The City of Winnipeg
Water and Waste Department
Engineering Division

Wilkes Reservoir North Cell Rehabilitation

Bid Opportunity 930-2015

Mandatory Bidder's Conference

Held at: Dillon Consulting Limited
1558 Willson Place
Winnipeg, MB R3T 0Y4

December 2 & 3, 2015 – 10:00am

City Project Manager
Rob Carroll, P.Eng.

Dillon Consulting Limited
Sital Rihal, M.Eng., P.Eng.
David Amorim, EIT
Fred Kemp, P.Eng.

Introductions

Outline

- Project Background
- Project Site
- Laydown Area (Completed by Others)
- Security Requirements
- Environmental Requirements
- Project Scope and Details
- Equipment Restrictions Within the Site
- Material Requirements Within the Cells
- Conclusions
- Q&A

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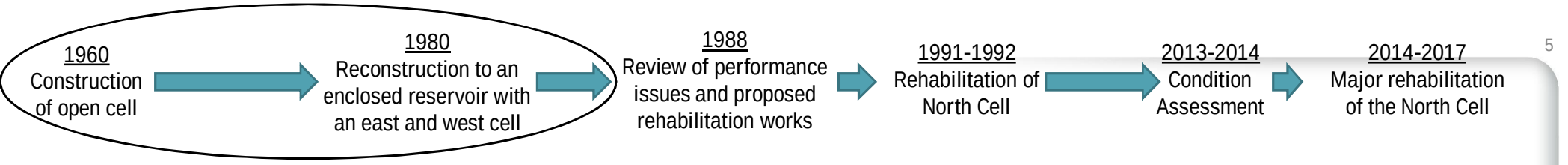
Project Background



Project Background

- Wilkes Reservoir constructed as an open cell reservoir in 1960 and reconstructed as an enclosed cell in 1980.
- 1980 reconstruction divided the North Cell into East and West cells.
- Reconstruction of the North Cell consisted of:
  - Cast-in-place perimeter wall and footing on hexagonal precast concrete piles.
  - Interior precast columns founded on cast-in-place footings with hexagonal precast concrete piles. Columns on a 10 m x 11 m grid.
  - Precast inverted-tee beams supporting 1220 mm x 305 mm hollowcore roof slabs.
  - Replacement of approximately 30% of the existing unreinforced concrete floor slab.
  - Roof envelope: minimal waterproofing. Reservoir left uninsulated.

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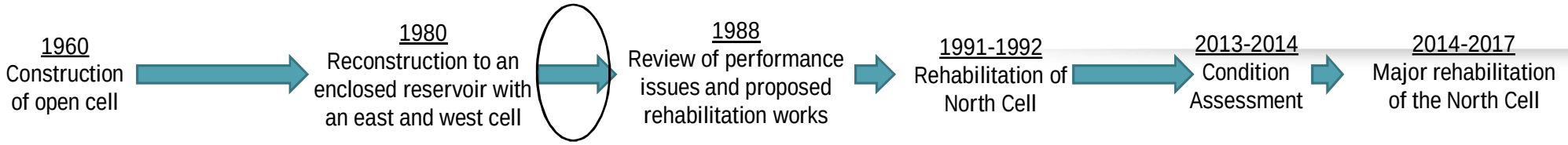

Project Background Cont.

- Within 3 years of reconstruction, major issues were noted with the reservoir during routine inspections including:
  - Roof envelope did not perform to prevent leakage into cells.
  - Foundation settlements and roof depressions.
  - Uncontrolled roof movements with jamming of expansion joints.
  - Concrete spalling at ends of precast concrete beams.
  - Side splitting and bulging of the precast beam neoprene bearing pads.
  - Popouts and cracking in hollowcore slabs.
- Freeze/thaw cycles without adequate waterproofing and insulation contributed to rapid deterioration.

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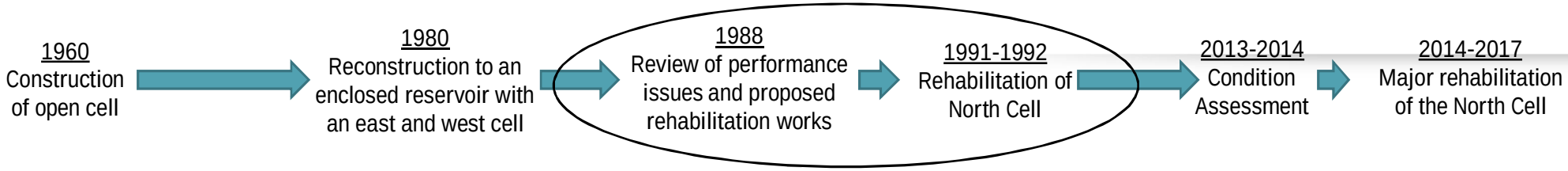

Project Background Cont.

- In 1988, detailed review of North Cell performance issues completed.
- Majority of problems attributed to performance of roof envelope.
- In 1991-1992, the North Cell was rehabilitated to address the noted problems.
  - 1991 – Structural Rehabilitation.
  - 1992 – Building envelope installation.
- Rehabilitation consisted of:
  - Replacement of deteriorated hollowcore slabs.
  - Installation of new building envelope: protected membrane roof (PMR) consisting of EPDM membrane on protection board, rigid insulation and a geotechnical fabric held down by concrete paving slabs.
  - Miscellaneous concrete repairs: beam end spalls and hollowcore popouts/cracking.
  - Underpinning of pile caps to control foundation settlement.

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1960
Construction of open cell → 1980
Reconstruction to an enclosed reservoir with an east and west cell → 1988
Review of performance issues and proposed rehabilitation works → 1991-1992
Rehabilitation of North Cell → 2013-2014
Condition Assessment → 2014-2017
Major rehabilitation of the North Cell

Project Background Cont.

- In 2013, Dillon was retained by WWD to perform a Condition Assessment of the North Cell.
- Condition Assessment included:
  - Exterior Inspection:
    - Roof elevation survey
    - Inspection of building envelope
  - Interior Inspection:
    - Underside of roof (hollowcore slabs/beams) by boat
    - Floor slabs/walls/suction pits of empty cells

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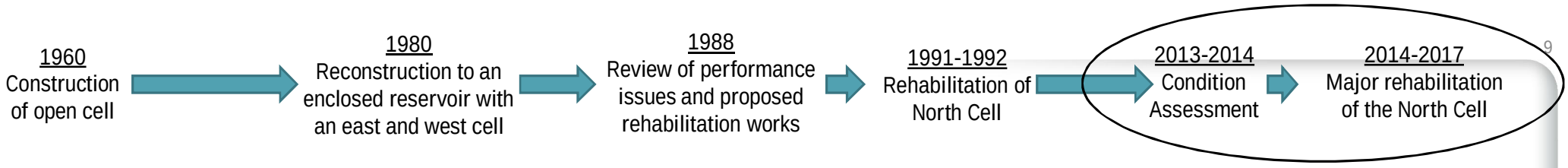

Project Background Cont.

- 2013/2014 Assessment findings:
  - Failure of building envelope.
  - Continued structural deterioration since 1991-1992 rehabilitation including:
    - Continuing foundation settlement and roof depression at column F-16.
    - Deterioration of some concrete pile caps – spalling.
    - Increased deterioration of neoprene bearing pads supporting precast beams … pads at end of service life.
    - Increased deterioration of roof elements - hollowcore slab cracking, precast beam spalling.
- Assessment recommendations:
  - Rehabilitation of North Cell to address building envelope problems and most severe structural issues to extend its service life by another 50 years.
- In 2014, Dillon retained to complete the detailed design for the rehabilitation of the North Cell.

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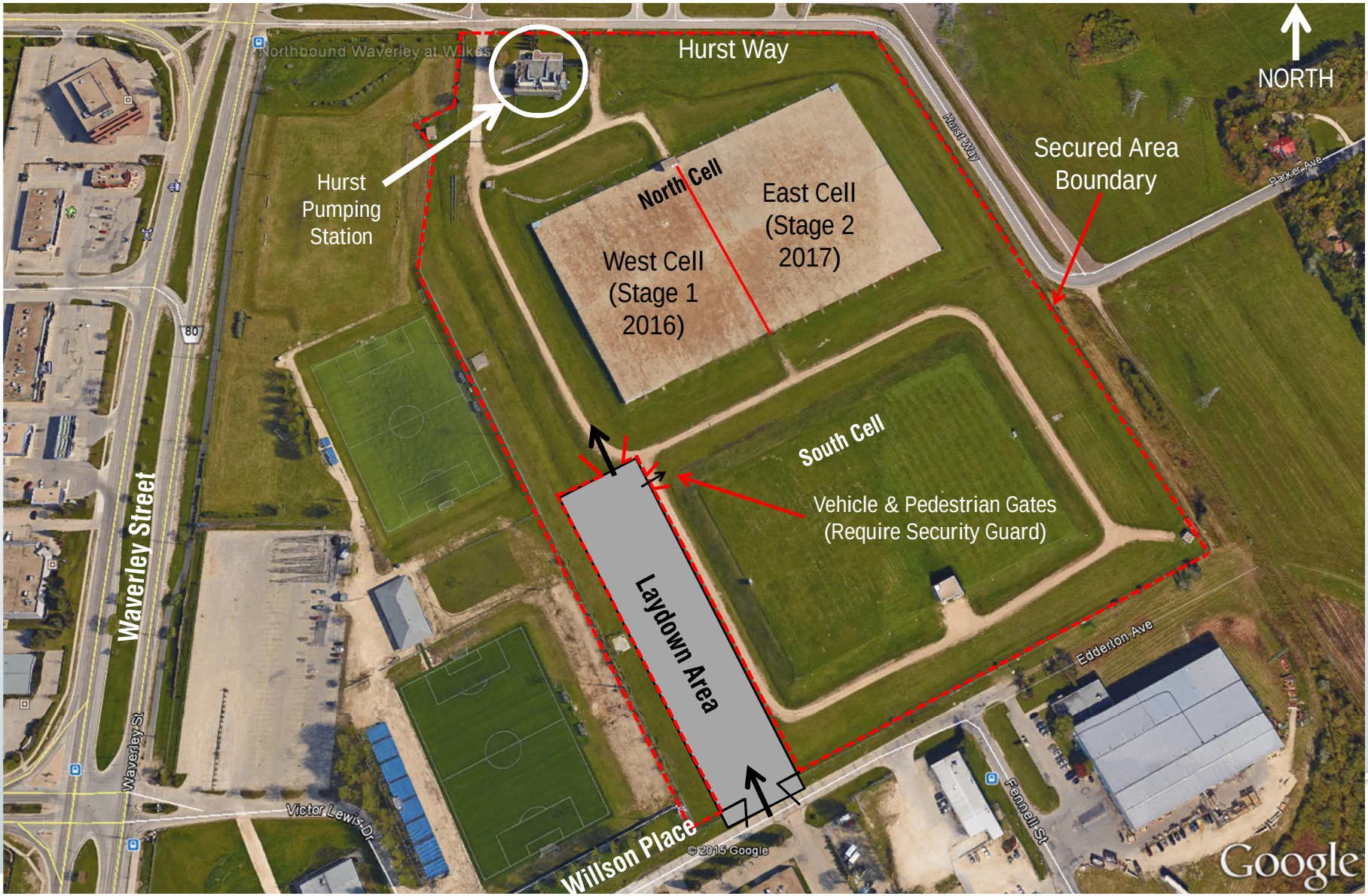
Project Site


