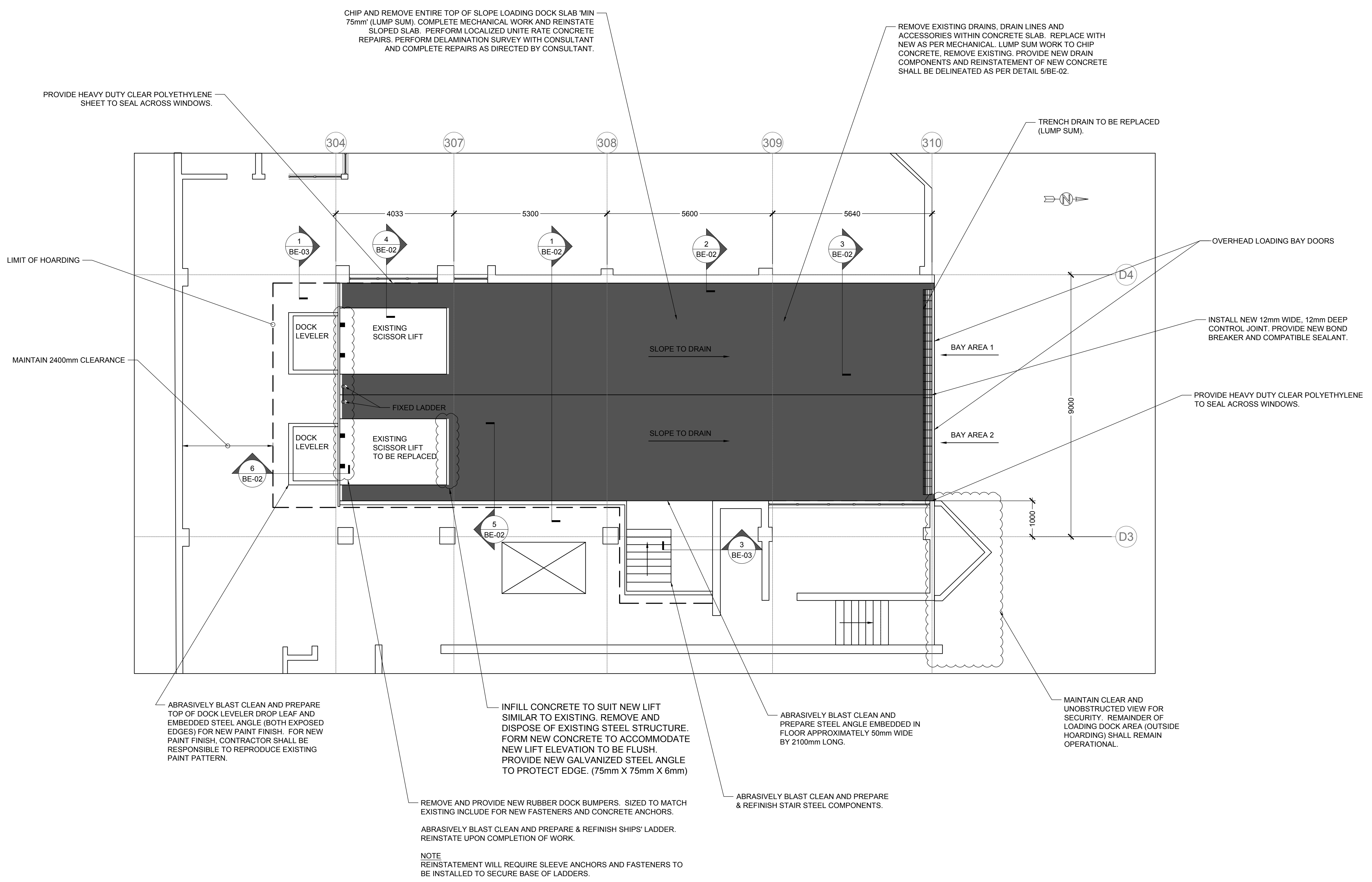
2440 Don Reid Drive, Ottawa, ON K1H 1E1
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380 SUSSEX DRIVE, OTTAWA, ON

COVER SHEET

DATE: JAN 2018	DRAWING No:
SCALE: SHOWN	BE-00
DESIGN: PS	
DRAWN: SG	PROJECT No:
REVIEWED: PS	1701155.00

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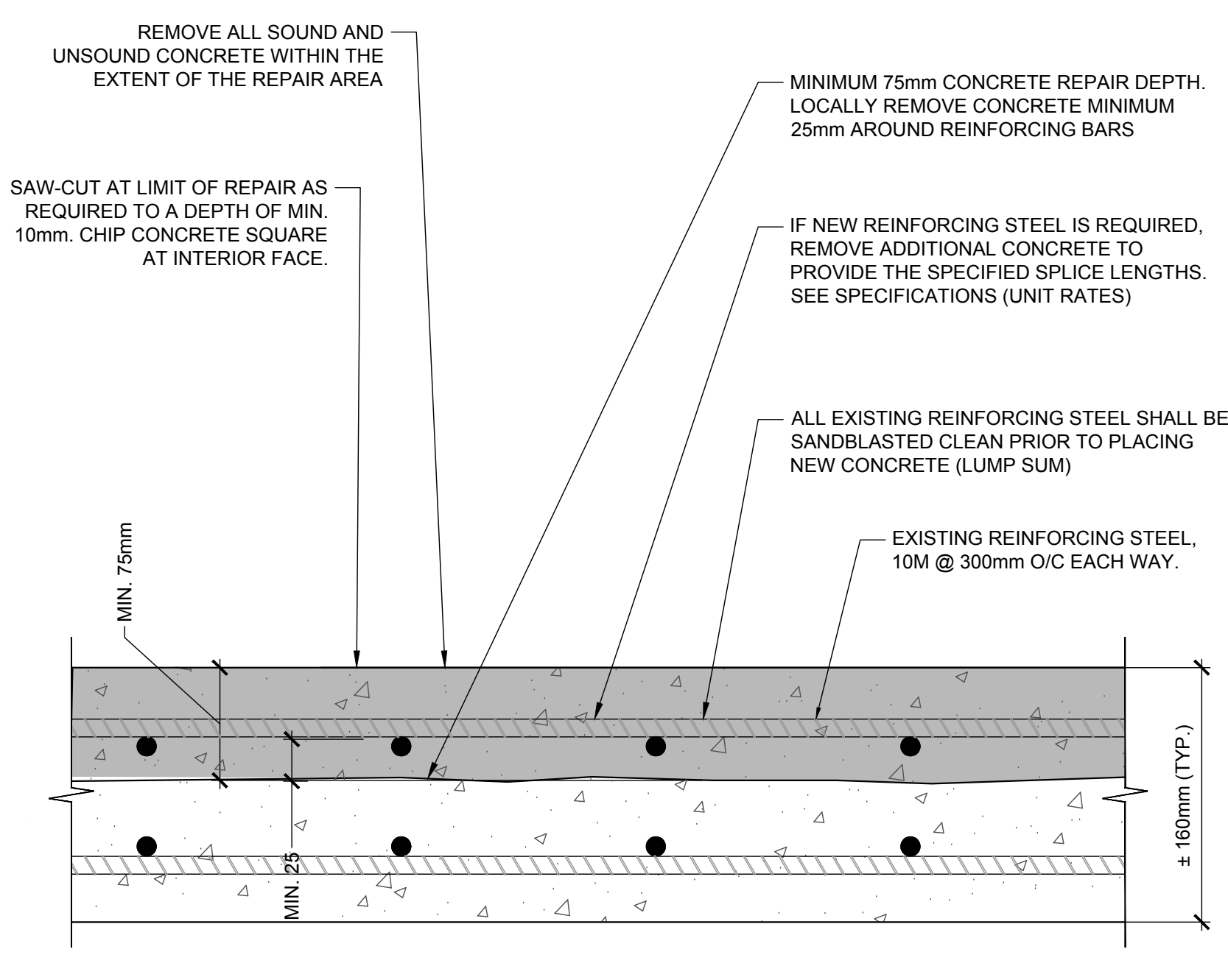
TYPICAL FLOOR PLAN

DATE: JAN 2018	DRAWING No:
SCALE: SHOWN	BE-01
DESIGN: PS	PROJECT No:
DRAWN: SG	1701155.00
REVIEWED: PS	

1 TYPICAL FLOOR PLAN
 BE-01 SCALE N.T.S.

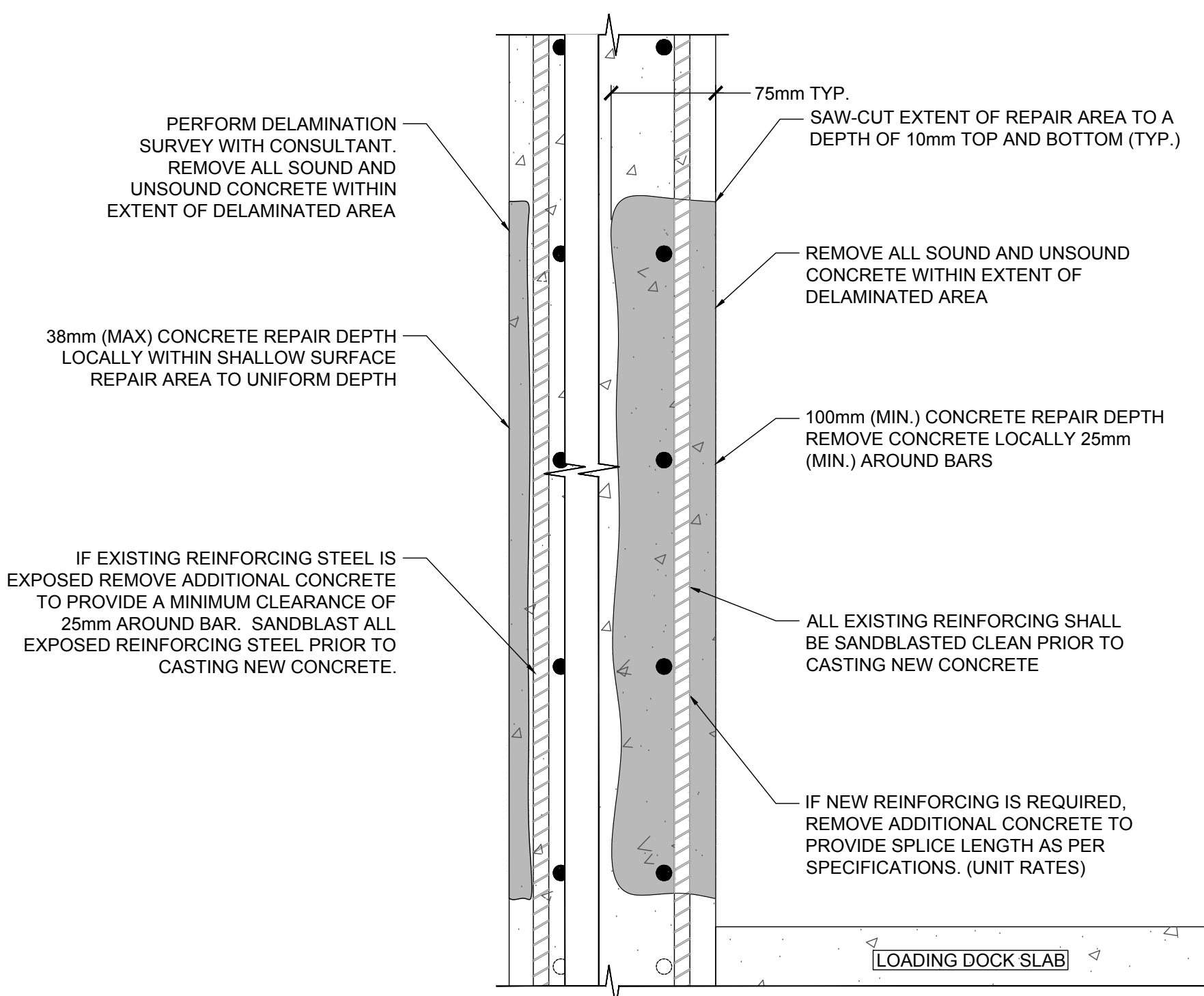
DO NOT SCALE DRAWING. DIMENSIONS TO BE VERIFIED ON SITE. DRAWING TO BE READ IN CONJUNCTION WITH WRITTEN SPECIFICATION.

KEYPLAN

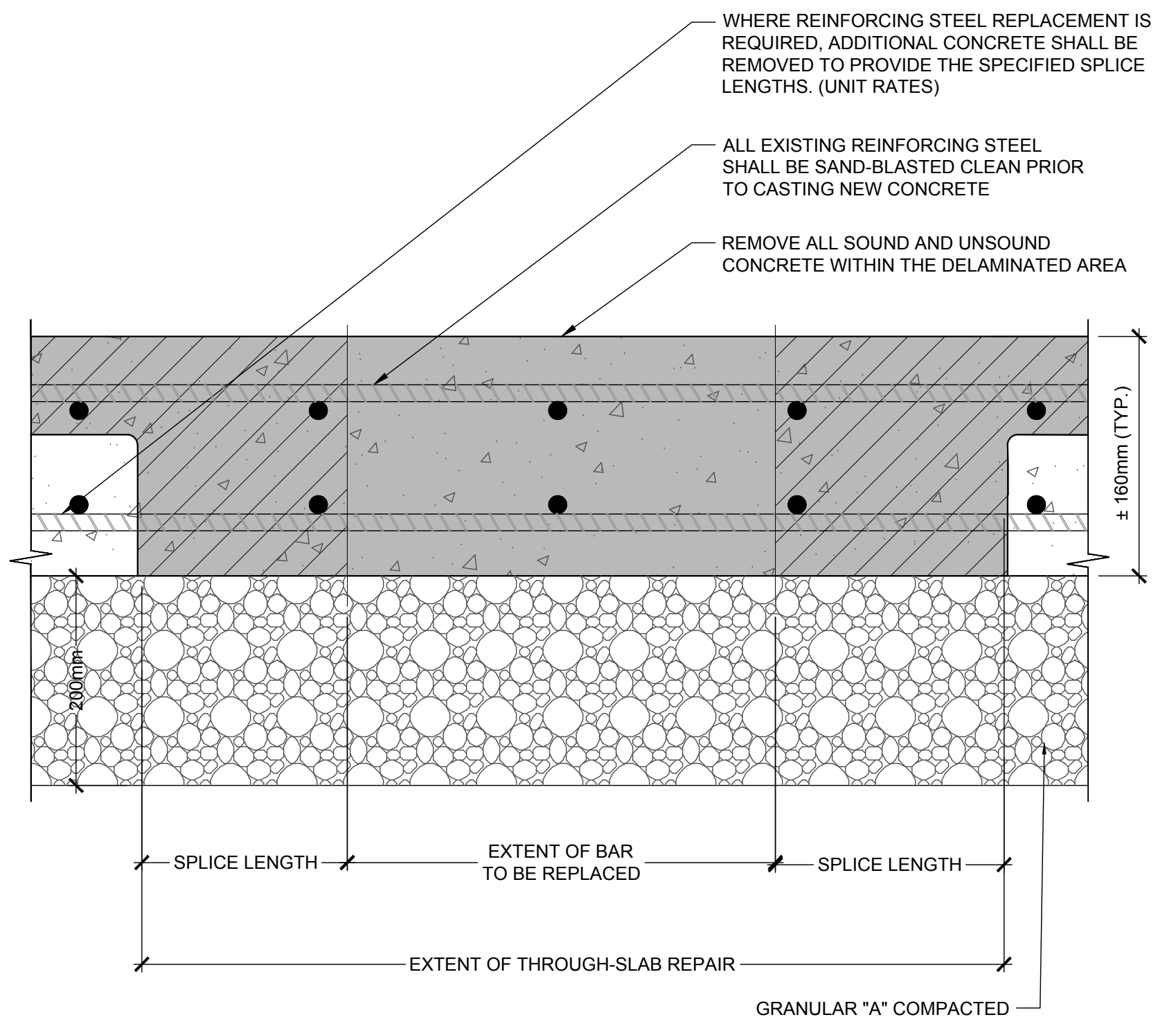


NOTE: ALL CONCRETE AND REINFORCING STEEL REMOVED AND REPLACED IS PART OF THE STIPULATED LUMP SUM PRICE.

