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FIELD MEMO
62325

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Unit 100B, 1425 Pearson Place
Kamloops, B.C., Canada V1S 1J9
Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WT Leung Architects, INC. PROJECT NO.: VAN-00217815
ATTENTION: Konning Tam DATE: August 25, 2015
CC: ITC FROM: Mahdi Hosseyni
ATTENTION: Antonio Pavi and Mitchell Scott

SERVICE PROVIDED: Review of Shoring construction and Anchor Testing

LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to Review construction of Temporary Shoring and Anchor Testing at above site.

observations: East side: 4 Anchors #8 DYWIDAG were tested to 44 kips and locked-off at 37kips and

west side: 7 Anchors #8 DYWIDAG were tested to 33 Kips (4th row) and lockedoff at 26 kips; all Anchors Stated Design Requirements as specified on the Desig Drawings.

South side:

NOTE: 3 Anchor #9 were replaced by IBO R38 N (Equivalent)

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CLIENT: WT Leung Architects, Inc
PROJECT NO.: VAN-00217815
ATTENTION:
DATE: August 25, 2015
CC: ITC
FROM: Mahdi Hosseyni
ATTENTION:

SERVICE PROVIDED:

LOCATION:

OBSERVATIONS:

at East portion of South side. These 3 Anchors (IBO R38N) were tested to 67 Kips and locked-off at 56 Kips and stated Design Requirements.

NOTE: slope cuts were observered to be steeper than 1H:1V and spacing from Shotcrete Face and next stage of Excavation are shown on Design Drawings to be 3 ft which was observed 2 ft. The subContractor supervisore was informed the issue. Two photo attached for more information.

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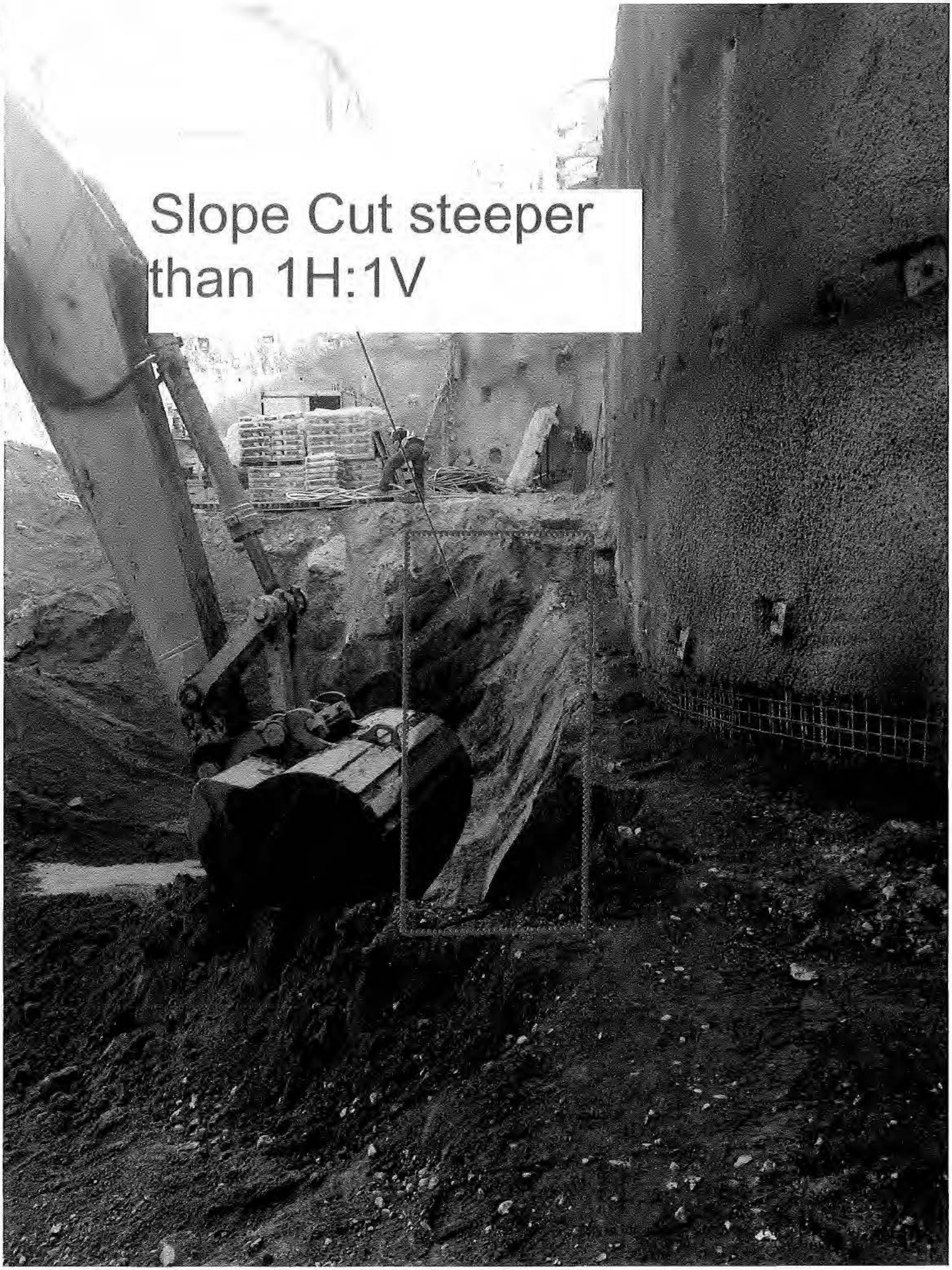
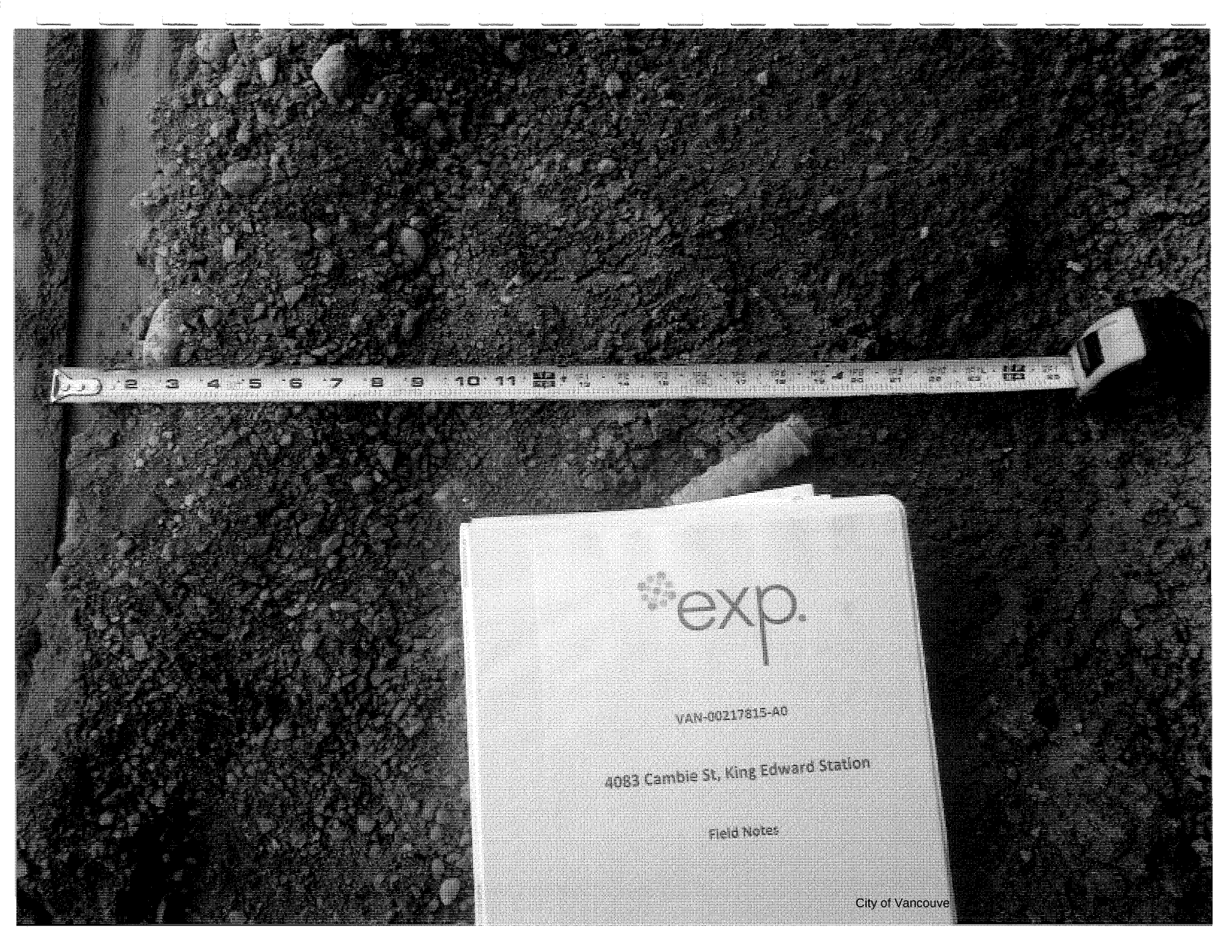

Slope Cut steeper
than 1H:1V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VAN-00217815-A0
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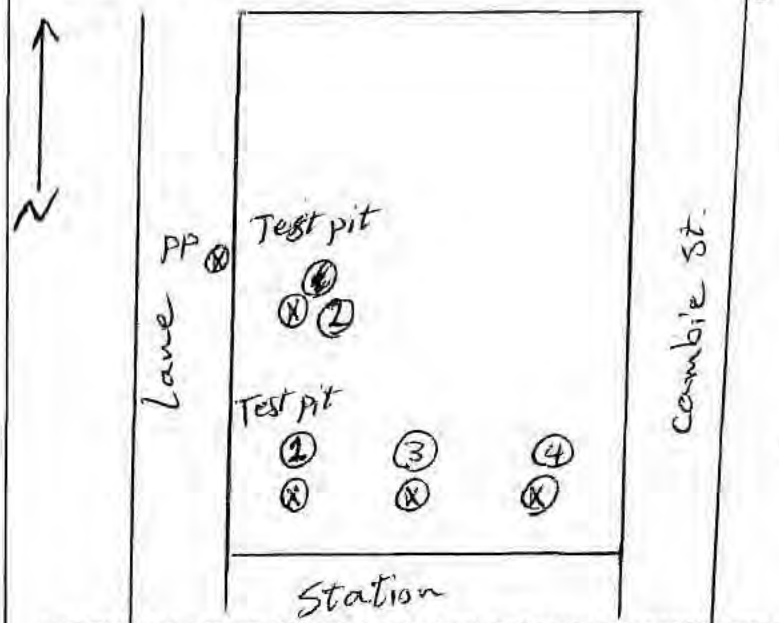
CLIENT: WT leung Architects, Inc.
PROJECT NO.: VAN - 00217815
ATTENTION: Konning Tam
DATE: August 25, 2015
CC: ITC & Storm Guard
FROM: Mahdi Hosseyni
ATTENTION: Antonio pavi & Mitchell Scott & Cliff oleksiew

SERVICE PROVIDED: Review of exploratory test pit to verify Groundwater Table by Dewatering Subcontractor
LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to Review exploratory test pits in order to verify Ground-water table by subcontractor (Storm Guard). 4 Test pits were excavated as shown. At the time of testing No access was possible to north and North-East portion of the site.



provided information to us by ITC:
- A benchmark showing EL: 198ft on the shoring wall

NOTE: ITC superintendent stated that inaccuracy of the benchmark was about ± 0.5 ft.

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CLIENT: PROJECT NO.:

ATTENTION: DATE:

CC: FROM:

ATTENTION:

SERVICE PROVIDED:

LOCATION:

OBSERVATIONS:

- Elevation of top of the Raft foundation = 185ft
- Thickness of the Raft = 3.5ft

observation:

Depth of Excavations (test pit) were limited to presence of Groundwater or bottom of the Raft Slab. Followings are calculated Groundwater Table base on the provided information:

Test pit ①: - Ground water Table observed at Elevation ± 185
- A layer of very permeable sand by thickness of about 1.5ft – 2ft was observed.
- Water was flowing ~~from~~ mostly from direction of South and South West into test pit.

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CLIENT:

PROJECT NO.:

ATTENTION:

DATE:

CC:

FROM:

ATTENTION:

SERVICE PROVIDED:

LOCATION:

OBSERVATIONS:

Test pit ② - Water Table Elevation about: ±184
- Sand with some silt
- premeablity seemed to be less than ~~test~~ location of test pit ①.

Test pit ③: - The test pit was dug to Elevation of about 184ft and no water was observed.
- Ground layer included Sand and silt and seemed less permeable than test pit ①.

Test pit ④ - was dug to Elevation of about 181ft and water was observed at Elevation 181ft
- permeability was about location of test pit ②.

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WT Leung Architects, Inc.
PROJECT NO.: VAN-00217815
ATTENTION: Konning Tam
DATE: August 31, 2015
CC: ITC
FROM: Mahdi Hosseyni
ATTENTION: Antonio Pavi & Mitchell Scott

SERVICE PROVIDED: Review of Temporary Shoring Construction and Anchor Testing

LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to review construction Temporary Shoring and Anchor Testing at above mentioned site.

Observation:

NOTE: Rebar Arrangment and spacing was Reviewed on Friday afternoon (August 28, 2015) and stated Design Requirments.

West side: one Anchor Bar #9 DYWIDAG was tested (on 4th row) to 33 kips and locked-off to 2 kips. And 4 Anchors IBO R38 at 5th row were tested to 44 kips and locked-off at 36 kips. All Anchors stated the Design requirments.

NOTE: Double mesh were used at the location of these 5 Anchors

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT:	PROJECT NO.:
ATTENTION:	DATE:
CC:	FROM:
ATTENTION:	

SERVICE PROVIDED:

LOCATION:

OBSERVATIONS:

South side: . 2 IBo Anchors R38 tested to 64 kips and locked-off at 53 kips (4th row of west portion). And 4 Anchors IB, R32 → at 2nd row (East portion) were tested to 39 kips and locked-off at 32 kips. All Anchors started the Design Requirments as specified on the Design Drawings.

NOTE: Double mesh were used at the location these 6 Anchors.

- one Anchor IBo R38 was tested to 67 kips and locked-off at 56 kips. (First Row of East portion).

East side:

- one Anchor #8 DYWIDAG (4th Row) and 2 Anchors IBo R32 (5th row) were tested to 44 kips and locked-off at 37 kips and

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62382

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CLIENT:

PROJECT NO.:

ATTENTION:

DATE:

CC:

FROM:

ATTENTION:

SERVICE PROVIDED:

LOCATION:

OBSERVATIONS:

Stated Design Requirments.

NOTE: Double mesh was used for 2 Anchors at 5th row only.

NOTE: Temporary cut Slope was upserved to be steeper than 1H:1V.
The Subcontractor's Supervisor was informed the Issue.

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WT Leung Architects, Inc.
PROJECT NO.: VAN-00217815
ATTENTION: Konning Tam
DATE: Sep 1st, 2015
CC: ITC
FROM: Mahdi Hosseyni
ATTENTION: Antonio Pavi & Mitchell Scott

SERVICE PROVIDED: Review of Shoring Construction and Anchor Testing, Drilling for Dewatering purposes

LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to review Construction of Temporary Shoring and Anchor Testing at above subject site.

Obeservations:

South side: - 4 Anchors R32 (at second row, East portion) were tested to 39 kips and locked-off to 32 kips. And 3 Anchors IBO R38 tested to 64 kips and locked-off at 53 kips. All Anchors stated the Design Requirements.

East side: 3 Anchors IBO R32 (at 5th row) were tested to 44 kips and locked-off at 37 kips and stated Design Requirements.

west side: 6 Anchor IBO R38 (At 5th row) were tested to 44 kips and locked off at 36 kips and stated Design Requirements.

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CLIENT:

ATTENTION:

CC:

ATTENTION:

PROJECT NO.: VAN-00217815

DATE: Sep 1st, 2015

FROM:

SERVICE PROVIDED:

LOCATION:

OBSERVATIONS:

NOTE: The rebar Arrangements and spacing were reviewed on the afternoon of August 31, 2015 and were observed to be based on the Design Drawings.

NOTE: In total for 6 panels, Double mesh were used.

NOTE: One hole (D=6") was Drilled Along Gridline (A) Between Grid (4) and (5) and water observed to out elevation about 185.2'.

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WT Leung Architects, Inc.
PROJECT NO.: VAN-00217815
ATTENTION: Konning Tam
DATE: September 2nd, 2015
CC: ITC
FROM: Mahdi Hosseyni
ATTENTION: Antonio Pavi & Mitchell Scott

SERVICE PROVIDED: Review of Temporary Shoring Construction and Anchor Testin
LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site was on site to review construction of Temporary shoring and Anchor Testing at above Subject site.

Observations: West side: one Anchor IBO R32 (Tier 5th) tested to 44 and locked-off at 36kips and Stated Design Requirments.

South side: 3 Anchors IBO R38 (Tier 5 - west portion) were tested to 64 Kips and locked-off at 53 kips. And 4 Anchors IBO R32 (2nd Tier - west portion) were tested to 39 Kips and locked-off to 32 Kips. All Anchors Stated Design requirments.

NOTE: In total Double mesh was used at location of 5 panels.

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WT leung Architects, Inc
PROJECT NO.: VAN-217815-A0
ATTENTION: Konning Tam
DATE: Sep 8 - 2015
CC: ITC
FROM: Mahdi Hosseyni
ATTENTION: Antonio pavi & Mitchell Scott

SERVICE PROVIDED: Review of Temporary construction and Anchor Testing

LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to Review Construction of Temporary Shoring and Anchor Testing at above Subject site.

Observations:

- 8 Anchors IBO R32 at south side were tested to 39 kips and locked-off at 32 kips as specified on the Shoring Design Drawings. All Anchors Stated Design Requirements.

NOTE: The orignial Design Drawing indicated Bar # 7 DYWIDAG for the above Anchors.

NOTE: Dimention of "L" shape Rebars for Underpinning was observed to be less than 12", however, It was fixed later by the subcontractor.

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Phone: 250 372-5321 Fax: 250 372-1678

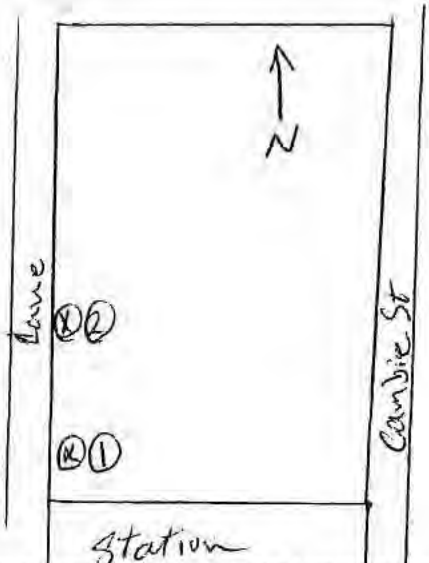
CLIENT: WT leung Architects Inc. PROJECT NO.: VAN-00217815-A0
ATTENTION: Konning Tam DATE: September 9, 2015
CC: ITC FROM: Mahdi Hosseyni
ATTENTION: Antonio Pavi & Mitchell Scott

SERVICE PROVIDED: Review of Drilling for Dewatering wells and Anchor Testing
LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to Review Drilling for Dewatering well points at west side, and Anchor testing at south side of the excavation.

Observations:



(1) The Dewatering subcontractor (Stormguard) use an air track Drill rig to Drill the Dewatering well points.

Two holes were Drilled at S-W corne and along the west side wall, as shown The first well Drilled at 5-6 ft from t South wall and the 2nd well at 32' Spa

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CLIENT:
PROJECT NO.:
ATTENTION:
DATE: Sep 9, 2015
CC:
FROM:
ATTENTION:

SERVICE PROVIDED:

LOCATION:

OBSERVATIONS:

The first hole was drilled by a 4" bit to depth of about 15' (El about (174-175'). However, when drilling completed the hole collapsed and was accessible for only 3ft. So the Storm guard crew could not place the well point pipe into the hole. Then tried with 6" bit and collapsed ag The second hole was drilled at 32' spacing using same bit (4") to the same Elevation (174 - 175') and again hole collapsed and stayed open only for about 8'.