Hurst Way
NORTH
Secured Area Boundary
Hurst Pumping Station
North Cell
East Cell (Stage 2 2017)
West Cell (Stage 1 2016)
South Cell
Vehicle & Pedestrian Gates (Require Security Guard)
Laydown Area
Waverley Street
Willson Place
Victor Lewis Dr
Edderton Ave
Fennell St
Parker Ave
Northbound Waverley at Wilkes
© 2015 Google
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Hurst Way
NORTH
Secured Area Boundary
North Cell
East Cell (Stage 2 2017)
West Cell (Stage 1 2016)
South Cell
North Gate off Hurst Way
(City of Winnipeg use only)
Willson Place
Edderton Ave
Fennell St
Parker Ave
© 2015 Google
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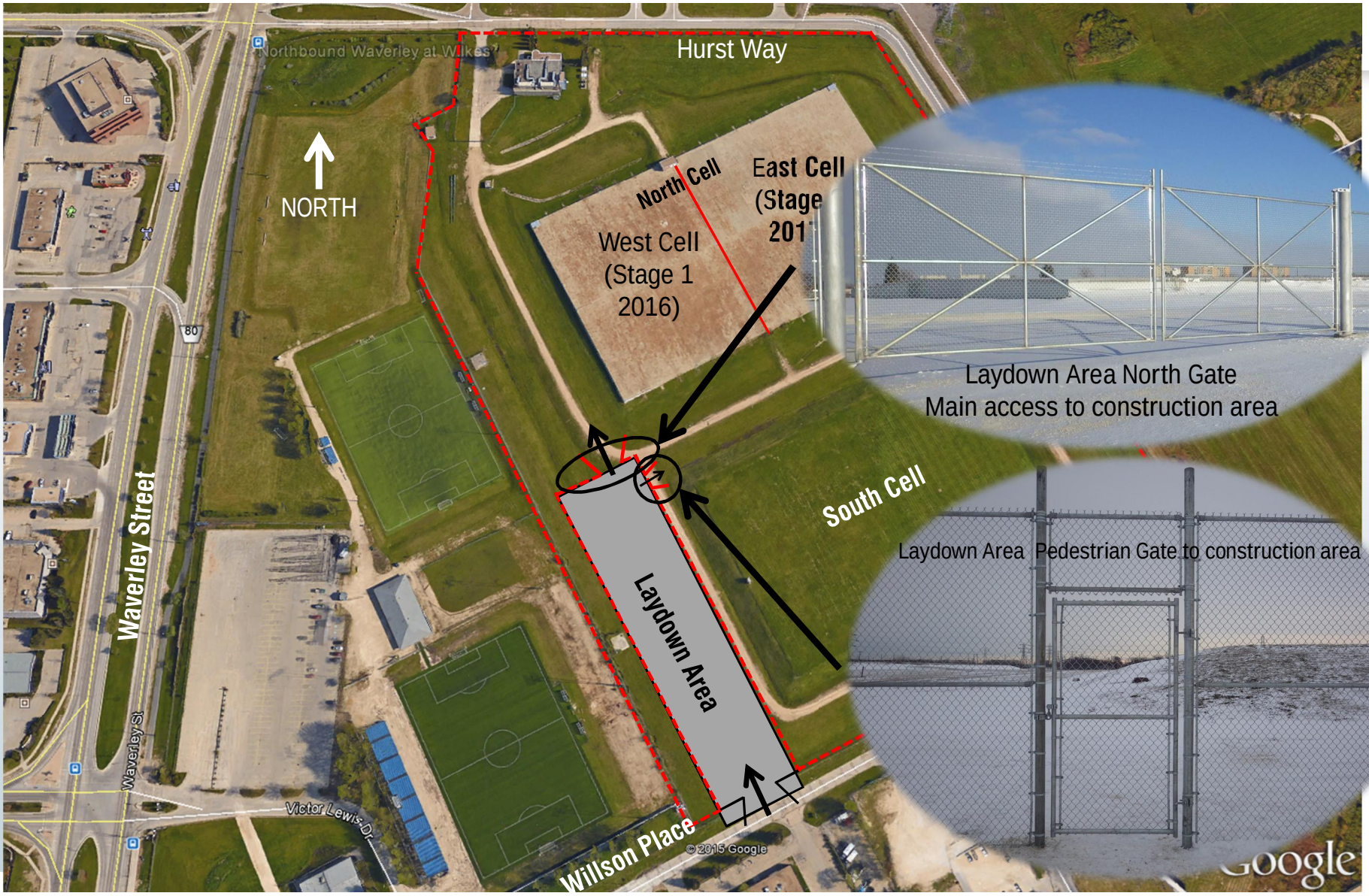
Hurst Way
NORTH
North Cell
East Cell
(Stage
201
West Cell
(Stage 1
2016)
Laydown Area North Gate
Main access to construction area
South Cell
Laydown Area Pedestrian Gate to construction area
Laydown Area
Waverley Street
Waverley St
Victor Lewis Dr
Willson Place
© 2015 Google
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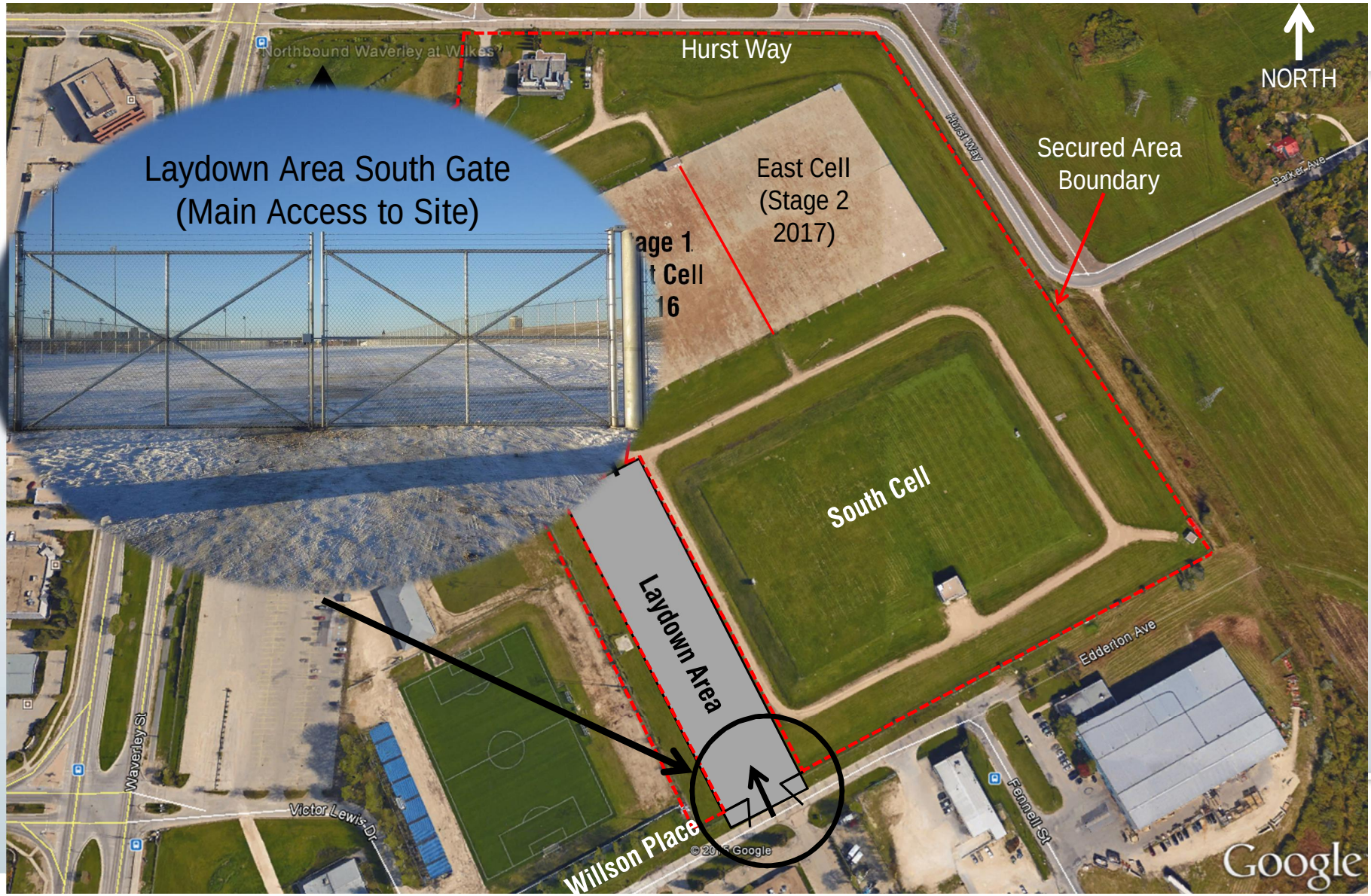
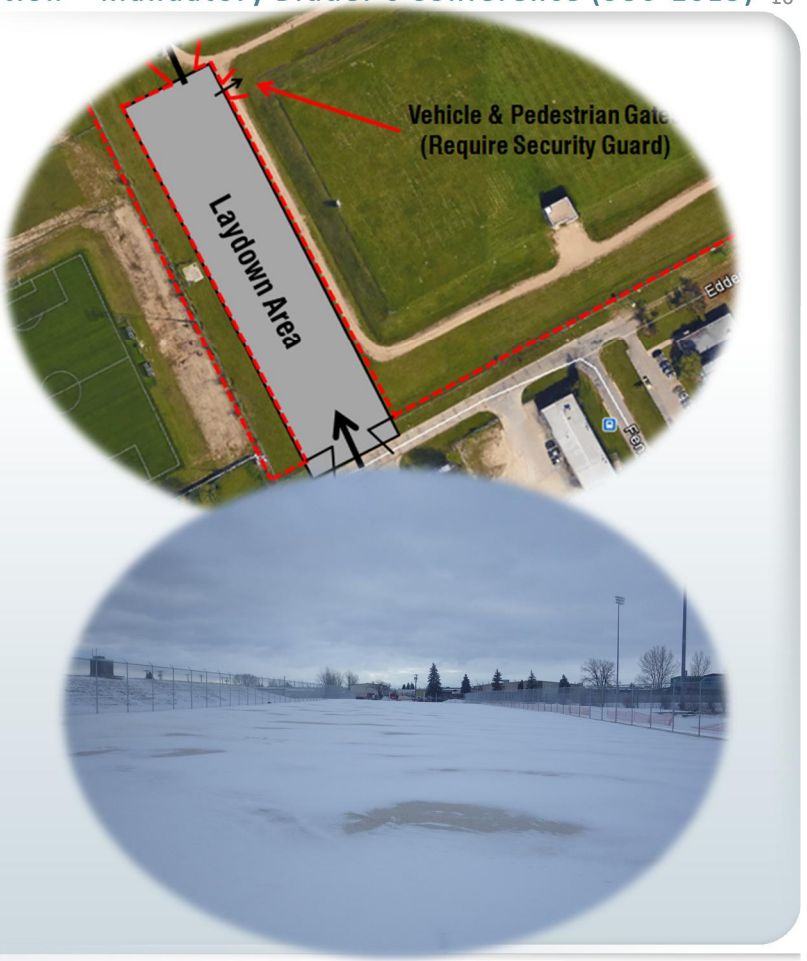

Laydown Area South Gate
(Main Access to Site)
Hurst Way
NORTH
East Cell
(Stage 2
2017)
Secured Area
Boundary
South Cell
Laydown Area
Willson Place
Edderton Ave
Waverley St
Victor Lewis Dr
Fennell St
Parker Ave
Google

Laydown Area (Completed by Others)

Laydown Area

- Constructed by others (City of Winnipeg Bid Opportunity 711-2015).
- Approximately 35 m x 150 m granular pad enclosed with 3.0 m high barbed wire fencing.
- Will be main storage area for materials, deliveries, site offices, parking, etc.
- Security clearances not required within laydown area (see Security Requirements).
- South gate of laydown area to be locked when Contractor not on site.