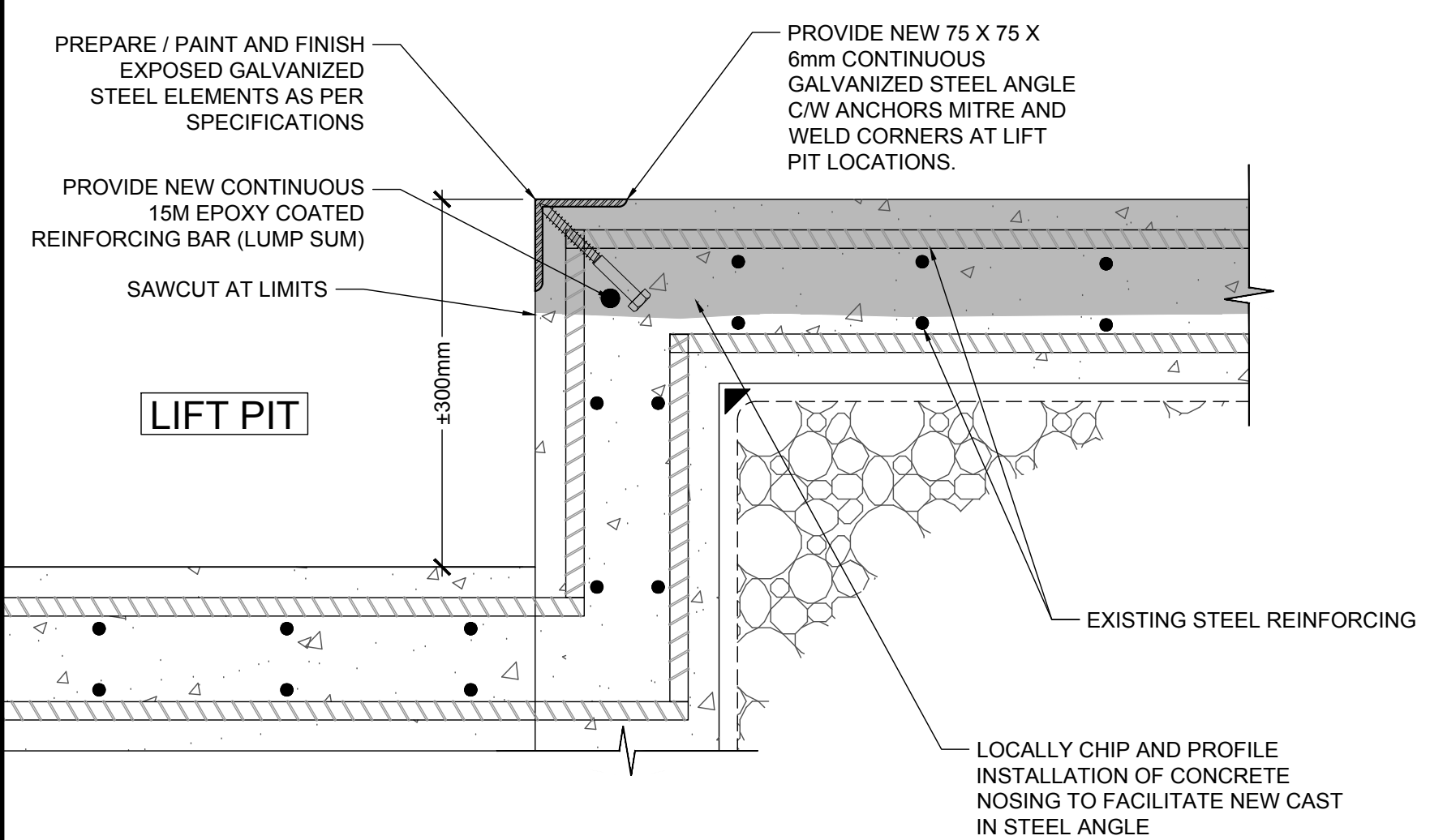
1 TYPICAL TOP SURFACE CONCRETE REPAIR
BE-02 SCALE 1:5



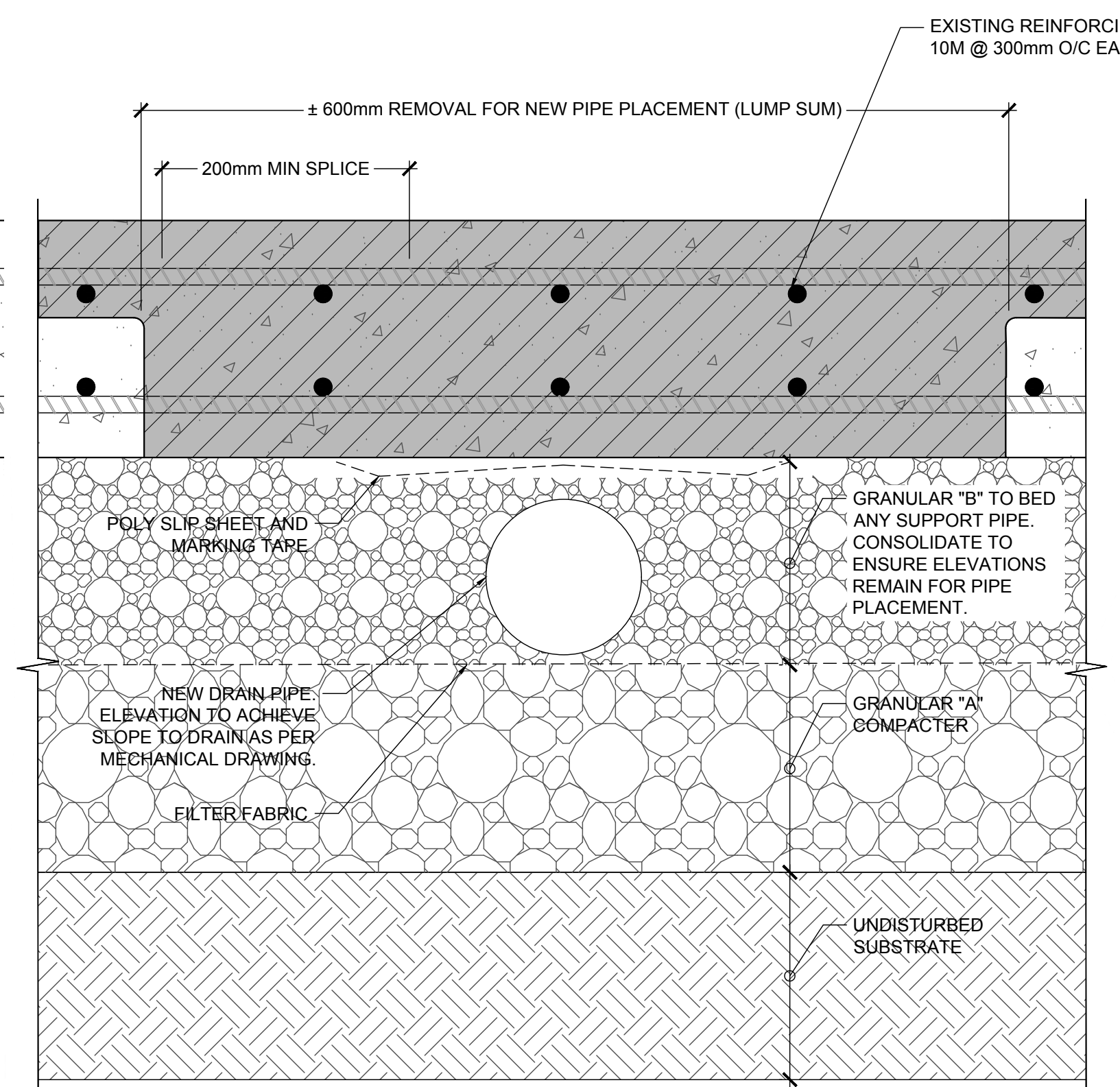
2 TYPICAL SHALLOW AND DEEP VERTICAL REPAIRS
BE-02 SCALE 1:5



3 TYPICAL THROUGH SLAB REPAIR
BE-02 SCALE 1:5

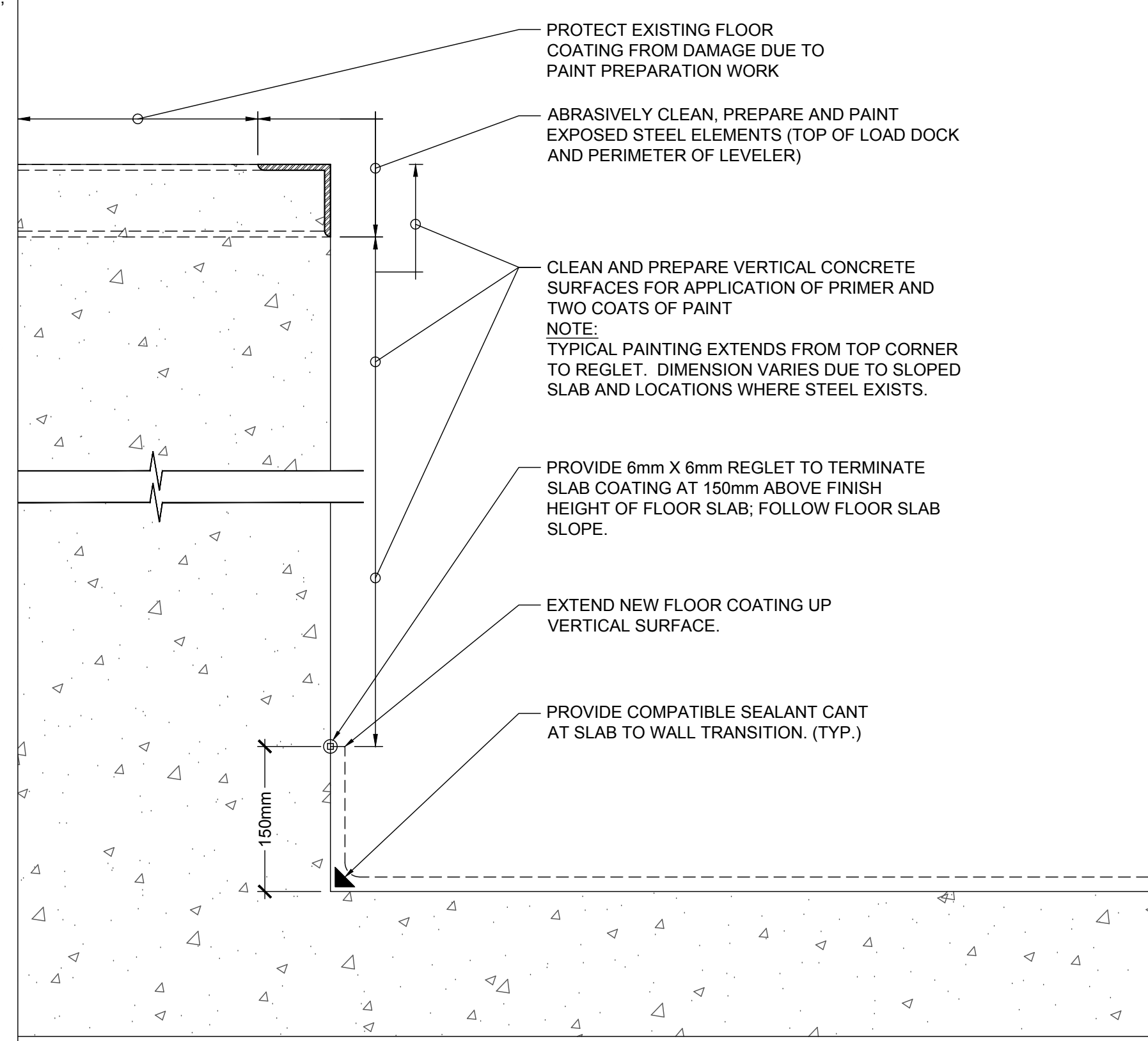


4 TYPICAL CURB ANGLE AND CONCRETE REPAIRS AT LIFT PIT
BE-02 SCALE 1:5



NOTE: ALL CONCRETE AND REINFORCING STEEL REMOVED AND REPLACED IS PART OF THE STIPULATED LUMP SUM PRICE.

5 NEW DRAIN PIPE AND CONCRETE REPAIR
BE-02 SCALE 1:5



6 TYPICAL LIMITS OF COATING AND PAINT
BE-02 SCALE 1:5

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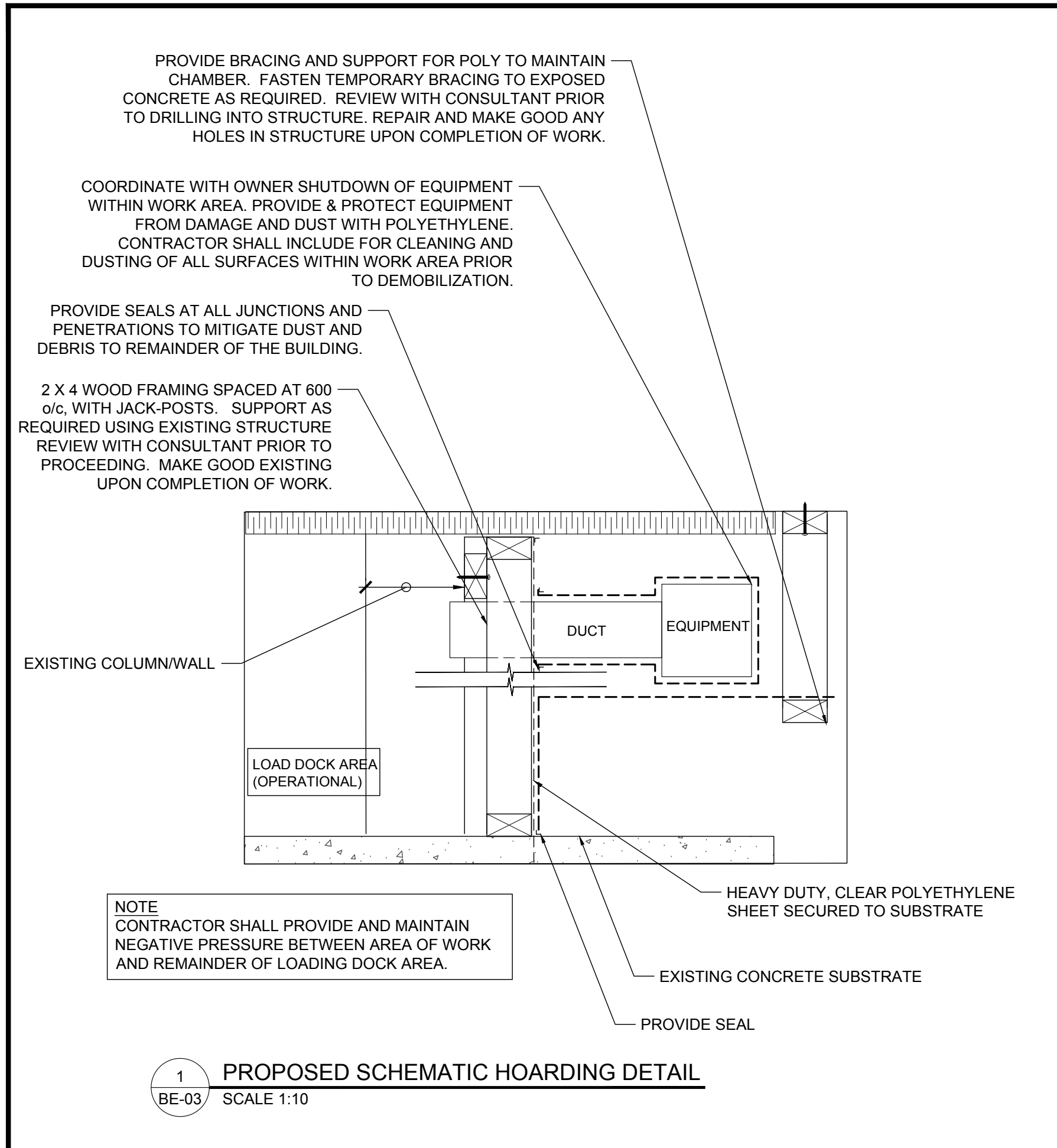
ISSUE	DESCRIPTION	DATE
2	ISSUED FOR TENDER	03/07/2018
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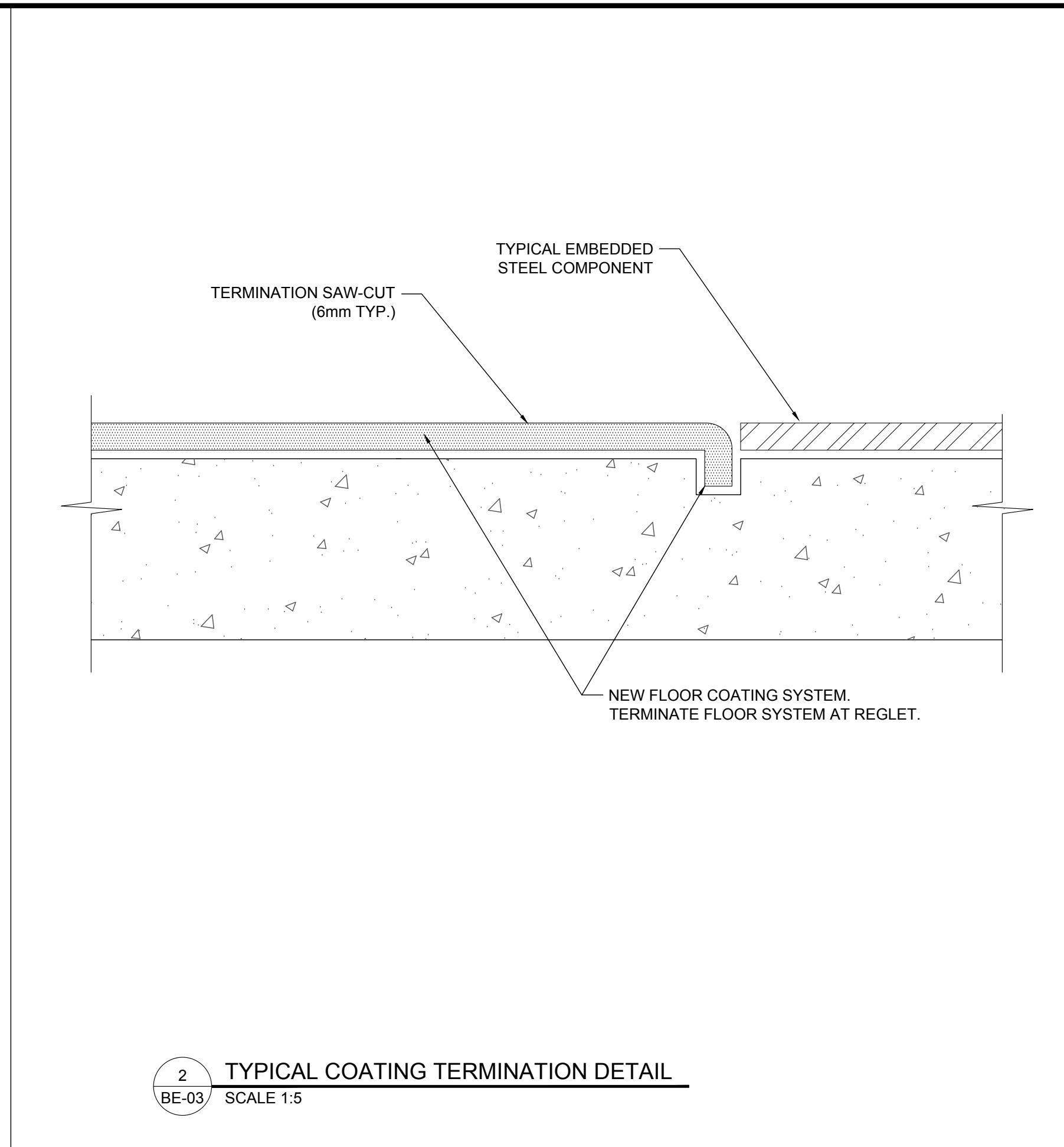
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TYPICAL CONCRETE DETAILS

