NOTES

A. Design Parameters:

Soils:
γ = 21 kN/m³
Ka = 0.33 For Soil
Kp = 4.0
q = 12 kPa

1. Shoring design is based on drained conditions (i.e. No hydrostatic forces).

2. Shoring designs are intended to be temporary and have a limited design life. Design assumes the permanent structure be constructed within 12 months upon completion of excavation.

3. Any proposed supernormal loads such as crane outriggers or excavators applied to the top of the shoring, other than indicated on these drawings, must be provided for review and acceptance by RWH prior to placement.

4. Design is based on the assumption that the existing structure foundation configurations, elevations and loads (if specified) as indicated on the shoring drawings are correct. Should any of these assumptions change a redesign of the shoring may be required.

5. Anchor design adhesion = 400 kPa for rock anchors. To be verified by testing. Testing program to be prepared by RWH.

6. Design is in accordance with the structural requirements of the Ontario Building Code and the Canadian Highway Bridge Design Code.

7. All work is to be carried out in accordance with the Occupational Health and Safety Act.

B. Materials:

8. Structural steel design, connections, fabrication and erection is to conform to requirements of CSA S16.1, S136, the Canadian Institute of Steel Construction (CISC) "Code of Standard Practice for Buildings".

9. Structural steel to be new or sound material and conform to CSA CAN3-G40.21, Grade 350W for wide flanges, channel and hollow structural sections and Grade 300W minimum for plates, angles and all other shapes.

10. Alternative sections or grades of equivalent strength may be substituted subject to approval by RWH.

11. Welding to conform to CSA W59 and be performed by certified welders.

12. Concrete strengths to be as follows unless noted:

Piles and Lagging:	
Pile Toes	20.0 MPa;
Fill Above Pile Toes	0.4 MPa;
Anchorages	30.0 MPa.

Note: Both anchorage grout and shotcrete are to reach 50% of the final strength at three days.

13. Concrete materials, mixing, handling, design, formwork, rebar, placement, cutting and finishing to comply with CSA CAN3-A23.1, 2 & 3, unless modified in writing by RWH.

14. Anchors shall be fabricated from the following materials: ASTM A722 830/1035MPa (designated by diameter in mm i.e. 36mm Threadbar) or ASTM A615 517/690MPa (designated by # i.e. #11 Threadbar) or ASTM A615 500MPa (designated by R#) or ASTM A416 Fu=1864 MPa, A=140mm² per strand (designated as Strand). Exact sizes as shown in sections or when not shown to be chosen later for loads shown in the schedule.

15. Lagging to be 75mm timber lagging unless noted otherwise.

C. Piles and Lagging and Caisson Wall Construction Procedures:

16. Drill holes to sizes and depths indicated employing liners, mud drilling and/or other methods as required to avoid the ingress of soil or groundwater. Install piles plumb and to line. Fill holes with concrete strength as specified above.

17. Pile to be installed within 75mm tolerance from plan location and pile to be plumb within 0.5% of the excavated height in all directions.

18. Excavate in stages to suit shoring work.

19. Excavate installing lagging in maximum 1500mm lifts or as specified by RWH. Should caving or ravelling occur, reduce lift height. Leave a 1:1 berm above the excavation elevation. Leave no excavation open overnight. In the case of caisson wall trim face as required.

20. Where timber lagging is used, fill all voids behind lagging with excavated or imported granular material rammed in place or use lean mix.

21. Do not excavate more than 600mm maximum below support level. Install tiebacks, walers, rakers, raker pads and/or struts as specified on the drawings. Walers to be installed prior to raker and strut installation.

22. Tieback drilling method to be selected to prevent ground loss.

23. When grouting tiebacks, if grout takes are observed to be higher than the theoretical volume RWH to be notified prior to continuing with installation.

24. In advance allow for anchor performance load test to 150% of the design load. Perform one load test along each shoring wall or as directed by RWH. Allow for additional strand/bar capacity as required to facilitate testing. Production tieback lengths may require modification based on testing results. RWH to be present during performance testing.

25. Proof test all anchors to 133% of the design load shown in section or schedule not less than 72 hours after installation. Anchor must hold load for 10 minutes with less than 2mm creep. Lock off anchor at 105% of the design load. RWH to be present during anchor stressing.

30. Pre-load all corner struts, top and middle row rakers. Rakers to be pre-loaded to 50% of the design load not less than 72 hours after installation under typical conditions.

31. Maintain tieback strands/bars in good order to allow for re-stressing if necessary.

32. Tiebacks, braces and/or rakers are to be installed without delay to minimize shoring movements.

33. Do not continue excavation until support installation is complete and/or design load locked off in the case of tiebacks or preloaded (if required) in the case of rakers and braces.

34. Continue to final excavation level following the same procedure as outlined above.

35. Construct the basement structures and ground floor slab. Properly backfill the completed structures to grade.

36. Removal of any shoring elements to be reviewed and approved by RWH prior to proceeding with work.

37. In the case of piles and lagging, in wet ground provide spacers to create 10mm gaps between individual lagging boards, place filter material behind lagging to allow passage of water without loss of soil fines.

D. General Contractor:

38. Complete a pre-construction condition survey of all adjacent structures within the influence of the excavation.

39. Verify the existing foundation configurations and elevations of all adjacent structures during the demolition phase of the work. Report any discrepancies to RWH prior to the start of the shoring installation.

40. Secure appropriate encroachment agreements and permits where shoring components extend beyond the project property limits.

41. Elevation of site grades and underside of footings to be coordinated with structural and architectural drawings by the General Contractor prior to the beginning of shoring installation.

42. Locate and identify all existing underground and/or overhead services and structures within the influence of the shoring. General Contractor to confirm location of services as shown on the drawings in both plan and elevation. All services to be checked against service drawings and site locates provided by One Call Locates. Inverts of services must be checked on site at manholes and other available locations.

43. Confirm in writing that no discrepancies exist from the information presented on the drawings. Report any discrepancies and/or additional services discovered and advise of any potential interferences with shoring components to RWH prior to the beginning of shoring works. General Contractor to protect, relocate or replace services as required.

44. Excavate in advance to remove any underground obstructions that will interfere with shoring installation, backfill and compact voids.

45. Reduce grade to top of shoring. Provide and maintain a level working surface adequate for shoring equipment and build up working platforms as required.

46. Provide layout information such that shoring elements can be located and constructed in all three dimensions. Layout shoring including all pile locations and check all dimensions. General location of shoring and building layout to be done from architectural drawings. Do not use shoring drawings alone to lay out piles. Report any discrepancies or inconsistencies to RWH prior to proceeding with shoring installation.

47. Excavation must be kept dry at all times, where necessary dewater in advance to lower the water table to a minimum of 1m below the lowest excavation level to eliminate negative impact on shoring operations. Shoring is not designed to accommodate a water table above the bottom of excavation or to retain water unless specified otherwise.