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Security Requirements

Security Clearance Requirements

D10 - Criminal Record Search Certificate and Public Safety Verification Check
Part F – Security Clearance

- ALL personnel working on Site required to obtain these clearances.
- Clearances to be submitted at least three (3) Business Days prior to commencement of the Works.

- Only exceptions are as follows:
  - Personnel working solely within the laydown area do not require clearances provided they do not cross the north gate into the secured Reservoir area.
  - Contractor's supervisor to provide an escort for delivery drivers w/o clearance while within the secured area. Delivery drivers must stay within 5 m of their vehicle at all times.

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Security and Access to Site

E8 – Security and Access to Site

Security Guard

- Security guard from a bonded security company required at north end of the laydown area (vehicle/pedestrian gate).
- Guard responsible for validating the security clearances of all personnel accessing the secured area.

Keys to Site

- Contractor will be issued three keys to the secured construction area.
- Keys require a $10,000 holdback which will be released upon return of keys at Substantial Performance (end of Stage 2 – 2017)

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Environmental Requirements

Environmental Requirements

- E3 Environmental Plan
- Need to submit Environmental Protection Plan.
  - Includes a Fuel Handling and Storage Plan
  - Contractor to propose refueling procedures/location for approval
  - Requires some form of fuel containment
  - Requires membranes under large stationary equipment e.g. cranes

Example of vehicle berm for fuel containment during refueling (Basic Concepts Inc.)

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Project Scope and Details

Critical Dates

- STAGE 1 – West Cell Works
  - April – October 2016
- STAGE 2 – East Cell Works
  - April – October 2017
- Stage 1 Completion – October 31, 2016
- Stage 2 Completion – October 31, 2017
- Substantial Performance – October 31, 2017
- Total Performance – November 15, 2017

NOTE:
- D16 – Detailed Work Schedule
- Schedule is critical and will be monitored closely
- Schedule is firm and no extensions to critical dates will be permitted

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Scope of Work

STAGE 1 – West Cell Works (April – October 2016)

- Remove/replace building envelope
- Supply/install temperature monitoring system
- Hollowcore slab rehabilitation
- Bearing replacement
- Wall expansion joint repairs
- Concrete spall repairs
- Gel injection at suction pits
- Supply/install steel stairways into cell
- Cell cleaning

STAGE 2 – East Cell Works (April – October 2017)

- Remove/replace building envelope
- Supply/install temperature monitoring system
- Hollowcore slab rehabilitation
- Bearing replacement
- Wall expansion joint repairs
- Concrete spall repairs
- Gel injection at suction pits
- Supply/install steel stairways into cell
- Underpinning pile cap F-16
- Cell cleaning

Cleaning must be completed and Cells turned over to the City by October 31 of each year

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Project Scope and Details

Exterior Cell Works

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Removal and Replacement of Building Envelope

REMOVAL

- Remove existing building envelope
- Salvage steel grid line marker plates

REPLACEMENT

- Install new building envelope

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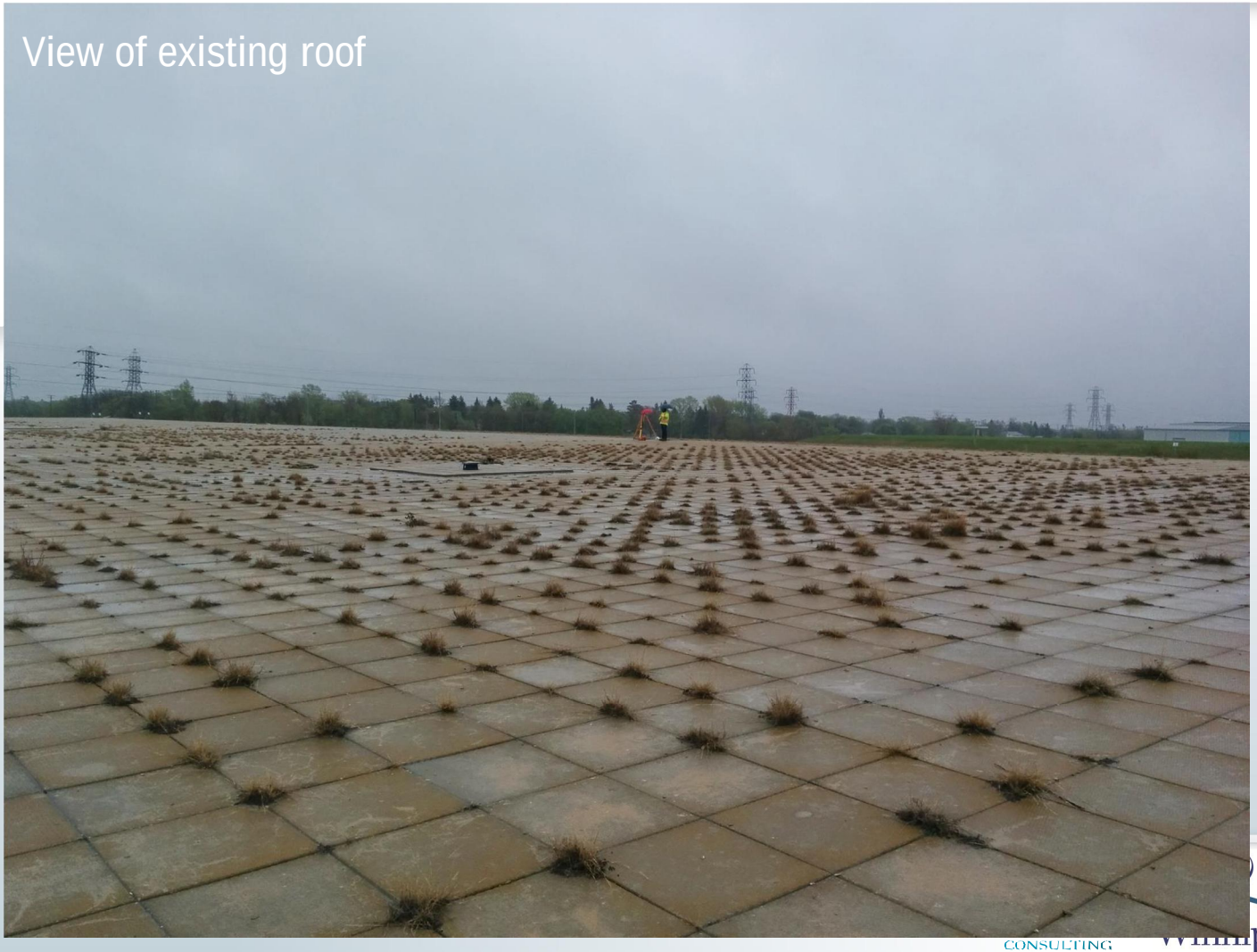
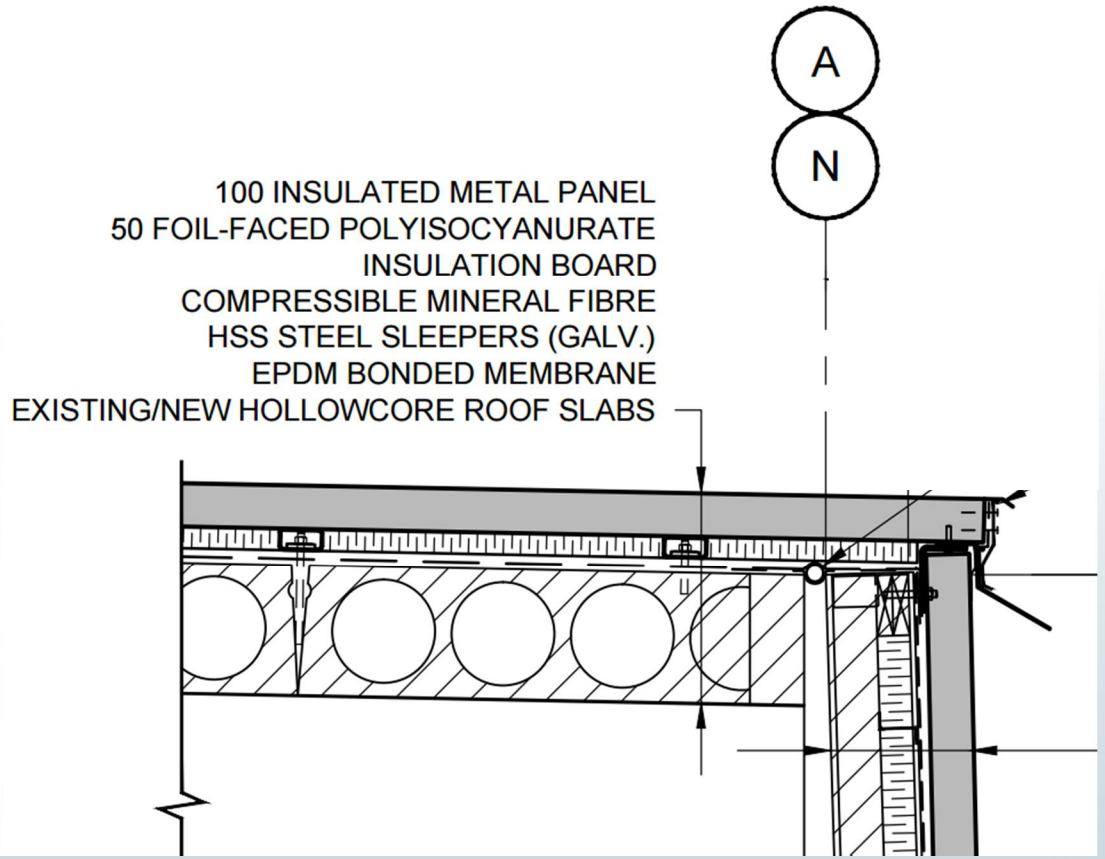
View of existing roof