It was observed that the air track rig was not suitable for this purpos and lost ground. Air track rig also causes Loosen sides of the hole and collapse the hole. Therefor, It seems

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DATE: Sep 9, 2015

CC:

FROM:

ATTENTION:

SERVICE PROVIDED:

LOCATION:

OBSERVATIONS:

Casing of the holes is required.

(2) Exp also reviewed Anchor testing at 3rd Row of Anchors at East portion of South side. 4 Anchors IBO R32 were tested to 39 kips and locked off at 32 kips and stated Design requirme

NOTE: The orginal Design for these Anchors were #7, however, were repla by equivalent IBO R32.

West side: one Anchor IBO R38 was teste (5th Row) to 44 kips and locked off at 30 kips and stated Design Requirements.

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Phone: 250 372-5321 Fax: 250 372-1678

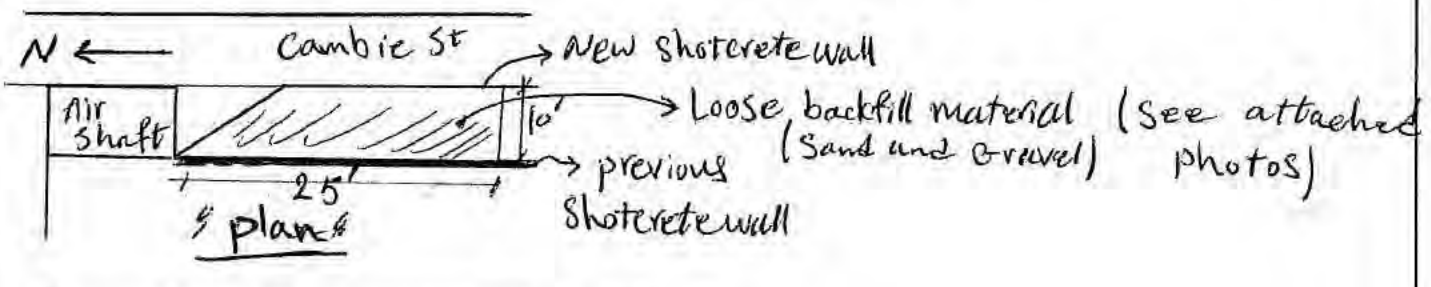
CLIENT: WT Leung Architects Inc.
PROJECT NO.: VAN-00217815-A0
ATTENTION: Konning Tam
DATE: September 10, 2015
FROM: Mahdi Hosseyni
CC: —
ATTENTION: —

SERVICE PROVIDED: Review of Shoring construction.

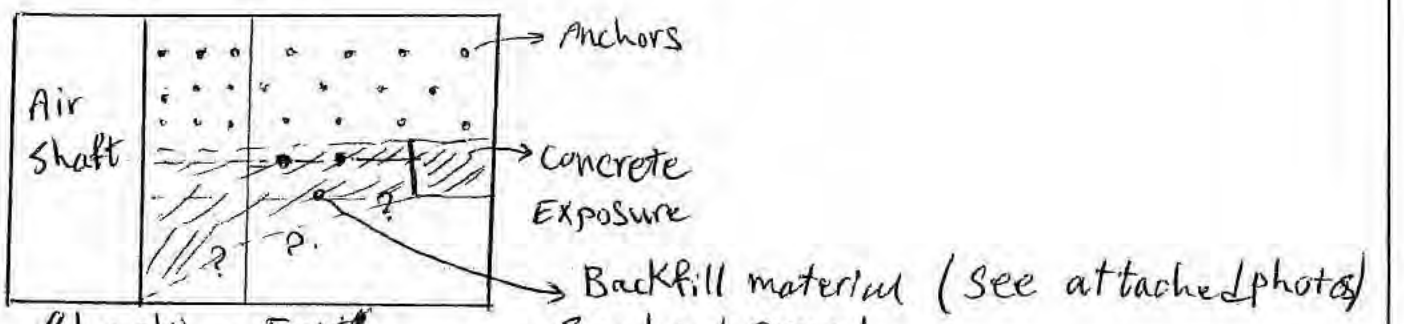
LOCATION: 4083 Cambie St., Vancouver, BC.

OBSERVATIONS:

Exp was on site to Review construction of Temporary Shoring at East Side (next to Existing Air Shaft) as shown below.



"plan"



"Looking East"

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT:

PROJECT NO.:

ATTENTION:

DATE: Sep 10, 2015

CC:

FROM:

ATTENTION:

SERVICE PROVIDED:

LOCATION:

OBSERVATIONS:

Fourth Row of Anchors at location of Airshaft were under construction. At Elevation of about ±201', backfill Engineering materials (Sand and Gravel) was observed which was Extended to 7' from the Shoring Wall (East) to a length of about 25' to South (as shown on the sketches).

The Existing (previous) shoring wall was observed at about 7' from new Shoring Wall and extended to South, its spacing about 10' from East wall.

Excavation was conducted by sub contractor, however, the loose backfill materials wers sloughing (running away) from East Excavation side. It seems additional Immediated Remediation is required at this location.

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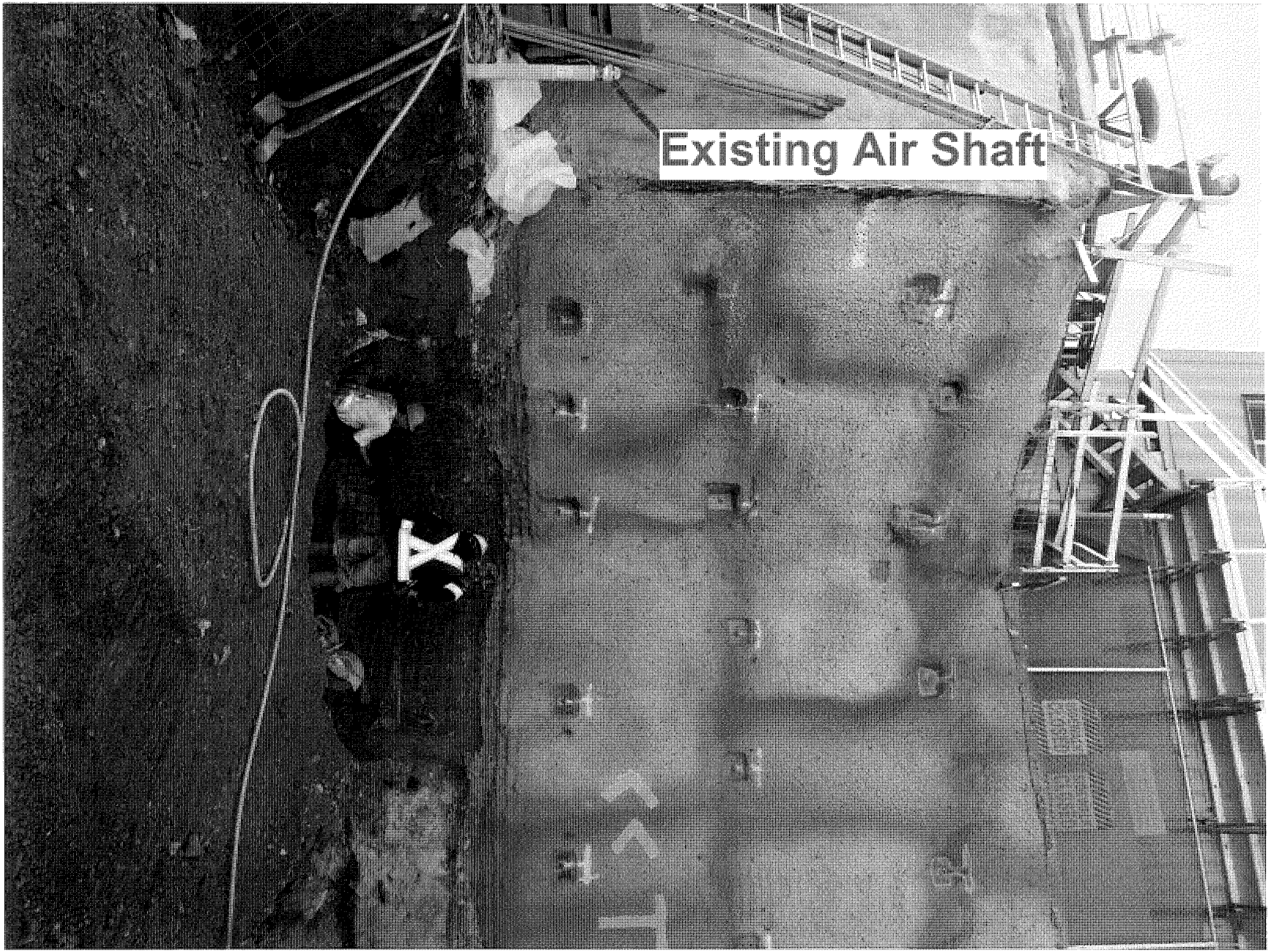
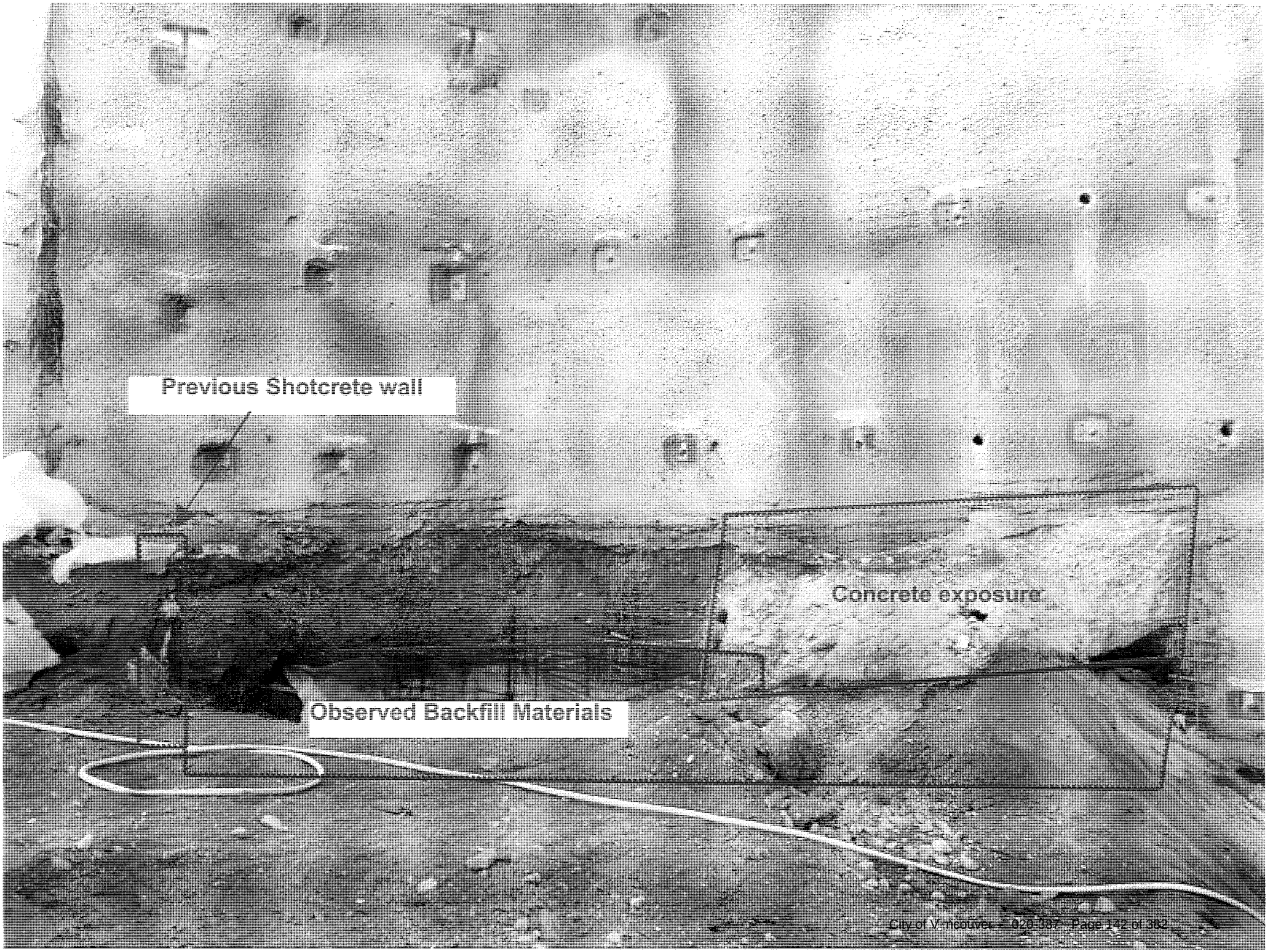
Distribution: White – Client Canary – Field Pink – File


Existing Air Shaft


Previous Shotcrete wall
Concrete exposure
Observed Backfill Materials


Previous Shotcrete wall

Memorandum

Date: 2015-09-17 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
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☐	☒	Graeme Macleod	exp Services	graeme.macleod@exp.com
☐	☒	Kai-Sing Hui	exp Services	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 2

Subject: **Dewatering Drilling Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

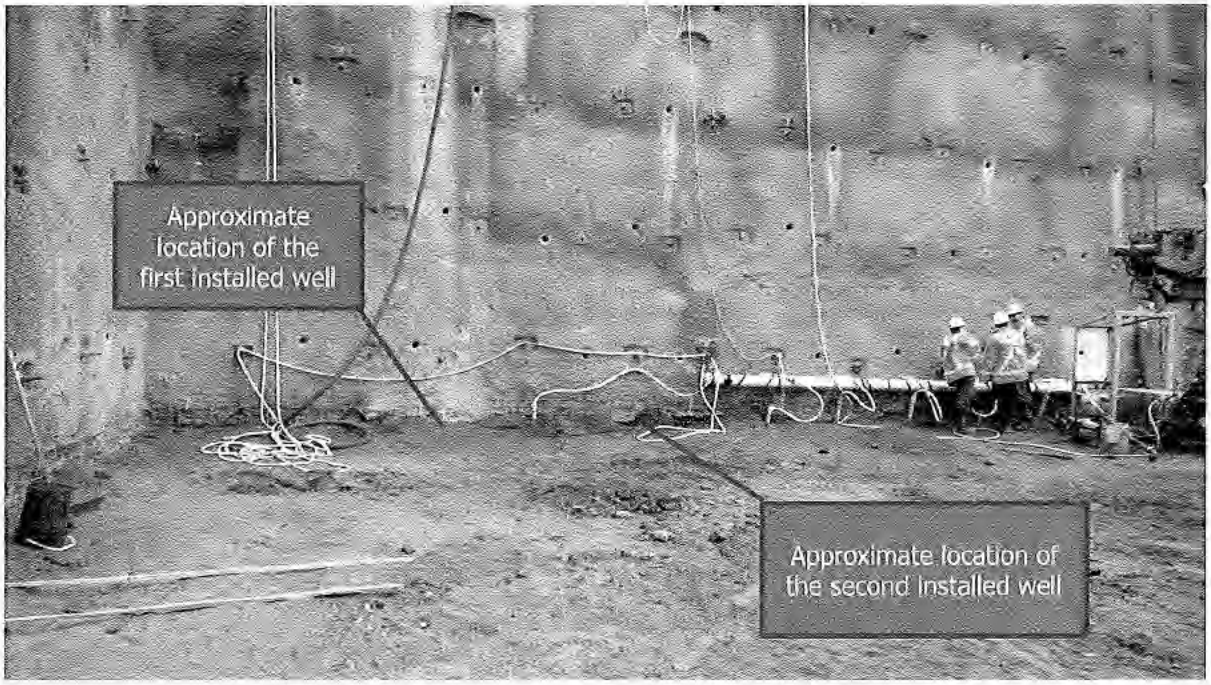
COMMENTS:

This memorandum summarizes the field drilling review for the dewatering wells installed today at the subject site located at 4083 Cambie Street, Vancouver, BC. When **exp** services arrived on site at 7:30am, Kani, the drilling contractor, had already been on site and was preparing for drilling. The drilling rig used was a water jet rig with 6"-diameter drilling casing.

The first installed dewatering well was located along the west wall at about 13ft from the south wall, see photo below. The drilled hole was 17.5ft below existing grade that was at about elevation 188ft. When placing the PVC pipe of the dewatering well, it was inferred that about 4ft of soil had heaved inside the drilling casing. After retrieving the first section of the drilling casing, it was noticed that Kani had lost about 13ft of the casing. During the attempts of retrieving the lost casing, the previously placed PVC pipe was damaged and a new one was installed in the same location.

The second installed dewatering well was also located along the west wall at about 22ft from the south wall, see photo below. The second dewatering well installed today was located on top of a previous failed attempt to install a dewatering well at the same location. The second installed dewatering well was drilled 17.5ft below existing grade that was about elevation 188ft. When placing the PVC pipe of the dewatering well, it was inferred that about the soil had heaved inside the drilling casing by about 5.5ft. After developing the dewatering well, the pumped out water from the well appeared to be clean water.

After evaluating the amount of heaved soil in both installed wall, **exp** recommended not to proceed with installing any more dewatering wells using the current drilling rig. Should other dewatering wells be installed using different techniques, **exp** Services should be informed and asked to review proposed techniques and future dewatering well installations.



Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

Attachments:

MAK

(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-09-17 MAK Dewatering Drilling Review.docx)

Memorandum

Date: 2015-09-22 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	Storm Guard	Cliff	cliff@stormguard.ca
☐	☒	Graeme Macleod	exp Services	graeme.macleod@exp.com
☐	☒	Kai-Sing Hui	exp Services	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 2

Subject: **Dewatering Drilling Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the field drilling review for the dewatering wells installed today at the subject site located at 4083 Cambie Street, Vancouver, BC. When **exp** services arrived on site at 7:25am, Downrite Drilling, the drilling contractor, appeared to have just arrived and started to set up. The reviewed dewatering wells were drilled using a sonic rig with 5.5"-diameter drilling case. The drilling methodology used to install the dewatering wells is summarized as follow:

- A vibrating closed-faced-bottom bit was used to drill five foot sections followed by vibrating casing while maintaining water circulation in the bit as well as the casing.
- After reaching the required depth specified by Stormguard, the dewatering contractor, a PVC pipe with a screen at the bottom is placed inside the casing
- Backfill (appeared to be birds eye gravel) is placed inside the casing every 5ft. then
- The casing (which is at this time full of water and some backfill) is pulled in 5ft sections.

Today, three dewatering wells were installed along the west shotcrete wall and two along the south shotcrete wall. Observed dewatering well installation details are summarized in the tables below. It should be noted that all depths are measured from ground surface that was at about 188ft elevation.

Installed dewatering wells along the west wall

Distance from the South Wall	Drilled Depth Below Ground Surface	Apparent Heaved Soil Inside the Casing	Length of Placed PVC Below Ground Surface	Comments
10 ft	20 ft	1 ft	16 ft	Initially 18 ft long PVC pipe was placed. However, the pipe appeared to have been lifted by 2ft while pulling the casing
24.5 ft	22.75 ft	1 ft	21 ft	The PVC pipe was pulled out and the well was re-drilled since backfill accidentally got inside the PVC pipe
4.3 ft	23 ft	No Noticeable Soil Heaving was Inferred	23 ft	

Installed dewatering well along the south wall

Distance from the West Wall	Drilled Depth Below Ground Surface	Apparent Heaved Soil Inside the Casing	Length of Placed PVC Below Ground Surface	Comments
11.5ft	23ft	No Noticeable Soil Heaving was Inferred	23ft	
6 ft	23.5ft	No Noticeable Soil Heaving was Inferred	23.5ft	

To evaluate the drop of the water table during the period of dewatering well installation, a stand pipe was installed at about 9ft north of the south wall and 4ft east of the 48-inch raft slab. The stand pipe was drilled to about 19.83ft. After place a 22ft PVC pipe, the entire hole was backfilled with what appeared to be bird's eye gravel.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-09-22 MAK Dewatering Drilling Review.docx)

Memorandum

Date: 2015-09-23 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	Storm Guard	Cliff	cliff@stormguard.ca
☐	☒	Graeme Macleod	exp Services	graeme.macleod@exp.com
☐	☒	Kai-Sing Hui	exp Services	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 2

Subject: **Dewatering Drilling Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the field drilling review for the dewatering wells installed today at the subject site located at 4083 Cambie Street, Vancouver, BC. When **exp** services arrived on site at 7:25am, Downrite Drilling, the drilling contractor, had just arrived. The reviewed dewatering wells were drilled using a sonic rig with 5.5"-diameter drilling case. The drilling methodology used to install the dewatering wells is summarized as follow:

- A vibrating 3.5" diameter core barrel was used to drill five foot sections followed by vibrating casing while maintaining water circulation in the casing.
- After reaching the required depth specified by Stormguard, the dewatering contractor, a PVC pipe with a screen at the bottom is placed inside the casing
- Backfill (appeared to be birds eye gravel) is placed inside the casing every 5ft. then
- The casing (which is at this time full of water and some backfill) is pulled in 5ft sections.