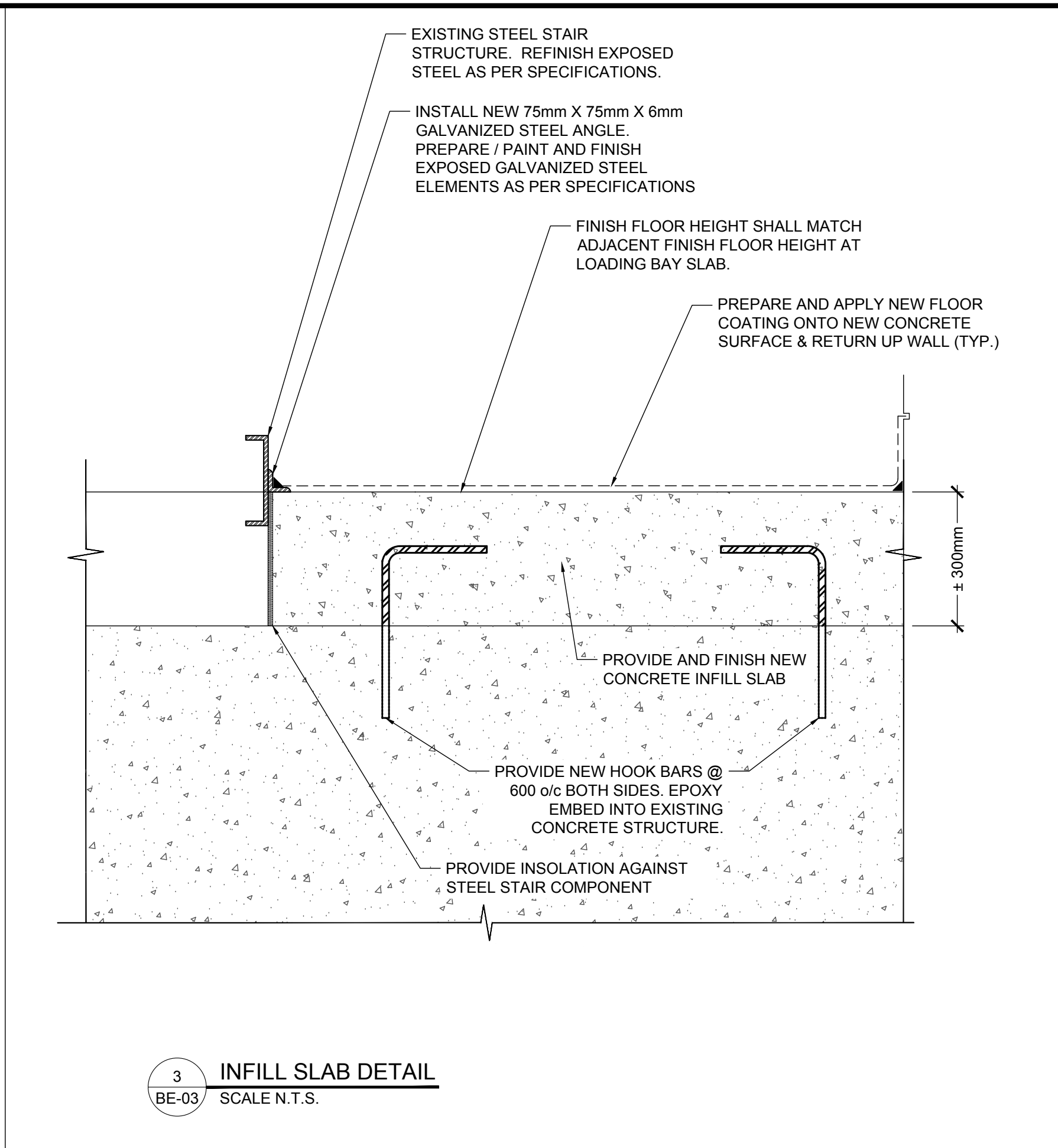
DATE: JAN 2018	DRAWING No:
SCALE: SHOWN	BE-02
DESIGN: PS	PROJECT No:
DRAWN: SG	1701155.00
REVIEWED: PS	



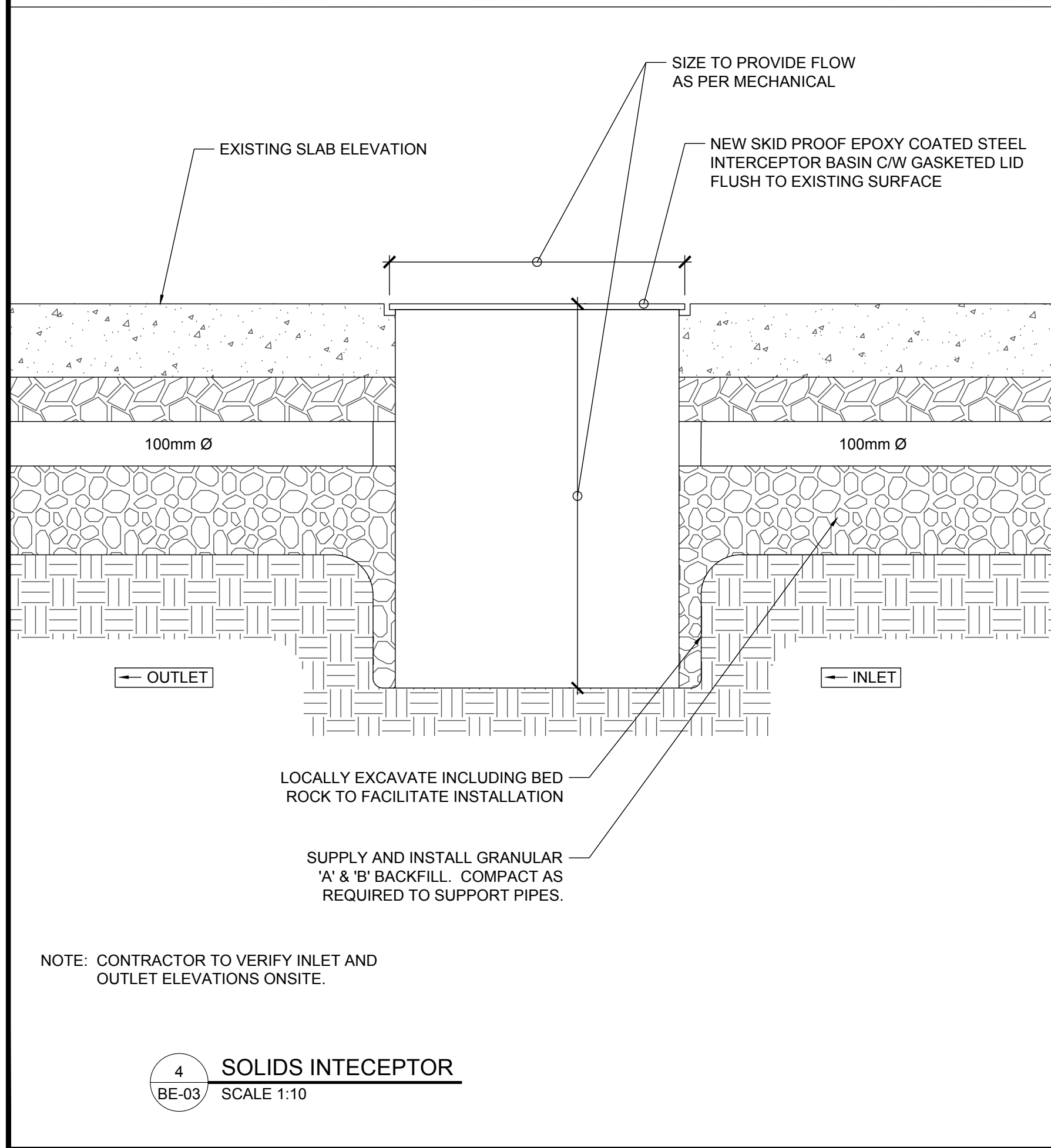
1 PROPOSED SCHEMATIC HOARDING DETAIL
BE-03 SCALE 1:10



2 TYPICAL COATING TERMINATION DETAIL
BE-03 SCALE 1:5



3 INFILL SLAB DETAIL
BE-03 SCALE N.T.S.



4 SOLIDS INTECEPTOR
BE-03 SCALE 1:10

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KEYPLAN

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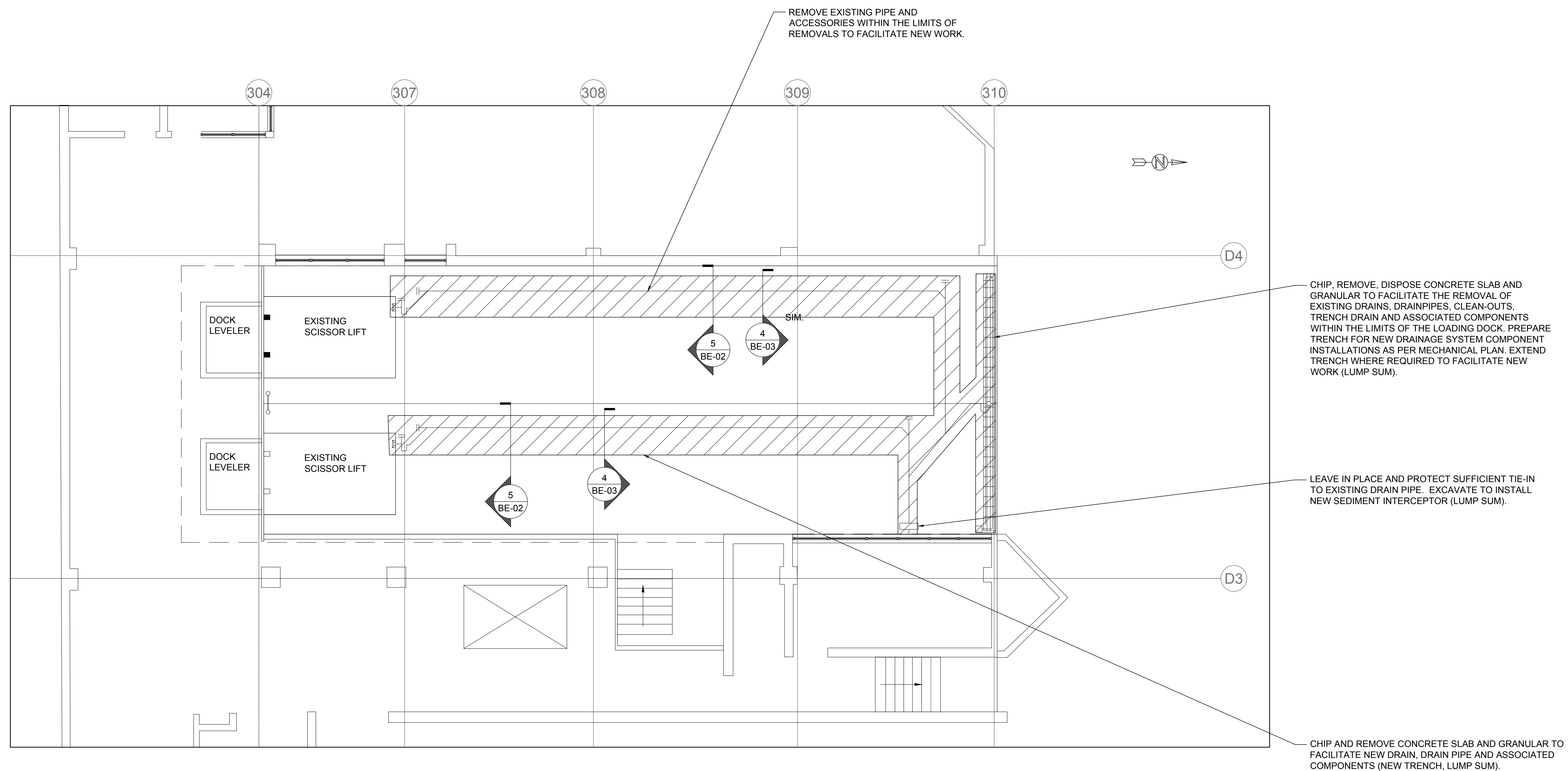
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DETAIL SHEET

DATE: JAN 2018	DRAWING No:
SCALE: SHOWN	BE-03
DESIGN: PS	
DRAWN: SG	PROJECT No:
REVIEWED: PS	1701155.00

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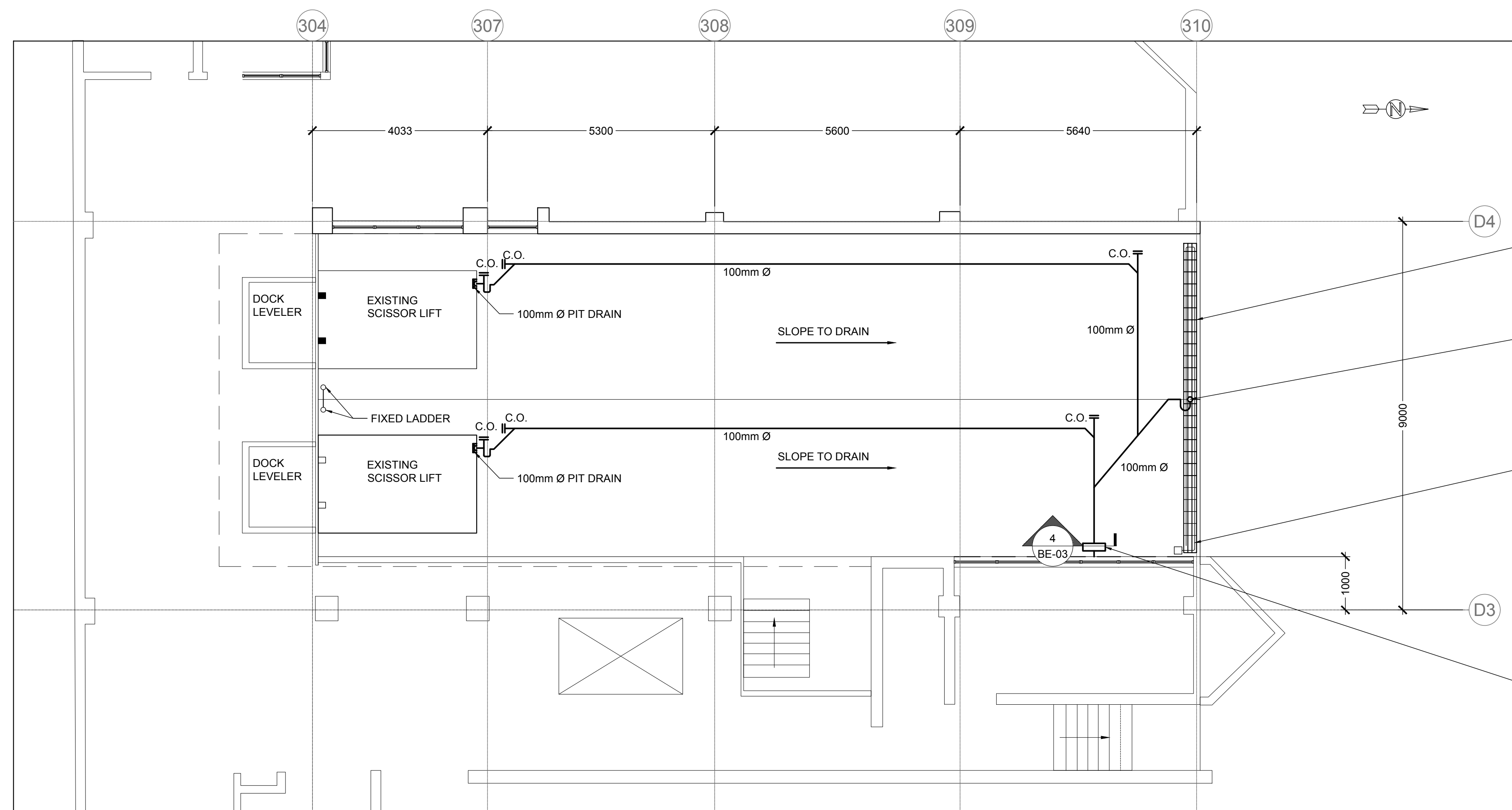
**MECHANICAL PLAN
 REMOVALS**

DATE: JAN 2018	DRAWING No:
SCALE: SHOWN	M-01
DESIGN: BM	
DRAWN: SG	PROJECT No:
REVIEWED: PCS	1701155.00

1 MECHANICAL PLAN - REMOVALS
 M-01 SCALE N.T.S.

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KEYPLAN



PROVIDE NEW 150mm TRENCH DRAIN SLOPED TO CENTER. EXISTING GRATE TO BE CUT TO SIZE AND REFUSE IN NEW TRENCH DRAIN. TRENCH DEPTH TO BE SET APPROPRIATELY TO HAVE GRATE LEVEL WITH FINISHED SLAB.