Typical steel grid line marker plate

Existing roof envelope exposed during 2013-2014 Condition Assessment

New Building Envelope for Reservoir Roof



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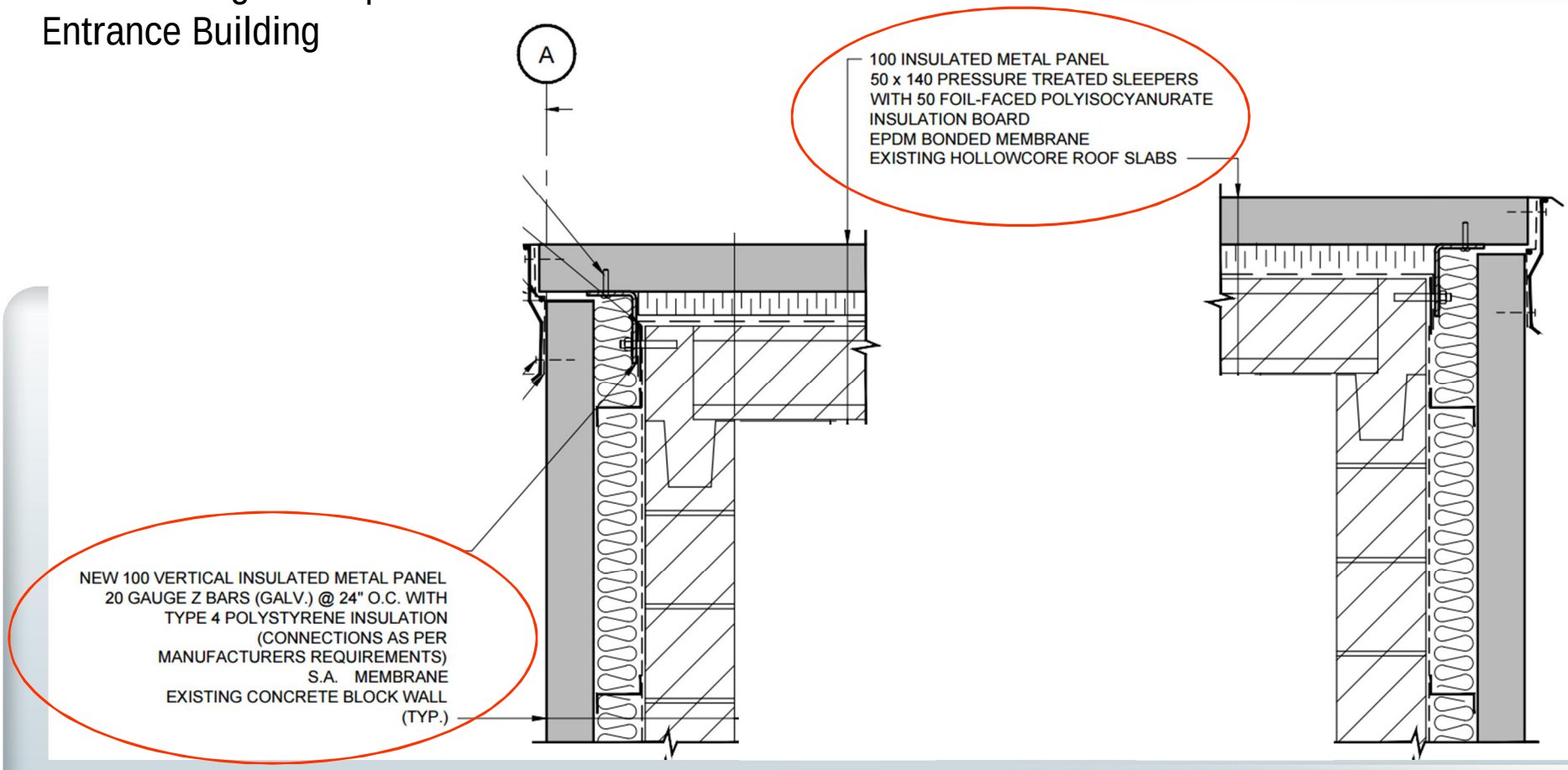
New Building Envelope for Entrance Building



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Replacement/Repair of Hollowcore Slabs

Replace designated hollowcore slabs with new slabs

Repair designated hollowcore slabs

- Cut slots into each void from above
- Place rebar
- Fill voids solid with SCC

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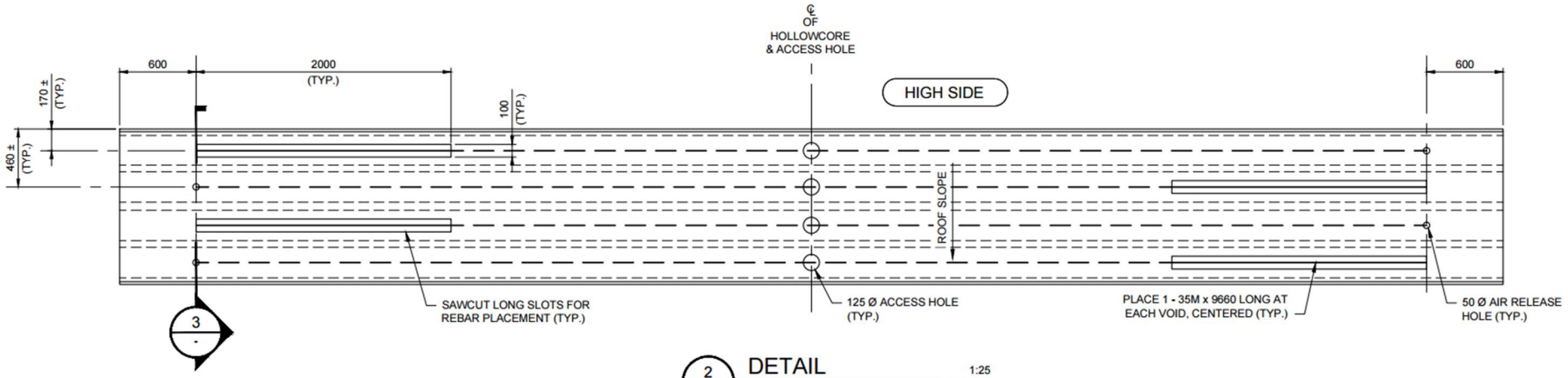
Hollowcore Slab Replacement

For information

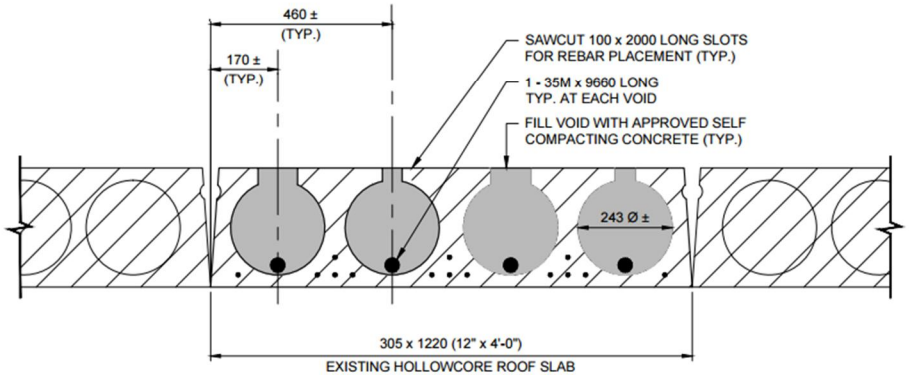
- Note: See drawings for load restrictions for equipment operating on the roof.
- Picture shows a system used to install hollowcore slabs during the 1991 rehabilitation.
- Contractor to submit proposed hollowcore replacement method for review and approval.

Typical Hollowcore Slab Repair



2 - DETAIL 1:25

TYPICAL HOLLOWCORE REPAIR



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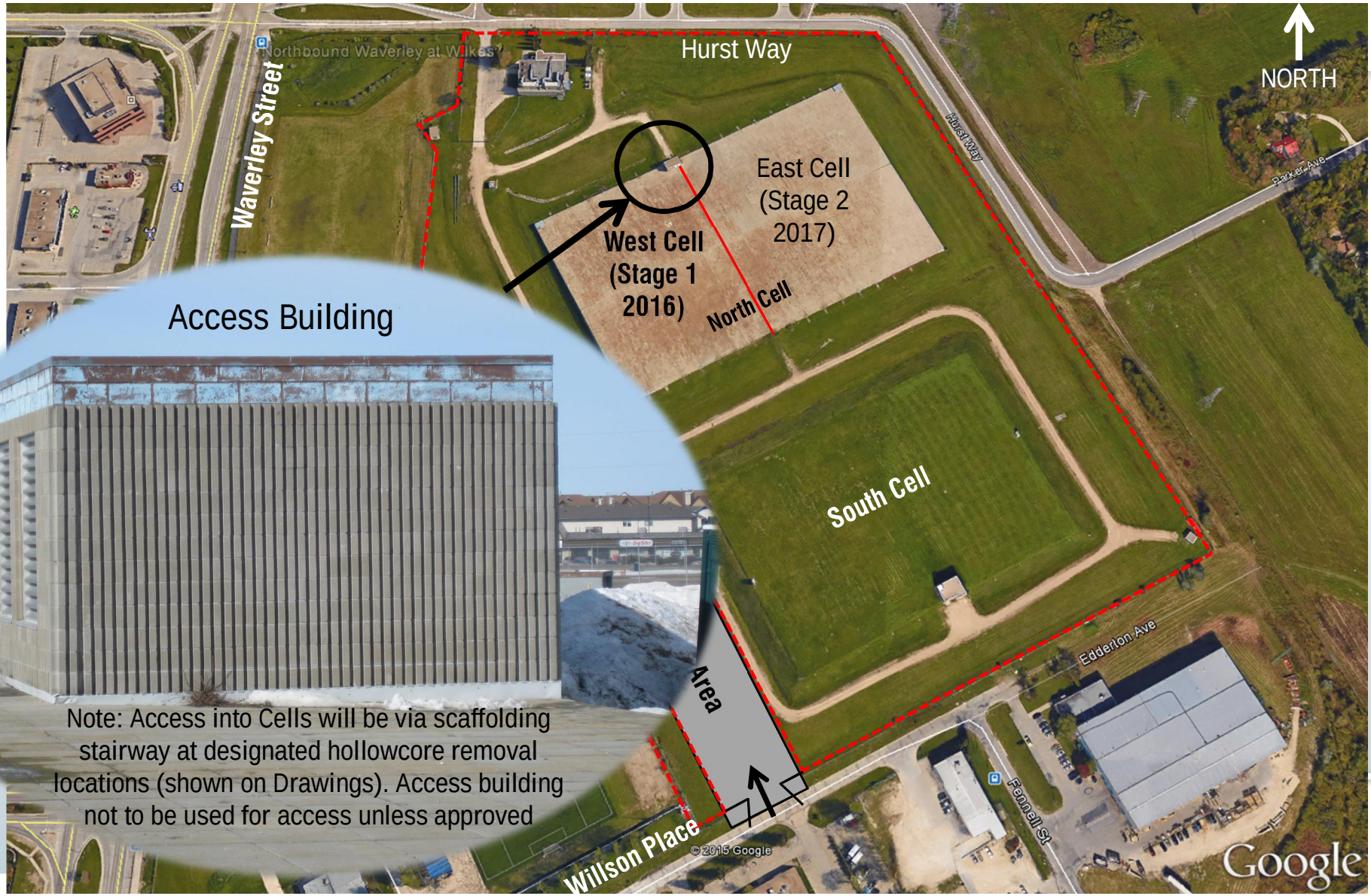
Project Scope and Details