Today, seven (7) dewatering wells were installed along the south shotcrete wall. All dewatering wells were installed at approximately 20 degrees from vertical. Observed dewatering well installation details are summarized in the table below. It should be noted that all depths are measured from ground surface that was at about 188-189ft elevation.

Installed dewatering well along the south wall

Distance from the West Wall	Drilled Depth Below Ground Surface	Inferred Heaved Soil Inside the Casing	Length of Placed PVC Below Ground Surface	Comments
22.5ft	19.5ft	0.3ft	19.2ft	
26.5ft	21.3ft	0.75ft	20.6ft	
17ft	21ft	No Noticeable Soil Heaving	21ft	
31.5ft	23.5ft	No Noticeable Soil Heaving	23.5ft	
36.5ft	24ft	0.5ft	23.5ft	
42.5ft	20.25ft	1.25ft	19ft	The PVC pipe seems to have been pull up while pulling the casing
47.5ft	23.5ft	No Noticeable Soil Heaving	23.5ft	

Dewatering Wells along the South wall (2015-09-23)

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-09-23 MAK Dewatering Drilling Review.docx)

Memorandum

Date: 2015-09-24 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	Storm Guard	Cliff	cliff@stormguard.ca
☐	☒	Graeme Macleod	exp Services	graeme.macleod@exp.com
☐	☒	Kai-Sing Hui	exp Services	kai-sing.hui@exp.com

From: Sean Daly, E.I.T

Total No. of Pages: 2

Subject: **Dewatering Drilling Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the field drilling review for the dewatering wells installed today at the subject site located at 4083 Cambie Street, Vancouver, BC. When **exp** services arrived on site at 7:30am, Downrite Drilling, the drilling contractor, was already on site. The reviewed dewatering wells were drilled using a sonic rig with 5.5"-diameter drilling case. The drilling methodology used to install the dewatering wells is summarized as follow:

- A vibrating 3.5" diameter core barrel was used to drill five foot sections followed by vibrating casing while maintaining water circulation in the casing.
- After reaching the required depth specified by Stormguard, the dewatering contractor, a PVC pipe with a screen at the bottom is placed inside the casing
- Backfill (appeared to be birds eye gravel) is placed inside and around the casing every 5ft. then
- The casing (which is at this time full of water and some backfill) is pulled in 5ft sections.

Today, eight dewatering wells were installed along the south shotcrete wall. All dewatering wells were installed at approximately 20 degrees from vertical. Observed dewatering well installation details are summarized in the table below. It should be noted that all depths are measured from ground surface that was at about 188-189ft elevation.

Distance from the West Wall	Length of Placed PVC Below Ground Surface
52.5ft	20ft
57.5ft	20ft 6in
62.5ft	20ft 10in
67.5ft	23ft 4in
72.5ft	22ft 6in
77.5ft	20ft
82.5ft	20ft

Sloughing / heaving of soil in the bottom of the casing was checked before well installation at each location, and was less than 1' in all cases, typically about 4" to 6", and was flushed out as required before the well installation was carried out. In all cases the PVC pipe was pulled up slightly during removal of the drill casing, typically 3" to 6". This is normal during well installation as the granular fill tends to bind between the PVC pipe and the casing as it is pulled. The drilling process was monitored to ensure the methodology above was followed, and to ensure that the volume of soil washed out due to the drilling process was tolerable.

I hope that this memo meets your present needs.

Submitted by:

exp Services Inc.

Sean Daly, E.I.T
Geotechnical Engineer

SCD
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-09-23 MAK Dewatering Drilling Review.docx)

Memorandum

Date: 2015-09-25 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	Storm Guard	Cliff	cliff@stormguard.ca
☐	☒	Graeme Macleod	exp Services	graeme.macleod@exp.com
☐	☒	Kai-Sing Hui	exp Services	kai-sing.hui@exp.com

From: Sean Daly, E.I.T

Total No. of Pages: 2

Subject: **Dewatering Drilling Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the field drilling review for the dewatering wells installed today at the subject site located at 4083 Cambie Street, Vancouver, BC. When **exp** services arrived on site at 7:25am, Downrite Drilling, the drilling contractor, was already on site. The reviewed dewatering wells were drilled using a sonic rig with 5.5"-diameter drilling case. The drilling methodology used to install the dewatering wells is summarized as follow:

- A vibrating 3.5" diameter core barrel was used to drill five foot sections followed by vibrating casing while maintaining water circulation in the casing.
- After reaching the required depth specified by Stormguard, the dewatering contractor, a PVC pipe with a screen at the bottom is placed inside the casing
- Backfill (appeared to be birds eye gravel) is placed inside and around the casing every 5ft. then
- The casing (which is at this time full of water and some backfill) is pulled in 5ft sections.

Today, four dewatering wells were installed along the south shotcrete wall. All dewatering wells were installed at approximately 20 degrees from vertical. Observed dewatering well installation details are summarized in the table below. It should be noted that all depths are measured from ground surface that was at about 188-189ft elevation.

Distance from the West Wall	Length of Placed PVC Below Ground Surface	Comment
93ft	9ft 8in	Could not reach required depth by Stormguard due to obstructions
96.5ft	23ft	-
102.5ft	20ft	-
106.5ft	19ft 6in	-

Sloughing / heaving of soil in the bottom of the casing was checked before well installation at each location, and was less than 1' in all cases, typically about 2" to 6", and was flushed out as required before the well installation was carried out. In all cases the PVC pipe was pulled up slightly during removal of the drill casing, typically 3" to 6". This is normal during well installation as the granular fill tends to bind between the PVC pipe and the casing as it is pulled. The drilling process was monitored to ensure the methodology above was followed, and to ensure that the volume of soil washed out due to the drilling process was tolerable.

It is understood that today concludes dewatering well installation along the shotcrete south wall and future dewatering wells are to be installed along the shotcrete west wall on a later date. Prior to installing future dewatering wells, exp services should be notified and be allowed to review future dewatering well installations.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-09-25 MAK Dewatering Drilling Review.docx)

Memorandum

Date: 2015-10-01 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
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☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 5

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the anchor reinforcement review conducted on September 30, 2015, and the anchor testing carried out on October 1, 2015 at the subject site located at 4083 Cambie Street, Vancouver, BC.

On September 30, the anchor reinforcement details were reviewed and found to be generally in conformance with exp design. To avoid washing sand, A&A Excavation (shoring contractor) used double mesh at the soil face.

On October 1, thirteen anchors were tested and passed.

Details of the reviewed anchor reinforcement and the tested anchors can be found in the following pages.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

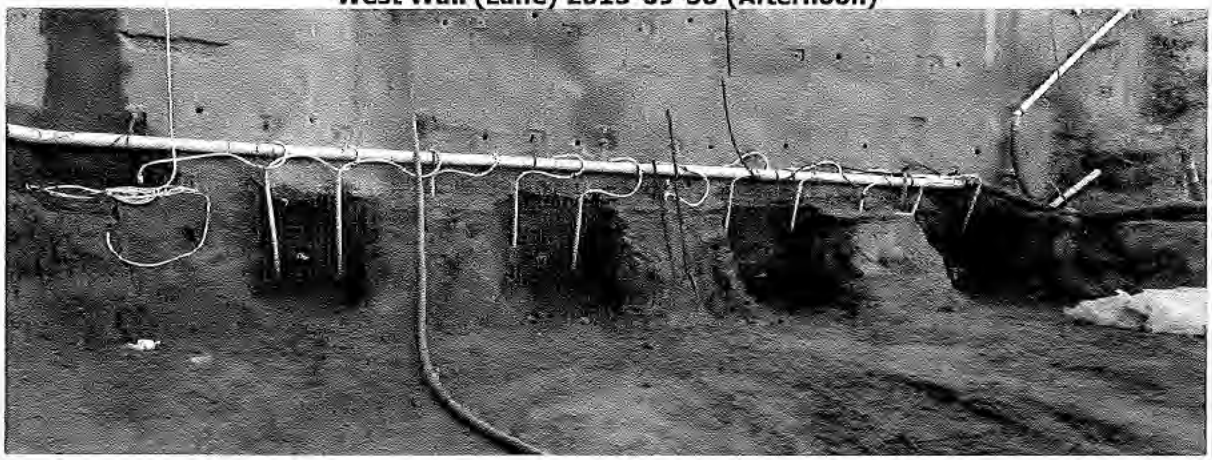
MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-09-25 MAK Dewatering Drilling Review.docx)

Anchor Reinforcement Review

West Wall (Lane)

Section	Tier	Anchor Panel
6	6	3
6	6	6
6	6	9
6	6	12

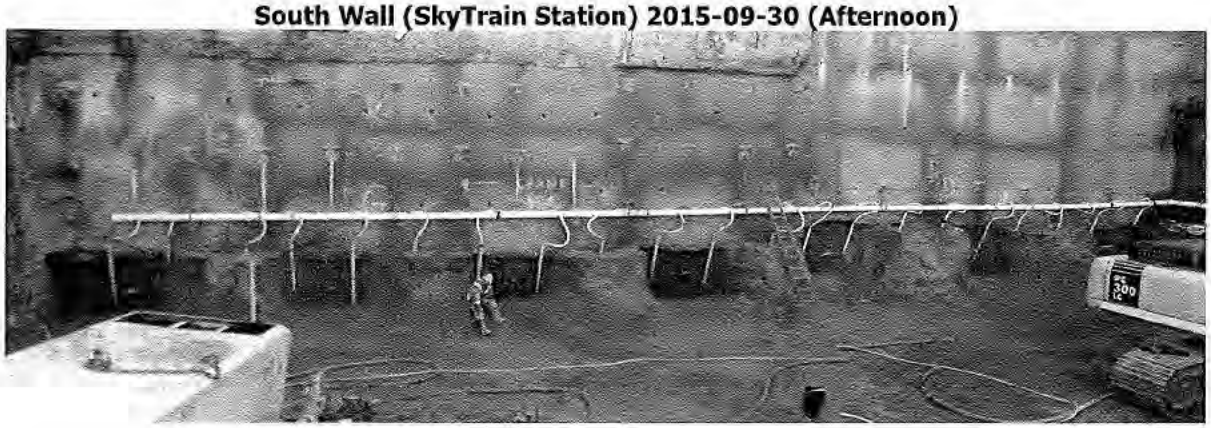
West Wall (Lane) 2015-09-30 (Afternoon)



South Wall (SkyTrain Station):

Section	Tier	Anchor Panel
Section 9	Tier 6	20
Section 7	Tier 6	17
Section 9	Tier 6	14
Section 8	Tier 4	11
Section 8	Tier 4	8
Section 8	Tier 4	5
Section 8	Tier 4	2
Section 8	Tier 4	1

South Wall (SkyTrain Station) 2015-09-30 (Afternoon)



Wall	Section	Tier	Anchor Panel
East Wall	Section 2	Tier 6	11

Anchor Testing Review

West Wall (Lane)

Section	Tier	Anchor	Comments	Elongation
6	6	3	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/8"
6	6	6	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/16"
6	6	9	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/16"
6	6	12	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/8"

Notes: PL = Proof Load
LL= Lock-off Load
West Wall count relative to SW corner.

West Wall (Lane) 2015-10-01 (Morning)

South Wall (SkyTrain Station):

Section	Tier	Anchor	Comments	Elongation
9	4	20	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3800psi)	1/2"
7	4	17	Proof Loaded to 64 kips (PL=4400 psi) and locked off at 53 kips (3700psi)	1/8"
9	4	14	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3800psi)	1/8"
8	4	11	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3800psi)	1/4"
8	4	8	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/4"
8	4	5	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/4"
8	4	2	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/8"
8	3	1	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/2"

Notes: PL = Proof Load
LL= Lock-off Load
South Wall count relative to SE corner.

South Wall (SkyTrain Station) 2015-10-01 (Morning)

East Wall (Cambie Street):

Section	Tier	Anchor	Comments	Elongation
2	6	11	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 37 kips (2600psi)	1/2"

Notes: PL = Proof Load
LL= Lock-off Load
East Wall count relative to NE corner.

Memorandum

Date: 2015-10-02 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
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☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 7

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the anchor reinforcement review conducted on October 1, 2015, and the anchor testing carried out on October 2, 2015 at the subject site located at 4083 Cambie Street, Vancouver, BC.

On October 1, the anchor reinforcement details were reviewed and found to be generally in conformance with exp design. To avoid washing sand, A&A Excavation (shoring contractor) used double mesh at the soil face.

On October 2, eleven anchors were tested and passed.

Details of the reviewed anchor reinforcement and the tested anchors can be found in the following pages.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

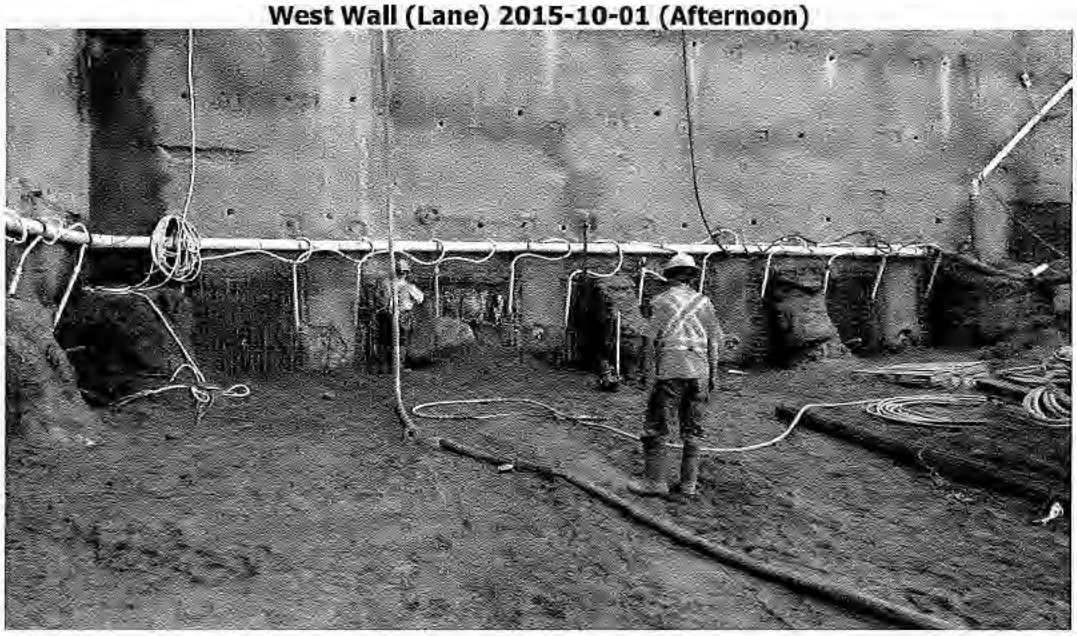
MAK
(\\pvanctp001\projectsfrom2007\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-02 MAK Anchor Testing.docx)

Anchor Reinforcement Review

West Wall (Lane)

Section	Tier	Anchor Panel
6	6	2
6	6	8
6	6	5
6	6	11

West Wall (Lane) 2015-10-01 (Afternoon)



South Wall (SkyTrain Station):

Section	Tier	Anchor Panel
Section 9 & 7	Tier 6	15
Section 9 & 7	Tier 6	18
Section 8	Tier 4	4
Section 8	Tier 4	6
Section 8	Tier 4	9
Section 8	Tier 4	12

South Wall (SkyTrain Station) 2015-10-01 (Afternoon)

East Wall (Cambie Street):

Section	Tier	Anchor Panel
2	6	8

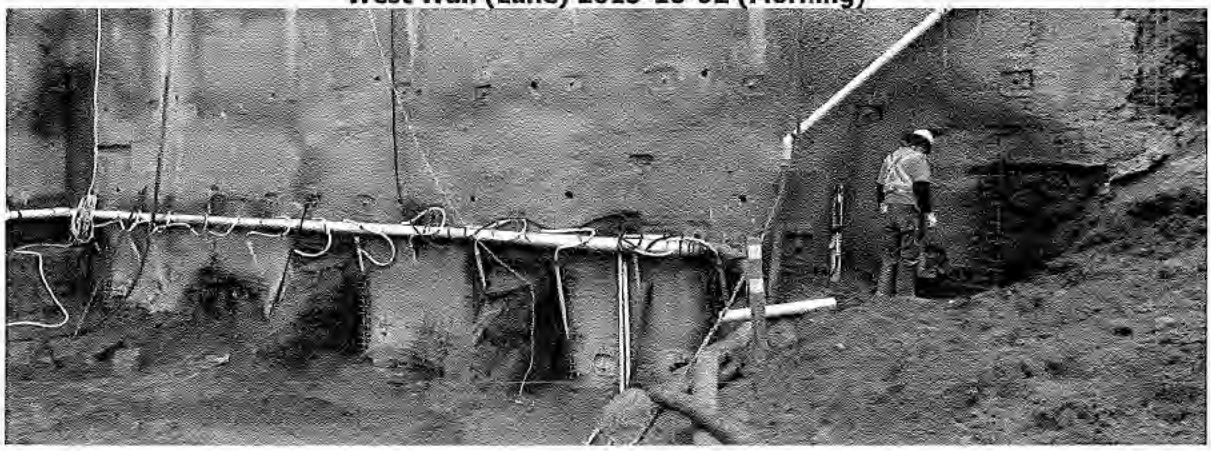
Anchor Testing Review

West Wall (Lane)

Section	Tier	Anchor	Comments	Elongation
6	6	2	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/4"
6	6	8	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/8"
6	6	11	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/16"
6	6	13	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 36 kips (2500psi)	1/4"

Notes: PL = Proof Load
LL= Lock-off Load
West Wall count relative to SW corner.

West Wall (Lane) 2015-10-02 (Morning)



South Wall (SkyTrain Station):

Section	Tier	Anchor	Comments	Elongation
9&7	4	15	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/2"
9&7	4	18	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/4"
9	4	4	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3800psi)	1/8"
8	4	6	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/8"
8	4	9	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/2"
8	4	12	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/2"

Notes: PL = Proof Load
LL= Lock-off Load
South Wall count relative to SE corner.

South Wall (SkyTrain Station) 2015-10-02 (Morning)

East Wall (Cambie Street):

Section	Tier	Anchor	Comments	Elongation
2	6	8	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 37 kips (2600psi)	1/16"

Notes: PL = Proof Load
LL= Lock-off Load
East Wall count relative to NE corner.

East Wall (Cambie Street) 2015-10-02 (Morning)

Memorandum

Date: 2015-10-05 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
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☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 3

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the results of the anchor testing carried out on October 5, 2015 at the subject site located at 4083 Cambie Street, Vancouver, BC.

Thirteen anchors were tested today. While twelve anchors passed, anchor 21 of the 6 tier at the south wall failed and locked off at 29 Kips.