100mm Ø FLOOR DRAIN IN TRENCH

PROVIDE AND INSTALL NEW 20m SELF REGULATING HEAT TRACE CABLE IN TRENCH DRAIN. CABLE SHALL BE 600V, 909W, AND HALL ALL REQUIRED CSA APPROVALS FOR INSTALLATION IN THIS LOCATION. CONNECT TO EXISTING CIRCUIT AT LOCAL JUNCTION BOX. PROVIDE CONTROL TO ENSURE HEAT TRACE ONLY OPERATES WHEN FREEZING CONDITIONS EXIST.

PROVIDE AND INSTALL NEW SOLIDS INTERCEPTOR WITH 100mm Ø INLET, 100mm Ø OUTLET, AND 6.3L/s FLOW CAPACITY. LID SHALL BE SOLID GASKETED CHECKPLATE BOLTED IN PLACE.

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MECHANICAL PLAN

DATE: JAN 2018	DRAWING No:
SCALE: SHOWN	M-02
DESIGN: BM	
DRAWN: SG	PROJECT No:
REVIEWED: PCS	1701155.00

GENERAL NOTES

1. CONTRACTOR SHALL INSTALL ALL DRAINAGE PIPE CLEANOUTS AND ACCESSORIES IN ACCORDANCE WITH OBC.
2. CLEANOUTS TO BE COMPLETE WITH PIPE EXTENDING TO FINISHED SLAB AND SCREWED DOWN CORROSION PROOF COVER RATED FOR VEHICLE TRAFFIC.
3. CONTRACTOR SHALL PROVIDE AND INSTALL NEW TRAP PRIMING IN ACCORDANCE WITH OBC

1 MECHANICAL PLAN
 M-02 SCALE N.T.S.

APPENDIX B:
TECHNICAL SPECIFICATIONS

Part 1 GENERAL

1.1 Description

- .1 Supply labour, materials, services and equipment necessary to complete the work of this section. Work includes, but is not limited to, the following:
 - .1 The contractor will be required to provide unrestricted access to the consultant to allow for review of the work.
 - .2 Erect construction fencing/ hoarding to enclose the area of work to prevent non-authorized access.
 - .3 Install construction signage and barricades as required. Coordinate signage and required barricades with the owner.
 - .4 Install temporary protection (as required) to protect all adjacent building components and systems designated to remain located adjacent to the area of work (includes but is not limited to the following; glazing units, window frames, door systems, mechanical units, ducts, insulation, overhead doors electrical and plumbing services, etc).

1.2 References

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA S269.2-M87 (R2003), "Access Scaffolding for Construction Purposes".
- .2 Comply with National Building Code of Canada (NBC 2010), Part 8, "Safety Measures at Construction and Demolition Sites", and Provincial requirements.
- .3 Ontario Occupational Health and Safety Act and Regulations for Construction Projects.
- .4 Workplace Safety and Insurance Board (WSIB) of Ontario.

Part 2 PRODUCTS (as required)

Part 3 EXECUTION

3.1 Preparation/ Protection

- .1 Provide drop sheets, tarps and/or other means to protect all interior finishes designated to remain during access and delivery of materials through the building.
- .2 Protect all interior and exterior building components and finishes designated to remain in place from damage. Make good any items damaged as a result of the work to the satisfaction of the owner and consultant.
- .3 Do not disrupt active or energized utilities intended to remain undisturbed.
- .4 Building and adjacent loading area will remain occupied for the duration of construction. Contractor to coordinate access into the building with the National Gallery.
- .5 Do not disrupt, disconnect or otherwise affect services or utilities without written approval from the owner and/or consultant.
- .6 Keep noise, dust, and inconvenience to a minimum.

- .7 Protect all building systems, services and equipment.
- .8 Provide temporary dust screens, covers, railings, supports and other protection as required, by the owner and/or consultant.
- .9 Comply with the requirements of the Occupational Health and Safety Act and Regulations for Construction Projects. As minimum provide workers with respiratory protection (e.g., N95 disposable respirator), gloves and eye protection during demolition work.

3.2 Construction Hoarding and Fencing

- .1 Erect construction fencing to enclose all material storage areas at grade level and to enclose the bottom of the scaffold systems to prevent non-authorized access. Supply, erect and maintain construction fencing in accordance with the Occupational Health and Safety Act.
- .2 Review layout and construction of hoarding/fencing with Consultant prior to proceeding.
- .3 Construction fencing to consist of panelized, 6 foot high, heavy duty, welded wire steel fencing on a sturdy tubular frame. Lock or clamp sections of fencing together.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Provide all labour, materials, services and equipment necessary to complete the work of this section. Work includes, but is not limited to the following:
 - .1 Supply and install dust screens located within the loading dock area as indicated on the drawings. Provide negative air ventilation to the exterior via temporary exhaust fan to mitigate dust migration to the interior areas of the Gallery.
 - .2 Review all identified locations of concrete removals with the Consultant prior to proceeding with the work.
 - .3 Remove and dispose of the top 75mm of the sloped slab-on-grade within the limits shown on the drawings. Contractor shall remove top of concrete slab at both loading bays.
 - .4 Remove and dispose of existing concrete and necessary granular base to remove the existing drainage piping and accessories as shown in the drawings.
 - .5 Remove and dispose of existing trench drain. Remove and dispose of concrete locally to facilitate installation of new trench drain, pipe, pipe connections, and accessories to connect to new drainage layout as shown on the drawings.
 - .6 Perform a delamination survey of the slab to remain with the Consultant. Mark any unsound and delaminated concrete, review with Consultant prior to proceeding with further removals.
 - .7 Remove all deteriorated, delaminated and unsound concrete located within the identified repair locations, as defined in the Contract Documents.
 - .8 Perform additional concrete removals as directed by the Consultant.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA):
 - .1 CAN/CSA S448.1-10 (R2015), Repair of Reinforced Concrete in Buildings.
 - .2 CAN/CSA S269.1-1975 (R2003), Falsework for Construction Purposes.
 - .3 CAN/CSA S269.3-M92 (R2013), Concrete Formwork.
- .2 Ontario Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 Ontario Building Code, 2012.

1.3 SUBMITTALS

- .1 Submit to the consultant shop drawings for all temporary engineered shoring for the support of the existing structure prior to performing any concrete removals. Shoring drawings are to be signed and sealed by a Professional Engineer licensed in the Province of Ontario. Drawings submitted must clearly show the design criteria and the procedural sequence to be followed for shoring installation. Review of drawings does not relieve the Contractor of their responsibility for the design, adequacy, and safety of all shoring support. All temporary shoring and formwork is to be designed and installed in accordance with CAN/CSA S448.1, CAN/CSA S269.1 and CAN/CSA S269.3.

- .2 Prior to performing concrete removals, submit in detail a construction schedule indicating the date and time of proposed concrete removals. Obtain approval of the Construction schedule by the Owner/Consultant prior to the start of work. Concrete removals are to be performed only at times approved by Owner.

1.4 MEASUREMENT OF PAYMENT

- .1 The following clarifies what components of the work will be measured and paid for under the unit rates defined in the contract documents and what components are to be included in the lump sum base bid price:
 - .1 Concrete removals of the slab-on-grade beyond the limits shown on the drawings which extend to through slab depth (full depth) are to be performed as part of the unit rates defined in the contract documents. Quantities will be measured on site by the contractor in the presence of the consultant. Payment for repairs will be based on the quantities recorded, calculated and published by the consultant at the unit rates defined in the contract documents.
 - .2 Costs associated with carrying out a delamination survey and reviewing limits of all concrete repair locations with the consultant will not be measured separately and is to be included within the lump sum base bid price.
 - .3 Costs associated with engineered shoring design, preparation of shop drawings, revisions, installation and removal of all temporary engineered shoring to support the existing structure during concrete repair work will not be measured separately but considered incidental to the work and costs are to be included in the lump sum base bid price.

Part 2 Products

2.1 EQUIPMENT

- .1 Air Hammers
 - .1 Use 22 lb. (maximum) jack hammers for the removal of all concrete above the reinforcing steel.
 - .2 Use 15 lb. (maximum) chipping hammers for the removal of the concrete beneath the reinforcing, and for all final chipping.

Part 3 Execution

3.1 TEMPORARY SUPPORT

- .1 All structural members (such as slabs, columns, beams, walls, etc...) shall be adequately supported for the Contractor's equipment, removal operations, and vehicular traffic where applicable. Provide temporary shoring to maintain structural integrity, as required for the proper execution of the work. The cost for all shoring is to be inclusive to the repair item.
- .2 Install all temporary shoring and bracing in strict accordance to engineered shop drawings as required. Any deviations from the approved shop drawings are to be reviewed and accepted in writing by the engineer taking responsibility for the shoring design.
- .3 Shoring and bracing shall remain in place until repair concrete has reached the specified 28 day strength.

- .4 Shored structures shall be continuously supported to on rigid boards to distribute the load on the slab-on-grade. Slab-on-grade shall be checked by the Contractor for soundness prior to shoring installation.
- .5 The design of temporary shoring shall be conducted using the following design criteria:
 - .1 Live Loading: 2.4 kPa
 - .2 Shoring is to be designed to support the factored dead and live loads in accordance with the design methodology of the 2012 OBC. Original structural drawings will be made available to the Contractor.

3.2 REMOVAL

- .1 Identify all deteriorated concrete, including spalls, delaminations, scaling, honeycombing and unsound concrete, by the use of chain-drag and/or hammer-sounding prior to commencing with removals. Delineate same with suitable markings.
- .2 Review the repair areas with the Consultant prior to initiating removals.
- .3 Conduct concrete chipping and removals only during times approved by the Owner.
- .4 Remove areas of delaminated concrete to minimum removal depth of 3" (75 mm) and provide 1" (25 mm) clearance around exposed bars.
- .5 Remove areas of scaled concrete to a level of sound concrete (minimal removal depth of 1" (25 mm)).
- .6 Saw-cut the perimeter of all removal areas to a minimum depth of 3/8" (10 mm), to prevent feathering of repair concrete. Take precautions to prevent damage to existing reinforcement and/or buried services. Saw cutting to consist of clean, straight lines.
- .7 Support and secure reinforcement, as required, to maintain specified concrete cover, and to prevent movement during placement of repair concrete.
- .8 Replace and/or reinforce damaged or severely corroded reinforcement, in accordance with Section 03200 - Concrete Reinforcement and as indicated on the drawings. Record exact positioning of existing reinforcement, and install replacement in same position.
- .9 Dispose of all debris off site in accordance with all applicable governmental regulations.
- .10 Review all areas of repair with the Consultant prior to casting new concrete and provide as-built drawing(s) showing all areas of repair.

3.3 OPERATIONAL CONSTRAINTS

- .1 Avoid damage to adjacent concrete, reinforcing steel, other components and utilities to remain in place.
- .2 Concrete removal will not be permitted within 5 feet (1525 mm) of newly placed concrete for a period of 72 hours.
- .3 Air Hammers: The use of air breaker hammers heavier than 22 lb. is not permitted within 24" (610 mm) of concrete that is to remain in place.

3.4 PROTECTION

- .1 Supply and maintain during the course of the work all temporary work enclosures as required to carry out the work of this contract.

- .2 Supply and maintain all signage, barricades, hoarding and other related equipment as necessary to provide safety to the Occupants. All signage, barricades, hoarding and other related equipment to meet requirements of the Contract Documents and Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 Supply and maintain protection for existing asphalt, concrete aprons and existing steel components adjacent to areas of concrete removals. Asphalt, concrete or steel to remain which is damaged or defaced due to failure to provide such protection shall be removed, replaced, or repaired, as directed by the Consultant at no additional cost to the Owner.
- .4 Protect all sprinkler heads, electrical conduits, fixtures, plumbing and any other element located within area of concrete removals. Provide temporary support for items as required. Repair, replace or make good any items damaged as a result of work at no additional cost to the Owner.
- .5 Upon completion of all work, contractor shall include for cleaning and dusting all surfaces within the work area which includes the existing mechanical ducts and equipment above the loading dock bays.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Provide all labour, materials, services and equipment necessary to complete the work of this section. Work includes, but is not limited to the following:
 - .1 Supply, fabricate and erect concrete formwork required for new cast-in-place concrete for the following elements:
 - .1 Structural repairs to slab-on-grade, including but not limited to scissor lift pits, new trench drain, new drainage system components and concrete walls.
 - .2 Coordinate, arrange and pay for design and support of all concrete formwork (as required). Submit shoring/formwork drawings signed and sealed by a Professional Engineer licensed in the Province of Ontario.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA S269.1-16, Falsework and Formwork.
 - .3 CAN/CSA 0121-M1978 (R2003), Douglas Fir Plywood.
- .2 APA - The Engineered Wood Association.

1.3 MEASUREMENT OF PAYMENT

- .1 The following clarifies what components of the work will be measured and paid for under the unit rates defined in the contract documents and what components are to be included in the lump sum base bid price:
 - .1 All costs associated with the repair of existing structural components (i.e., slab-on-grade, trench drain, scissor pits, concrete walls, etc..) will not be measured separately and are to be included within the lump sum base bid price unit rates defined in the contract documents. Costs associated with the design, erection and removal of all formwork and related support components will not be measured separately and are to be included within the lump sum base bid price.

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials:
 - .1 Structural Components: Formwork materials to CAN/CSA-A23.1 and CAN/CSA 0121 for quality and strength. Provide square edged smooth panels of plywood, steel or plastic. Form surfaces to be true in plane, clean, free of holes, surface markings and defects.
 - .1 Medium density concrete forming plywood, manufactured using Douglas fir logs and a fully waterproof phenolic resin, with sealed edges, meeting

- the quality assurance program by APA - The Engineered Wood Association.
- .2 Minimum 19.0mm (3/4") nominal thickness.
- .3 Acceptable product:
 - .1 Pourform-107, as manufactured by Ainsworth Engineered or approved equivalent.
- .2 Form release agent:
 - .1 Chemically-active release agents containing compounds which react with free lime present in concrete to provide water-insoluble soaps, preventing set of film of concrete in contact with form.
 - .1 Non staining, water based, biodegradable form release agent. Acceptable product:
 - .1 Nox-crete (Form coating EB), as manufactured by Nox-crete or approved equivalent.
- .3 Falsework materials: to CSA S269.1.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork and falsework installation to ensure dimensions conform with existing site conditions or as detailed on the drawings.
- .2 Fabricate and erect formwork in accordance with CAN/CSA-S269.1 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1/A23.2 and to match existing site conditions.
- .3 Form repair to existing structural elements (i.e. concrete foundation walls and slabs) to match existing size, shape, profile and general arrangement.
- .4 Design, erect, support and brace formwork so that it will support all vertical and lateral loads from wet concrete and vibration procedures without distortion of the formwork until concrete has set.
- .5 Align form joints and make watertight. Keep form joints to minimum.
- .6 Design and erect formwork for easy removal without hammering or prying against new concrete surfaces.
- .7 Clean formwork in accordance with CSA A23.1/A23.2, before placing concrete.
- .8 Apply form release agent to interior surface of forms in strict accordance with the manufacturer's installation instructions.

3.2 REMOVAL AND RESHORING

- .1 Leave formwork and shoring in place for the following minimum period of time after placing concrete:
 - .1 Formwork: Until concrete has achieved 75% of required 28-day strength.