Interior Cell Works


Hurst Way
NORTH
Waverley Street
Northbound Waverley at Wilkes
East Cell
(Stage 2
2017)
West Cell
(Stage 1
2016)
North Cell
South Cell
Access Building
Note: Access into Cells will be via scaffolding stairway at designated hollowcore removal locations (shown on Drawings). Access building not to be used for access unless approved
Area
Willson Place
Edderton Ave
Fennell St
Parker Ave
© 2015 Google
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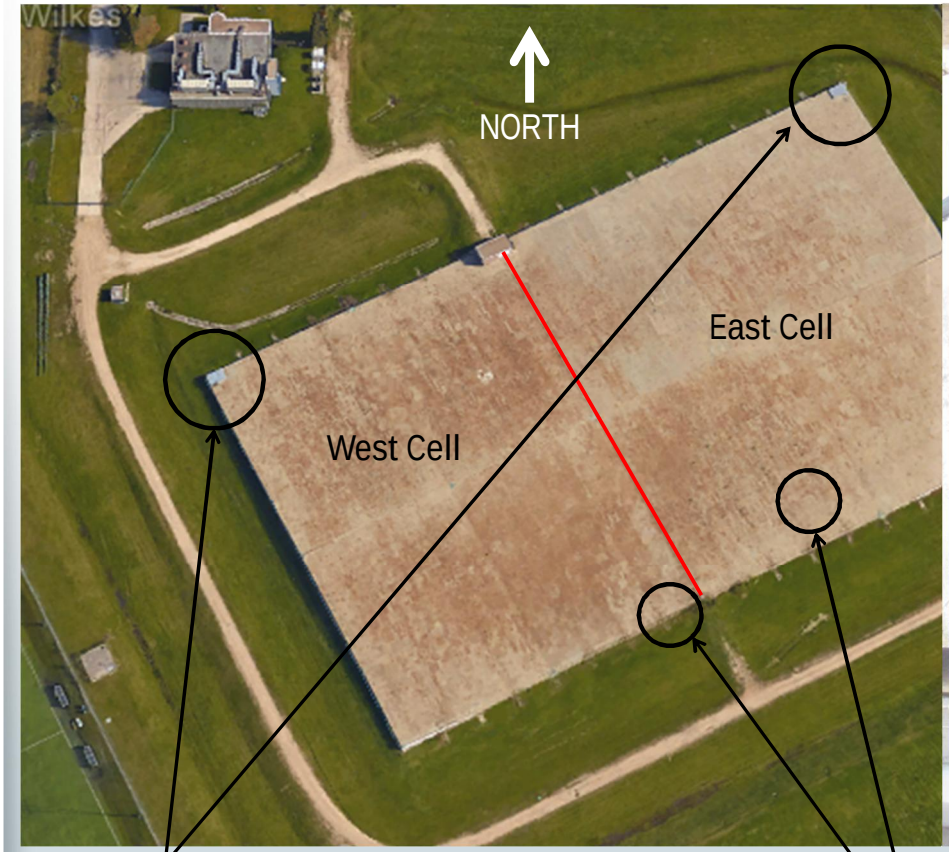
Equipment access hatches (opened)



Existing equipment access hatches
(2.6 m x 4.1 m)

Approximate locations
of temporary access
(scaffolding/stairway)

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Project Scope and Details

Video 1 – Cell Access and General Construction

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Project Scope and Details

Video 2 – Access Building and Roof Structure

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Project Scope and Details

Video 3 – Access Panels and Suction Pit

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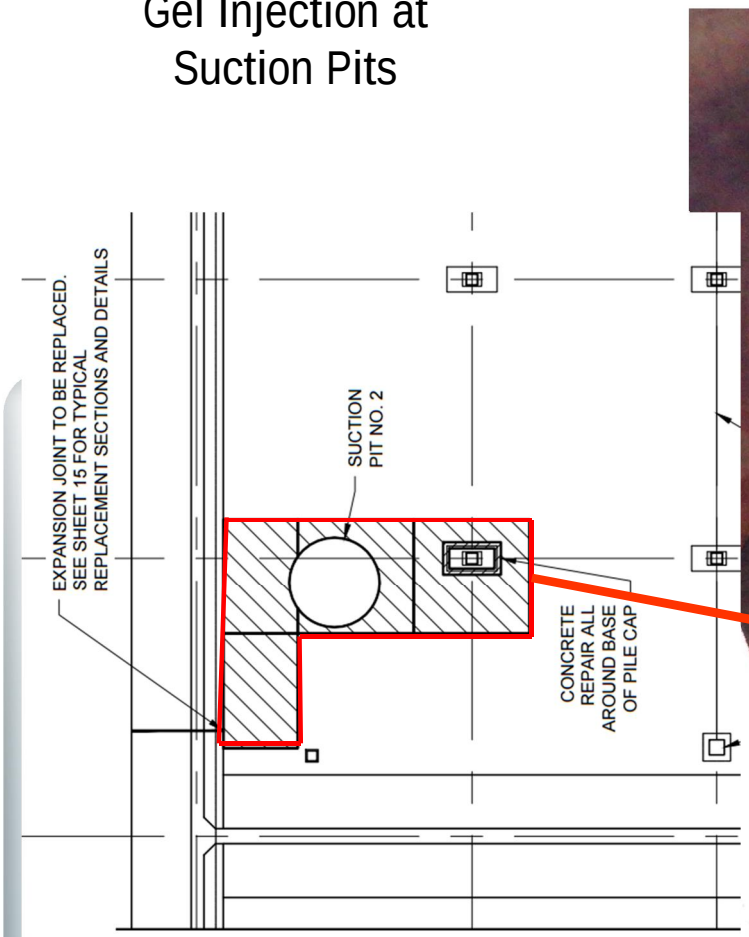
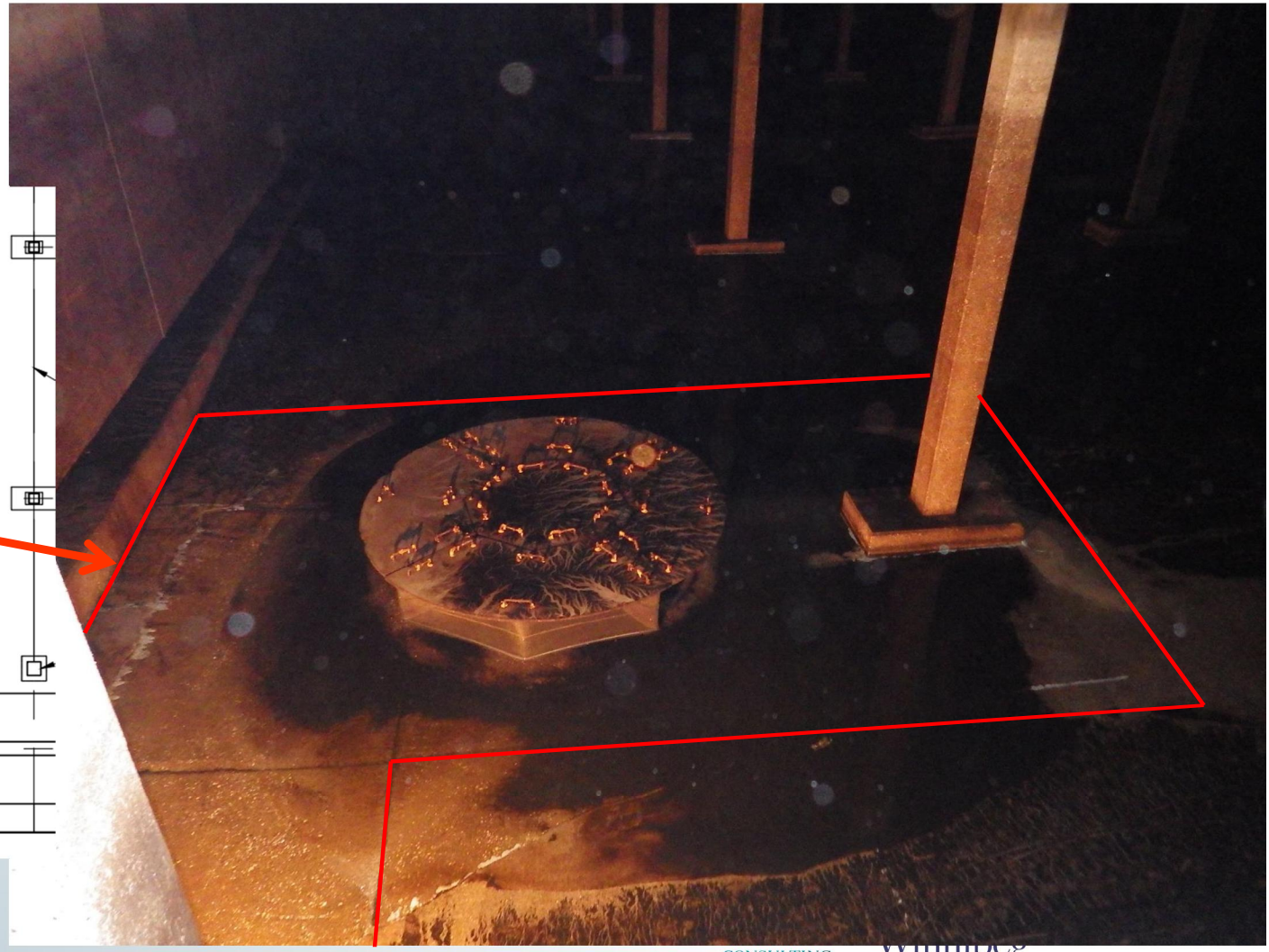
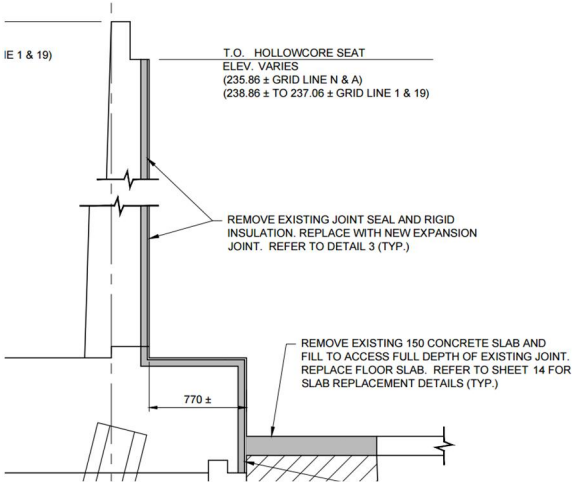
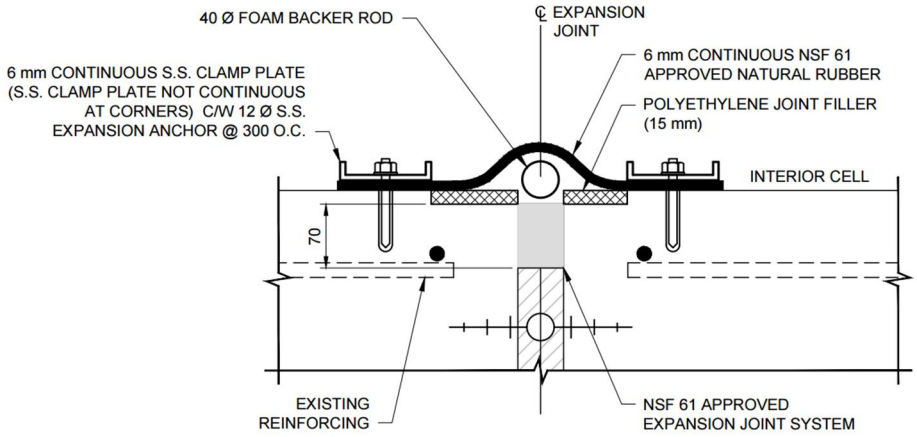
Gel Injection at Suction Pits