Details results of tested anchors can be found in the following pages.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

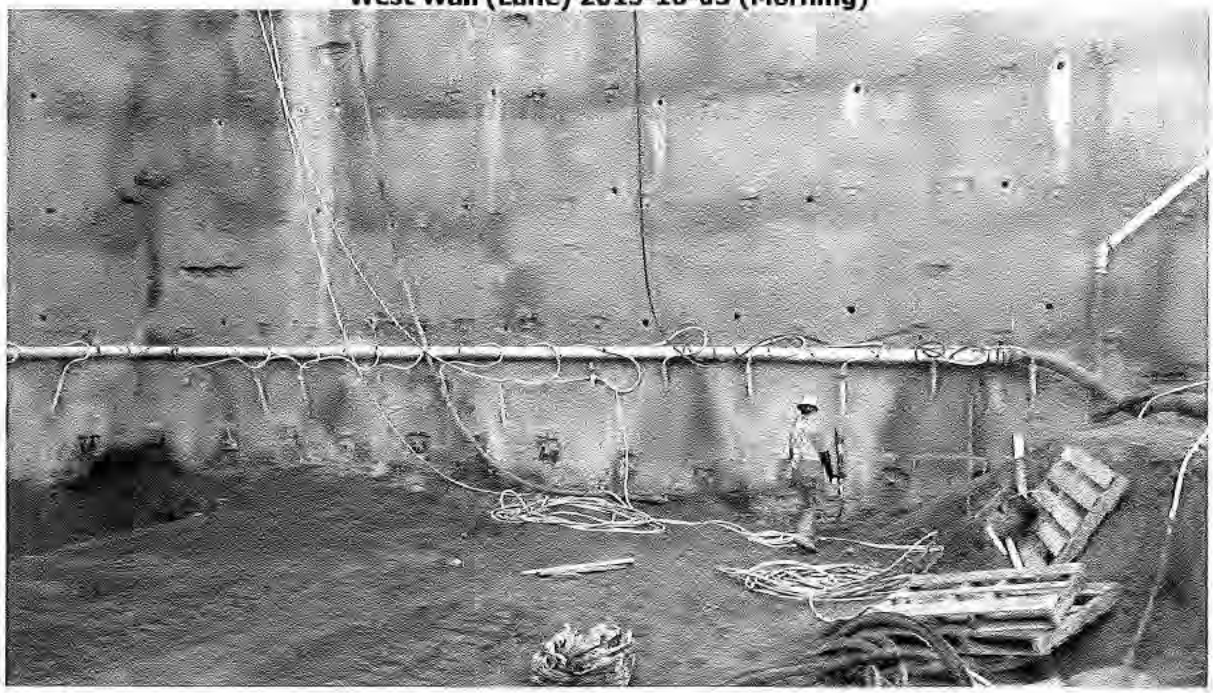
MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-05 MAK Anchor Testing.docx)

West Wall (Lane)

Section	Tier	Anchor	Comments	Elongation
6	6	1	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/2"
6	6	4	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/8"
6	6	5	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/4"
6	6	7	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/8"
6	6	10	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 45 kips (3200psi)	1/8"

Notes: PL = Proof Load
LL= Lock-off Load
West Wall count relative to SW corner.

West Wall (Lane) 2015-10-05 (Morning)



South Wall (SkyTrain Station):

Section	Tier	Anchor	Comments	Elongation
9&7	6	16	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/4"
9&7	6	19	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/8"
9&7	6	21	Failed and locked off at 29Kips (2000psi)	
8	4	1	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	-
8	4	3	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/2"
8	4	7	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/16"
8	4	10	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/2"
8	4	13	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/2"

Notes: PL = Proof Load
LL= Lock-off Load
South Wall count relative to SE corner.

South Wall (SkyTrain Station) 2015-10-05 (Morning)

Memorandum

Date: 2015-10-05 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
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☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 2

Subject: **Mini-Piles Installation Review for the site located at 4083 Cambie Street, Vancouver, BC.**

COMMENTS:

This memorandum summarizes the full-time reviews for the attempts to install the mini-piles and spiles located south of TransLink air-shaft at the subject site on September 30 and October 1, 2015.

On September 30, A&A Excavation (the shoring contractor) peeled about 30ft of the east shotcrete wall south of TransLink air-shaft to install the mini-piles. The peeled area was about 2-2.5ft above tire four. Then the grade was raised to allow for installing the mini-piles at 5° from the vertical with the drilling entry point 2.5ft above tier four. Due to drilling equipment limitation, the separation distance between the mini-pile entry point and the shotcrete wall could not be smaller than 10". After evaluating the limitation of the separation distance between the shotcrete wall and the mini-pile's entry point, it was concluded that the mini-piles, spiles and the proposed waler would not meet exp's original design dated September 28, 2015 and would excessively extrude into the foundation wall. As a result, no mini-piles could be installed on this day.

After incorporating the field limitation imposed by the separation distance between the wall and mini-pile's entry point into exp's design and receiving permission from W.T. Leung Architects to extrude into the foundation wall, A&A Excavation increased the peeled area to about 5ft above tier four of the east shotcrete wall. Then the grade was also raised to about 5ft above tier four to minimize the extrusion into the foundation wall. A mini-pile was drilled about 16ft from the north edge of the east wall. When reaching

about 17ft depth, the pile could not be advanced further and A&A called it practical refusal. To evaluate the drilling rig capacity to drill the proposed spiles, a 30ft spile was drilled about 2ft south of the mini-pile.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-05 MAK Mini Piles Installation Attempts.docx)

Memorandum

Date: 2015-10-05 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
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☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 2

Subject: **Spiles Installation Review for the site located at 4083 Cambie Street, Vancouver, BC.**

COMMENTS:

This memorandum summarizes the full-time review for the installed spiles on October 5, 2015 located south of TransLink's air-shaft at the subject site.

Today, 18 spiles (R38 IBO) were installed along the east shotcrete wall south of TransLink's air-shaft. The installed spiles were about 25ft long and inclined at approximately 5° from vertical. The drilling entry points for the spiles were about 1-0.5ft below anchor tier three. The spiles length below tier three ranges from 24-24.5ft. The spiles were drilled by A&A Excavation Ltd. (the shotcrete contractor) with R38 IBO using air and water as drilling fluids. Only the bottom 4ft of the spiles were grouted. The spile drilled on October 1 was also grouted today.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-05 MAK Spiles Installation Review.docx)

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-06 MAK Additional Anchors for South wall Section 7.docx)

Memorandum

Date: 2015-10-06 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
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☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 2 + attachment

Subject: **Additional Anchors at the South Wall for the Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the non-conformance of section 7 of the south wall with exp's shotcrete wall design, and exp's recommendations for this section.

Based on the attached drawing, exp's design for section 7 of the south wall is to have 5 tiers of 6ft. under-pinning panels and 7.1ft under-pinning panel for the last tier. To account for TransLink's foundation at section 7, the top under-pinning panel was dropped by 3ft. compared to adjacent areas.

Based on field observations, it was noticed that anchor's vertical spacing for section 7 of the south wall has been gradually decreasing with depth. By the fifth and sixth anchor tiers, anchors for sections 7 are in line with the adjacent area, see photo below.

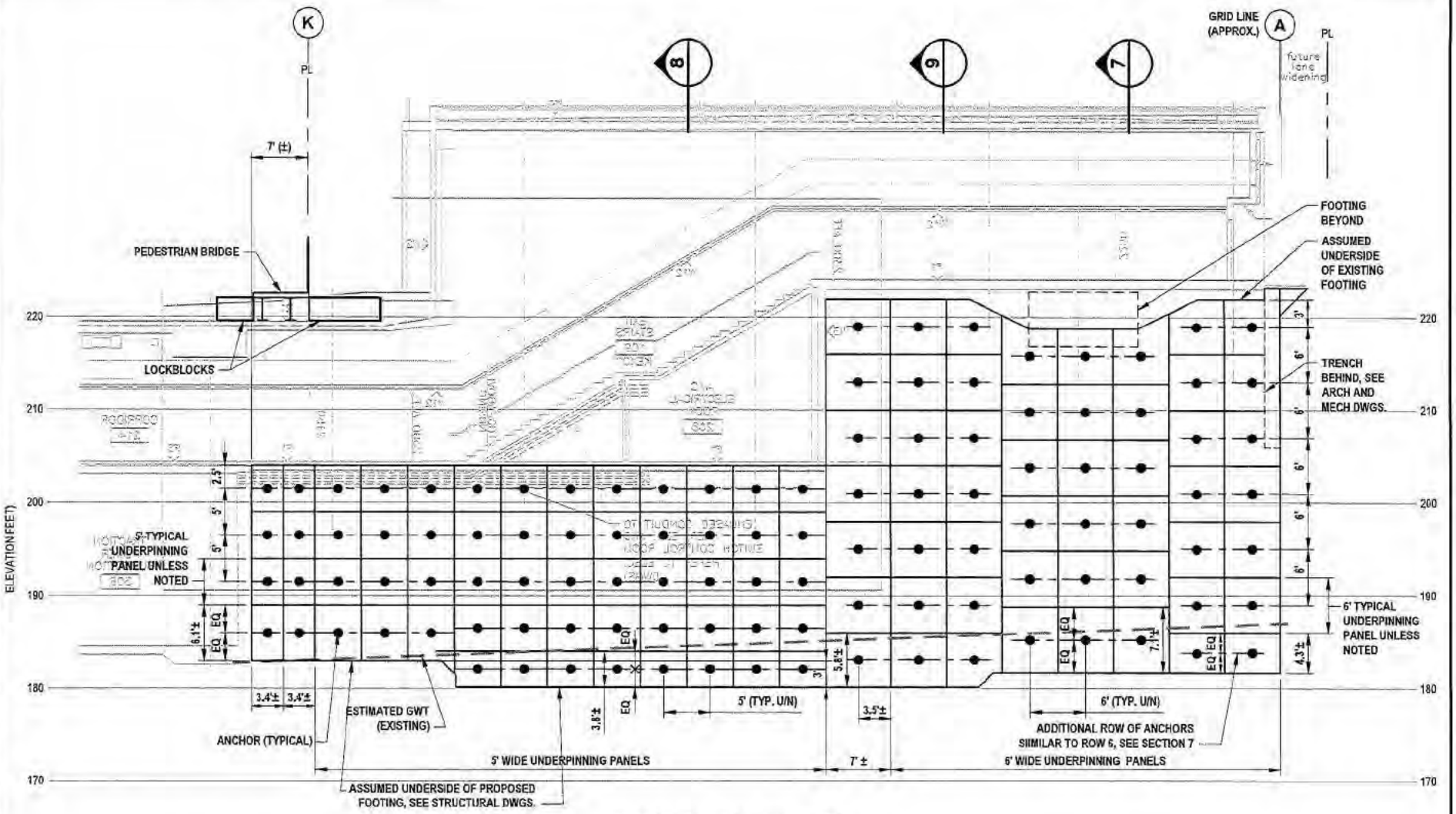
Reduction of anchor's vertical spacing yielded longer panels than designed at the bottom of section 7. As a correction action, it is recommended to drill three more anchors at the bottom panels of section 7 in line with adjacent anchors. The three additional anchors should be placed at the contractor's expense.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-06 MAK Additional Anchors for South wall Section 7.docx)



ELEVATION LOOKING SOUTH

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	DSGN.	CHK.
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
9	ISSUED FOR CONSTRUCTION	2015-05-22
8	TELUS DUCTS ADDED IN LANE	2015-05-21
7	SEWER MANHOLE LOCATION REVISED	2015-04-29
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 GAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING ELEVATION LOOKING SOUTH

DATE	SCALE	DWG NO.
2014-05-16	1"=10'	G14

Memorandum

Date: 2015-10-06 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 3

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the anchor reinforcement review conducted on October 5, 2015, and the anchor testing carried out on October 6, 2015 at the subject site located at 4083 Cambie Street, Vancouver, BC.

On October 5, the anchor reinforcement details were reviewed and found to be generally in conformance with exp design. To avoid washing sand, A&A Excavation (shoring contractor) used mesh at the soil face.

On October 6, five anchors were tested and passed.

Details of the reviewed anchor reinforcement and the tested anchors can be found in the following pages.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-06 MAK Anchor Testing.docx)

South Wall (SkyTrain Station):

Section	Tier	Anchor	Comments	Elongation
9&7	7	15	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/8"
9&7	7	9	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/4"
8	5	6	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/4"
8	5	62	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/4"

Notes: PL = Proof Load
LL= Lock-off Load
South Wall count relative to SE corner.

South Wall (SkyTrain Station) 2015-10-06 (Afternoon)

East Wall (Cambie Street):

Section	Tier	Anchor	Comments	Elongation
2	6	10	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 37 kips (2600psi)	1/16"

Notes: PL = Proof Load
LL= Lock-off Load
East Wall count relative to NE corner.

East Wall (Cambie Street) 2015-10-06 (Morning)

Memorandum

Date: 2015-10-06 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 2

Subject: **Mini-Piles Installation Review for the site located at 4083 Cambie Street, Vancouver, BC.**

COMMENTS:

This memorandum summarizes the full-time review for the attempt to install the mini-piles located south of TransLink's air-shaft at the subject site on October 6, 2015.

Based on previous communications with ITC (the site contractor), it was understood that Downrite Drilling would provide a sonic rig that could drill the mini-piles as close as 12" from the shotcrete wall. However, when the rig arrived on site, it was learnt that the rig could not get closer than 26" from the well. Drilling the mini-piles 26" from the face of the shotcrete wall would result in an extrusion of the waler into the foundation wall by approximately 24" at the four anchor tier.

By about noon, A&A Excavation proposed some modification to their drilling rig which they believed may help drilling the piles as close as 10" from the wall. As a result, exp stayed on site until about 2:20PM when notified that the rig modifications could not be carried out by the end of the day.

Based on site conversation with W.T. Leung Architects and ITC, it is understood that it is acceptable for the shotcrete wall to extrude into the foundation wall as required while drilling the mini-piles as close to the shotcrete wall as practically possible.

When exp left the site, no mini-piles were installed.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-06 MAK Mini Piles Installation Attempts.docx)

Memorandum

Date: 2015-10-07 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
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☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 2

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the anchor reinforcement review conducted on October 6, 2015, and the anchor testing carried out on October 7, 2015 at the subject site located at 4083 Cambie Street, Vancouver, BC.

On October 6, the anchor reinforcement details were reviewed and found to be generally in conformance with exp design.

On October 7, four anchors were tested and passed.

Details of the reviewed anchor reinforcement and the tested anchors can be found in the following pages.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-07 MAK Anchor Testing.docx)

South Wall (SkyTrain Station):

Section	Tier	Anchor	Comments	Elongation
9&7	7	16	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/8"
9&7	7	10	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/4"
8	5	7	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/8"
8	5	3	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/4"

Notes: PL = Proof Load
LL= Lock-off Load
South Wall count relative to SE corner.

South Wall (SkyTrain Station) 2015-10-07 (Afternoon)

Memorandum

Date: 2015-10-07 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
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☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 2

Subject: **Mini-Piles Installation Review for the site located at 4083 Cambie Street, Vancouver, BC.**

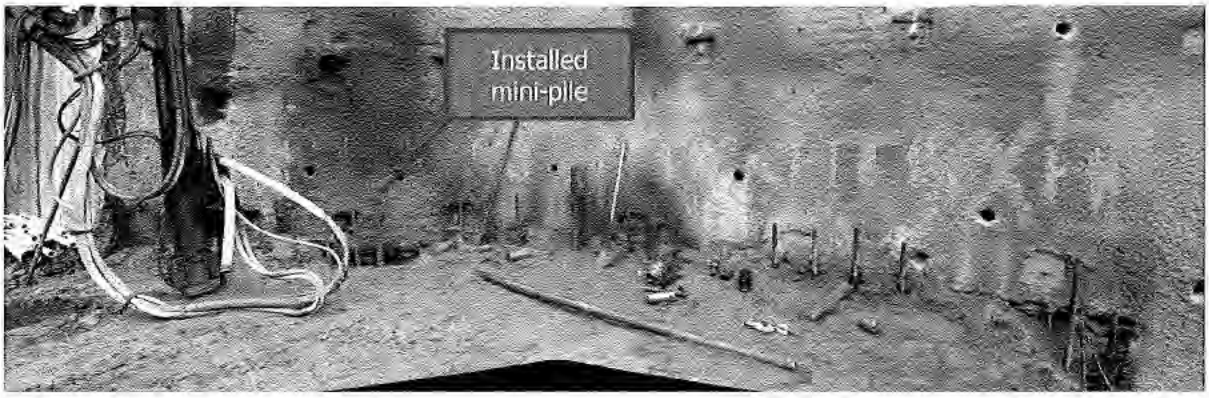
COMMENTS:

This memorandum summarizes the full-time installation review of the mini-pile located south of TransLink's air-shaft along the east shotcrete wall installed on October 7, 2015 at the subject site.

After implementing the modification proposed by A&A Excavation (the shoring contractor) to their drilling rig which consisted of welding two different size couplers to each other so that one coupler would fit the T76N mini-pile and the other coupler would fit their rig, A&A successfully drilled a mini-pile located about 9.5ft from the north edge of the east shotcrete wall at about 5° degrees inclination from vertical through the clear crush gravel and advanced it to about 42ft below the third line of anchors. While grouting the mini-pile, exp notified A&A that the mini-pile was not advanced to the designed depth of 45ft below the third line of anchors. It should be noted that the design depth had been communicated to A&A during the mini-pile installation and prior to grouting.

To advance the mini-pile to the required depth, A&A resumed drilling. However, reaching the designed depth could not be achieved due to clog of the mini-pile head which required pulling out the mini-pile. After pulling out the mini-pile, the pile was re-drilled at the same location at about 5° degrees inclination from vertical and was advanced to about 47.5ft below the third line of anchors.

To account for the large hole diameter, about 105 liter of grout was used to grout the bottom 20ft of the mini-pile.



Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-07 MAK Mini Piles Installation.docx)

Memorandum

Date: 2015-10-08 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 2

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the anchor reinforcement review conducted on October 7, 2015, and the anchor testing carried out on October 8, 2015 at the subject site located at 4083 Cambie Street, Vancouver, BC.

On October 7, the anchor reinforcement details were reviewed and found to be generally in conformance with exp design.

On October 8, ten anchors were tested and passed.

Details of the reviewed anchor reinforcement and the tested anchors can be found in the following pages.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-08 MAK Anchor Testing.docx)

South Wall (SkyTrain Station):

Section	Tier	Anchor	Comments	Elongation
8	5	1	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/4"
8	5	4	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/4"
8	5	5	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/4"
8	5	8	Proof Loaded to 39 kips (PL=2700 psi) and locked off at 32 kips (2200psi)	1/4"
9&7	7	10	(Lift-off Test) No load loss was found. Anchor locked off at 56 kips (3900psi)	-
9&7	7	11	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/8"
9&7	7	12	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1"
9&7	7	13	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/8"
9&7	7	14	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/8"
9&7	6	21 (Re-drill)	Proof Loaded to 68 kips (PL=4700 psi) and locked off at 56 kips (3900psi)	1/2"

Notes: PL = Proof Load
LL= Lock-off Load
South Wall count relative to SE corner.

South Wall (SkyTrain Station) 2015-10-08 (Afternoon)

Memorandum

Date: 2015-10-09 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 2

Subject: **Mini-Piles Installation Review for the site located at 4083 Cambie Street, Vancouver, BC.**

COMMENTS:

This memorandum summarizes the full-time installation reviews of the mini-piles located along the east shotcrete wall and south of TransLink's air-shaft that were installed on October 8 and October 9, 2015 at the subject site.

To account for the clear crush found along the east shotcrete wall and south of TransLink's air-shaft, **exp** Services (**exp**) issued a revise design (latest revision is attached) in which ten (10) mini-piles with 20ft bond length should be installed and sloped at about 5° from vertical. The new mini-piles should be at least 38ft long below the fourth row of anchors. T76N was approved as a substitute for T75/53. To maintain the mini-pile's inclination and reduce the extrusion of the proposed waler, the grade of the drilling entry point of the mini-piles was raised to about 0.5-1ft below the third row of anchors (i.e. 5-5.5ft higher than originally designed). To account for the raise in grade and the actual length of each pile sections, each mini-pile was required be 45ft long below the third row of anchors.

On October 8 and October 9, 2015, A&A Excavation (the shoring contractor) installed 9 mini-piles with about 20ft bond length that were sloped at approximately 5° from vertical. However, it was noticed that the slope of the mini-piles slightly changed as the piles advanced. It should be noted that A&A installed piles longer than design length to avoid producing a mini-pile length shorter than design length and provide a pile stickup with enough space between the shotcrete wall and their equipment. The installation details of the 9 mini-pile are summarized in the table below.