- .2 Shoring: Until concrete has achieved 100% of required 28-day strength.
- .2 Submit test results to the consultant demonstrating 75% or 100% of required 28-day strength has been achieved, and obtain Consultant's approval prior to removing any formwork or shoring.
- .3 Be solely responsible for safety of structure before and after forms are removed. Remove forms carefully so that concrete is not chipped or cracked and ensure that hardening is not due to freezing. Re-shore as required to limit deflections.
- .4 Provide all necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction, as directed by the Consultant.
- .5 Re-use formwork and falsework subject to requirements of CAN/CSA A23.1/A23.2, and as approved by the consultant.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Provide all labour, materials, services and equipment necessary to complete the work of this section. Work includes, but is not limited to the following locations:
 - .1 Supply and place reinforcement to replace or augment damaged or deteriorated reinforcing bars in existing structural building components (i.e. slab-on-grade, trench drain, etc) as directed by the Consultant. New reinforcement shall be plain billet steel to replace or augment existing. Plain billet steel shall also be installed where specifically noted.
 - .2 Epoxy coating (touch-up) shall be applied to existing exposed bars at localized repair areas (unit rate) as directed by consultant.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-09, Design of Concrete Structures for Buildings.
 - .3 CAN/CSA-G30.18-M92 (R2007), Billet-Steel Bars for Concrete Reinforcement.
 - .4 CSA G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 Systems and Specifications Manual, SSPC Painting Manual, Volume Two, Society for Protective Coatings (SSPC).
 - .1 SSPC-SP 1 - Solvent Cleaning
 - .2 SSPC-SP 3 - Power Tool Cleaning.

1.3 MEASUREMENT OF PAYMENT

- .1 The following clarifies what components of the work will be measured and paid for under the unit rates defined in the contract documents and what components are to be included in the lump sum base bid price:
 - .1 Replacement of all deteriorated reinforcing steel in structural components (i.e. slab-on-grade, etc.) are to be performed as part of the unit rates defined in the contract documents except as noted otherwise. Quantities will be measured on site by the contractor in the presence of the consultant. Payment for replacement will be based on the quantities recorded, calculated and published by the consultant at the unit rates defined in the contract documents.
 - .2 Supply and install new reinforcing steel as specifically noted on drawings. Payment for specifically noted steel shall not be measured separately and is to be included within the lump sum base bid price. Steel for new components shall be plain (non-epoxy coated) billet steel per standards noted above.

Part 2 Products

2.1 MATERIALS

- .1 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise. Size new reinforcing steel to match existing or as indicated on the drawings. The use of epoxy coated steel reinforcing steel shall not be acceptable.
- .2 Chairs, bolsters, bar supports, spacers: to. CAN/CSA-A23.1/A23.2.
- .3 Mechanical splices: subject to approval of the Consultant and as defined on the drawings.
- .4 Adhesive Resin: 2-component adhesive anchoring system designed for anchoring reinforcing steel to existing concrete structural systems.
 - .1 Acceptable material: Hilti HIT HY 200 as manufactured by Hilti Canada or approved equivalent.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, ANSI/ACI 315, and Reinforcing Steel Manual of Standard Practice by Reinforcing Steel Institute of Canada.
- .2 Obtain Consultant's approval for locations of reinforcing splices other than those shown on drawings.
- .3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
- .4 Bend reinforcing steel in accordance with details shown on the drawings.

2.3 SOURCE QUALITY CONTROL

- .1 Upon request, provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.
- .2 Upon request, inform Consultant of proposed source of material to be supplied.

2.4 TOUCH-UP PAINT EPOXY COATED REINFORCING (ONLY WHERE EXISTING)

- .1 Patch compound applied by brush or roller. Acceptable Material:
 - .1 Scotchkote 413/215 Rebar Liquid Patch Compound manufactured by 3M or approved equivalent.

Alternative materials will be accepted provided they are equivalent and listed in the Ontario Provincial Standards Specification (OPSS)
- .2 Primer: As required and recommended by the manufacturer.
- .3 The use of touch-up paint on non-epoxy coated steel reinforcing shall not be permitted and shall be removed if applied prior to concrete placement.

Part 3 Execution

3.1 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Consultant.

- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars which develop cracks or splits.

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel in accordance with CAN/CSA-A23.1/A23.2 and to match existing arrangement. Note: layout of reinforcing steel showing on concrete repair details is estimated and is not consistent with all areas of the slab, walls or columns.
- .2 Replace and/or augment damaged or deteriorated reinforcing steel that has been reduced to less than 90 percent of its original cross-sectional area (to be determined by Consultant). Replacement reinforcing bars shall be same diameter, length, type and spacing as the original. The minimum length of splice required for new reinforcing shall be in accordance with CAN/CSA-A23.1, Class 'B' splice, included below:
 - .1 10M Bar: 375mm (15") splice length beyond limit of deterioration, each side.
 - .2 15M Bar: 525mm (21") splice length beyond limit of deterioration, each side.
 - .3 20M Bar: 625mm (25") splice length beyond limit of deterioration, each side.
 - .4 25M Bar: 1000mm (40") splice length beyond limit of deterioration, each side.
 - .5 30M Bar: 1200mm (48") splice length beyond limit of deterioration, each side.
- .3 It is the Contractor's responsibility to record the exact position of reinforcing bars before removal, and to install new bars in same position. New bars shall be supported to maintain specified concrete cover. Reinforcement shall be fixed into position, so as to prevent movement during concrete placement and consolidation.
- .4 Notify Consultant when steel reinforcement installation is complete and before placing of concrete. At least 48 hours' notice shall be given to provide opportunity to review the Work.

3.3 APPLICATION OF EPOXY COATING

- .1 Prepare all surfaces of reinforcing steel in accordance with coating manufacturer's installation requirements.
- .2 Power tool clean all exposed reinforcing steel exhibiting signs of visible surface corrosion in accordance with SSPC-SP 3, following by solvent wipe cleaning in accordance with SSPC-SP 1.
- .3 Apply primer (as required) and new epoxy coating in strict accordance with the coating manufacturer's installation instructions to provided anti-corrosion coating to new and existing reinforcement.
- .4 Take care when applying primer and new epoxy coating to avoid getting coating onto adjacent concrete surfaces. Any epoxy coating observed on the surrounding concrete surfaces will not be accepted and must be removed to the satisfaction of the consultant.
- .5 The use of touch-up paint on non-epoxy coated steel reinforcing shall not be permitted and shall be removed if applied prior to concrete placement.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Provide all labour, materials, services and equipment necessary to complete the work of this section. Work includes, but is not limited to the following:
 - .1 Concrete Repairs (Structural):
 - .1 Supply, place and finish cast-in-place concrete for all structural repairs (i.e. slab-on-grade). Note repairs are to be carried out under the lump sum price as defined in the contract and as described below unless noted otherwise.
 - .2 Supply, place and finish cast-in-place concrete infill slab near access stair.
 - .2 Coordinate, arrange and pay for concrete testing (includes all structural concrete repairs), as defined in this section.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A23.1-09/A23.2-09 (R2014), Concrete Materials and Methods of Concrete Construction, Methods of Standard Test Practices for Concrete.
 - .2 CAN/CSA-A3000-13, Cementitious Materials Compendium (includes CSA-A3001, CSA-A3004 and CSA-A3005).
 - .3 CAN/CSA-A283-06, Qualification Code for Concrete Testing Laboratories.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM C260-06, Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C494/C494M-08a, Standard Specification for Chemical Admixtures for Concrete.
 - .3 ASTM C1107/C1107M-14a, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).

1.3 SUBMITTALS

- .1 Submit one (1) copy of the following information in accordance with Scope of Work, section 3. General Project Notes.
 - .1 Submit name of concrete supplier and plant address.
 - .2 Submit concrete mix design, including proportions and source of all constituent materials and admixtures; plastic air content test reports, hardened air-void spacing factor test reports.
 - .3 Submit results of concrete testing including results of 7 day and 28 day strength, air entrainment and slump tests.

1.4 MEASUREMENT OF PAYMENT

- .1 The following clarifies what components of the work will be measured and paid for under the unit rates defined in the contract documents and what components are to be included in the lump sum base bid price:
 - .1 Structural repairs to the slab-on-grade which exceed the limits of the locations noted in the drawings and which exceed the removals of the top of the existing slab, are to be performed as part of the unit rates defined in the contract documents. Quantities will be measured on site by the contractor in the presence of the consultant. Payment for repairs will be based on the quantities recorded, calculated and published by the consultant at the unit rates defined in the contract documents.
 - .2 Supply and install new sloped concrete slab-on-grade. All work associated with the construction of the new slab-on-grade will not be measured separately and is to be included within the lump sum base bid price.
 - .3 Supply and install new infill slab near access stair. All work associated with the construction of the infill slab will not be measured separately and is to be included within the lump sum base bid price.
 - .4 All inspection, testing and reporting specified, shall not be measured separately but considered incidental to the work and costs are to be included in the lump sum base bid price.
 - .5 The supply, installation and maintenance of insulated tarps, wood framing and/or scaffolding systems to protect newly placed concrete is to be included as part of the lump sum base bid price. The supply of supplemental heat (as required) to maintain the minimum curing temperature during 7 day curing period will be negotiated separately at an additional cost to the contract, as described below in item 3.5.6.

Part 2 Products

2.1 MATERIALS

- .1 Aggregates: normal density, satisfying the physical and gradation requirements of CAN/CSA-A23.1.
- .2 Hydraulic Portland Cement: shall conform to the requirements of CSA A3001 and CSA A23.1. Acceptable types of Portland cement for use on this project:
 - .1 General use hydraulic cement, Type "GU", acceptable for use in general concrete construction.
 - .2 High-early-strength hydraulic cement, Type "HE", acceptable for use in structural elements where high-early strength is required.
- .3 Water: potable, from municipal water main, to CAN/CSA-A23.1.
- .4 Air entraining admixture: to ASTM C260.
- .5 Chemical admixtures: if used shall conform to the requirements of ASTM C494/C494M and shall be compatible with each other and the air entraining admixture.
- .6 Calcium chloride or any admixture containing chloride shall not be used in the Work.

- .7 Curing compounds: if used, must be compatible with any finishes to be applied and shall conform to CAN/CSA-A23.1.
- .8 Polyethylene film: to CAN/CGSB-51.34.
- .9 Joint filler: 3/8" (10mm) Premoulded bituminous impregnated fibreboard.

2.2 CONCRETE MIXES

- .1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, to satisfy the following performance requirements:
 - .1 Minimum compressive strength at 28-days: 35 MPa
 - .2 Nominal size of coarse aggregate: 20 mm
 - .3 Air Content: Category 1
 - .4 Maximum water/cementing materials ratio: 0.40
 - .5 Exposure classification: C-1

2.3 PRE-PACKAGED CONCRETE REPAIR MATERIAL

- .1 Repair Concrete (permitted for use on horizontal surface repairs where the total repair quantities are low): High performance, pre-packaged concrete material containing Portland cement, silica fume, air admixture and 10 mm diameter aggregate. Minimum performance criteria as follows:
 - .1 Minimum compressive strength at 28 days 40 MPa to ASTM C39.
 - .2 Air Content: 7% +/- 2% to ASTM C457.
 - .3 Acceptable Product:
 - .1 MS-S10 Concrete, as manufactured by KPM Industries
- .2 Self-Consolidating Concrete (permitted for use on vertical surface column/foundation wall repairs where the total repair quantities are low): High performance, pre-packaged, flowable concrete material containing Portland cement, silica fume and 10mm diameter stone. Suitable for vertical surface concrete repairs to a minimum repair depth of 100mm (4"). Minimum performance criteria as follows:
 - .1 Minimum compressive strength at 28 days 40 MPa to ASTM C39.
 - .2 Air Content: 7% +/- 2% to ASTM C457.
 - .3 Acceptable Product:
 - .1 Master Emaco S 440, as manufactured by BASF
 - .2 MS-S10 Self-Consolidating Concrete, as manufactured by KING.
 - .3 Sikacrete-08-SCC, as manufactured by SIKA Canada.

2.4 POLYMER MODIFIED CEMENTITIOUS REPAIR MORTAR

- .1 Repair Mortar: Polymer modified, shrinkage compensated, cementitious repair mortar with corrosion inhibitor, suitable for shallow, vertical surface concrete repairs to base of existing columns and foundation walls, up to a maximum repair depth of 1-1/2" (38mm). Minimum performance criteria as follows:
 - .1 Minimum compressive strength at 28 days 35 MPa to ASTM C109.

- .2 Acceptable Products:
 - .1 Master Emaco N425, as manufactured by BASF.
 - .2 Planitop X, as manufactured by MAPEI.
 - .3 SikaTop 123 Plus, as manufactured by SIKA Canada.
 - .4 Super-Top OV, as manufactured by KING.

Part 3 Execution

3.1 PREPARATION

- .1 Obtain Consultant's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.
- .2 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .3 Ensure abrasive blast cleaning of all new/existing reinforcing steel is complete, as specified in Section 03350 - Abrasive Blast Cleaning.
- .4 Maintain accurate records of poured concrete items to indicate date, location of pour, air temperature, tests samples taken and field tests results.
- .5 Do not place load upon new concrete until authorized by the Consultant.

3.2 FORMWORK

- .1 Construct and install formwork for structural cast-in-place concrete repairs and new landscaping retaining wall in accordance with Section 03100 - Concrete Formwork and as detailed on the drawings.

3.3 CONCRETE PLACEMENT

- .1 Prior to placing new concrete, wet existing concrete surfaces to achieve a saturated surface dry (SSD) condition. Standing water will not be permitted at the time of concrete placement.
- .2 Place cast-in-place concrete in manner consistent with good construction practice for this type of work. Supply, mix, place, consolidate, finish and cure concrete in strict accordance with CAN/CSA-A23.1.
- .3 Vibrate concrete to ensure complete consolidation.
- .4 Provide all new concrete surfaces with a smooth, dense, finish free of blemishes to match existing.
- .5 At areas where new membrane is to be applied, provide concrete surfaces with a smooth, dense, finish free of blemishes by troweling to a minimum wood float finish acceptable to the Membrane Manufacturer.
- .6 Membrane Manufacturer to confirm via letter to the Consultant that surface conditions are acceptable prior to membrane application.
- .7 No water shall be added to the concrete mix or added to the placed concrete.
- .8 Following removal of formwork, repair all honeycombing, poorly consolidated concrete, and form/tie marks, as directed by the consultant.

3.4 CONTROL/ EXPANSION JOINTS

- .1 Form and install control and expansion joints in new/existing cast-in-place concrete elements in accordance with CAN/CSA-A23.1 and as shown in the drawings.
- .2 Install expansion joints to full depth of concrete and recess 1/4" (6mm) with finished surface.

3.5 CURING

- .1 Curing and protection shall be in accordance with CAN/CSA-A23.1. Apply curing as soon as possible after finishing, and without damage to surface.
- .2 Protect repair areas from damage during the curing period. Do not permit chipping operations adjacent to the new concrete for a minimum of seven (7) days after the installation of cast-in-place concrete.
- .3 The cast-in-place concrete should be shaded from direct sunlight or excessive wind for seven (7) days.
- .4 Moisture cure new concrete for a minimum of 7 days. Install wet burlap over newly placed concrete in accordance with CAN/CSA A23.1.
- .5 Curing temperatures shall be maintained between +10 degrees Celsius and +30 degrees Celsius for the entire curing period.
 - .1 The Contractor shall be responsible for supplying, installing and maintaining insulated tarps and wood framing and/or scaffolding for support of tarps as required.
- .6 The Contractor shall maintain the minimum specified curing temperature when the curing temperature is expected to or has dropped below +10 degrees Celsius. The Contractor shall include for the costs of #1 in the base bid amount. The supply of supplementary heat (item #2) will be negotiated separately, if required.
 - .1 The Contractor shall be responsible for supplying, installing and maintaining insulated tarps and wood framing and/or scaffolding for support of tarps as required. Remove tarping and enclosure when no longer required.
 - .2 Supply supplementary heat as required, and as approved by the Consultant, to maintain the minimum specified curing temperature throughout the entire curing period. The use of direct fired heaters discharging waste products into work areas will not be permitted.

3.6 QUALITY ASSURANCE

- .1 Testing of concrete and concrete materials shall be carried out by a testing laboratory designated by the Consultant, in accordance with CAN/CSA-A23.2. Testing agency shall be certified by the Canadian Standards Association CSA-A283 to perform the specified tests.
- .2 Concrete testing by an independent agency will include, but will not necessarily be limited to the following:
 - .1 One standard test for each truck of ready mixed concrete placed or for every three cubic meters (3 m³) of concrete mixed on site.. Each strength test will consist of three cylinders with proper identification and field data. One specimen will be tested at 7 days and two at 28 days. Submit test results to the Consultant.

- .2 Test cylinders are to be laboratory cured.
- .3 Perform one standard air entrainment test for each standard strength test.
- .4 Perform one standard slump test with each standard strength test.
- .3 Inspection or testing by Consultant will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

3.7 INSTALLATION OF POLYMER MODIFIED REPAIR MORTAR

- .1 Prepare existing surfaces, mix and install new polymer modified cementitious repair mortar in strict accordance with manufacturer's installation instructions or as supplemented herein.
- .2 Saw-cut limit of all concrete repair areas to a minimum depth of 3/8" (10mm). Complete all shallow surface concrete repairs as detailed on the drawings.