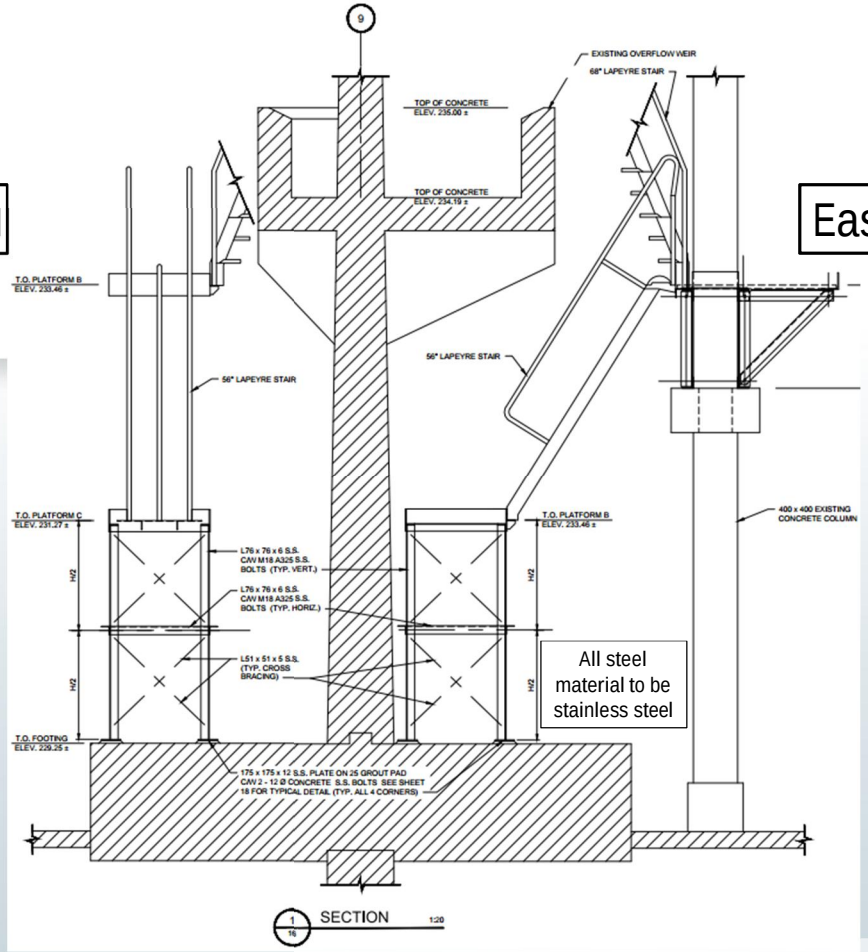
Wall Expansion Joint Replacement





Steel Stairway

West Cell



East Cell

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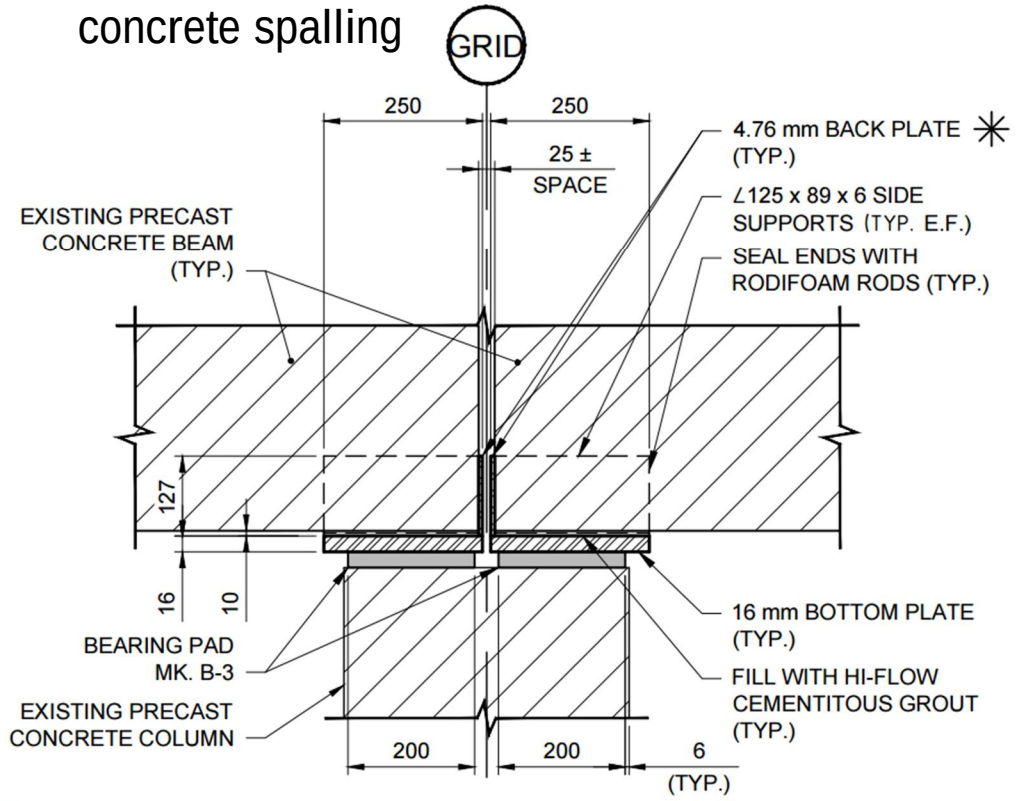
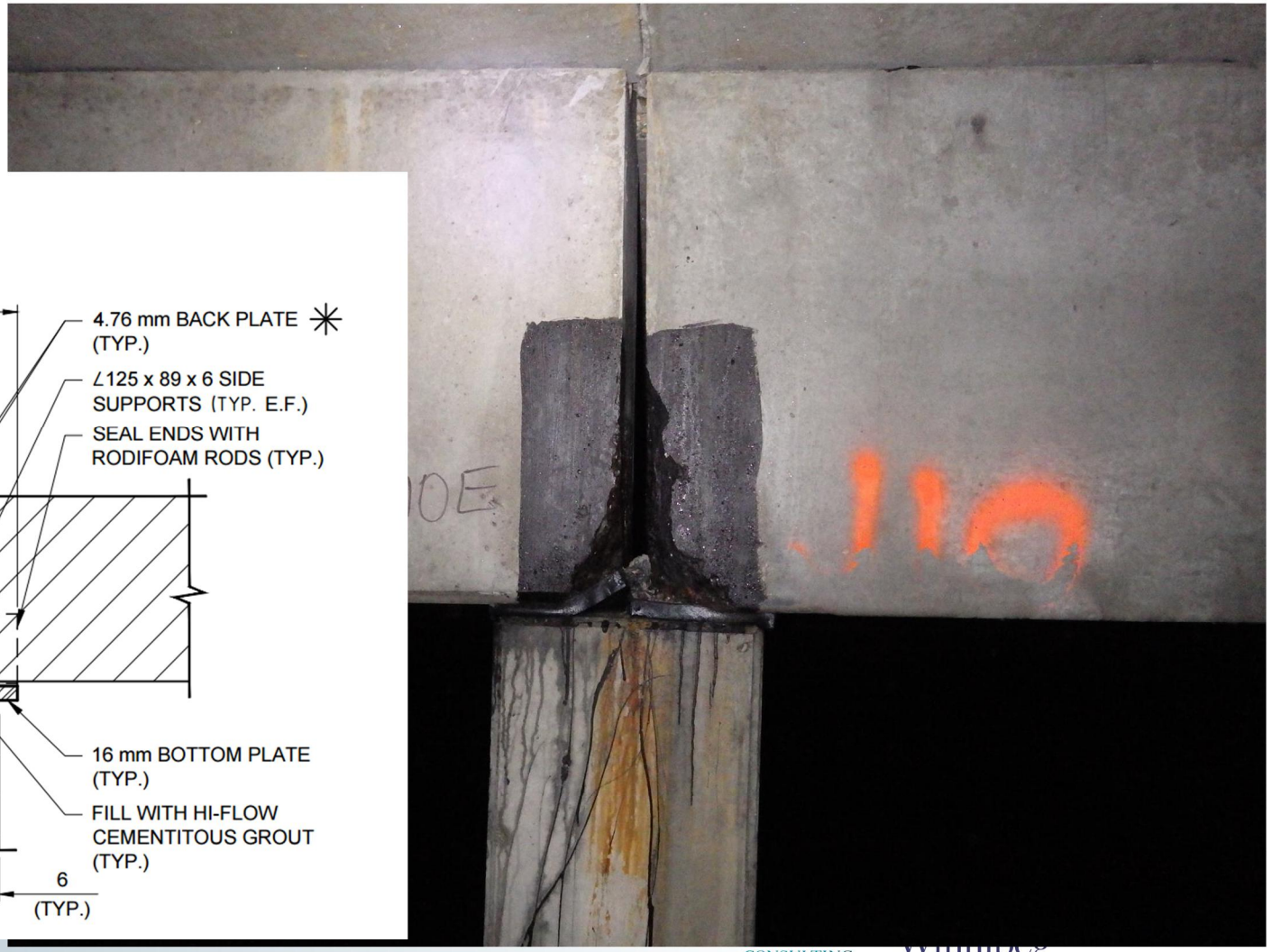
Type 1 – Interior Column Shoes