48. Protect shoring and/or soil face from erosion as required. Redirect water away from the top of the shoring as required to prevent material washout behind the shoring wall.

49. Protect shoring and/or soil face from the effects of freezing as required. Minimum R2 frost blankets must be available on site should use be necessary. Heating may be required to combat frost effects.

E. Excavation:

50. General Contractor to flag installed shoring system below grade prior to excavation. Excavator to dig in lifts and follow procedures as outlined in the shoring construction procedures and the configurations of typical excavation berming details when shown on the drawings. Do not over-excavate beyond the design or Shoring Contractors requirements.

51. General Contractor to supervise Excavators trim line at shoring face. Do not excavate within 3000mm of shoring face unless Shoring Contractor is present.

52. Excavator to exercise care when digging near stressed anchors and rakers.

53. Excavator to report any wall breaches or shoring damage immediately. Backfill and berm material at any such locations and report to the Shoring Contractor, General Contractor and RWH. Do not continue with further excavation in the area.

F. Monitoring (By General Contractor or Owner):

54. Provide complete vertical and horizontal movement precision monitoring of the shoring. Monitoring shall include but is not limited to the following:

a. Unless otherwise noted provide targets at the top of every second pile (minimum) or on the top row of every second panel in the case of shotcrete shoring. Installation of inclinometers at the discretion of RWH.

On shoring wall install one inclinometer in the middle of the wall or as indicated on the shoring drawings. Inclinometer depth to be to the base of the pile toe.

b. Take target readings with an accuracy of ± 2mm for vertical and horizontal movement. Readings to be taken weekly during active excavation activities or as otherwise specified by RWH. At the discretion of RWH, and if felt necessary for the safety of the project, readings be taken more frequently and/or at critical stages of the excavation. Monitoring frequency throughout construction to be stepped down as directed by RWH.

c. Express the readings clearly in spreadsheet and graphical form and in mm only. Positive movements are into the excavation and down. For each weekly reading the spreadsheet should show the location change of each target from the last reading and from the first reading. The spreadsheet should also show the reading history.

d. Provide preconstruction survey of all adjacent structures that are in the influence of the excavation and/or may be affected by shoring operations. Provide target monitoring of all buildings to detect damage or settlement for the duration of shoring operations. Readings to be taken weekly during active excavation activities or as otherwise specified by RWH. Monitoring frequency throughout construction to be stepped down at the discretion of RWH.

e. If targets are found to be obstructed or damaged at a reading, reestablish before next reading and report to RWH.

f. All monitoring reports to be distributed promptly to RWH and Shoring Contractor.

G. References:

55. Geotechnical Report:
As produced by Landtek Limited dated Sept. 9, 2016 File Number: 14124.

As produced by Landtek Limited dated Jan. 19, 2015 File Number: 14124.

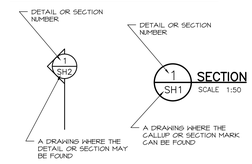
56. Structural:
N/A

57. Architectural:
Drawings A200 to A203 dated Jun. 04, 2021 by Core Architects.

58. Civil:
Drawings G2.1 to G2.2 dated Apr. 26, 2021 by MTE.

Structural, Architectural and Geotechnical Consultants to check that documents noted above have not significantly changed.

CROSSREFERENCING CONVENTION



No.	Description	Date
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1.	ISSUED FOR PERMIT	21/06/04
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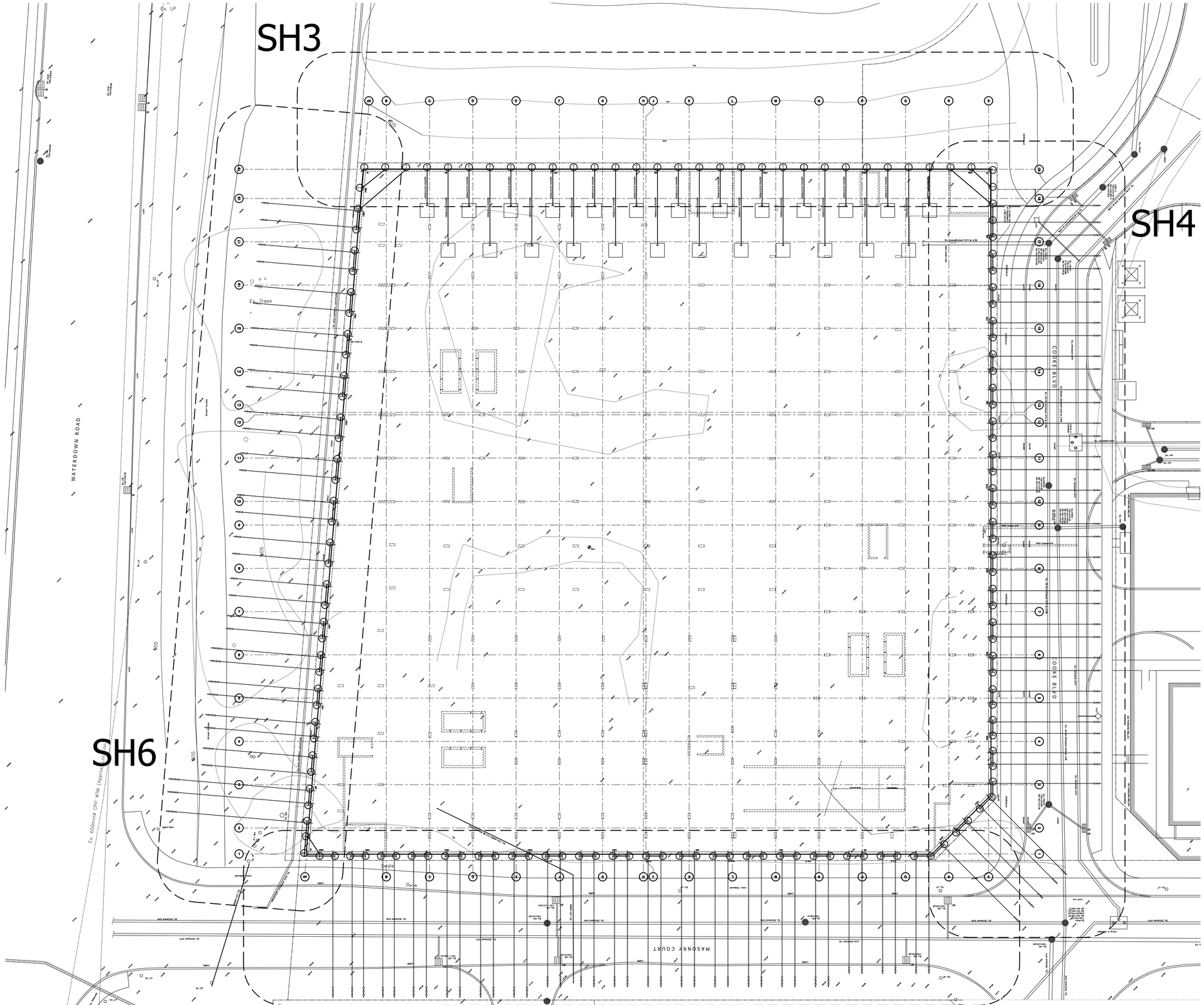
Project
1120 COOKE BLVD
STATION WEST PHASE 2
BURLINGTON ONTARIO