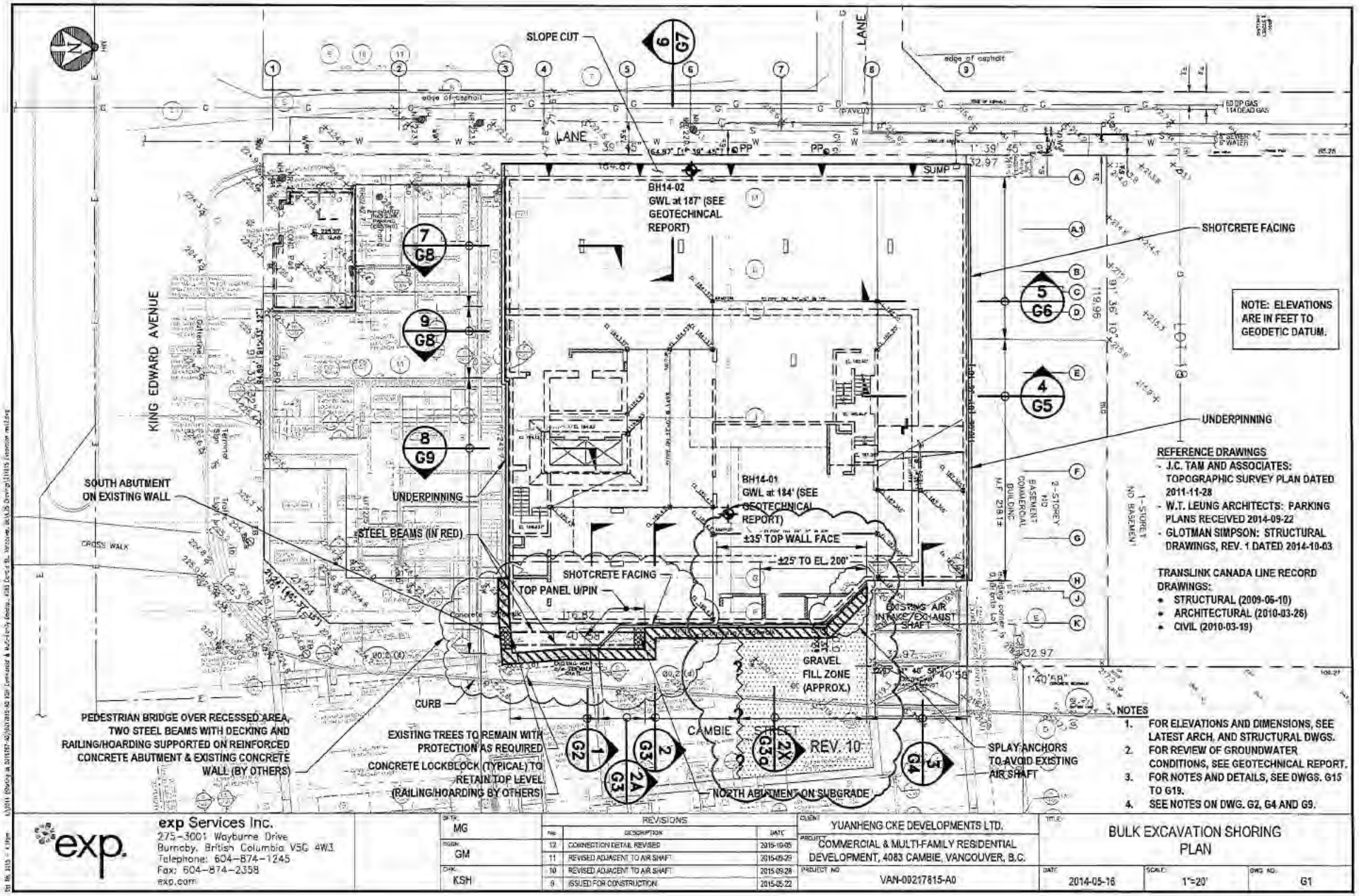
Approximate Distance from the North Edge of the East Shotcrete Wall	Depth Below the Third Row of Anchors (ft)	Mini-pile Inclination at the End of Drilling (degree from vertical)
3'7"	47.5	7
5'11"	48	4
12"	48	4
15'7"	47	6
16'7"	46.5	6
21'2"	47	6
22'4"	48	6
27'9"	48.5	7
29'2"	48.5	5

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-09 MAK Mini Piles Installation.docx)



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Fax: 604–874–2358
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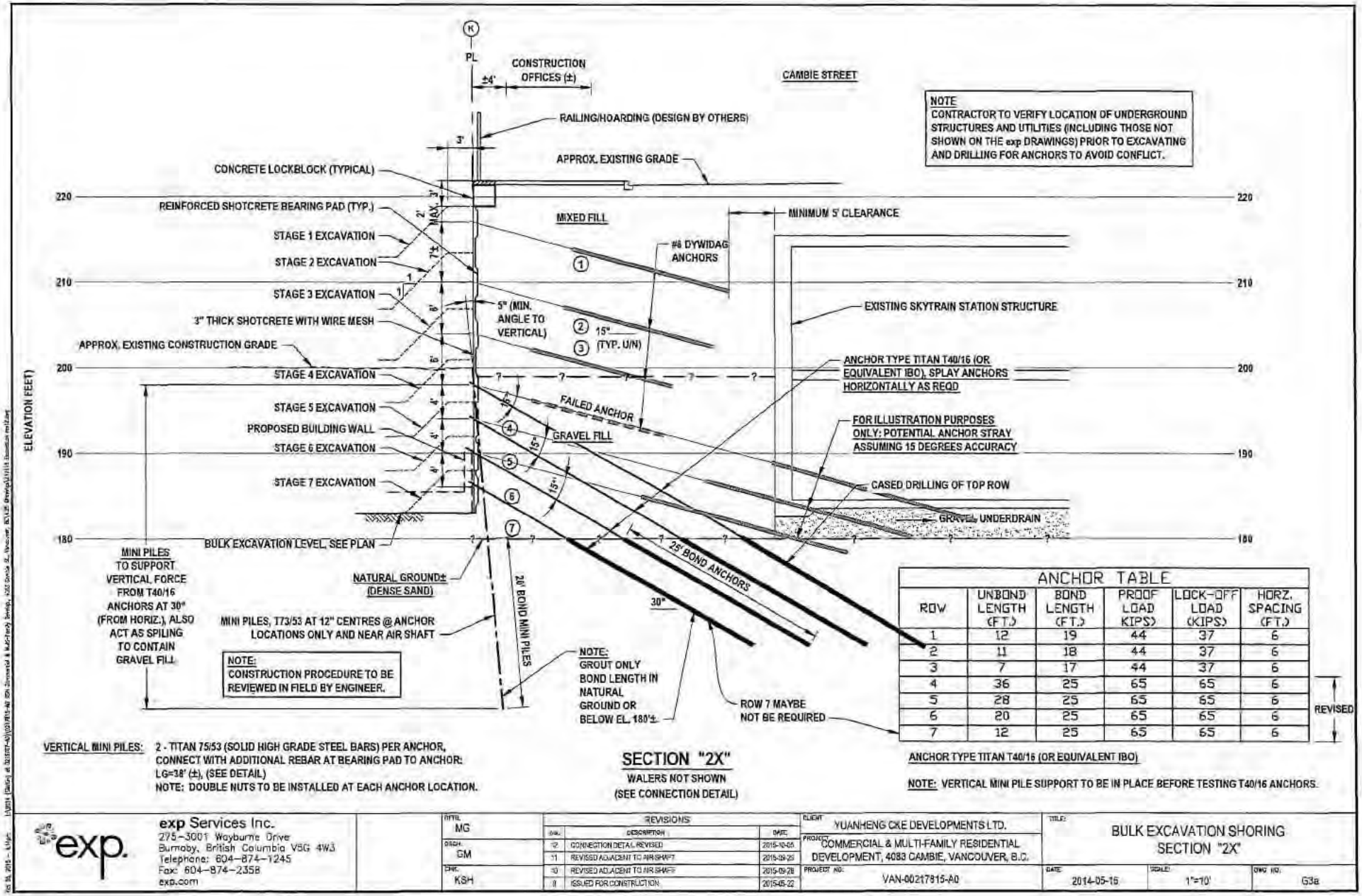
DR'N	REVISIONS		
MG	No	DESCRIPTION	DATE
DSGN	12	CONNECTION DETAIL REVISED	2015-10-05
GM	11	REVISED ADJACENT TO AIR SHAFT	2015-09-29
CHK	10	REVISED ADJACENT TO AIR SHAFT	2015-09-28
KSH	9	ISSUED FOR CONSTRUCTION	2015-05-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO: VAN-00217615-A0

TITLE: BULK EXCAVATION SHORING PLAN
DATE: 2014-05-16
SCALE: 1"=20'
DWG NO.: G1



ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	12	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	36	25	65	65	6
5	28	25	65	65	6
6	20	25	65	65	6
7	12	25	65	65	6

REVISED

ANCHOR TYPE TITAN T40/16 (OR EQUIVALENT IBO)

NOTE: VERTICAL MINI PILE SUPPORT TO BE IN PLACE BEFORE TESTING T40/16 ANCHORS.

VERTICAL MINI PILES: 2 - TITAN 75/53 (SOLID HIGH GRADE STEEL BARS) PER ANCHOR, CONNECT WITH ADDITIONAL REBAR AT BEARING PAD TO ANCHOR: LG=38' (±), (SEE DETAIL)
NOTE: DOUBLE NUTS TO BE INSTALLED AT EACH ANCHOR LOCATION.

SECTION "2X"

WALERS NOT SHOWN
(SEE CONNECTION DETAIL)

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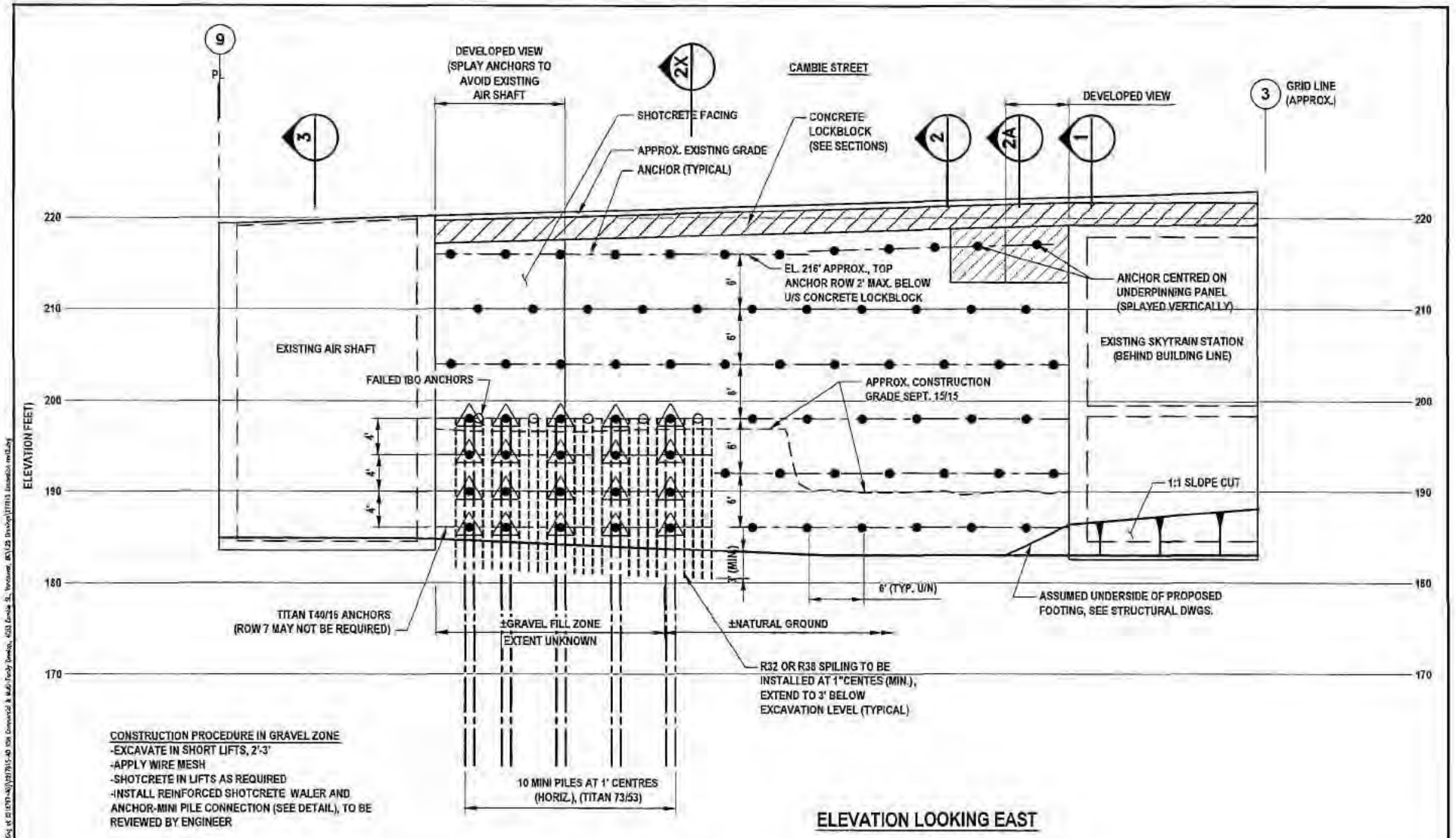
APPD.	MG
DSGN.	GM
DRN.	KSH

REVISIONS		
DESCRIPTION		DATE
12	CONNECTION DETAIL REVISED	2015-10-05
11	REVISED ADJACENT TO AIR SHAFT	2015-09-29
10	REVISED ADJACENT TO AIR SHAFT	2015-09-28
9	ISSUED FOR CONSTRUCTION	2015-05-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "2X"

DATE	SCALE	DWG NO.
2014-05-15	1"=10'	G3a



ELEVATION LOOKING EAST

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DRN.	DES.	CHK.
MG	GM	KSH

REVISIONS		
NO.	DESCRIPTION	DATE
12	CONNECTION DETAIL REVISED	2015-10-05
11	REVISED ADJACENT TO AIR SHAFT	2015-09-29
10	REVISED ADJACENT TO AIR SHAFT	2015-09-28
9	ISSUED FOR CONSTRUCTION	2015-05-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING
ELEVATION LOOKING EAST

DATE: 2014-05-16
SCALE: 1"=10'
DWG NO.: G11

3.0 CONTRACTOR EXPERIENCE

exp Services Inc. reserves the right to withdraw their services if in their opinion an excavation/shoring contractor is selected which does not have adequate experience to complete the work in a safe manner.

4.0 PRECONSTRUCTION SURVEYS/MONITORING

It is strongly recommended that preconstruction surveys be completed on adjacent structures in order that deficiencies of these structures can be documented prior to start of construction. Continued monitoring of these buildings by survey control points should be undertaken during construction.

5.0 DRAWING USE

These drawings have been prepared for the exclusive use of the client named on the title page of the Shoring Design package. The design shown indicates minimum requirements based on limited or assumed soil conditions only, with design revisions likely required to suit actual conditions encountered during construction. These drawings must not be used for construction unless the design engineer or his representatives monitors installation of the shoring system.

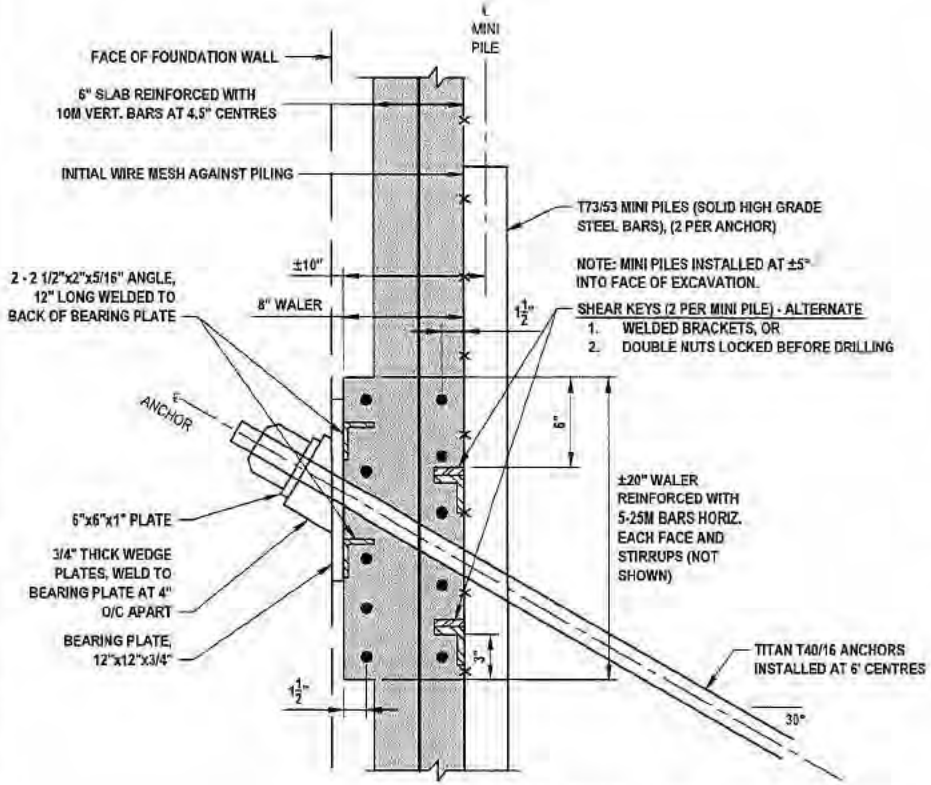
6.0 LEGAL

These design documents are prepared solely for use by the party with whom the design professional entered into a contract. No representations of any kind are made by the design professional to any party with whom the design professional has not entered into contract.

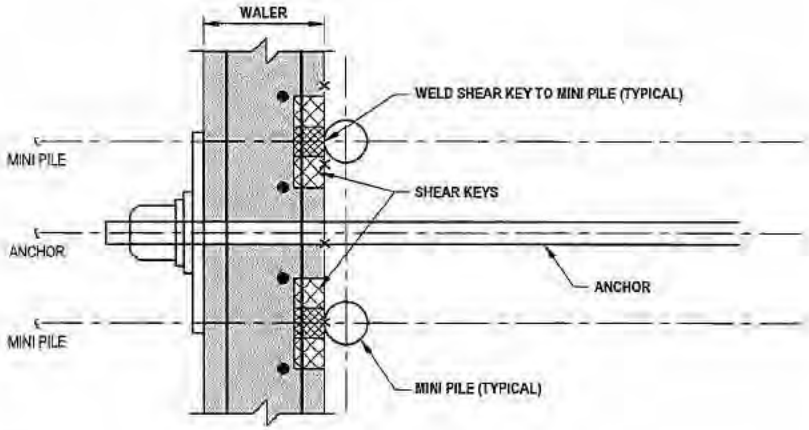
The owner and contractor are responsible for determining and conforming to the appropriate environmental regulations.

7.0 ALLOWANCES

The Contractor should provide allowances in his bid by unit rates for additional shotcrete anchors and installation of 1 1/2" diameter slotted drains.



SECTION (4" SLAB AND STIRRUPS NOT SHOWN)



PLAN

CONNECTION DETAIL

SCALE 1 1/2"=1'-0"

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DSGN.	MG & MAK
DRAWN	GM
CHK.	KSH

REVISIONS		
No.	DESCRIPTION	DATE
12	CONNECTION DETAIL REVISED	2015-10-05
11	REVISED ADJACENT TO AIR SHAFT	2015-09-29
10	REVISED ADJACENT TO AIR SHAFT	2015-09-28
9	ISSUED FOR CONSTRUCTION	2015-05-22

CLIENT	YUANHENG CKE DEVELOPMENTS LTD.
PROJECT	COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.	VAN-00217815-A0
TITLE	BULK EXCAVATION SHORING NOTES
DATE	2014-05-16
SCALE	NTS
DWG NO.	G19

Memorandum

Date: 2015-10-10 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 1

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

Exp Services was on site to test the additional anchors along the north shotcrete wall that were designed to support the excavator for temporary ramp removal as per **exp**'s memorandum dated on October 8, 2015.

Ten anchors were tested today and passed. The tested anchors were proof tested to about 12.5kips and locked off at 10kips.

North Wall 2015-10-10

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer
MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-10 MAK Anchor Testing.docx)

Memorandum

Date: 2015-10-15 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 3

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the anchor reinforcement review conducted on October 14, 2015, and the anchor testing carried out on October 15, 2015 at the subject site located at 4083 Cambie Street, Vancouver, BC.

On October 14, the anchor reinforcement details were reviewed and found to be generally in conformance with exp design. To avoid washing sand when placing shotcrete, A&A Excavation (shoring contractor) used double mesh.

On October 15, eight anchors were tested and passed.