3.8 INSTALLATION SELF-CONSOLIDATING CONCRETE

- .1 Prepare existing surfaces, mix and install new pre-packaged, self-consolidating concrete in strict accordance with manufacturer's installation instructions or as supplemented herein.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Provide all labour, materials, services and equipment necessary to complete the work of this section. Work includes, but is not limited to the following:
 - .1 Perform abrasive blast cleaning of all new/existing reinforcing steel exposed within the concrete repair areas.
 - .2 Perform abrasive blast cleaning of all concrete and metal surfaces to be painted.
 - .3 Perform abrasive blast cleaning of all concrete surfaces to receive a coating as required by coating manufacturer.

1.2 REFERENCES

- .1 Systems and Specifications Manual, SSPC Painting Manual, Volume Two, Society for Protective Coatings (SSPC).
 - .1 SSPC-SP 6 - Commercial Blast Cleaning.
 - .2 SSPC-SP 10/NACE No.2 - Near-White Blast Cleaning.
 - .3 SSPC-SP 13 - Dry Abrasive Blasting
- .2 International Concrete Repair Institute (ICRI)

1.3 MEASUREMENT OF PAYMENT

- .1 The following clarifies what components of the work will be measured and paid for under the unit rates defined in the contract documents and what components are to be included in the lump sum base bid price:
 - .1 Abrasive blast cleaning of all exposed reinforcing steel in concrete repair locations will not be measured separately, but considered incidental to the work. Include all costs associated with abrasive blast cleaning in the lump sum base bid price.
 - .2 Abrasive blast cleaning of all existing concrete and metal components requiring painting, will not be measured separately, but considered incidental to the work. Include all costs associated with abrasive blast cleaning in the lump sum base bid price.
 - .3 Dry abrasive blast cleaning of concrete slab surfaces in preparation for application of new waterproofing membrane, will not be measured separately, but considered incidental to the work. Include all costs associated with abrasive blast cleaning in the lump sum base bid price.

Part 2 Products

2.1 ABRASIVE BLAST MATERIAL REINFORCING STEEL

- .1 All purpose, high density, abrasive material suitable for the abrasive blast cleaning operation. Acceptable material:
 - .1 Ebonygrit (Copper Slag), as manufactured by Opta Minerals Inc. Minimum performance, size and profile requirements:

- .1 #EG 14 - 2.8 to 4.0 Mil profile.
 - .2 Specific gravity: 3.8
 - .3 Grain Shape: Angular
 - .4 Hardness: 7 Mohs
- .2 Re-use of the abrasive blast material will not be permitted.

2.2 ABRASIVE BLAST MATERIAL CONCRETE SLAB SURFACE

- .1 Abrasive material suitable for the purpose of achieving the surface profile and amplitude recommended by the membrane manufacturer and in accordance with the International Concrete Repair Institute (ICRI) surface profiles.
- .2 Re-use of the abrasive blast material will not be permitted.

Part 3 Execution

3.1 NEW/EXISTING CONCRETE SURFACE PREPARATION

- .1 Surfaces to be waterproofed or painted shall be prepared in strict accordance with the membrane or paint manufacturer's instructions. As a minimum abrasive clean all new/existing concrete surfaces to receive waterproofing membrane or paint by dry abrasive blasting to SSPC-SP 13, surface preparation of concrete.
- .2 Newly placed concrete shall also receive the same treatment to remove all loose material, surface contaminants or laitance.

3.2 REBAR SURFACE PREPARATION

- .1 All exposed reinforcement shall be sandblasted to SSPC-SP10 (near-white blast cleaning). All mill scale, rust scale, paint or foreign matter must be removed by the use of abrasives. The surface shall appear a grayish, metallic white, very uniform in colour. Protect localized epoxy coated bar where directed by Consultant.
- .2 A maximum of 24 hours shall be allowed to elapse between the abrasive blast cleaning operation and concrete placement.

3.3 METAL SURFACE PREPARATION

- .1 Existing Steel surfaces to be painted shall be sandblasted to SSPC-SP 6 (Commercial Blast Cleaning). All mill scale, rust scale, paint or foreign matter must be removed by the use of abrasives. The surface shall appear a grayish, metallic white, very uniform in colour.
- .2 A maximum of 24 hours shall be allowed to elapse between the abrasive blast cleaning operation and painting.

3.4 PROTECTION

- .1 Provide protective screens where necessary, and at boundaries of work areas to protect all adjacent surfaces and work from damage. Take extra care while working in close proximity to glazing or architectural components.
- .2 Provide suitable protection to contain all abrasive materials within enclosed work area.

- .3 Clean and remove all blast media material from work area upon completion of work prior to proceeding.
- .4 Make good all items damaged as a result of this work, as directed by the Consultant, at no additional cost to the Owner.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Provide all labour, materials, services and equipment necessary to complete the work of this section. Work includes, but is not limited to the following:
 - .1 Abrasively clean and prepare all new/existing concrete slab and vertical wall surfaces for application of new slab coating over the entire area of work, as specified in section 03350 - Abrasive Blast Cleaning, and as recommended by the membrane manufacturer.
 - .2 Remove and replace all existing drains and piping as indicated with new and connect into existing plumbing (typical for all existing drains located within the area of work). Provide new drain, piping, sediment interceptor as indicated in the drawings. Replacement of all new and existing drains and piping with new is to be completed as part of the base bid price.
 - .3 Coordinate and arrange to have the membrane manufacturer visit the site to review the existing concrete slab surfaces, prior to application of new coating system. Perform additional surface preparation and/or cleaning of the existing slab surface as recommended by the manufacturer.
 - .4 Install new coating system in accordance with the manufacturer's written instructions, specifications and details contained herein.
 - .5 Coordinate, arrange and pay for in-situ bond testing of the bearing coating system.
 - .6 Install new traffic markings/line painting on all new membrane surfaces to match existing arrangement or as indicated on the drawings.
 - .7 Conduct pressure washing of entire work area upon completion and curing of new coating system application. Protect piping and sprinkler heads as required.
 - .8 Clean area of work and demobilize from site.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C1583/C1583M-13-e1, Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method).
 - .2 ASTM D 412-15a, Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
 - .3 ASTM D 903-98 (2010), Test Method for Peel or Stripping Strength of Adhesive Bonds.
 - .4 ASTM D 1004-13, Test Method for Initial Tear Resistance of Plastic Film and Sheeting.
 - .5 ASTM D 1149-16, Test Method for Rubber Deterioration - Surface Ozone Cracking in a Chamber (Flat Specimens).
 - .6 ASTM D 2240-15, Test Method for Rubber Property - Durometer Hardness.
 - .7 ASTM E 96/E96M-15, Test Methods for Water Vapor Transmission of Materials.

1.3 QUALIFICATIONS OF CONTRACTOR

- .1 Work of this Section shall be performed by a Contractor with adequate plant, equipment, and skilled tradesmen to perform work expeditiously, and is known to have been responsible for satisfactory installations, similar to those specified, during a period of at least the immediate past five years.
- .2 Contractor shall also be certified and/or approved by the system manufacturer as qualified to apply the specified system.

1.4 SUBMITTALS

- .1 Submit samples in accordance with, "General Requirements".
- .2 Submit coating manufacturer's specification data sheet and WHMIS Material Safety Data Sheets (MSDS) for all products used, including compliance test certificates.
- .3 Submit typical expansion joint systems drawings indicating dimensions of expansion joint, length, vertical turns, number, general construction, expansion joint opening dimensions, block out dimensions and product information.
- .4 Prior to application, submit written certification from the coating system manufacturer that the condition of substrate(s) was acceptable to the manufacturer.
- .5 Prior to application, submit written certification from the expansion joint system manufacturer that the condition of substrate(s) was acceptable to the manufacturer.
- .6 Prior to final payment, submit written certification from the coating system and expansion joint systems manufacturers certifying that the application was acceptable to the manufacturer.

1.5 PERFORMANCE REQUIREMENTS

- .1 Design topping to allow for structural movement or deflection of building, and span cracks in substrate surfaces to maximum 1.5 mm wide which may occur after installation of topping.
- .2 Design topping for pedestrian traffic and vehicular traffic.
- .3 Design moving joints to allow for structural movement and/or deflection of building, and accommodate repeated cycles of movement at joints, to a maximum of 25% of joint width.
- .4 Adhesion of the waterproofing to the concrete substrate must be a minimum of 0.7 MPa.

1.6 JOB CONDITIONS

- .1 Do not apply coating until all concrete work is complete.
- .2 Do not install membrane system when ambient air temperature or substrate temperature is less than the minimum recommended by the manufacturer.
- .3 Maintain air temperatures and structural base temperature of balcony topping installation area above minimum recommended temperature for 12 hours before, during and 72 hours after installation.
- .4 Do not apply in rain or when rain is expected within 24 hours of application time.
- .5 Provide protection from water runoff from adjacent areas, services or other water sources that will wet the substrate or waterproofing membrane system prior to it adequately curing.

Replace membrane damaged as a result of not providing such protection, at no additional cost to the Owner.

- .6 Provide adequate ventilation of work area.
- .7 Provide workers with adequate eye protection and respirator.

1.7 MOCK-UP

- .1 Construct mock-ups in accordance with Section 01001, "General Requirements", item 15 Mock-ups.
- .2 Construct a full scale mock-up demonstrating new traffic bearing membrane installation within one complete column bay of the parking garage (6m² minimum area), located within the parking stalls, as approved by the consultant. Mock-up of new membrane installation shall demonstrate all aspects of the work, including but not limited to the following:
 - .1 Minimum surface preparation and cleaning requirements of existing slab surfaces.
 - .2 Crack treatment procedures for both static cracks that are less than 1.6mm wide and dynamic cracks/joints that are greater than 1.6mm wide.
 - .3 Application of primer
 - .4 Application of basecoat (membrane)
 - .5 Application of top coat (wear coarse)
- .3 Mock-up will serve for initial review purposes by the Consultant and Owner, when accepted, shall represent the minimum standard of quality for all remaining work.
- .4 Arrange for the membrane manufacturer's technical representative to visit the site during mock-up installation, to review and provide comment/acceptance of the surface preparation and application procedures.
- .5 All materials used for mock-up must be in complete accordance with this Specification.
- .6 Mock-up, if accepted, may remain as part of the finished Work.

1.8 INSPECTION

- .1 Cooperate with the Consultant and provide access to all areas of work.
- .2 Arrange for membrane and expansion joint system manufacturer (as applicable) to have qualified technical representative visit site prior to commencement of work to discuss with Contractor, Subcontractor (applicator) and Consultant, the application procedures to be used and to analyze conditions of surfaces to be coated, and make alternative recommendations should adverse conditions exist. A separate surface preparation inspection is required for each phase of work.
- .3 Following review of the surface preparation, the manufacturers will be required to submit in writing a letter clearly indicating the following:
 - .1 Date of site visit.
 - .2 Letter indicating that they have reviewed the surface preparation and accepted the existing substrate conditions for application of the new waterproofing membrane/expansion joint system, or alternatively, clearly described items/surface conditions identified for repair and outline in detail the recommended repair procedures.

- .3 Define manufacturers minimum recommended cure times for newly placed concrete.
- .4 Arrange for the qualified technical representative to visit site at regular intervals during application and upon completion of work to ensure adherence to Specifications, and to check quality of completed work.
- .5 The above site visits by the system manufacturer shall be performed at no additional cost to the Owner.
- .6 In the event of a dispute regarding the quality of application of the waterproofing system or expansion joint system, flood testing may be performed (at the discretion of the consultant) to ensure no defects or leaks are present in the waterproofing system. The parameters and conditions of the flood test are to be defined by the consultant. If the results of the flood tests deem the installation to be satisfactory, the owner will assume and pay for the costs of the test. If defects are noted in the installation the contractor will assume and pay for all costs associated with the tests, including all costs associated with the repairs.
- .7 Correct any deficient work to the Consultant's satisfaction.

1.9 FIELD TESTING

- .1 Contractor will be required to coordinate, arrange and pay for one separate in-situ bond tests located within a 1.5m x 1.5m area of the completed traffic bearing coating system installation as part of this project. Parameters for in-situ bond testing include the following:
 - .1 Prepare existing slab surfaces (as specified in the contract documents) and apply primer, basecoat (membrane) and topcoat (wear surface) of new traffic bearing coating system over a 1.5m x 1.5m minimum area (in a location approved by the consultant).
 - .2 Allow a minimum of 7 days cure of new traffic bearing coating installation prior to beginning in-situ bond testing.
 - .3 Contractor to coordinate and complete one separate in-situ bond tests by an independent testing agency, in strict accordance with the requirements of ASTM C1583.
 - .4 Provide 48hrs minimum notice to the consultant prior to completing the in-situ bond testing. The consultant must be present during the test.
 - .5 Membrane manufacturer's technical representative must be present during in-situ bond testing.
 - .6 Based on the results of the in-situ bond test, membrane will be deemed to be bonded to the substrate if either of the following minimum criteria is met:
 - .1 If uniform substrate failure occurs (as deemed by the consultant), or
 - .2 If failure occurs along the bond line of the membrane to the substrate at, or greater than a pressure of 1Mpa (145psi).
 - .7 In-situ bond test area will not remain as part of the completed work.
 - .8 Testing agency to submit to the consultant a formal report summarizing the results of the in-situ bond test.
- .2 Based on the test results, the contractor/ manufacturer may be required to make any necessary adjustments to the surface preparation procedures required and level of cleaning of the existing slab surfaces to ensure bond of the new membrane system to the existing

slab. If adjustments are made to the level of surface preparation required as a result of bond failure of the new traffic bearing coating system, allow for one follow-up test (i.e. three separate in-situ bond tests located within a 1.5m x 1.5m area), at no additional cost to the owner.

- .3 In-situ bond testing must be completed prior to start of application of the traffic bearing coating system within the remainder the parking garage.
- .4 In the event of a dispute regarding the quality/level of surface preparation completed for the remaining work, additional in-situ bond testing may be performed (at the discretion of the consultant) to confirm general conformance of the current installation to the contract documents. The parameters and conditions of the in-situ bond testing will be performed as noted above in item 1.9.1. If the results of the in-situ bond testing deem the installation to be satisfactory, the owner will assume and pay for the costs of the test. If defects are noted in the installation the contractor will assume and pay for all costs associated with the tests, including all costs associated with the repairs.

1.10 WARRANTY

- .1 Provide written five (5) year labour and material warranties for the new traffic bearing membrane system and expansion joint system specified in this Section. Labour and material warranties will take effect on the date of Substantial Performance of the contract.
- .2 As part of the warranty submission the manufacturers shall submit in writing a reasonable maintenance schedule outlining in detail the recommended minimum cleaning and inspection requirements for the owner.
- .3 The Contractor shall warrant that the coating will be free of defects related to workmanship and/or material deficiency. The following shall be specifically covered under the warranty: water penetration, separation, scaling, delamination, debonding, crazing, cracking, crumbling, bubbling, shrinkage, pinholing, disintegration, sagging, change of colour, loss of adhesion, and staining of adjoining or adjacent materials or surfaces.
- .4 Correct deficiencies immediately. Any repair(s) required under the warranty shall be carried out in accordance with the requirements of this Specification and with the recommendations of the Consultant.
- .5 If warranty repairs are required, the Contractor will be required to phase the work in a manner which permits vehicular access to the remainder of the parking garage and does not result in more than 15 parking stalls being closed at any given time. As part of the warranty repair work, allow for installation of 1800mm high galvanized steel temporary construction fencing covered with opaque tarps to enclose the area of work and to minimize the spread of dust throughout the parking garage.

1.11 MEASUREMENT OF PAYMENT

- .1 Erection of hoarding, provision of signage, cleaning of the areas of work, supply and operation of equipment, etc., shall not be measured separately but included in the lump sum price component of work.
- .2 Application of the new traffic bearing coating/membrane system, including preparation of the substrate(s), crack treatment, membrane application, wear course application and other required work, shall not be measured separately but included in the lump sum component of work.

- .3 Replacement of all existing drains, including all associated plumbing modifications to connect new drains into existing piping, located on levels 4 & 5 of the parking garage shall not be measured separately but included in the lump sum component of work.
- .4 All inspection, in-situ bond testing and reporting specified, shall not be measured separately, but considered incidental to the work.
- .5 Application of the traffic markings and line painting shall not be measured separately but included in the lump sum component of work.
- .6 Installation of new expansion joint system and concrete block-out to allow is to be included as part of the lump sum price.

Part 2 Products

2.1 TRAFFIC BEARING MEMBRANE SYSTEM

- .1 Waterproof Traffic Coating: High-solids, low odour, waterproof traffic coating system consisting of a flexible, liquid applied, polyurethane membrane topped with a liquid applied polyurethane wear course, ultraviolet resistant with suitable aggregates to create a non-skid, traffic resistant wear surface. System shall include reinforcement, crack treatments, flashings and sealants. Acceptable traffic coating systems:
 - .1 MasterSeal Traffic 2500 Deck Coating System, as manufactured by BASF, consisting of the following components:
 - .1 MasterSeal P255 primer
 - .2 MasterSeal M 265 base coat
 - .3 MasterSeal TC 295 top coat
 - .2 Vulkem 360NF/951NF Deck Coating System, as manufactured by Tremco, consisting of the following components:
 - .1 Vulkem Primer 171
 - .2 Vulkem 360NF base coat
 - .3 Vulkem 951NF top coat
 - .3 Sikalastic Duochem 390/394 Deck Coating System, consisting of the following components:
 - .1 Sika MT Primer
 - .2 Sikalastik 390 base coat
 - .3 Sikalastik 394 top coat
- .2 See Sections 3.5 for specific membrane systems and their area of application.
- .3 All vehicular traffic coating materials to be utilized on this project are to be products of a single manufacturer.
- .4 Primer: as specified above or as recommended otherwise (based on existing slab surface conditions) by the traffic bearing coating system manufacturer, in writing.
- .5 Aggregate for Wear Course: as supplied and recommended by the traffic coating system manufacturer.
- .6 Reducer: as recommended by the traffic coating manufacturer.