Drawing Title
NOTES

Drawn	R.C	Scale	AS NOTED
Checked	K.D.	Date	ARR 2021
Project No.	J21-022	Drawing No.	SH1

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1 KEY PLAN
SH2 SCALE 1:200

No.	Description	Date
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Project

1120 COOKE BLVD
STATION WEST PHASE 2
BURLINGTON ONTARIO

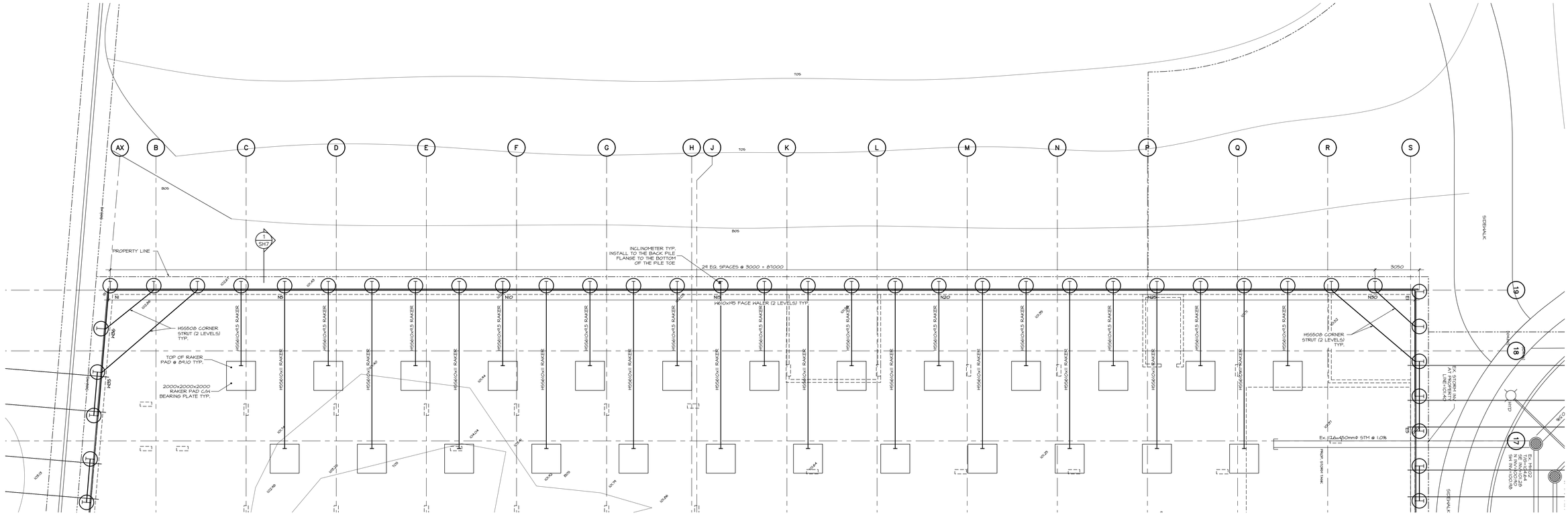
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KEY PLAN

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Project No.	J21-022	Drawing No.	SH2

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1 / SH3 PLAN (NORTH WALL)
SCALE 1:100

No.	Description	Date
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Project

1120 COOKE BLVD
STATION WEST PHASE 2
BURLINGTON ONTARIO


Drawing Title

PLAN (NORTH WALL)

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Checked	K.D.	Date	ARR 2021
Project No.	J21-022	Drawing No.	SH3

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1 / SH4 **PLAN (EAST WALL)**
SCALE 1:100

No.	Description	Date
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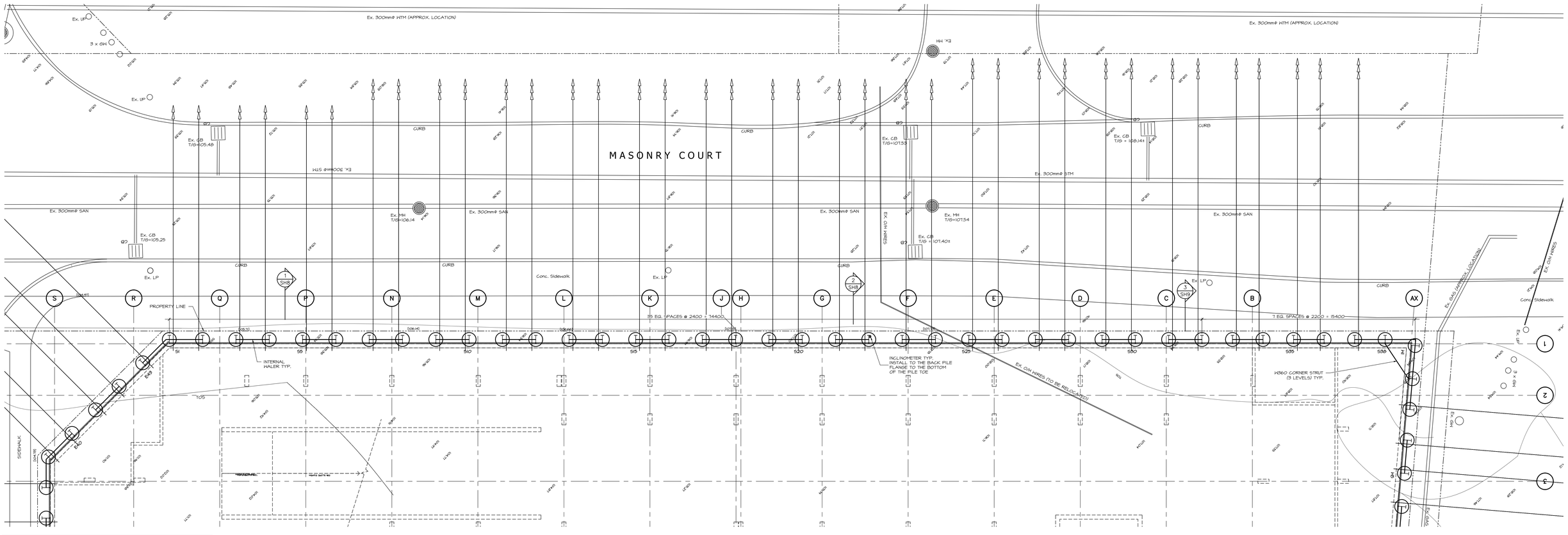
Project
1120 COOKE BLVD
STATION WEST PHASE 2
BURLINGTON ONTARIO

Drawing Title
PLAN (EAST WALL)