Details of the tested anchors can be found in the following pages.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

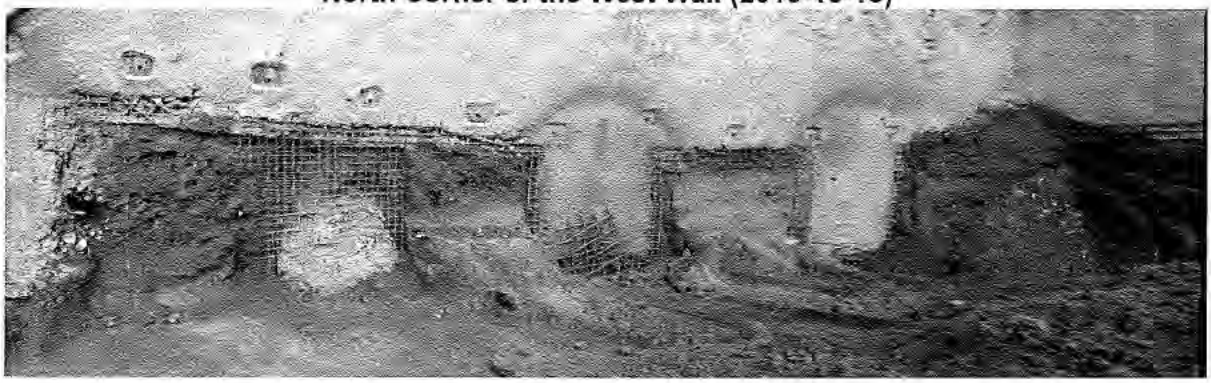
MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St. Vancouver, BC\Construction\Field Memo\FM 2015-10-15 MAK Anchor Testing.docx)

West Wall (Lane)

Section	Tier	Anchor	Comments	Elongation
6	4	19	Proof Loaded to 33 kips (PL=4100 psi) and locked off at 26 kips (3300psi)	1/8"
6	4	17	Proof Loaded to 33 kips (PL=4100 psi) and locked off at 26 kips (3300psi)	1/8"
6	4	21	Proof Loaded to 33 kips (PL=4100 psi) and locked off at 26 kips (3300psi)	1/8"

Notes: PL = Proof Load
LL= Lock-off Load
West Wall count relative to SW corner.

North Corner of the West Wall (2015-10-15)



North Wall (Neighboring House)

Section	Tier	Anchor	Comments	Elongation
4&5	4	3	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/8"
4&5	4	6	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/16"
4&5	4	9	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/8"
4&5	4	12	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/4"
4&5	4	15	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/16"

Notes: PL = Proof Load
LL= Lock-off Load
West Wall count relative to NW corner.

North Wall (2015-10-15)

exp.

FIELD MEMO
62397

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☐ KAMLOOPS OFFICE
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Kamloops, B.C., Canada V1S 1J9
Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: W T Leung Architects Inc.
PROJECT NO.: VAN-00217815-A0
ATTENTION: Konning Tam
DATE: October 16, 2015
CC: ITC
FROM: Mahdi Hosseyni
ATTENTION: Antonio Pavi, Mitchell Scott

SERVICE PROVIDED: Review of Shoring construction and Anchor Testing

LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to Review construction of Temporary Shoring and Anchor Testing at above subject site.

Observations:

West Side: - 7 Anchors Bar #8 DYWIDAG at 4 Tier Tested to 33 kips and locked-off at 26 kips.

- one Anchor Bar #8 DYWIDAG at 3rd Tier was tested to 25 kips and locked-off at 21 kips.

All Anchors stated Design Requirment and were found in conformance of exp design.

→ Next page

"MEMO SHALL NOT BE CONSTRUED AS AUTHORIZATION FOR EXTRA PAYMENT. ALL CLAIMS FOR EXTRA PAYMENT REQUIRE THE APPROVAL OF THE CONTRACT ADMINISTRATOR."

exp Services Inc. Per

Signature

NOTE: PRELIMINARY INFORMATION ONLY – SUBJECT TO CONFIRMATION

exp.

FIELD MEMO

page 2/2 62398

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT:

PROJECT NO.: VAN-00217815

ATTENTION:

DATE:

CC:

FROM:

ATTENTION:

SERVICE PROVIDED:

LOCATION: 4083 Cambie St

OBSERVATIONS:

North Side:
- 10 Anchors IBO R32 at 4th Tier were tested to 44 kips and locked-off at 37 kips.
- One Anchor IBO R32 at 3rd Tier was tested to 44 kips and locked-off at 37 kips.
- All Anchors Stated Design requirments as specified on exp's Design Drawings.
- These 11 Anchors at (nort side) were designed to be bar #8 DywIDA, howere, because of existing Sand and Gravel were changed to equivalent IBOs.
- A representative from consultant of the north, neighbouring Building (Horizon Engineering Inc.) also reviewed Anchor testing at North Side.

"MEMO SHALL NOT BE CONSTRUED AS AUTHORIZATION FOR EXTRA PAYMENT. ALL CLAIMS FOR EXTRA PAYMENT REQUIRE THE APPROVAL OF THE CONTRACT ADMINISTRATOR."

exp Services Inc. Per

Signature

NOTE: PRELIMINARY INFORMATION ONLY – SUBJECT TO CONFIRMATION

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FIELD MEMO

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page 1/2

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WT Leung Architects Inc.
PROJECT NO.: VAN-00217815-A0
ATTENTION: Konning Tam
DATE: October 19, 2015
CC: ITC
FROM: Mahdi Hosseyni
ATTENTION: Antonio Pavi, Mitchell Scott

SERVICE PROVIDED: Review of construction of Temporary Shoring and Anchor Testing
LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

exp was on site to Review Construction of Temporary Shoring and Anchor Testing at above site.

observations:

West Side:

- 4 Anchors IBO R38 at 5th Tier were tested to 44 kips and locked-off at 36 kips.
- one Anchor IBO R38 at 4th Tier was tested to 33 kips and locked-off at 24 kips. Please see follower NOTE

NOTE: This Anchor is shown bar #8 DYWIDAG on the Design Drawings. However, A&A used IBO instead as they did not have Conventional bar #8 on site at the time of Anchor Installation.

"MEMO SHALL NOT BE CONSTRUED AS AUTHORIZATION FOR EXTRA PAYMENT." exp Services Inc. Per
ALL CLAIMS FOR EXTRA PAYMENT REQUIRE THE APPROVAL OF THE CONTRACT ADMINISTRATOR."

Signature

NOTE: PRELIMINARY INFORMATION ONLY – SUBJECT TO CONFIRMATION

Distribution: White – Client Canary – Field Pink – File Golden Rod - Book

exp.

FIELD MEMO

62400

page 2/2

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☐ KAMLOOPS OFFICE
Unit 100B, 1425 Pearson Place
Kamloops, B.C., Canada V1S 1J9
Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: W T Leung Architects

PROJECT NO.: VAN-00217815-A0

ATTENTION:

DATE: 2015-10-19

CC:

FROM:

ATTENTION:

SERVICE PROVIDED:

LOCATION: 4083 Cambie St

OBSERVATIONS:

North side:

- one Anchor IBO R32 tested to 44 kips and locked-off at 37 kips. (Tier 4)
- 3 Anchors IBO R32 at 5th Tier tested to 44kips and locked-off at 37 kips.

NOTE: one of these IBO on Design Drawings shown to be #8 and A&A installed IBO R32 due to ~~Existing~~ of Sand and Gravel.

All the above Anchors stated design requirments as stated on the Design Drawings.

"MEMO SHALL NOT BE CONSTRUED AS AUTHORIZATION FOR EXTRA PAYMENT. ALL CLAIMS FOR EXTRA PAYMENT REQUIRE THE APPROVAL OF THE CONTRACT ADMINISTRATOR."

~~exp~~ Services Inc. Per

Signature

NOTE: PRELIMINARY INFORMATION ONLY – SUBJECT TO CONFIRMATION

Distribution: White - Client Canary - Field Pink - File Golden Rod - Book

Memorandum

Date: 2015-10-20 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 3

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the anchor testing carried out on October 20, 2015 at the subject site located at 4083 Cambie Street, Vancouver, BC.

Seven anchors were tested and passed.

A&A Excavation (the shoring contractor) indicated that the tested anchors had double mesh to avoid washing sand when placing shotcrete. It should be noted that the double mesh is not part of exp recommendations.

Details of the tested anchors can be found in the following pages.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-20 MAK Anchor Testing.docx)

West Wall (Lane) (used 60ton Jack)

Section	Tier	Anchor	Comments	Elongation
6	5	15	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 36 kips (2500psi)	1/16"
6	5	18	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 36 kips (2500psi)	1/8"
6	5	21	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 36 kips (2500psi)	1/16"

Notes: PL = Proof Load
LL= Lock-off Load
West Wall count relative to SW corner.

North Corner of the West Wall (2015-10-20)

North Wall (Neighboring House) (used 30 ton Jack)

Section	Tier	Anchor	Comments	Elongation
4&5	5	2	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/8"
4&5	5	5	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/8"
4&5	5	8	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/4"
4&5	5	10	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/4"

Notes: PL = Proof Load
LL= Lock-off Load
West Wall count relative to NW corner.

North Wall (2015-10-20)

Memorandum

Date: 2015-10-21 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 3

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the anchor testing carried out on October 21, 2015 at the subject site located at 4083 Cambie Street, Vancouver, BC.

Seven anchors were tested and passed.

A&A Excavation (the shoring contractor) indicated that the tested anchors had double mesh to avoid washing sand when placing shotcrete. It should be noted that the double mesh is not part of exp recommendations.

Details of the tested anchors can be found in the following pages.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

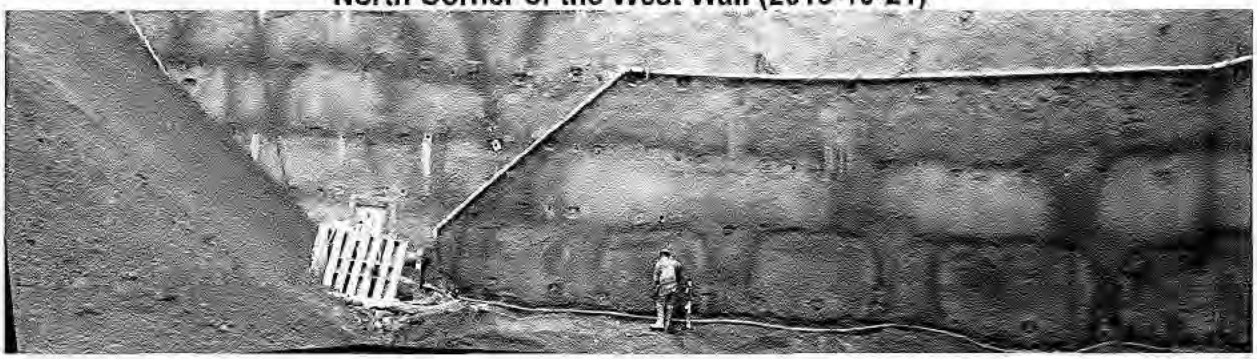
MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-21 MAK Anchor Testing.docx)

West Wall (Lane) (HR 118 Jack was used)

Section	Tier	Anchor	Comments	Elongation
6	5	16	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 36 kips (2500psi)	1/16"
6	5	19	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 36 kips (2500psi)	1/8"
6	5	22	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 36 kips (2500psi)	1/4"

Notes: PL = Proof Load
LL= Lock-off Load
West Wall count relative to SW corner.

North Corner of the West Wall (2015-10-21)



North Wall (Neighboring House) (used 30 ton Jack)

Section	Tier	Anchor	Comments	Elongation
4&5	5	1	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/8"
4&5	5	4	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/4"
4&5	5	7	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1"
4&5	5	11	Proof Loaded to 44 kips (PL=5500 psi) and locked off at 37 kips (4600psi)	1/4"

Notes: PL = Proof Load
LL= Lock-off Load
North Wall count relative to NW corner.

North Wall (2015-10-21)

Memorandum

Date: 2015-10-23 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 3

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the reinforcement review of the top proposed waler located along the east shotcrete wall and south of Translink's air-shaft as well as the anchor testing of the new T40/16 anchors along this waler.

On October 20, 2015, exp reviewed the waler reinforcement and found it to be generally in conformance with exp design.

On October 22, 2015, exp witnessed testing four of the five T40/16 anchors along this waler. All witnessed anchors passed.

Details of the tested anchors can be found in the following pages.

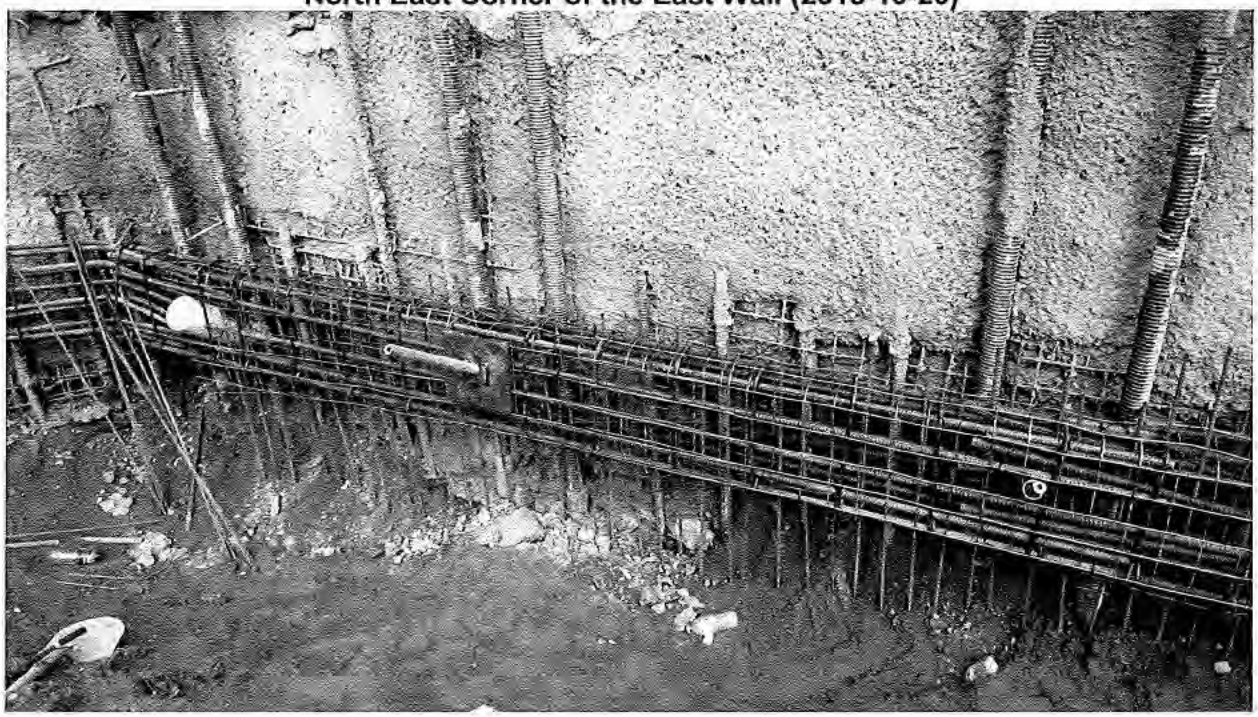
Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-23 MAK Anchor Testing.docx)

North East Corner of the East Wall (2015-10-20)



North East Corner of the East Wall (2015-10-20)

East Wall (Cambie)

Section	Tier	Anchor	Comments	Elongation
2X	4	1	Proof Loaded to 65 kips (PL=4500 psi) and locked off at 65 kips (4500psi)	5/4"
2X	4	2	Proof Loaded to 65 kips (PL=4500 psi) and locked off at 65 kips (4500psi)	1"
2X	4	4	Proof Loaded to 65 kips (PL=4500 psi) and locked off at 65 kips (4500psi)	1/4"
2X	4	5	Proof Loaded to 65 kips (PL=4500 psi) and locked off at 65 kips (4500psi)	3/4"

Notes: PL = Proof Load
LL= Lock-off Load
East Wall count relative to NE corner.

North East Corner of the East Wall (2015-10-22)

Memorandum

Date: 2015-10-24 Reference No.: VAN-00217815-A0

To:	cc:	Company	Contact	Email
☒	☐	W.T. Leung Architects Inc.	Konning Tam	konning@wtleungarch.com
☐	☒	ITC Group	Mitchell Scott	mscott@itc-group.com
☐	☒	ITC Group	Antonio Pavi	apavi@itc-group.com
☐	☒	A&A Excavation Ltd.	Aman Dosanjh	aaex1985@gmail.com
☐	☒	exp Services	Graeme Macleod	graeme.macleod@exp.com
☐	☒	exp Services	Kai-Sing Hui	kai-sing.hui@exp.com

From: Muhammed Al-Kustaban, E.I.T

Total No. of Pages: 4

Subject: **Anchor Review for Residential Development Located on 4083 Cambie Street, Vancouver, BC**

COMMENTS:

This memorandum summarizes the anchor reinforcement review conducted on October 23, 2015, and the anchor testing carried out on October 24, 2015 at the subject site located at 4083 Cambie Street, Vancouver, BC.

On October 23, the anchor reinforcement details were reviewed and found to be generally in conformance with exp design. To avoid washing sand when placing shotcrete, A&A Excavation (shoring contractor) used double mesh. It should be noted that the double mesh is not part of exp recommendations.

On October 24, eight anchors were tested and passed.

Details of the tested anchors can be found in the following pages.

Submitted by:

exp Services Inc.

Muhammed Al-Kustaban, E.I.T
Junior Geotechnical Engineer

MAK
(L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\Construction\Field Memo\FM 2015-10-24 MAK Anchor Testing.docx)

East Wall (Cambie)

Section	Tier	Anchor	Comments	Elongation
2X	4	3	Proof Loaded to 65 kips (PL=4500 psi) and locked off at 65 kips (4500psi)	1/2"

Notes: PL = Proof Load
LL= Lock-off Load
East Wall count relative to NE corner.

North East Corner of the East Wall (2015-10-24)

West Wall (Lane)

Section	Tier	Anchor	Comments	Elongation
6	5	23	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 36 kips (2500psi)	1/2"
6	6	15	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 32 kips (3200psi)	1/8"
6	6	18	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 32 kips (3200psi)	1"
6	6	31	Proof Loaded to 55 kips (PL=3800 psi) and locked off at 32 kips (3200psi)	1/4"

Notes: PL = Proof Load
LL= Lock-off Load
West Wall count relative to SW corner.

North Wall (Neighboring House)

Section	Tier	Anchor	Comments	Elongation
4&5	6	3	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 37 kips (2600psi)	1/4"
4&5	6	6	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 37 kips (2600psi)	1/4"
4&5	6	9	Proof Loaded to 44 kips (PL=3100 psi) and locked off at 37 kips (2600psi)	1/4"

Notes: PL = Proof Load
LL= Lock-off Load
North Wall count relative to NW corner.

exp.

FIELD MEMO

69101

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Kamloops, B.C., Canada V1S 1J9
Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: W T Leung Architects Inc. PROJECT NO.: VAN-00217815

ATTENTION: Konning Tam DATE: October 26, 2015

CC: ITC FROM: Mahdi Hosseyni

ATTENTION: Antonio Pavi, Mitchell Scott

SERVICE PROVIDED: Review of Anchor testing for Temporary Shoring.

LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to Review Testing of Temporary Anchors at above subject site.

Observations:

West side: - 8 Anchors IBO R38 (at 6th row) were tested to 55 kips and locked of at 45 kips and stated Generall Requiremets of the Design Drawings.

North side: - 6 Anchors IBO R32 (at 6th row) were tested and stated General Requirment Design Drawing (proof load test = 44 kips and lock-off load = 37 kips)

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exp Services Inc. Per

Signature

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WT Leung Architects Inc.
PROJECT NO.: VAN-00217815
ATTENTION: Konning Tam
DATE: October 27, 2015
CC: ITC
FROM: Mahdi Hosseyni
ATTENTION: Antonio Pavi & Mitchell Scott

SERVICE PROVIDED: Review of Shoring Construction and Anchor Testing

LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

exp was on site to Review construction Temporary Shoring and Anchor Testing at above subject site.

observations: - 3 Anchors Titan T40/16 at 5th (south of airshaft) on the East wall were tested and locked-off at 65 kips and Generally stated the Design Requirements as specified on the exp's Design Drawings.

NOTE: - 2 Anchors next to the airshaft (5th row East wall) were not ready to be tested. ITC and A&A Representatives are informed to not proceed to next Row of Anchore below this area until these Anchors tested and locked-off at Design Load.