- .7 Cleaner: as recommended by the traffic coating manufacturer.
- .8 Colour: wear course to be approved by the Owner, from manufacturer's standard colour selection. Membrane to be contrasting colour.
- .9 Joint and crack sealant: as recommended by the new membrane manufacturer.
- .10 Traffic paint: Permanent, retro-reflective yellow and/or white paint to match existing in accordance with OPSS 532. Acceptable product: Sikafloor Duochem LM
- .11 Paint thinner: to CGSB 1-GP-5M.

2.2 DRAINS and ACCESSORIES

- .1 Heavy duty, epoxy coated cast iron pit drain with removable backwater valve and seat. Acceptable product:
 - .1 Scissor Pit Drain: BV-600: manufactured by Watts Drainage Canada.
- .2 Pre-sloped polypropylene drain system with ductile iron frame. Acceptable product:
 - .1 Dead Level D: : manufactured by Watts Drainage Canada
- .3 Floor mounted epoxy coated steel solids interceptor with gasketed epoxy coated steel skid-proof cover secured with hex head center bolt(s), removable sediment basket, and no hub connection. Acceptable product:
 - .1 SI-770 Solids interceptor: : manufactured by Watts Drainage Canada.

Part 3 Execution

3.1 EXAMINATION

- .1 Clean all existing slab surfaces located within the entire area of work to permit detailed review of existing surface conditions by moderate pressure water, maximum 2,000 psi, with bio-degradable detergent/emulsion cleaner.
 - .1 Cleaning methods to be approved by the coating manufacturer.
- .2 Examine surfaces to receive new traffic bearing coating system with the consultant, and membrane manufacturer's technical representative, to ensure that all surfaces are in satisfactory condition for the commencement of the work of this Section, and are smooth, dry, and free from conditions that will adversely affect the execution, performance, or quality of the work.
- .3 Prior to commencement of any membrane installation work, ensure the following:
 - .1 Decks are firm, straight, smooth, clean and dry.
 - .2 All concrete repairs are complete and all newly placed concrete has cured for a minimum of 28 days.
 - .3 All concrete curbs at all mechanical/ electrical penetrations through the slab have been built.
 - .4 All new parking area drains have been installed to the proper elevations.

3.2 PREPARATION

- .1 Clean and prepare all new/existing concrete surfaces to receive traffic bearing coating system by Abrasive Blast Cleaning. As a minimum, mechanically prepare substrate to remove previous paint coatings, dirt, dust, oil, grease, coatings, laitance, efflorescence,

- mildew, fungus, cracked, brittle and non-adhering coatings, and miscellaneous surface contamination by shotblast method to profile equal to International Concrete Repair Institutes - CSP 3, as specified in Section 03350 - Abrasive Blast Cleaning.
- .2 Substrates to be dry and in sound condition.
 - .3 Existing membrane system to be removed to degree and level deemed acceptable to the new coating manufacturer. Abrade, scrap, condition, pretreat, re-activate and/or prime all areas in accordance to new coating manufacturer's written instructions. Existing areas of well bonded, sound membrane system may remain.
 - .4 Allow all new concrete, including all concrete repair locations to cure and air dry. All new concrete shall be allowed to cure for a minimum 28 days prior to membrane application, unless specified or approved otherwise by the membrane manufacturer in writing.
 - .5 Remove projections, surface irregularities and other conditions that will affect installation of new membrane system.
 - .6 Carry out and complete treatment of all cracks, as recommended by the membrane manufacturer. Minimum crack treatment requirements include the following:
 - .1 For all visible static/non-moving cracks less than 1.6mm wide (1/16 in.), clean crack surfaces, prime substrate and treat cracks with stretch coat (prestripping) using basecoat material, extending a minimum of 50mm on each side of crack, to yield a total thickness of 30 dry mils.
 - .2 For all visible dynamic/static cracks that are larger than 1.6mm wide (1/16 in.), route cracks to a minimum of 6mm wide by 6mm deep (1/4" x 1/4"), clean all cracks and apply bond breaker tape to prevent adhesion to bottom of joint. Prime joints as recommended by manufacturer, and apply recommended sealant to inside area of crack only. Detail sealed cracks, by prime adjacent concrete substrates and treat cracks with stretch coat (prestripping) using basecoat material, extending a minimum of 50mm on each side of crack, to yield a total thickness of 30 dry mils.
 - .7 During stretch coat (prestripping) application for all crack treatment, allow for the following:
 - .1 Apply stretch coat to thickness and distance on either side of all untreated cracks as noted above. Feather edges of stretch coat to avoid telegraphing through finishing coat.
 - .2 Allow stretch coat adequate time to dry, as recommended by coating manufacturer, prior to general application of waterproofing membrane.
 - .8 Prior to the application of the waterproofing, arrange for the coating system manufacturer to visually inspect the surface preparation and perform moisture content testing of the concrete, and to confirm the suitability of the substrate for membrane application.
 - .1 Correct all deficiencies identified by the coating system manufacturer.
 - .2 Submit written certification from the coating system manufacturer that the condition of the substrate(s) was acceptable to the manufacturer.
 - .9 Contractor will be required to prime all new and existing concrete surfaces as part of this project in accordance with coating manufacturer's written instructions. Install primer the same day that surface is cleaned and before deterioration or contamination of surface occurs.

- .10 Where existing membrane system is removed but concrete is sound, built-up surface over exposed concrete with new membrane to match surrounding membrane heights and elevations.

3.3 MEMBRANE COATING ENVIRONMENT

- .1 Do not apply coating when:
 - .1 Air temperature is below 5°C (41°F) or when temperature is expected to fall below 5°C (41°F) within 24 hours after application.
 - .2 Temperature of air and/or substrate(s) is within 5°C (5°F) of the ambient air dew point.
 - .3 Fog, mist or rain have just occurred or are present at site; it is raining or snowing; there is a danger of rain, fog, frost or snow; relative humidity is above 85%.
 - .4 Surface is wet, damp or frosted. Test surfaces with moisture meter before proceeding.
 - .5 Previous coat is not dry/cured.
- .2 Test for moisture content in each location immediately prior to commencing application.
- .3 Do not apply coating to surfaces where moisture content or ambient temperatures exceeds the manufacturer's maximum allowable values.
- .4 Maintain air temperatures and substrate temperature of traffic bearing coating installation areas above 5°C for 12 hours before, during and 48 hours after installation.

3.4 MEMBRANE MIXING

- .1 Follow coating manufacturer's instructions for mixing of multi-component coatings. Stir one-component coatings thoroughly to ensure consistency.
- .2 Mix thoroughly to ensure complete dispersion of components and pigments, and achieve uniform, workable consistency.
- .3 Mix only material quantities that can be safely used within the expected pot life.
- .4 Do not thin materials or use an accelerator without approval.

3.5 MEMBRANE COATING APPLICATION

- .1 After thoroughly vacuuming and cleaning the new/existing concrete substrate, apply primer to the properly prepared deck surfaces at the rate specified by the manufacturer (note: all new/existing horizontal and vertical concrete surfaces to receive new waterproofing membrane are to be primed as part of this project). Force primer into pores and voids to eliminate pinholes. Do not apply primer over stretch coat/prestripping.
- .2 Apply coating system to satisfy minimum recommended thicknesses and composition as described below or as recommended by the system manufacturer (whichever is more stringent). Apply coating(s) uniformly using a proper notched squeegee. Work into cracks, crevices, corners and sharp edges. Follow coating manufacturer's written instructions for the ideal coverage and thicknesses for optimal performance. The following provides a minimum application guideline for each manufacturer type by area of application:
 - .1 Type 1 (Driving Lanes):
 - .1 MasterSeal 2500 Deck Coating System, by BASF:

- .1 4 wet mils (0.1 mm) MasterSeal P 255 primer
 - .2 25 wet mils (0.64 mm) MasterSeal M 265-Z base coat
 - .3 20 wet mils (0.5 mm) MasterSeal TC 295 wear/top coat (1st coat)
 - .4 20 wet mils (0.5 mm) MasterSeal TC 295 wear/top coat (2nd coat).
- .2 Vulkem 360NF/951NF Deck Coating System, by Tremco:
 - .1 4 wet mils (0.1 mm) Vulkem primer 171
 - .2 25 wet mils (0.64 mm) Vulkem 360 NF base coat
 - .3 17 wet mils (0.43 mm) Vulkem 951NF wear/top coat (1st coat)
 - .4 15 wet mils (0.37 mm) Vulkem 951NF wear/top coat (2nd coat)
 - .5 10 wet mils (0.25 mm) Vulkem 951NF wear/top coat (3rd coat)
 - .3 Sikalastic Duochem 390/394 Deck Coating System, by Sika:
 - .1 8 wet mils (0.2 mm) of MT primer
 - .2 25 wet mils (0.64 mm) of Sikalastic 390 base coat
 - .3 20 wet mils (0.5 mm) of Sikalastic 394 wear/top coat (1st coat)
 - .4 20 wet mils (0.5 mm) of Sikalastic 394 wear/top coat (2nd coat)
- .3 Incorporate aggregate in deck coating at rate recommended by coating manufacturer, but not less than 0.5 kg/m² (0.1 lb/ft²). Broadcast and backroll aggregate as recommended by manufacturer. Apply between successive applications of top coat. Size and type of aggregate as recommended by coating manufacturer. Aggregate application for ramps and turning radii is to be applied to rejection unless noted otherwise.
 - .4 Follow coating manufacturer's written instructions for application of coating(s) and drying times to recoat, as well as criteria for acceptable drying weather.
 - .5 Provide integral membrane flashings at all locations where horizontal surface abuts a vertical surface (walls, curbs, and columns), and at all deck penetrations and posts. Membrane flashings shall be detailed and installed in accordance with the coating manufacturer's written instructions. Include all backer rod, tooled sealant cants, bond breaker, primer and membrane to size, length, composition, thickness and uniformity as per coating manufacturer's written instructions and the contract documents.
 - .6 The applied coating, including stretch coat, upturns, details and membrane flashings, shall be smooth and uniform in appearance, colour, texture and gloss, with no ghosting or flashing. The lap-in area shall exhibit uniformity with the rest of the areas being coated. There shall be no ridges, sags or wrinkles. The applied finish shall be free from coarse particles, dirt and other foreign matter. The finish shall be free from visible pinholes when viewed without magnification, with no craters or bubbles.
 - .7 Extend membrane and wear coarse a minimum of 200mm (8") up all vertical wall, column and curb surfaces. Wear course at vertical surfaces is to be conducted prior to conduction of wear course of horizontal surface to maintain straight clean lines.
 - .8 The membrane shall extend a minimum of 150mm (6") beyond doors into storage areas, mechanical rooms, etc., unless noted otherwise on the drawings. In these areas, the membrane shall be terminated in a saw-cut and feathered out as detailed on the drawings.

3.6 TEMPORARY PROTECTION

- .1 Provide temporary barriers and/or protection board to protect coating during curing period.
- .2 Protect all fixtures, equipment, surfaces and property not being coated from spatters, spills, overspray and other damage. These shall include, but not be limited to: doors, windows, finishes, equipment, hardware, wiring, piping, conduit, sprinkler heads, mechanical and electrical fixtures, etc. Clean and restore such surfaces as directed by Consultant. Remove protection upon completion of work.
- .3 Furnish sufficient masking, drop cloths, shields and other protective equipment as necessary in storage, preparation and work areas.
- .4 Protect freshly coated surfaces from excessive dust, temperature extremes and excessive humidity. Comply with material manufacturer's recommendations.
- .5 Follow manufacturer's recommendations for safety precautions. Ensure workers and general public are adequately protected during storage, handling, application and drying periods.

3.7 QUALITY ASSURANCE

- .1 Materials and workmanship will be subject to review, at any time, by qualified inspectors representing the Owner. Co-operate in permitting access for inspection to all places where work is being performed.

3.8 DEFICIENT WORK

- .1 Remove and replace any debonded membrane material. Repair any pinholes and areas of membrane that have inadequate thickness.
- .2 Repair all cuts and patches taken for inspection purposes.
- .3 Submit details of repair method to the Consultant prior to commencing such work.
- .4 In the event of failing the water leak test, repair or replace the defective membrane and repeat test.

3.9 TRAFFIC MARKINGS

- .1 Paint new traffic markings on membrane surfaces to match existing layout and general arrangement, or as indicated on the drawings.
- .2 Prepare surfaces and perform line painting in strict accordance with the paint manufacturer's recommendations.
- .3 Use paint thinner in accordance with manufacturer's requirements.
- .4 Protect completed line painting work until paint is fully cured, as recommended by the manufacturer.
- .5 Paint traffic markings prior to turning garage over to Owner. Provide sufficient time for paint to dry and/or cure to avoid damage to markings, vehicles or pedestrians.

3.10 CLEANING

- .1 Daily as the work proceeds and upon completion, remove all surplus materials and debris resulting from work of this Section.

- .2 Remove spilled, splashed, or splattered coating from all surfaces without marring the surface finish.
- .3 Touch up and restore coating and finishes where damaged.
- .4 During progress of the work, keep the premises free from any unnecessary accumulation of tools, equipment, surplus materials and debris.
- .5 Upon conclusion of work, remove all materials and debris connected with the work and leave the premises neat, clean and in condition as begun.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Provide labour, materials, services and equipment necessary to complete the work of this section. Work in this section includes, but is not limited to, the following:
 - .1 Priming and painting of all steel components within the limits of the work area including but not limited to:
 - .1 Top surface and edge of both dock levelers;
 - .2 Embedded steel angles at perimeter of both dock levelers;
 - .3 Embedded steel angle (top exposed edge) at access stair to load area;
 - .4 Access ladder;
 - .5 Existing loading dock scissor lift, top surface and edge;
 - .6 Embedded (new) steel angle at perimeter of both scissor lifts.
 - .2 Loading dock slab-on-grade line painting to match existing;
 - .3 Edge of upper loading dock, line painting to match existing;
 - .4 Lower portion of existing concrete walls at perimeter of loading area;
 - .5 All other work as specified herein or as detailed on the drawings.
- .2 All paint application to existing and new components shall match existing paint scheme. Contractor to photo document, measure/note existing high visibility paint scheme and reproduce to match.

1.2 REFERENCES

- .1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).
- .2 Systems and Specifications Manual, SSPC Painting Manual, Volume Two, Society for Protective Coatings (SSPC).
- .3 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).
- .4 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.59-97, Alkyd, Exterior Gloss Enamel.
 - .2 CGSB 85-GP-11M 80, Painting Steel for Protection Against Continuous Wetting.
 - .3 CGSB 85-GP-18M 80, Painting, Maintenance, Exterior, Steel, for Protection Against Continuous Wetting.
- .5 Canadian Painting Contractors' Architectural (CPCA).
 - .1 Painting Specifications Manual 1993.

1.3 QUALITY ASSURANCE

- .1 Contractor shall have a minimum of five years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.
- .2 Qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.
- .3 Conform to latest MPI requirements for exterior painting work including preparation and priming.
- .4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with MPI Painting Specification Manual "Approved Product" listing and shall be from a single manufacturer for each system used.
- .5 Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.
- .6 Retain purchase orders, invoices and other documents to prove that all materials utilized in this contract meet the requirements of the specifications. Produce documents when requested by Consultant.
- .7 Standard of Acceptance:
 - .1 Walls: No defects visible from a distance of 1000 mm at 90° to surface.
 - .2 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.4 SCHEDULING OF WORK

- .1 Submit work schedule for various stages of painting to Consultant for approval. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Obtain written authorization from Consultant for changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.5 SUBMITTALS

- .1 Submit the following information in accordance with Scope of Work, Section 3. General Project Notes.
- .2 Submit product data and manufacturer's installation/application instructions for all paints and coating to be utilized on this project.
- .3 Submit all WHMIS MSDS - Material Safety Data Sheets.
- .4 Upon completion, submit records of all products used. List products in relation to finish system and include the following:
 - .1 Finish formula designation.
 - .2 Product name, type and use.
 - .3 Manufacturer's product number/code.

- .4 Colour numbers.
- .5 Maximum VOC classification.
- .6 Manufacturer's Material Safety Data Sheets (MSDS).
- .5 Submit colour pallet indicating proposed colour selections for each type of paint, for review and acceptance by Owner, prior to project start-up.

1.6 SAMPLES

- .1 Submit samples in accordance with Scope of Work, Ssection 3. General Project Notes.
- .2 Submit one, 150mm x 150mm sample panel for each custom colour for review and approval by the owner. Sample is to include reference to manufacturer's colour code and product. Allow for one resubmission of custom colour if requested by the owner.
- .3 When approved, samples shall become acceptable standard of quality and will be retained on-site.