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Checked	K.D.	Date	ARR 2021
Project No.	J21-022	Drawing No.	SH4

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1 / SH5 PLAN (SOUTH WALL)
SCALE 1:100

No.	Description	Date
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Project

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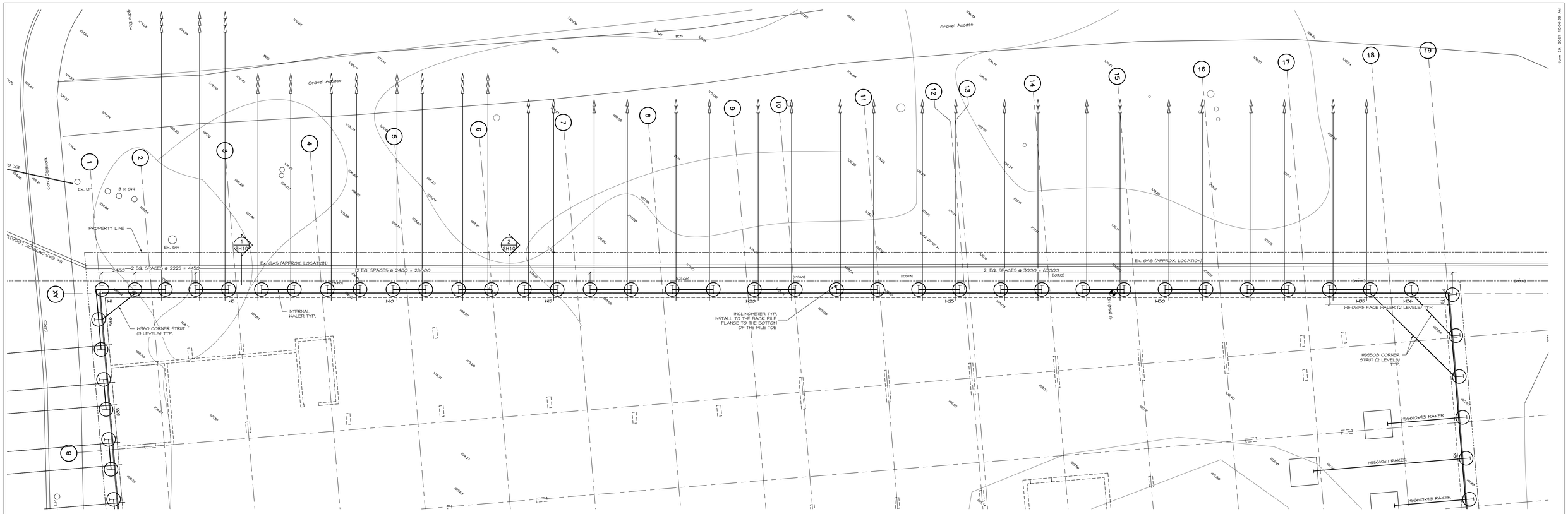
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PLAN (SOUTH WALL)

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R.C	AS NOTED
Checked	Date
K.D.	APR 2021
Project No.	Drawing No.
J21-022	SH5

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1 / SH6 PLAN (WEST WALL)
SCALE 1:100

No.	Description	Date
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Project

1120 COOKE BLVD
STATION WEST PHASE 2
BURLINGTON ONTARIO

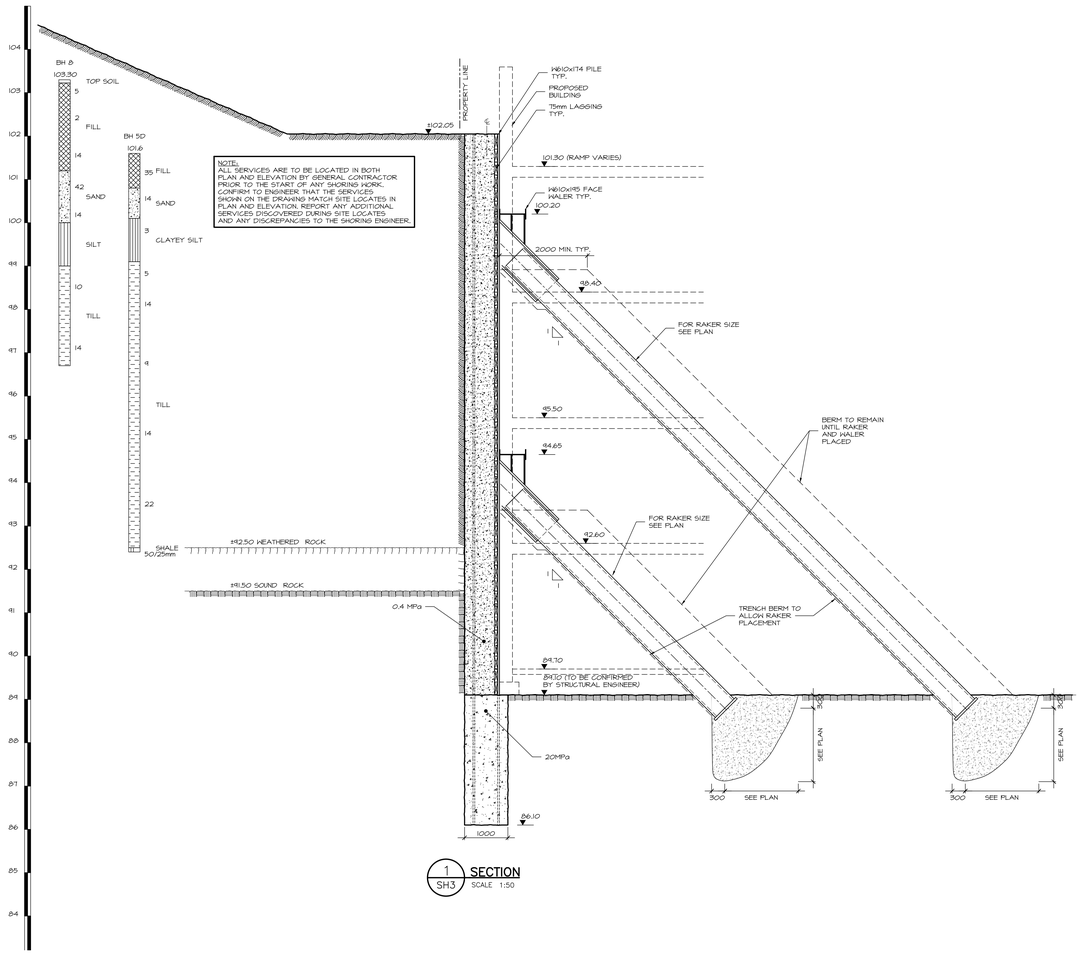
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PLAN (WEST WALL)