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WT Leung Architects Inc.
PROJECT NO.: VAN-00217815-A0
ATTENTION: Konning Tam
DATE: Oct 27, 2015
CC: ITC
FROM:
ATTENTION:

SERVICE PROVIDED:

LOCATION:

OBSERVATIONS:

- A4A (ITC's subcontractor) excavated the last lift (skirt) at west side (north portion) and north side (west portion) based on 2-day specific. At NW corner water was seeping, so A4A supervisore was asked to stop excavation. They excavated to design Elevation (underside of the raft) at west side, however, due to water seepage did not dig to design elevation at north. The seeped water was not significant, so they pumped out the water and shoterected area right way for Temporary use.

NOTE: ITC was informed to submit a dewatering plan for this area for exp review, and after approval of the dewatering plan ITC will proceed to excavat to the design elevation.

NOTE: ITC should not put a sump in the saturated ~~Silt~~ Sand before exp's approval.

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WT leung Architect Inc.
PROJECT NO.: VAN-00217815-A0
ATTENTION: Konning Tam
DATE: Oct 28, 2015
CC: ITC
FROM: Mahdi Hosseyni
ATTENTION: Antonio pavi & Mitchell Scott

SERVICE PROVIDED: Review of Temporary Shoring construction and Anchor Testing
LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

exp was on site to Review construction of Temporary Shoring and Anchor Testing at above subject site.

observations: -west side: 2 Anchors IBO R38 were tested to 55kips and locked-off at 45 kips and stated design Requirments.

-North side: one Anchor IB R32 (6th Row) was tested to 44 kips and locked-off at 37 kips and stated design Requirments.

NOTE: At North side just below the 6th of Anchor (half way from west to East) a boulde 4'X2.5' was exposed by about 1ft out of shoterete wall

-East side: 2 Anchors IBO Titan T40/16 next to airshaft (5th row) were tested and locked-off to 65 kips and Stated design Requirments.

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WT Leung Architects Inc.
PROJECT NO.: VAN-00217815-A0
ATTENTION: Konning Tam
DATE: October 30, 2015
CC: ITC
FROM: Mahdi Hosseyni
ATTENTION: Antonio Pavi & Mitchell Scott

SERVICE PROVIDED: Review of Temporary Shoring and Anchor Testing

LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to Review Construction of Temporary Shoring and Anchor Testing at the above subject site.

Observations:

- East side: 4 Anchors IBO Titan 40/16 at the 6th Tier of east wall were tested and locked off at 65 kips and stated the Design Requirements.

NOTE: Construction of the Waler for this Row was Reviewed on oct 29, 2015 and it was observed to be in conformance of the Design Drawing.

- North Wall: 5 Anchors IBO R32 (6th Row) were tested to 44 Kips and locked-off at 37 kips and stated the Design Requirements.

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WT Leung Architects
ATTENTION: Konning Tam
CC: ITC
ATTENTION: Antonio Pavi & Mitchell Scott

PROJECT NO.: VAN-00217815
DATE: October 31, 2013
FROM: Mahdi Hosseyni

SERVICE PROVIDED: Review of construction of Temporary shoring and Anchor Testing
LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to Review construction of Temporary shoring and Anchor Testing at above noted site.

Observations: East wall; at 7th row of Anchor at air-shaft area 3 Anchors Titan 40/16 tested and locked off at 44kips and stated the Design Requirments.

NOTE; The heiler was Eliminated at this Row of Anchors.

- At 6th row of Anchor Titan 40/16 tested to 44kips and locked off at 37 Kips and stated Design Requirements.

NOTE; The Design Drawings show this Anchor to be R32.

- At 6,7th row of Anchor at Crane pad Area 2Anchors teste to 44 kips and locked-off at 37 kips and stated Design Requirements.

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69107

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: WTleung Architects Inc.
PROJECT NO.: VAN-00217815
ATTENTION: Koming Tam
DATE: Nov. 2, 2015
CC: ITE
FROM: Mahdi Hosseyni
ATTENTION: Antonio pavi & Mitchell Scott

SERVICE PROVIDED: Review of Shoring Construction and Anchor Testing

LOCATION: 4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to Review construction of Temporary Shoring and Anchor Testing at above subject site.

Observations: East Wall :- At 6th row of Anchors at crane pad Area an IBO R32 Tested to 44 Kips and locked-off at 37 kips and Stated Design Requirements.

- 2 Anchor IBO Titan 40/16 at 6th row of Anchors at crane pad Area were tested to 44 Kips and locked-off at 37 and Stated Design Requirements.

NOTE: The Design Drawings show these two Anchors to be IBO R32.

- At Airshaft Area Three Titan 40/16 were tested and locked-off at the Specified loads and passed the test

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65231

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: ITC CONSTRUCTION GROUP
PROJECT NO.: VAN-00217895-A0
ATTENTION: MITCHELL SCOTT
DATE: NOVEMBER 3, 2015
CC: WT LEUNG ARCHITECTS INC
FROM:
ATTENTION: KONNING TAM

SERVICE PROVIDED: FIELD REVIEW - Subgrade Approval for Crane Pad Foundation.
LOCATION: Cambie Star Development
4083 Cambie St. Vancouver B.C.

OBSERVATIONS:

- Exp visited the site on NOV 3, 2015 @ 8:20 AM.
- Purpose was to review the crane pad foundation subgrade.
- Area Reviewed: G/L (F):(6) to (7) and (7):(E) to (1) (entire crane pad footprint)

OBSERVATIONS

- Subgrade consisted of a dense sand with some gravel seam of very hard clayey silt or clayey silt observed near G/L (7):(H).
- a minor accumulation of water observed on undisturbed subgrade surface @ G/L (6):(E).

CONCLUSION/RECOMMENDATION

- Exposed subgrade reviewed is satisfactory.
- We confirm a 'allowable' bearing for SLS design of 65 kPa.
- 100mm "Blinding" may be placed on the approved subgrade.
- All accumulations of water must be removed to prevent disturbance of the excavated surface.

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PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
M. G. J. YIP
37458

exp Services Inc. Per MY 3, 2015
Signature

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FIELD MEMO
69109

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Kamloops, B.C., Canada V1S 1J9
Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: W.T. Leung Architects Inc.
PROJECT NO.: VAN-00217815
ATTENTION: Konning Tam
DATE: Dec. 24, 2015
CC: ITC
FROM: Mahdi Hosseyni
ATTENTION: Mitchell Scott, Antonio Pavi

SERVICE PROVIDED: Review of Installation of Multi-Drain System on the Basement wall

LOCATION:
4083 Cambie St, Vancouver, BC

OBSERVATIONS:

Exp was on site to Review Installation of the proposed Multi-Drain System on the Basement wall as shown on the Sketches by exp (Dated Aug. 18, 2015).

OBSERVATIONS:

- The Elevation was provided by ITC at location of Multi-Drain to be 190 ft.
- one foot Multi Drian was intalled on the west and north wall. on the North wall from GL (A.1) to GL (A), and on the ~~W~~est wall from GL (A) to GL (7).
- Horizontal spacing of Interior collector pipe through the Basement wall was measured 13' to 14'.

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Phone: 250 372-5321 Fax: 250 372-1678

CLIENT:

PROJECT NO.: VAN-00217815

ATTENTION:

DATE: Dec 24, 2015

CC:

FROM:

ATTENTION:

SERVICE PROVIDED:

LOCATION:

OBSERVATIONS:

Based on the sketches by exp Dated August 18, 2015, The:

- Multi-Drain should be installed at Elevation 189 ft.
- Multi-Drain should be installed horizontal, and
- horizontal spacing of the interior collector pipe on the west wall and north wall from GL (E) to GL (A) should not be more than 10 ft (see attache sketches.

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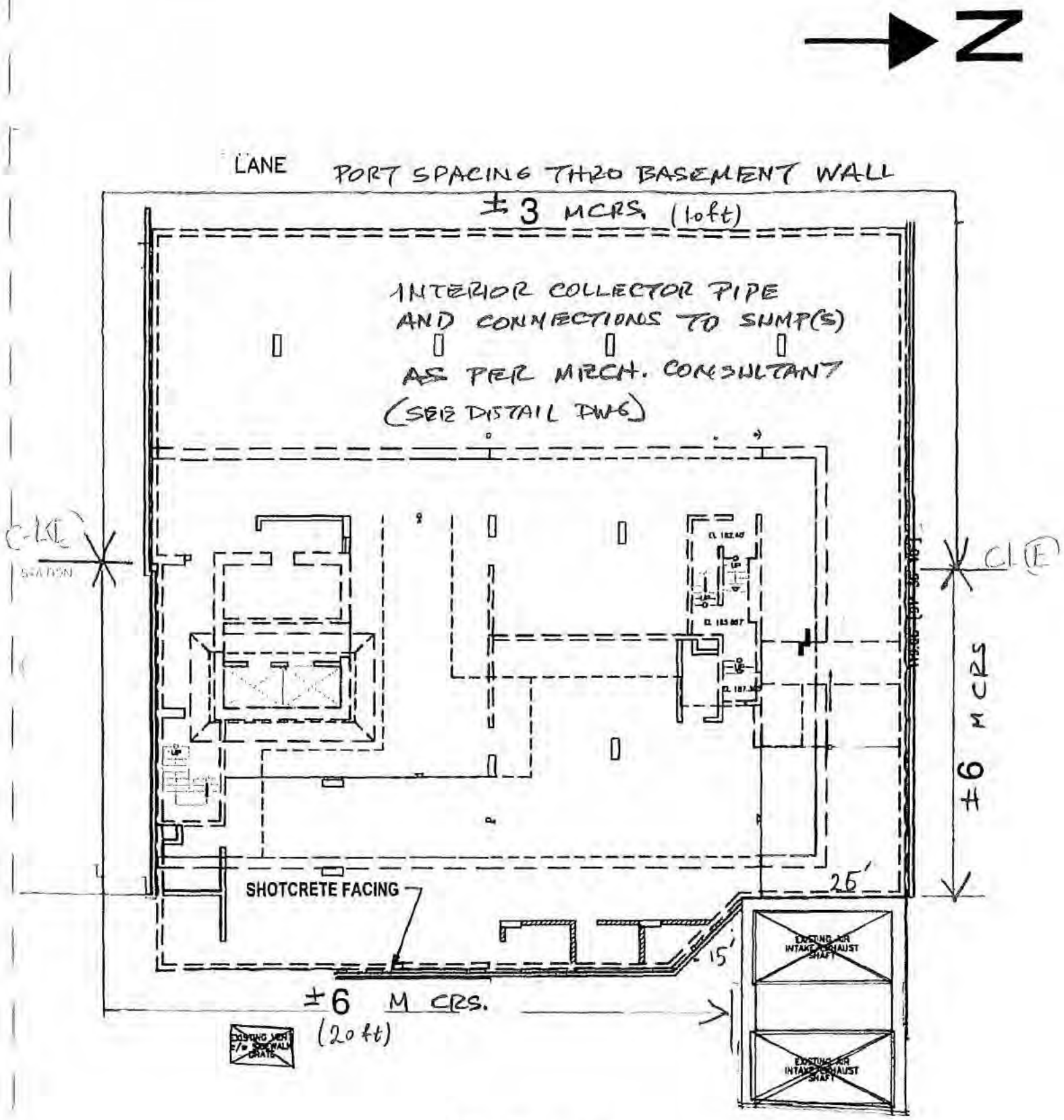


LOCATION OF PORTS THRO WALL

A8|618|15

ext

TOPOGRAPHIC SURVEY OF PARCEL 1 BLOCK 660 DISTRICT LOT 526 GROUP 1 NEW WESTMINSTER DISTRICT PLAN BCP37294

#4099 CAMBIE STREET,
VANCOUVER, B.C.
P.I.D 027-575-926

ZONING: C-2

WEST 24TH AVENUE

LOT 16

LOT 17

LOT 18

1-STOREY
NO BASEMENT

SCALE: 1 INCH = 16 FEET

ALL DIMENSION ARE IN FEET AND DECIMALS
THEREOF UNLESS OTHERWISE INDICATED

SCALE: 1 INCH = 16 FEET

0 5 10 20 30

ALL DIMENSION ARE IN FEET AND DECIMALS THEREOF UNLESS OTHERWISE INDICATED

LOT 18

1-STOREY
NO BASEMENT

LOT 19

#4033
2-STOREY NO BASEMENT
COMMERCIAL BUILDING

Building corner is 0.25 clear

Building corner is 218.0
0.18 onto Lot 1

91° 35' 57"

119.95

40.00

32.97

1°40'58"

10.00

METAL GRATE VENT

METAL GRATE VENT

Concrete Sidewalk

Asphalt

edge of asphalt

LANE (PAVED)

AMBIE STREET

SKYTRAIN STATION

Overhang

RF:242.7

MF:225.2

COVERED ENTRANCE

CONC. Pad

CONC.

94.89

91° 33' 32"

21.24

46° 37' 15"

116.82

1° 40' 58"

50.00

7.50

7.50

edge of asphalt

Concrete Sidewalk

Gutterline

VENT

WHITE DASH LINE

WHITE DASH LINE

WHITE DASH LINE

YELLOW LINE

MH NR:223.2

MH NR:223.9

MH NR:225.2

WV

LS

EB

Terminal

Traffic Light

WHITE DASHED LINE

WEST KING EDWARD AVENUE

CROSS WALK

MEDIA

LEGEND:

(d) denotes deciduous
(c) denotes coniferous
denotes power pole
denotes inspection chamber
denotes manhole
WV denotes water valve
GV denotes gas valve
denotes round catch basin
denotes lamp standard
denotes "No Parking" sign
EB denotes electrical box
MF main floor elevation
RF roof elevation
PM denotes park meter
WM denotes water meter
CB denotes catch basin

Canada and B.C. Land Surveyor
115 – 8833 Odlin Crescent
Richmond, B.C. V6X 3Z7
Telephone: 214-8928
Fax: 214-8929
E-mail: office@jctam.com
Website: www.jctam.com
Job No. 4694
FB199, P108-110; FB-233 P14-16
Drawn By: MY/TH

All trees and stumps have been plotted as required by Bylaw No. 7347

For construction, use city survey monument only for elevation control.

NOTE:
Elevations shown are based on Vancouver City Datum.
Bench Mark: Control Monument V-1313
B.M. Elevation = 226.24 feet
(68.959 metres)

RE-INSPECTED:

JOHNSON C. TAM, B.C.L.S.

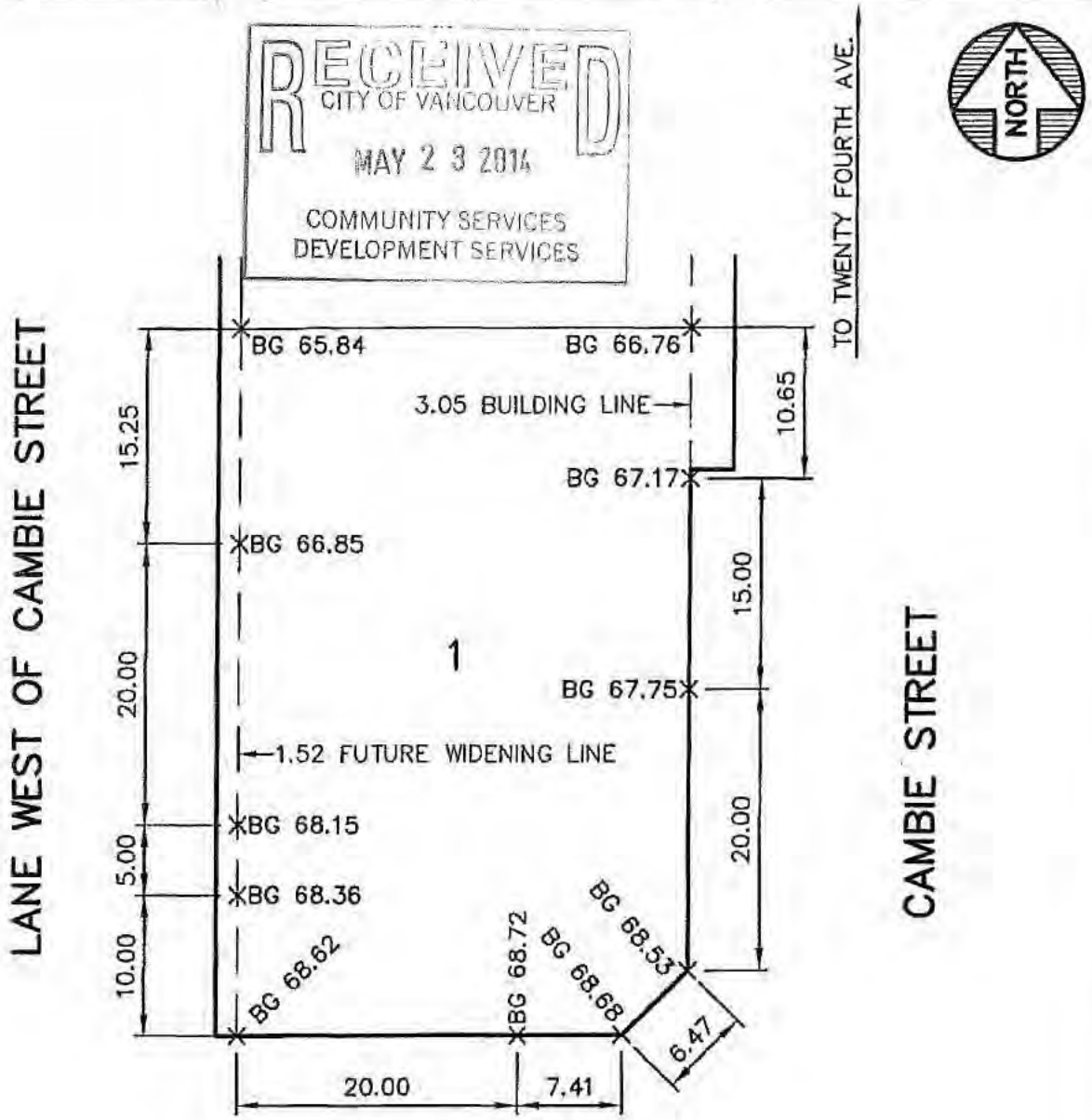
MAY 12th, 2014.

CERTIFIED CORRECT:
LOT DIMENSION ACCORDING TO FIELD SURVEY.

JOHNSON C. TAM, B.C.L.S.

JULY 16th, 2013.

DE417998 PC/ENG



KING EDWARD AVENUE

BENCH MARK ELEVATION: 68.959 DESCRIPTION: SURVEY MONUMENT MARKED V-1313 AT THE SOUTH WEST CORNER OF KING EDWARD AVENUE AND CAMBIE STREET.

ATTENTION

ELEVATIONS SHOWN ON THIS PLAN ARE IN METRES BASED ON GVRD DATUM (ISSUED MARCH 31, 2005). DIMENSIONS ARE ALSO IN METRES.

CITY OF VANCOUVER ENGINEERING SERVICES

SCALE: 1:500	BUILDING GRADE ELEVATIONS FOR PARCEL 1 GRP. 1, BLK. 660, D.L. 526, PLAN BCP37294.	DESIGN: P.B. DWG: J.D.H.
DATE: 2011-12-16		CHK: D.P. REV:
REF: FILE 110269 PPs 1054, 2059, 3002.		BG 110269

1.0.

CITY ENGINEERING DEPARTMENT
PROJECTS BRANCH DIVISION

REV A.

EXCAVATION ONTO CITY PROPERTY

THE ATTACHED PROPOSAL TO CONSTRUCT A TEMPORARY EXCAVATION, FOR CONSTRUCTION PURPOSES, ENCROACHING ONTO CITY PROPERTY HAS BEEN RECEIVED. PLEASE REVIEW AND STATE YOUR REQUIREMENTS OR APPROVAL.