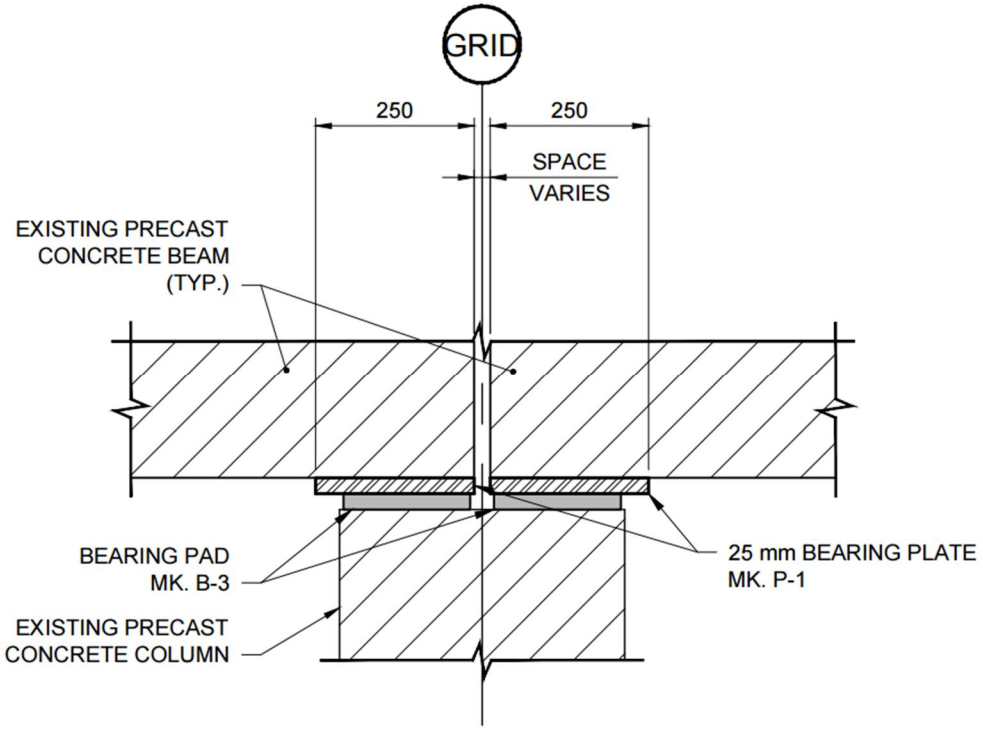
- At beam ends with concrete spalling



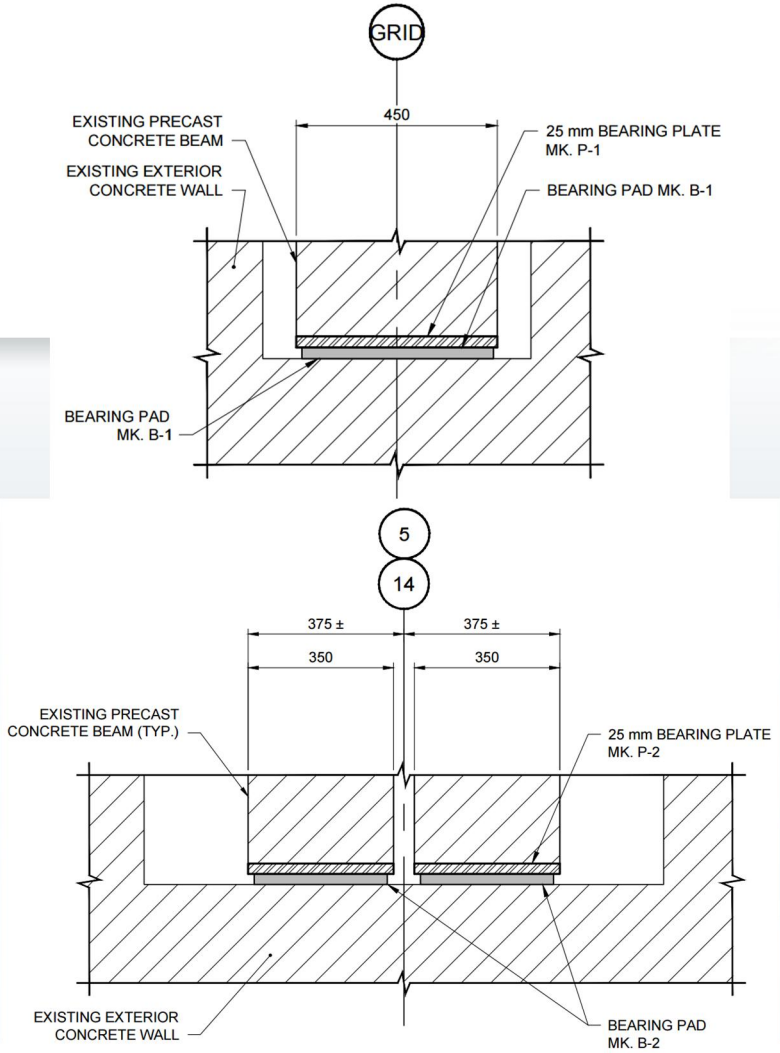


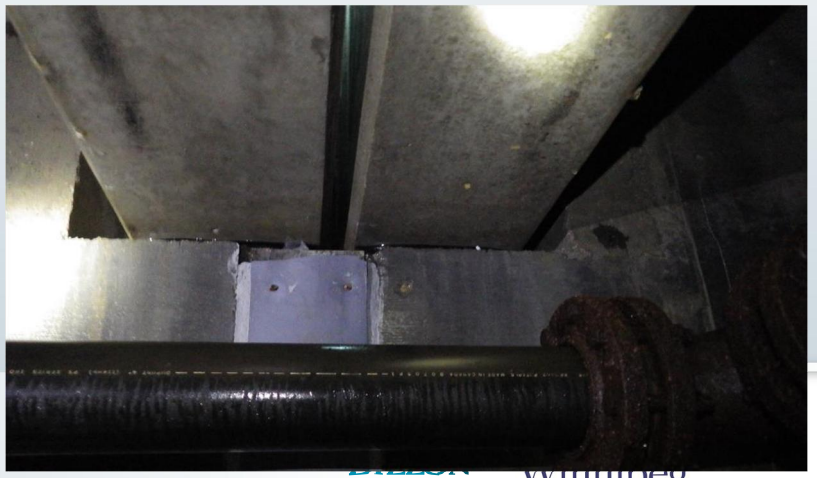
Type 2 – Interior Column Plates

- At good beam ends

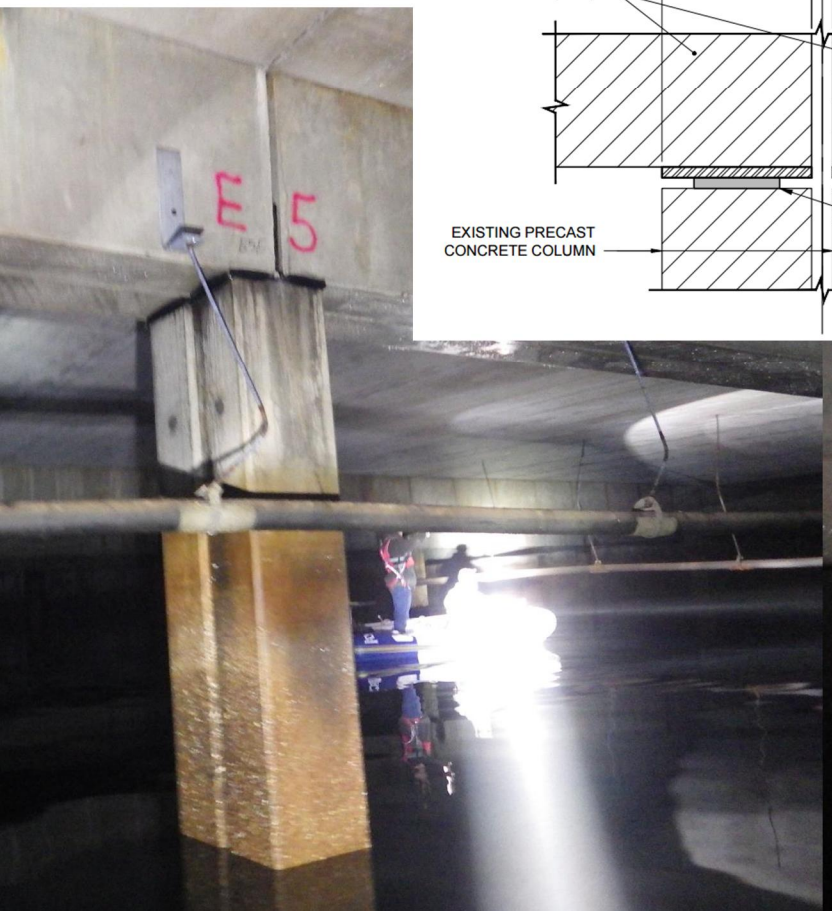


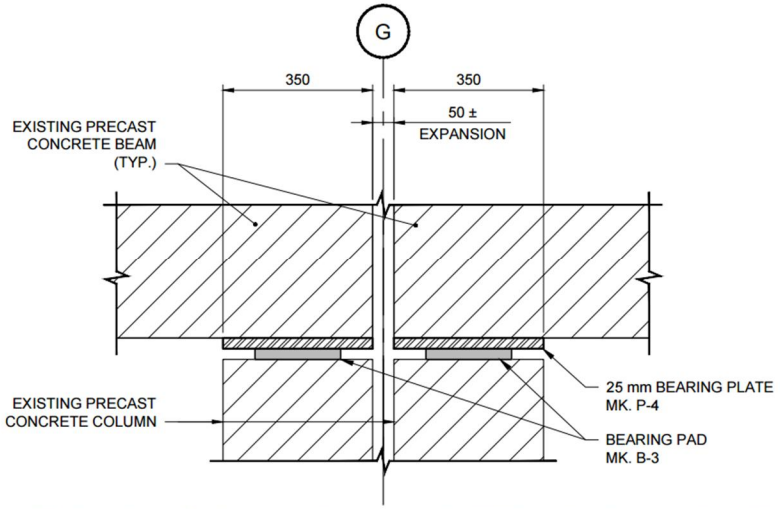
Type 3 – Wall Seat Plates

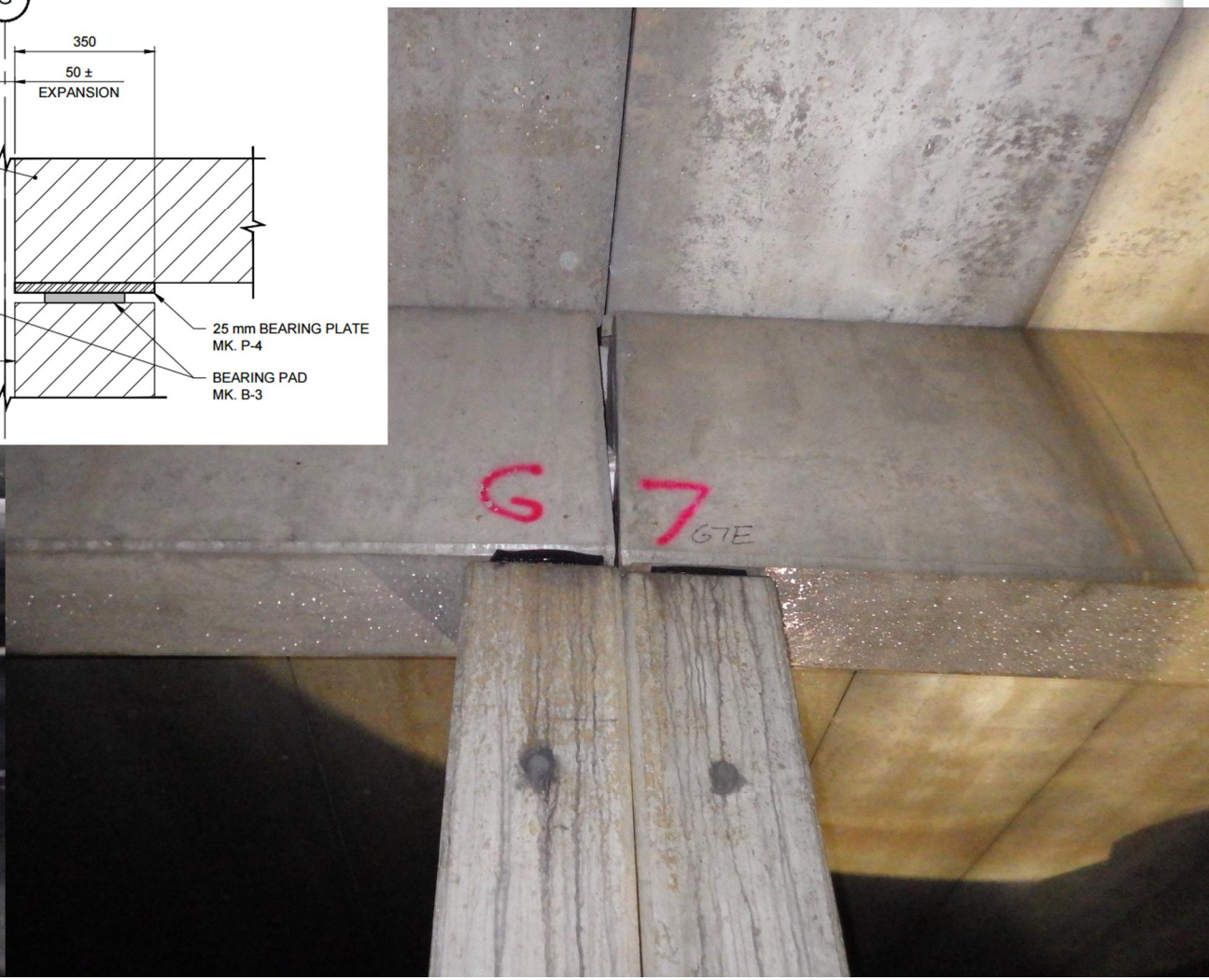




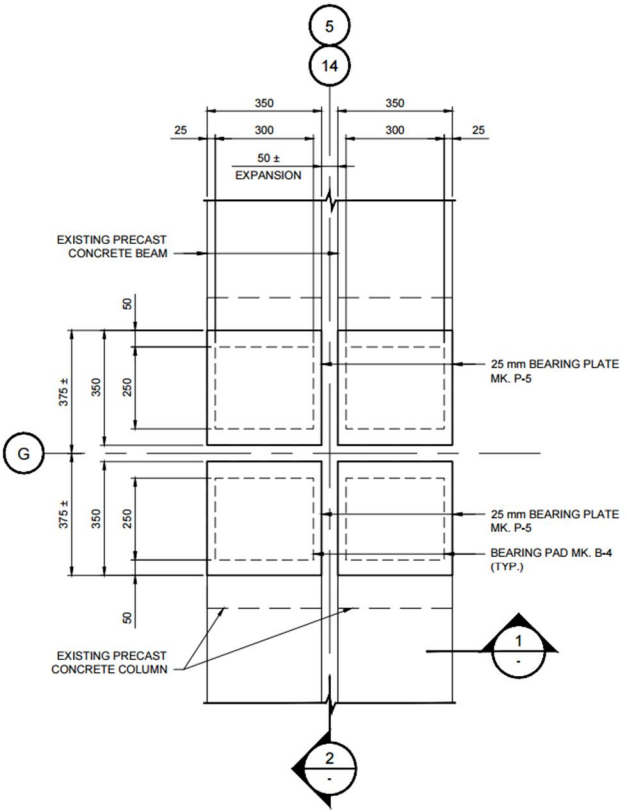
Type 4 – Double Column Plates

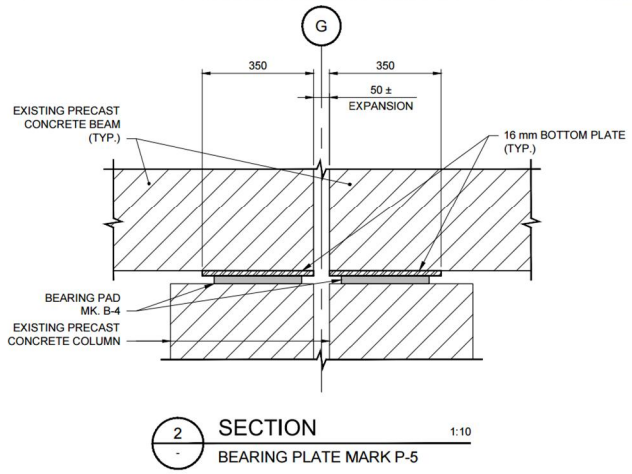




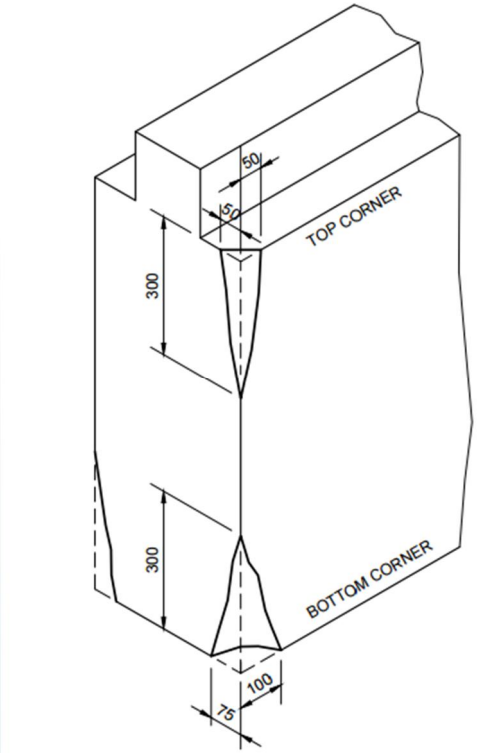


Type 5 – Quadruple Column Plates





Concrete Spall Repairs
Beam Ends



BEAM END SPALL REPAIR

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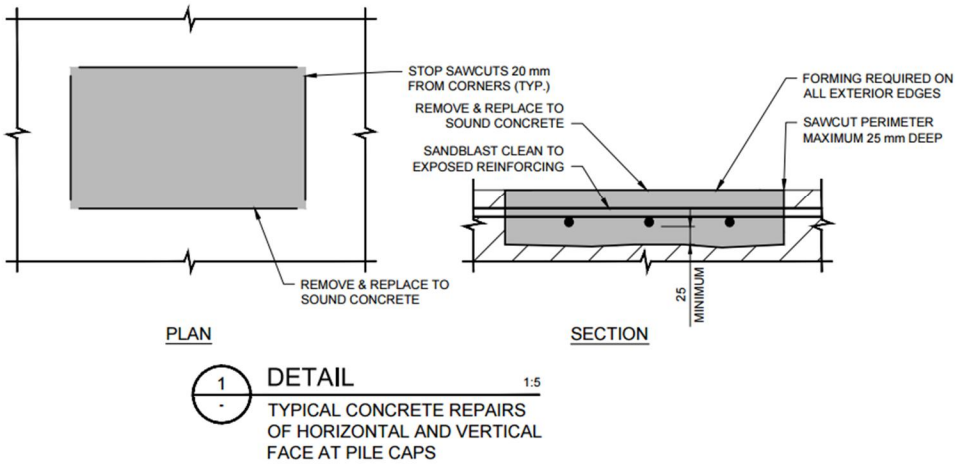
Concrete Spall Repairs
Pile Caps



Water Supply For Cell Clean-up

Equipment Restrictions Within the Site

Equipment Restrictions Include:

Within the Cells 

- NO gas, diesel, or any other fossil fuels permitted.
- Equipment shall be electric, battery powered, or pneumatic.
- NO vibratory/heavy equipment within 3 m of existing 1200 mm dia. Suction Line No. 4 below floor slab (between Grid line 7-8)

On Reservoir Roof

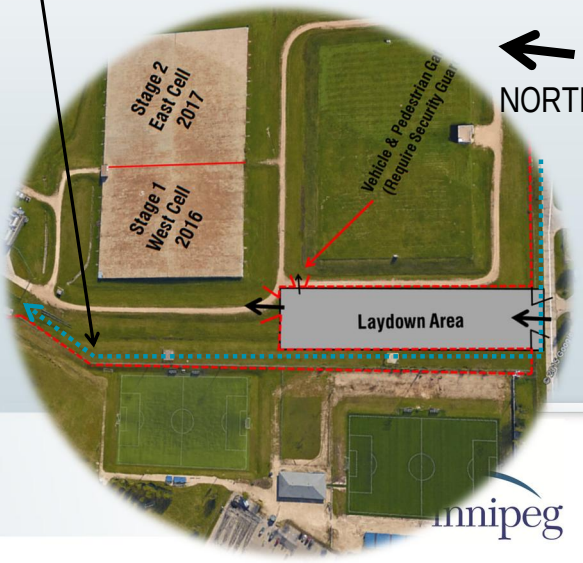
- Only one piece of equipment permitted on hollowcore slab at any time meeting the following load restrictions:
- During removal of existing concrete pavers
  - 5300 kg max GVW
  - 3500 kg max single axle load
- After removal of existing concrete pavers
  - 7200 kg max GVW
  - 4400 kg max single axle load

Within 5 m of Reservoir Walls

- NO heavy equipment (> 25 tonnes GVW) within 5 m of Reservoir walls

Within 5 m of By-pass Line

- NO equipment within 5 m of by-pass line