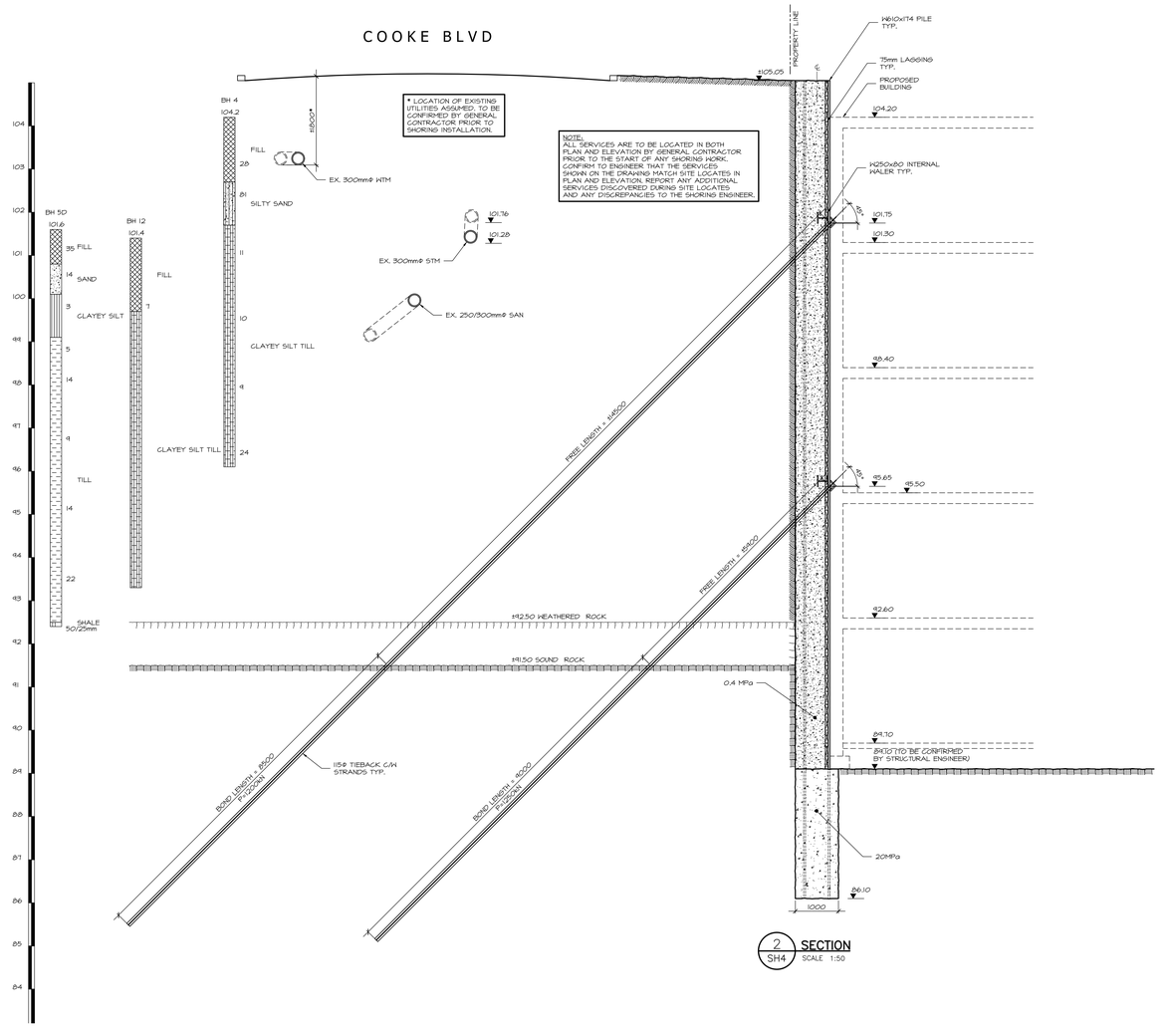
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1 SH3 **SECTION**
SCALE 1:50



2 SH4 **SECTION**
SCALE 1:50

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June 29, 2021 10:06:48 AM

No.	Description	Date
2.	ISSUED FOR PERMIT	21/06/29
1.	ISSUED FOR PERMIT	21/06/04
0.	ISSUED FOR PERMIT	21/04/22

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LICENSED PROFESSIONAL ENGINEER — K.T. YEOH — 100132919 — PROVINCE OF ONTARIO

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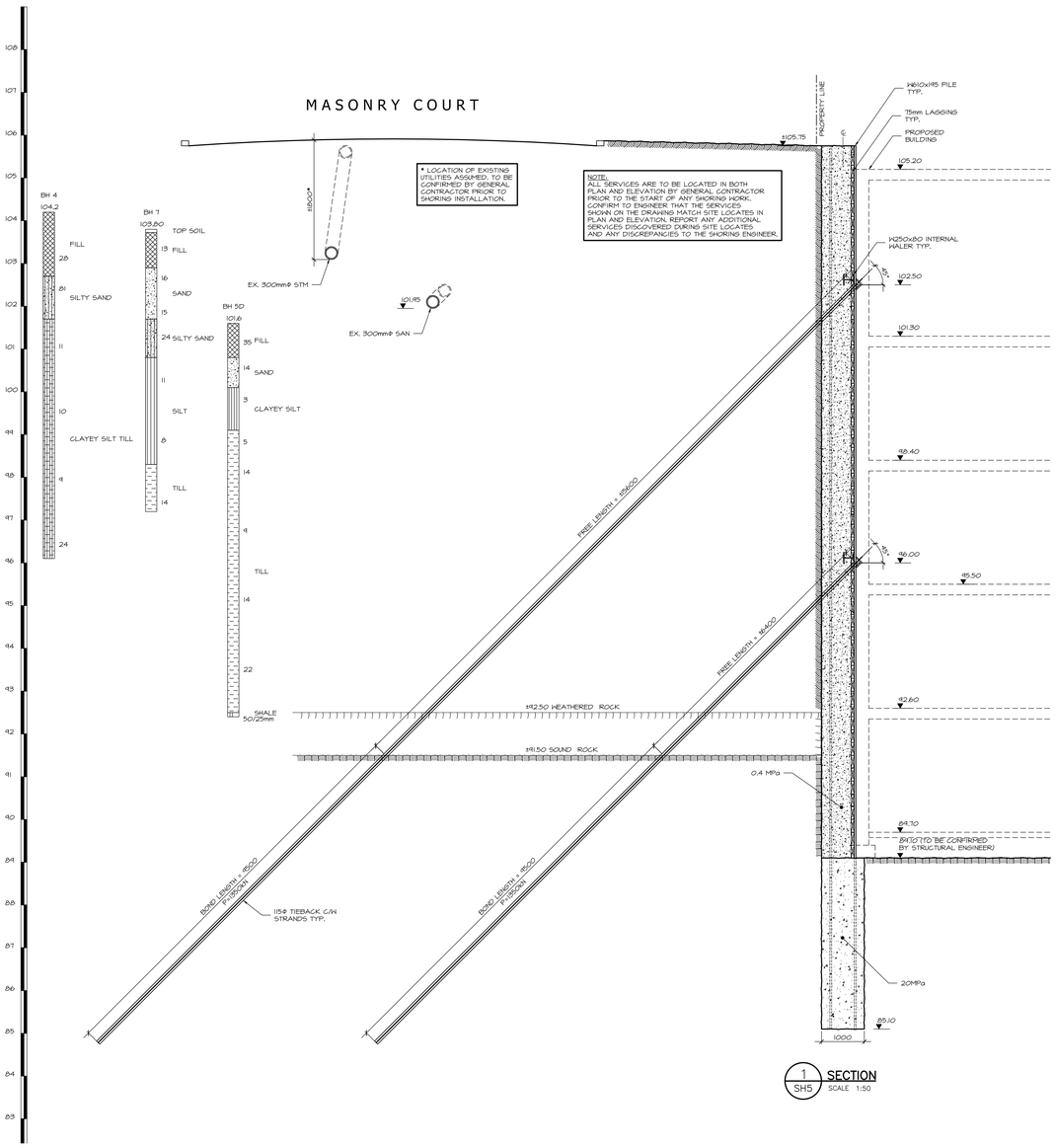
Project