1.7 EXTRA MATERIALS

- .1 Submit one - four litre can of each type and colour of finish coating specified. Identify colour and paint type in relation to established colour schedule and finish system.
- .2 Deliver to owner and store where directed.

1.8 DELIVERY, HANDLING AND STORAGE

- .1 Deliver and store materials in original containers, sealed, with labels intact.
- .2 Labels shall clearly indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Provide and maintain dry, temperature controlled, secure storage.
- .5 Observe manufacturer's recommendations for storage and handling.
- .6 Store materials and supplies away from heat generating devices.
- .7 Store materials and equipment in a well ventilated area with temperature range 7°C to 30°C.
- .8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.
- .10 Remove paint materials from storage only in quantities required for same day use.
- .11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .12 Fire Safety Requirements:

- .1 Provide one 9 kg Type ABC / dry chemical fire extinguisher adjacent to storage area.
- .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Safety: comply with requirements of Work place Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .2 Apply paint finishes only when conditions forecast for entire period of application fall within manufacturer's recommendations.
- .3 Where surface to be painted is not under cover, do not apply paint when:
 - .1 Substrate and ambient air temperature are expected to fall outside limits prescribed in paint standard and by manufacturer.
 - .2 Temperature of surface is over 50°C unless paint is specifically formulated for application at high temperatures.
 - .3 Rain or snow are forecast to occur before paint has thoroughly cured; it is foggy, misty, raining or snowing on site; relative humidity is above 85%.
 - .4 Surface to be painted is wet, damp or frosted.
 - .5 Previous coat is not dry.
- .4 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
- .5 Apply paint finish only when dust is no longer being generated by related construction operations or when wind conditions are such that airborne particles will not affect the quality of the finished surface.
- .6 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
- .7 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .2 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

1.11 INSPECTION AND TESTING

- .1 Field review of all painting operations will be completed by Consultant. Provide Consultant and Owner access to all areas of work. Inspection completed by the consultant, does not relieve the contractor of their responsibility for quality control of the work.
- .2 Coordinate and arrange for paint manufacturer's technical representative to visit site prior to commencement of work to discuss with Contractor, Subcontractor (applicator) and Consultant, the application procedures to be used and to review substrate conditions and surface preparation. Manufacturer's technical representative must submit in writing a record of their site inspection and shall summarize in writing all recommendations given on-site.
- .3 Arrange for the qualified technical representative to visit the site at regular intervals during application and upon completion of work to ensure adherence to Specifications, and to check quality of work.
- .4 The above supervision from the paint manufacturer shall be performed at no extra cost to the Owner.

1.12 WARRANTY

- .1 For work of this section, the contractor shall provide a full 24 month (2 year) material and labour warranty for all painting work. The 24 month warranty will take effect on the date of publication of substantial completion of the project.
- .2 Warranty includes but is not limited to the following; supply and installation of all required access equipment, removal of all failed coating systems, carry-out required surface preparation and supply/install all paint and primer material.
- .3 The following shall be specifically covered under the warranty: Evidence of corrosion of the underlying substrate through the finished coating, flaking, crazing, peeling, blistering, chalking and discolouration of coating.
- .4 Any repair(s) required under a warranty claim shall be carried out in accordance with the requirements of the contract documents and recommendations of the coating manufacturer and consultant. The contractor shall include as part of their warranty all costs associated with providing access to facilitate any replacement under the project warranties.

Part 2 Products

2.1 MATERIALS

- .1 All paint materials for use on this project shall be products of a single manufacturer.
- .2 Paint materials shall be as follows according to substrate:
 - .1 Steel Surfaces:
 - .1 Primer (one coat):
 - .1 Pitt-Guard - All Weather Direct-to-Rust (DTR), 2-component, Epoxy Mastic Coating (97-946 Series), as manufactured by PPG Industries.
 - .2 Finish Coat (two coats):

- .1 Acrylic Aliphatic Urethane: Pitthane Ultra Gloss Urethane Enamel,(95-812 series), as manufactured by PPG Industries.
- .2 Colour: Custom colour match, to match existing original colour as close as possible. Final colour to be approved by owner.
- .3 Sheen: Sheen to match existing.
- .2 Concrete Surfaces:
 - .1 Primer (one coat):
 - .1 Seal Grip Acrylic Latex Stain Blocking Primer (17-921 Series), as manufactured by Pittsburg Paints.
 - .2 Finish Coat (two coats):
 - .1 Manor Hall Exterior 100% Acrylic Latex (70-101 Series, "Flat"), as manufactured by Pittsburg Paints.
 - .2 Colour & Sheen: to match existing as close as possible. Colour: White.
- .3 Solvents: Epoxy Thinner (product code 97-725), as manufactured by Pittsburg Paints. Only to be used to thin the "All Weather DTM Epoxy Mastic primer", as recommended by manufacturer.
- .4 Traffic Paint: Permanent, retro-reflective yellow paint to match existing in accordance with OPSS 532.

2.2 COLOURS

- .1 Finish Coat: Colour to match existing.
- .2 Selection of colours will be from manufacturers full range of colours.
- .3 Where specific products are available in a restricted range of colours, selection will be based on the limited range.
- .4 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.
- .5 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Consultant's written permission.

Part 3 Execution

3.1 GENERAL

- .1 Perform preparation and operations for exterior painting in accordance with CPCA Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.2 EXISTING CONDITIONS

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Consultant. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Concrete: 12%.
- .4 Perform a compatibility spot test to determine the compatibility of the new system with the existing. This should include: assuring the adhesion of the proposed system to the substrate; applying proposed system; and observing for adhesion, lifting, bleeding, or other evidence of incompatibility.
- .5 Supply in writing to Consultant proof of compatibility between new and existing system.

3.3 PROTECTION

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Consultant at no additional cost to owner.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Protect passing pedestrians, building occupants and general public in and about the building.
- .5 Removal of light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings shall be done prior to undertaking painting operations by General Contractor. Items shall be securely stored and re-installed after painting is completed by General Contractor.
- .6 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .7 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Consultant.

3.4 CLEANING AND PREPARATION

- .1 Existing Steel Surfaces (to be removed and painted off-site):
 - .1 Clean existing metal surfaces to be repainted in accordance with the following:
 - .1 Coating manufacturer's written instructions.
 - .2 Solvent cleaning: SSPC-SP-1.
 - .3 Hand Tool Cleaning: SSPC-SP-2.
 - .4 Power Tool Cleaning: SSPC-SP-3.
 - .2 Prepare all metal surfaces in accordance with SSPC-SP-3 (Power Tool Cleaning) and the coating manufacturer's written instructions. To remove all loose mill scale, surface rust, peeling paint, sealants or any other loose detrimental foreign matter down to bare metal. The contractor is not required to remove existing well bonded paint to bare metal. Feather all edges of the existing paint left in place so that the repainted surfaces will have a smooth appearance.

- .3 Perform Hand Tool Cleaning (SSPC-SP-2) only for detailed sanding and between coats.
- .4 Following the completion of hand/power tool cleaning wipe down all surfaces with dry, clean rags to remove any dust caused by the cleaning. Ensure rags are changed on a regular basis. Wash down all metal surfaces in accordance with SSPC-SP-1 (Solvent Cleaning).
- .5 Apply primer and paint only after prepared surfaces have been reviewed and accepted by the consultant.
- .2 New and Existing Concrete Surfaces (to be painted):
 - .1 New and existing concrete surfaces to be painted to be abrasively cleaned to remove all laitance and existing paint, in accordance with the following:
 - .1 Power Tool Cleaning: SSPC-SP-3
 - .2 Dry Abrasive Blasting: SSPC-SP-13
 - .2 Prepare all concrete surfaces in accordance with SSPC-SP-13 (Dry Abrasive Blasting) and the coating manufacturer's written instructions. To remove all concrete laitance, peeling paint, sealants or any other loose detrimental foreign matter down to bare concrete. Power tool cleaning will only be accepted for final detailing or where the element is in close proximity to an element that cannot be reasonably protected.
 - .3 Abrasive cleaning must be performed in a uniform and consistent manner such that markings, ridges, swirl marks, or similar irregularities in the concrete substrate do not remain. Use power tool cleaning to feather existing paint surfaces at limits of work.
 - .4 Following the completion of hand/power tool cleaning wipe down all surfaces with dry, clean rags to remove any dust caused by the cleaning. Ensure rags are changed on a regular basis.
 - .5 Apply primer and paint only after prepared surfaces have been reviewed and accepted by the consultant.

3.5 APPLICATION

- .1 Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Consultant Engineer.

- .4 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .6 Sand and dust between coats to remove visible defects.
- .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
- .8 After items have be reinstated or installed on-site, perform touch-up painting in general accordance with the painting requirements of this Section. Sand, feather and otherwise prepare surfaces to prevent abrupt changes in finish and appearance. As a minimum, all touch up work to include the application of two coats of finish paint.

3.6 FIELD QUALITY CONTROL

- .1 Advise Consultant when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .2 Co-operate with Consultant and provide access to all areas of work at all times.

3.7 RESTORATION

- .1 Clean and re-install all hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Provide all labour, materials, services and equipment necessary to complete the work of this section. Work includes, but is not limited to the following:
 - .1 Scissor Lift:
 - .1 Supply, install, and commission one scissor lift.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40, Primer, Structural Steel, Oil Alkyd Type. Anticorrosive Structural Steel Alkyd Primer.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual
 - .1 MPI #79, Primer, Alkyd, Anticorrosive for Metal.
 - .2 MPI EXT 5.1, Structural Steel and Metal Fabrications.
- .4 American National Standards Institute (ANSI)
 - .1 ANSI MH29.1 Safety Requirements for Industrial Scissor Lifts.

1.3 SUBMITTALS

- .1 Submit one (1) copy of the following information in accordance with Scope of Work Section 3. General Projects Notes.
 - .1 Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - .2 Storage and handling requirements and recommendations.
 - .3 Installation methods.
 - .4 Shop Drawings: Showing overall dimensions (width, height) and location of electrical service panels and motor locations. Supporting construction requirements and equipment structural attachment. Operating range and required clearances.

1.4 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Providing sole source for design, engineering, manufacturing and warranty claims handling. Company specializing in manufacturing products specified with a minimum 20 years' experience.
- .2 Installer Qualifications: Trained, certified and approved by manufacturer, with documented experience on similar projects.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Store products in manufacturer's unopened packaging until ready for installation.

1.6 PROJECT CONDITIONS

- .1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 1.8 WARRANTY

- .1 Provide manufacturer's standard warranty.

Part 2 Products

2.1 MANUFACTURERS

- .1 Acceptable Manufacturer: Pentalift Equipment Corp., which is located at: 21 Nicholas Beaver Rd. ; Guelph, ON, Canada N1H 6H9 ; Tel: 519-763-3625; Fax: 519-763-2894; Email: request info (dock@pentalift.com); Web: www.pentalift.com
- .2 C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 Stationary Dock Lifts (BASE PRICE):

- .1 Product: HED Series as manufactured by Pentalift Equipment Corporation.
- .2 Dock lift shall be built of 4-way safety tread plate with 8 inches (203 mm) bevel toe guards. The unit shall have a vertical travel of 59 inches (1499 mm) (except 84" long which is 50") and a lowered height of 12 inches (305 mm).
- .3 An 18 inches by 60 inches (457 mm by 1524 mm) one piece, high tensile steel bridge plate shall be provided on the rolling end. Plated access chain between guard rails on fixed end.
- .4 The hydraulic lift cylinder(s) shall be, equipped with an automatic bypass system at the top of cylinder stroke. A hydraulic velocity fuse shall be incorporated to prevent platform free-fall in the event a hydraulic hose is accidentally severed.
- .5 Pivot points to have chromed pins and maintenance free bearings.
- .6 Unit shall have two removable guardrails 42 inches (1067 mm) high with mid rails and 4 inches (102 mm) high kick plates.
- .7 An integral maintenance stand shall be provided for safety during servicing.
- .8 Controls shall be NEMA 4X pendant type push-button.
- .9 The power unit shall be remote mounted and consist of a totally enclosed motor with integral hydraulic fluid reservoir. The motor shall be equipped with NEMA 12 pre-wired enclosure.
- .10 Power supply to be 575V / 3Ø / 60Hz.
- .11 The dock lift shall be shipped complete with hydraulic fluid.
- .12 Unit shall have gray corrosion resistant painted finish.
- .13 Model HED 710: 84 inches by 120 inches (2134 mm by 3048 mm).

- .14 Capacity and Load Rating: Side edge load rating is 63% of overall capacity; end edge load rating is 80% of overall rated capacity for capacities less than or equal to 15,000 lb (6804 kg).
 - .1 Capacity: 12,000 lb (5443 kg).
- .15 Provide toe sensor.
- .16 Provide push button on coil cord.
- .17 Provide wall mounted push button.

2.3 Dock Lift Options (Optional Pricing)

- .1 Provide pricing for each of the following options:
 - .1 Line-ex or similar coating on platform.
 - .2 Hot dip galvanized platform.
 - .3 Hot dip galvanization of all structural steel components.

Part 3 Execution

3.1 EXAMINATION

- .1 Do not begin installation until substrates have been properly prepared.
- .2 If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- .1 Clean surfaces thoroughly prior to installation.
- .2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- .1 Install in accordance with manufacturer's instructions.
- .2 Hire a licensed and qualified electrician to provide and install all power wiring up to local junction box.

3.4 PROTECTION

- .1 Protect installed products until completion of project.
- .2 Touch-up, repair or replace damaged products before Substantial Completion.

3.5 TESTING, ADJUSTING, AND COMMISSIONING

- .1 Make all adjustments to allow for normal lift operation.
- .2 Notify Engineer one week before commissioning date.
- .3 Demonstrate normal operation to Engineer and facility personnel

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Provide all labour, materials, services and equipment necessary to complete the work of this section. Work includes, but is not limited to the following:
 - .1 Sanitary Drainage Piping and accessories in accordance with this specification, OBC, and the project drawings:
 - .1 Supply and install drainage piping
 - .2 Supply and install pit drains
 - .3 Supply and install cleanouts
 - .4 Supply and install trench drain with heat trace
 - .5 Supply and install solids interceptor
 - .6 Supply and install new trap seal primer per OBC

1.2 REFERENCE STANDARDS

- .1 ASTM International Inc.
 - .1 ASTM D2235-04, Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
 - .2 ASTM D2564-04e1, Standard Specification for Solvent Cements for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-Series B1800-06, Thermoplastic Nonpressure Pipe Compendium - B1800 Series.
- .3 Green Seal Environmental Standards (GSES)
 - .1 Standard GS-36-00, Commercial Adhesives.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 National Research Council Canada (NRC)
 - .1 National Plumbing Code of Canada (NPC).
- .6 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Scope of Work, Section 3, General Projects Notes.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for piping and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

- .2 Provide two copies WHMIS MSDS - Material Safety Data Sheets

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Store at temperatures and conditions recommended by manufacturer.

Part 2 Products

2.1 MATERIAL

2.2 PIPING AND FITTINGS

- .1 For buried DWV piping to:
 - .1 CAN/CSA B1800.

2.3 JOINTS

- .1 Solvent weld for PVC: to ASTM D2564.
- .2 Solvent weld for ABS: to ASTM D2235.

2.4 CLEANOUTS

- .1 Install cleanouts where shown on drawings and as required by OBC.
- .2 Extend cleanout opening to grade and provide a sealed removable cover rated for vehicle traffic

2.5 TRENCH DRAIN

- .1 Provide and install polypropylene (corrosion proof) trench drain rated for vehicle traffic as shown on drawings.
- .2 Install trench drain per manufacturer's instructions.
- .3 Watts Dead Level D pre-sloped Polypropylene Trench Drain System with polypropylene frame or approved alternate shall be acceptable.
- .4 Cut existing reinforced fiberglass grate to fit new trench drain and reinstall.

2.6 HEAT TRACING HEATING CABLES

- .1 Type D: self-limiting heating cable with copper ground wire, thermoplastic rubber primary and overall jackets. Heating capacity: 909 W; for use with 600 V power supply.
- .2 Thermostat: remote bulb type.

2.7 SOLIDS INTERCEPTOR

- .1 Provide and install solids interceptor as shown on drawings.

Part 3 Execution

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install in accordance with OBC
- .2 Hire a licensed and qualified electrician to provide and install all power wiring up to local junction box.
- .3 Install Type D heating cables in accordance with manufacturer's instructions. Distribute evenly along trench drain. Ensure that heating cables do not touch or cross each other. Run only cold leads in conduit and ensure sensing bulb does not touch cable. Ground shield to building ground. Coordinate cable installation with insulation application. Loop additional cable at fittings, valves, and flanges.
- .4 Make power and control connections.

3.3 TESTING

- .1 Pressure test buried systems before backfilling.
- .2 Hydraulically test to verify grades and freedom from obstructions.

3.4 PERFORMANCE VERIFICATION

- .1 Cleanouts:
 - .1 Ensure accessible and that access doors are correctly located.
 - .2 Open, cover with linseed oil and re-seal.
 - .3 Verify cleanout rods can probe as far as the next cleanout, at least.
- .2 Test to ensure traps are fully and permanently primed.
- .3 Ensure fixtures are properly anchored, connected to system and effectively vented.

3.5 CLEANING

- .1 Flush system with potable water.

END OF SECTION