Material Requirements Within the Cells

NSF/ANSI 61 Compliance Requirement

- All repair materials in contact with potable water shall meet NSF/ANSI 61 certifications.

- Includes:
  - Expansion joint systems
  - Gel for injection around suction pits
  - Epoxy for bearing assembly installation
  - Spall repair grouts
  - Others as required by the Specifications

- Contractor shall provide compliance reports and access to materials so they can be inspected for the NSF compliance label.

- Note: Compliance is non-negotiable (Provincial requirement of operating licence)

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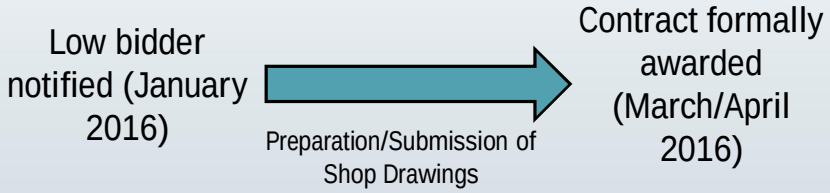
Summary of Major Submissions

Summary of Major Submissions

Prior to Commencement of any Work – D18

- Criminal Record Search Certificates & Public Safety Verification Checks – D10
- Safe Work Plan – D12
- Detailed Work Schedule – D16
  - Includes a schedule review meeting with the Contract Administrator to approve proposed schedule
- Construction Method Statement – D17
- Preconstruction Site Record – D20
- Environmental Protection Plan – E3

- Shop Drawings – E4/E5
  - Note: To meet tight construction schedule, Shop Drawing submission to be expedited



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Conclusion

Closing Notes…

- Optional Site Investigation – December 7, 2015 at 11:00 a.m. at the laydown area south gate.
- Public Safety Verification Check required 24 hrs in advance.

- Bid Opportunity submission deadline – December 11 at 12:00 p.m.

- City will obtain and pay for all necessary building permits for the Works.

Thank You

Questions and Answers

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