1120 COOKE BLVD
STATION WEST PHASE 2
BURLINGTON ONTARIO

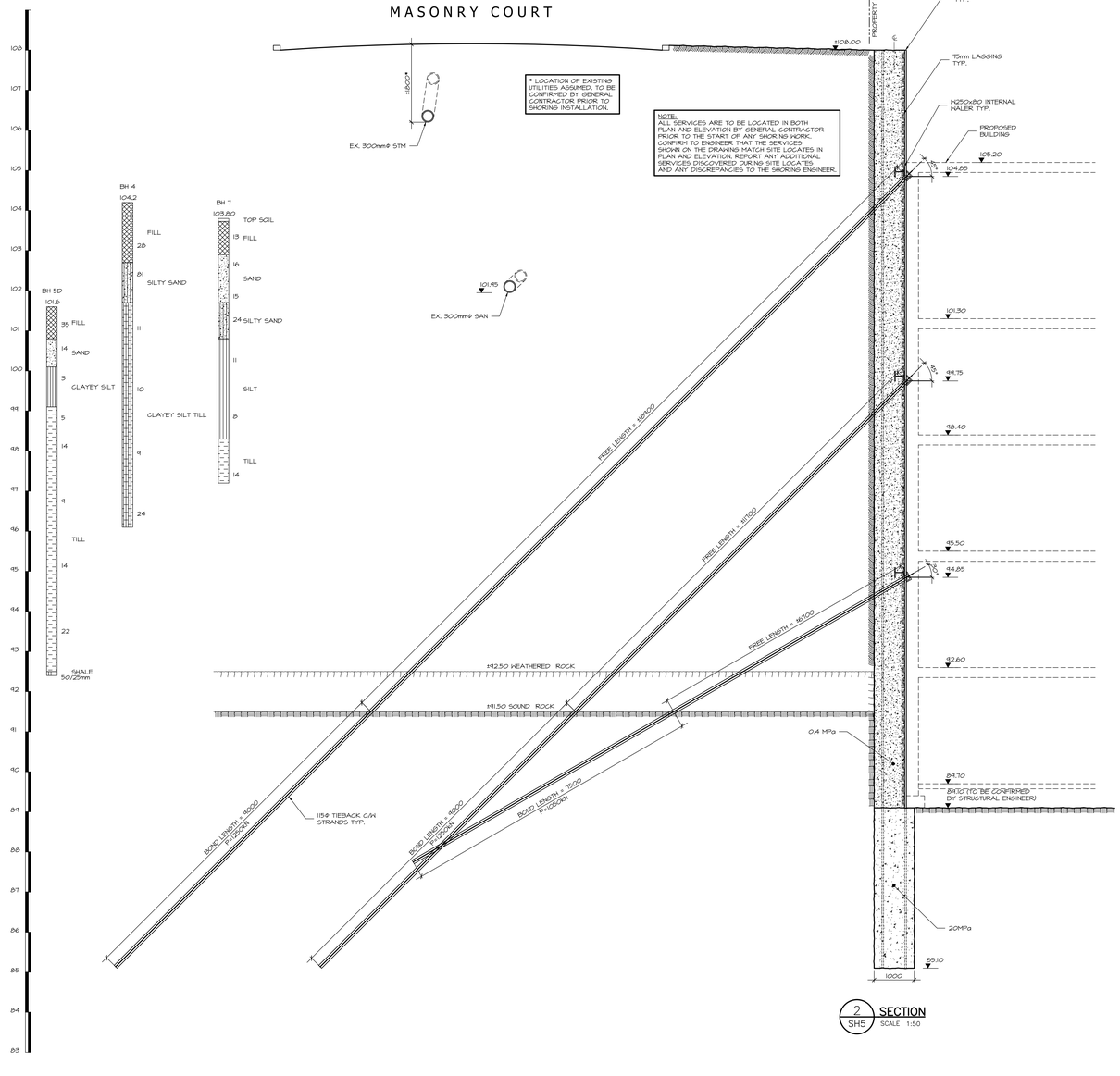
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Checked	Date
K.D.	ARR 2021
Project No.	Drawing No.
J21-022	SH7



1 SH5 SECTION
SCALE 1:50



2 SH5 SECTION
SCALE 1:50

No.	Description	Date
2.	ISSUED FOR PERMIT	21/06/29
1.	ISSUED FOR PERMIT	21/06/04
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Project

1120 COOKE BLVD
STATION WEST PHASE 2
BURLINGTON ONTARIO

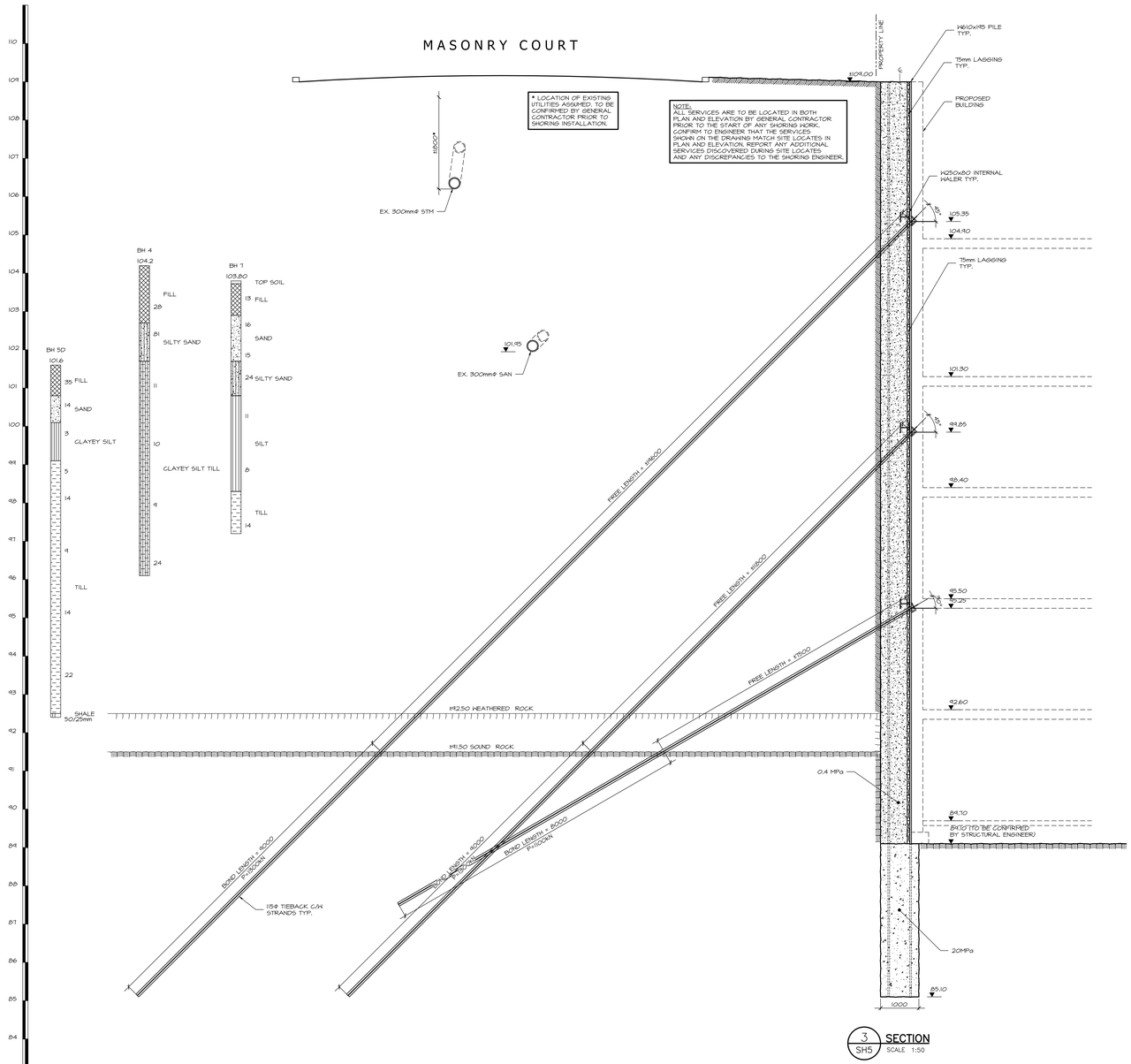
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Project No.	J21-022	Drawing No.	SH8

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3 SH5 **SECTION**
SCALE 1:50

No.	Description	Date
2.	ISSUED FOR PERMIT	21/06/29
1.	ISSUED FOR PERMIT	21/06/04
0.	ISSUED FOR PERMIT	21/04/22

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Project

1120 COOKE BLVD
STATION WEST PHASE 2
BURLINGTON ONTARIO

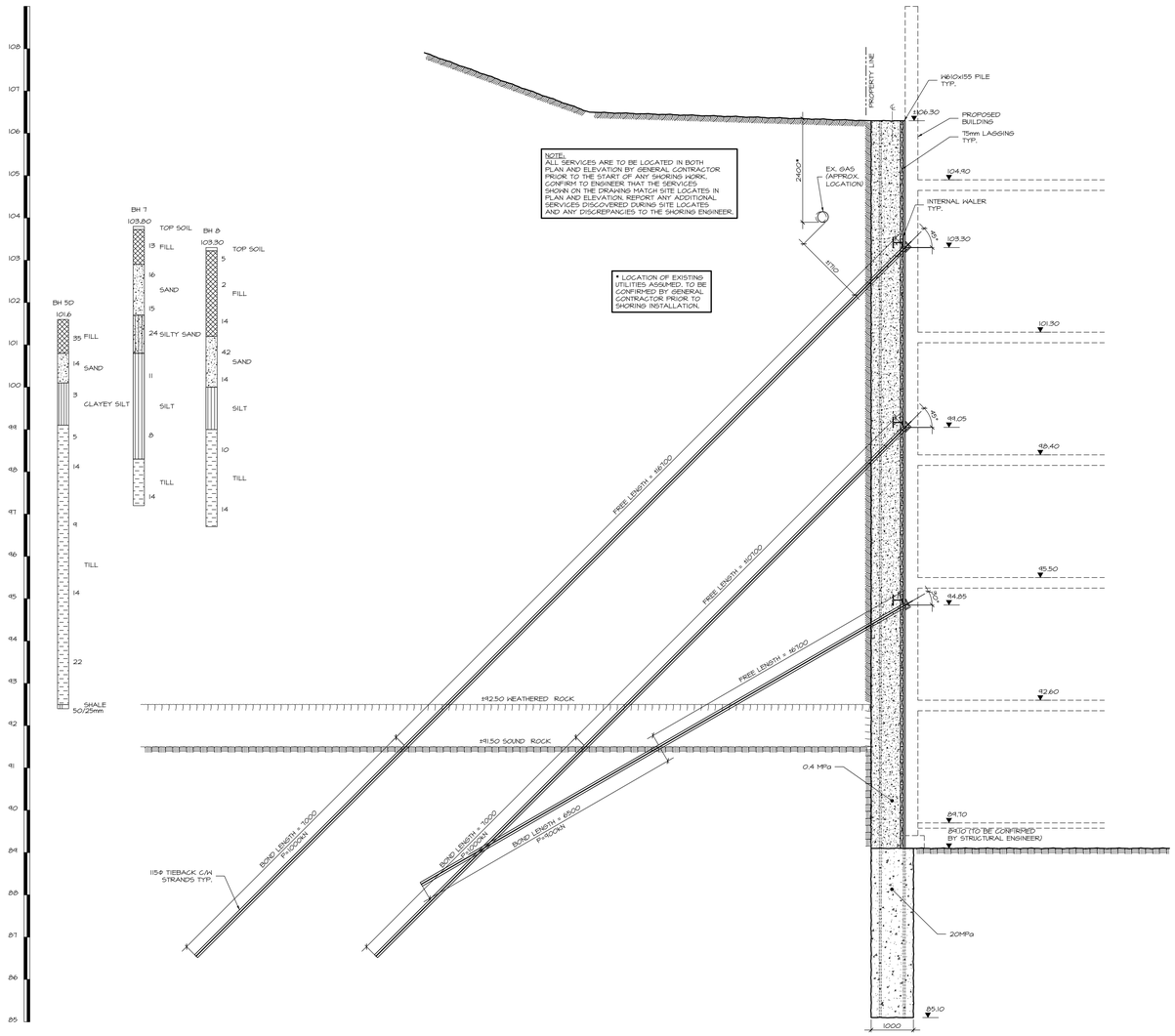
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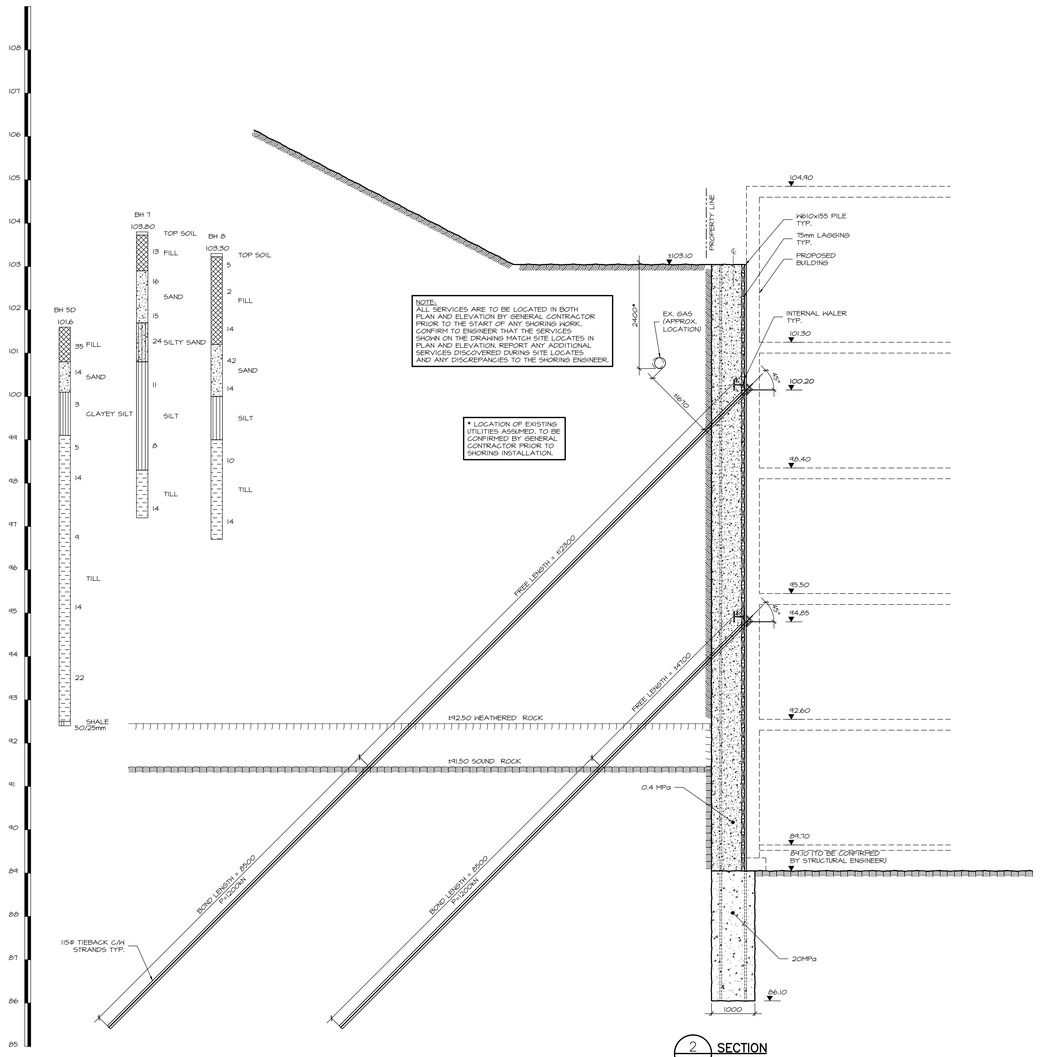
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Project No.	J21-022	Drawing No.	SH9

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1 SH6 **SECTION**
SCALE 1:50



2 SH6 **SECTION**
SCALE 1:50

No.	Description	Date
2.	ISSUED FOR PERMIT	21/06/29
1.	ISSUED FOR PERMIT	21/06/04
0.	ISSUED FOR PERMIT	21/04/22

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Project

1120 COOKE BLVD
STATION WEST PHASE 2
BURLINGTON ONTARIO

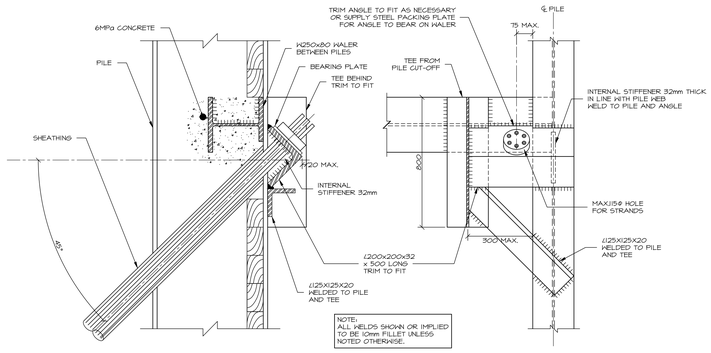
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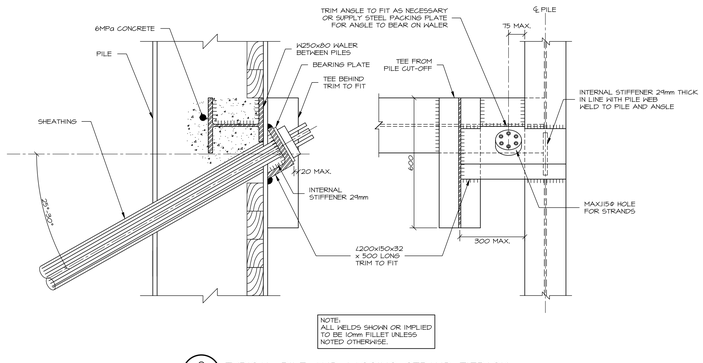
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Checked	Date
K.D.	ARR 2021
Project No.	Drawing No.
J21-022	SH10

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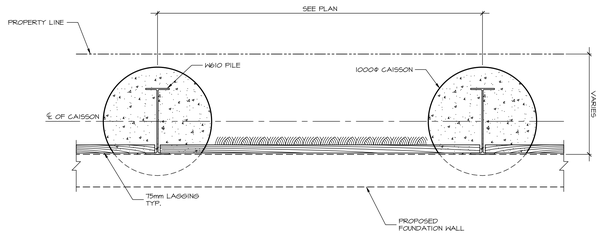
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1 / SH12 SCALE 1:10 **TYPICAL PILE AND LAGGING STRAND TIEBACK CONNECTION DETAIL (>1000kN)**



2 / SH12 SCALE 1:10 **TYPICAL PILE AND LAGGING STRAND TIEBACK CONNECTION DETAIL (>1000kN)**



3 / SH12 SCALE 1:20 **TYPICAL PILE AND LAGGING DETAIL**

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1.	ISSUED FOR PERMIT	21/06/04
0.	ISSUED FOR PERMIT	21/04/22

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Project

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STATION WEST PHASE 2

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DETAILS

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Checked	K.D.	Date	ARR 2021
Project No.	J21-022	Drawing No.	SH11

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