DATE: APRIL 13 2015

SITE ADDRESS: 4083 CAMBIE ST PLAN NO. _____

LEGAL : _____

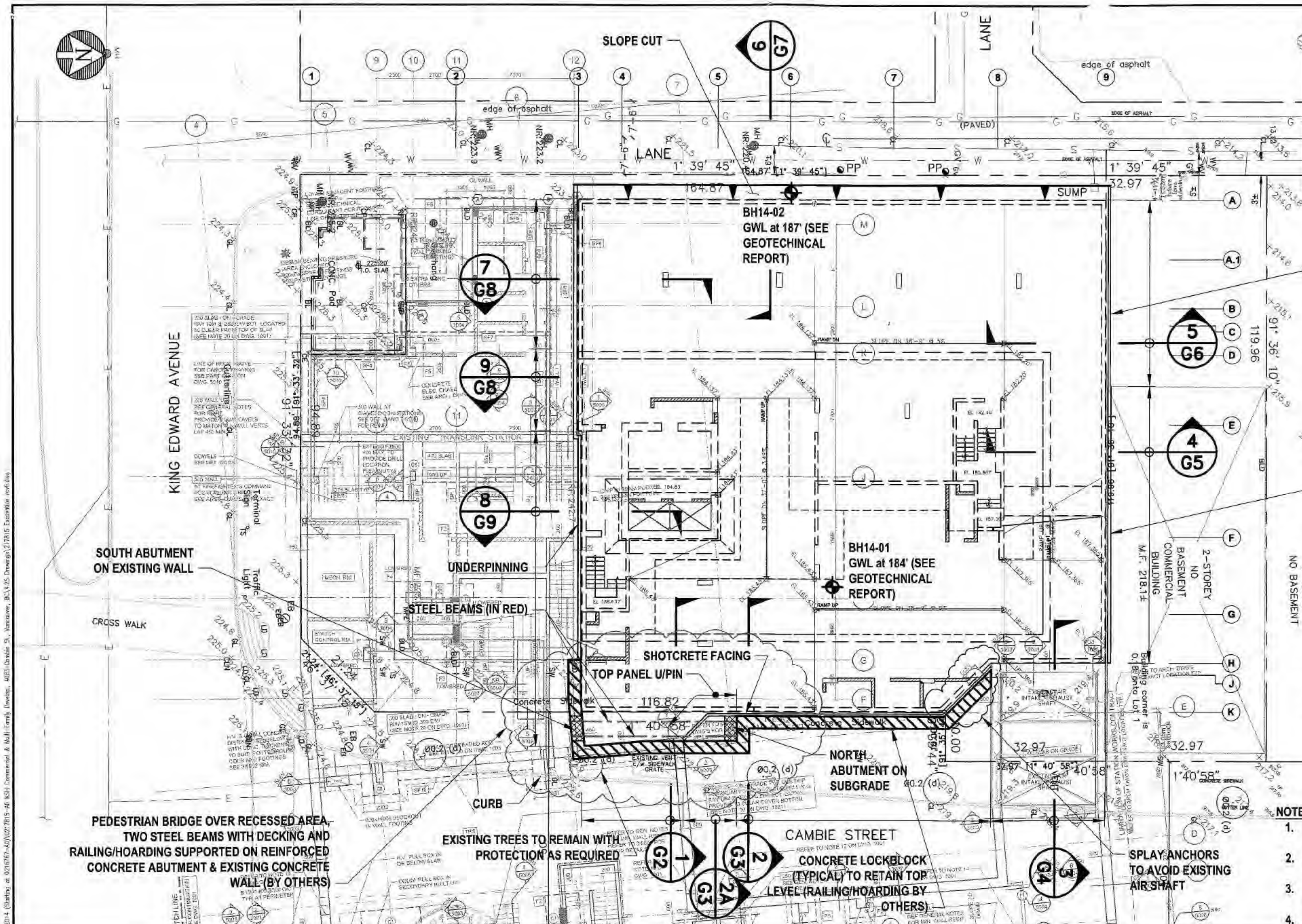
PLEASE PROCESS AND FORWARD TO THE FOLLOWING FOR COMMENTS:

SEWERS: CHECKED BY: D DATE: April 14 2015

- Manhole in wrong spot - Move manhole 2.5m north of current location along alignment.
- Review and Resubmit

UTILITIES: CHECKED BY: _____ DATE: _____ 20__

DEVELOPMENT SERVICES: CHECKED BY: _____ DATE: _____ 20__



REFERENCE DRAWINGS

- J.C. TAM AND ASSOCIATES: TOPOGRAPHIC SURVEY PLAN DATED 2011-11-28
- W.T. LEUNG ARCHITECTS: PARKING PLANS RECEIVED 2014-09-22
- GLOTMAN SIMPSON: STRUCTURAL DRAWINGS, REV. 1 DATED 2014-10-03

TRANSLINK CANADA LINE RECORD DRAWINGS:

- STRUCTURAL (2009-06-10)
- ARCHITECTURAL (2010-03-26)
- CIVIL (2010-03-19)

NOTES

1. FOR ELEVATIONS AND DIMENSIONS, SEE LATEST ARCH. AND STRUCTURAL DWGS.
2. FOR REVIEW OF GROUNDWATER CONDITIONS, SEE GEOTECHNICAL REPORT.
3. FOR NOTES AND DETAILS, SEE DWGS. G15 TO G19.
4. SEE NOTES ON DWG. G2, G4 AND G9.

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604-874-1245
Fax: 604-874-2358
exp.com

DFTR. MG | DSGN. GM | CHK. KSH

No.	REVISIONS DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

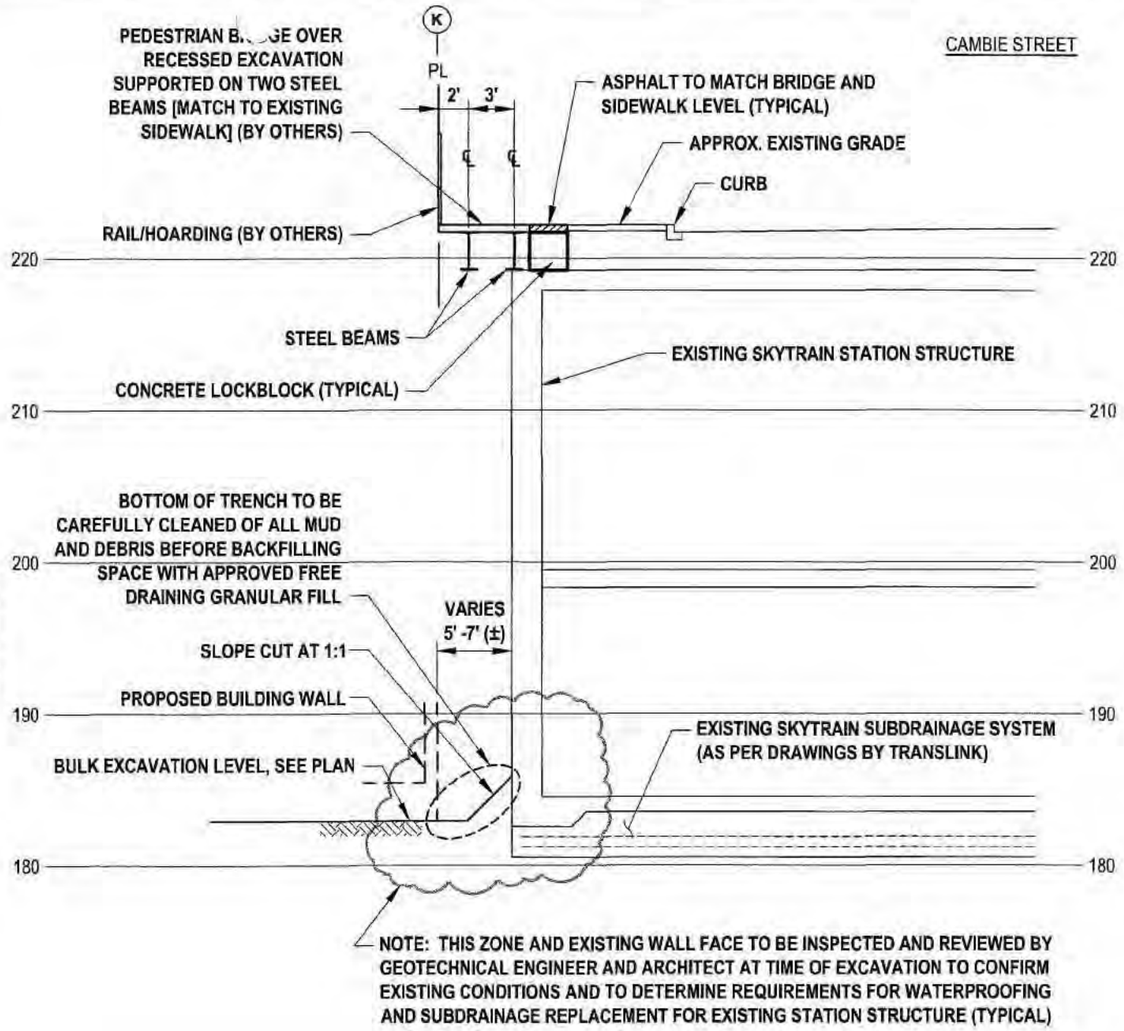
CLIENT: YUANHENG CKE DEVELOPMENTS LTD.

PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.

PROJECT NO: VAN-00217815-A0

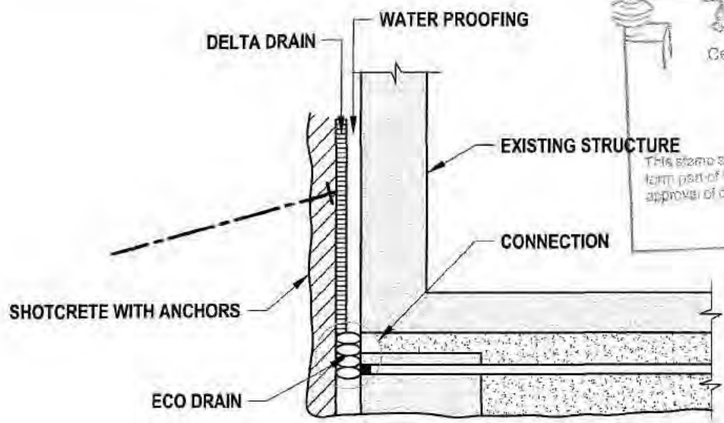
TITLE: BULK EXCAVATION SHORING PLAN

DATE: 2014-05-16 | SCALE: 1:200 | DWG NO: G1



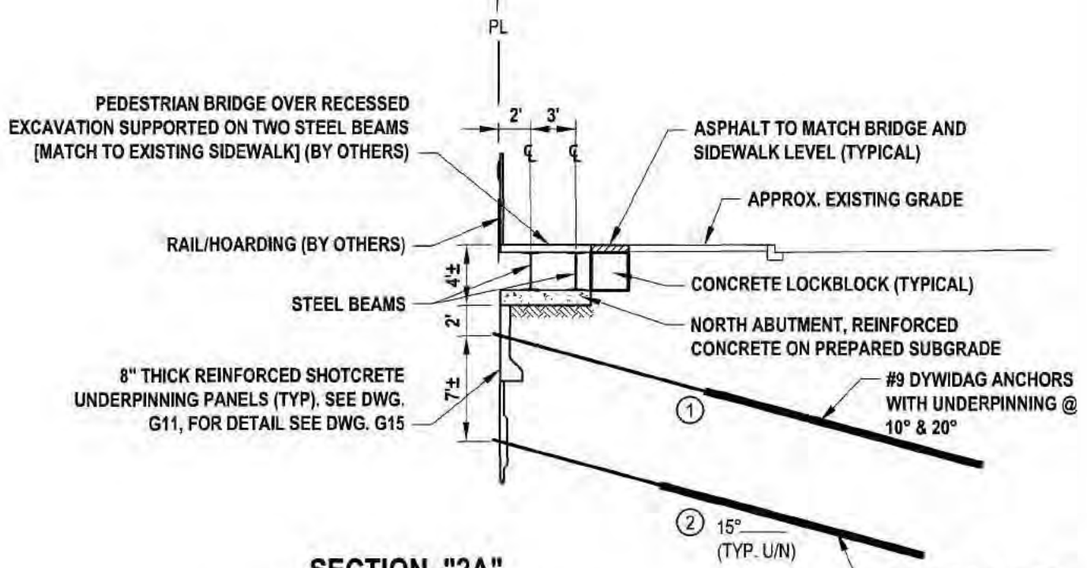
SECTION "1"

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



TYPICAL ASSUMED CONDITIONS (NTS)

ON OUTSIDE WALL OF EXISTING STATION STRUCTURE
-SEE 'AS BUILT' DWGS INCLUDING
STRUCTURAL - 5003(1)
CIVIL - 5002(3) & 5005(3)



SECTION "2A"

(DETAIL AT NORTH ABUTMENT ON SUBGRADE)

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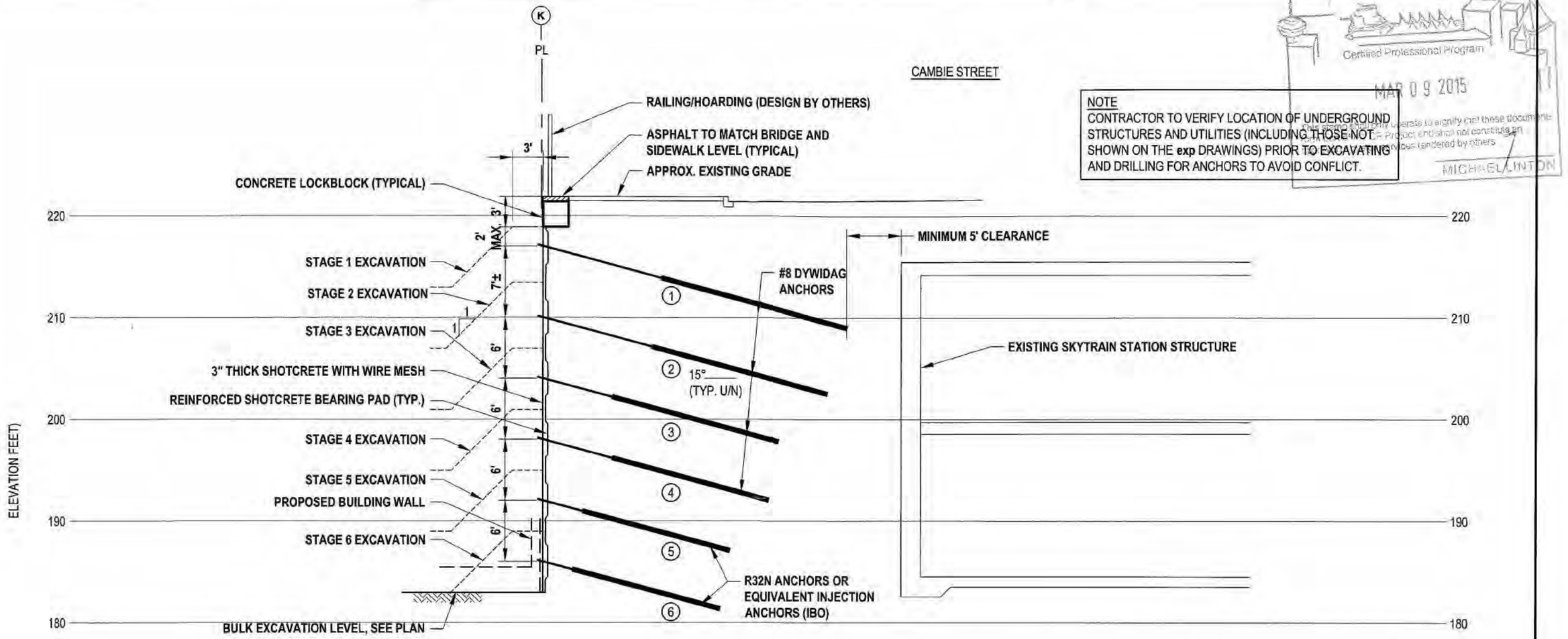
exp.com

DFTR.	DSGN.	CHK.
MG	GM	KSH

No.	REVISIONS DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO: VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING SECTION "1"
DATE: 2014-05-16
SCALE: 1:10
DWG NO.



NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.

SECTION "2"

ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	12	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	4	15	44	37	6
6	3	15	44	37	6

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DFTR. MG
DSCN. GM
CHK. KSH

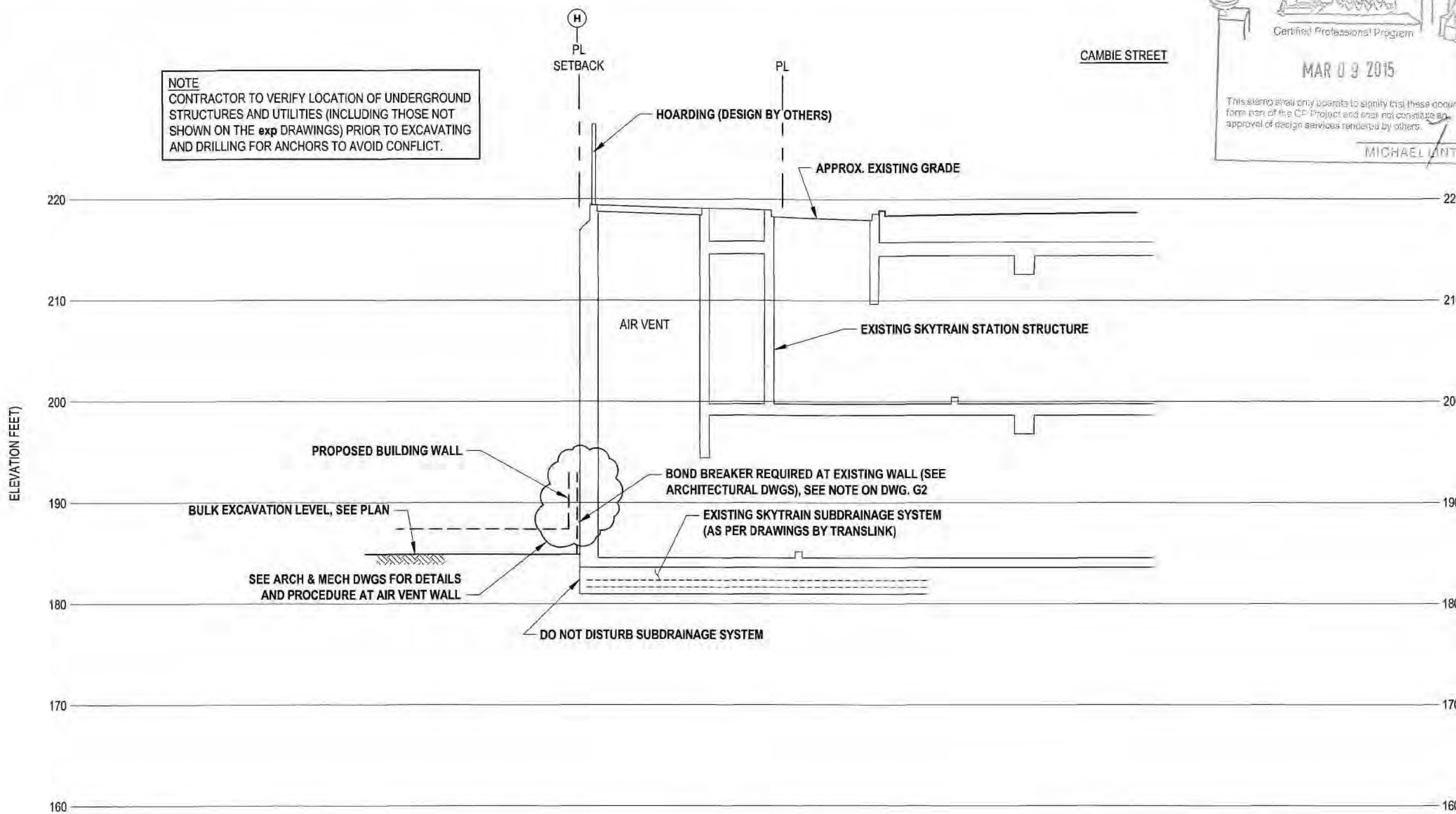
REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "2"

DATE: 2014-05-16
SCALE: 1:100
DWG NO.: 2020-387

Mar 05, 2015 - 11:35am L:\2014 (Starting at 0216767-40)\0217815-A0 KSH Commercial & Multi-Family Develop., 4083 Cambie St., Vancouver, BC\4.25 Drawings\21815 Excavation mvb.dwg



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MAR 0 9 2015
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SECTION "3"

Mar 05, 2015 - 11:35am L:\2014 (Starting at 0216767-A0)\0217815-A0 KSH Commercial & Multi-Family Develop. 4083 Cambie St., Vancouver, BC\4.25 Drawings\217815 Excavation rev6.dwg

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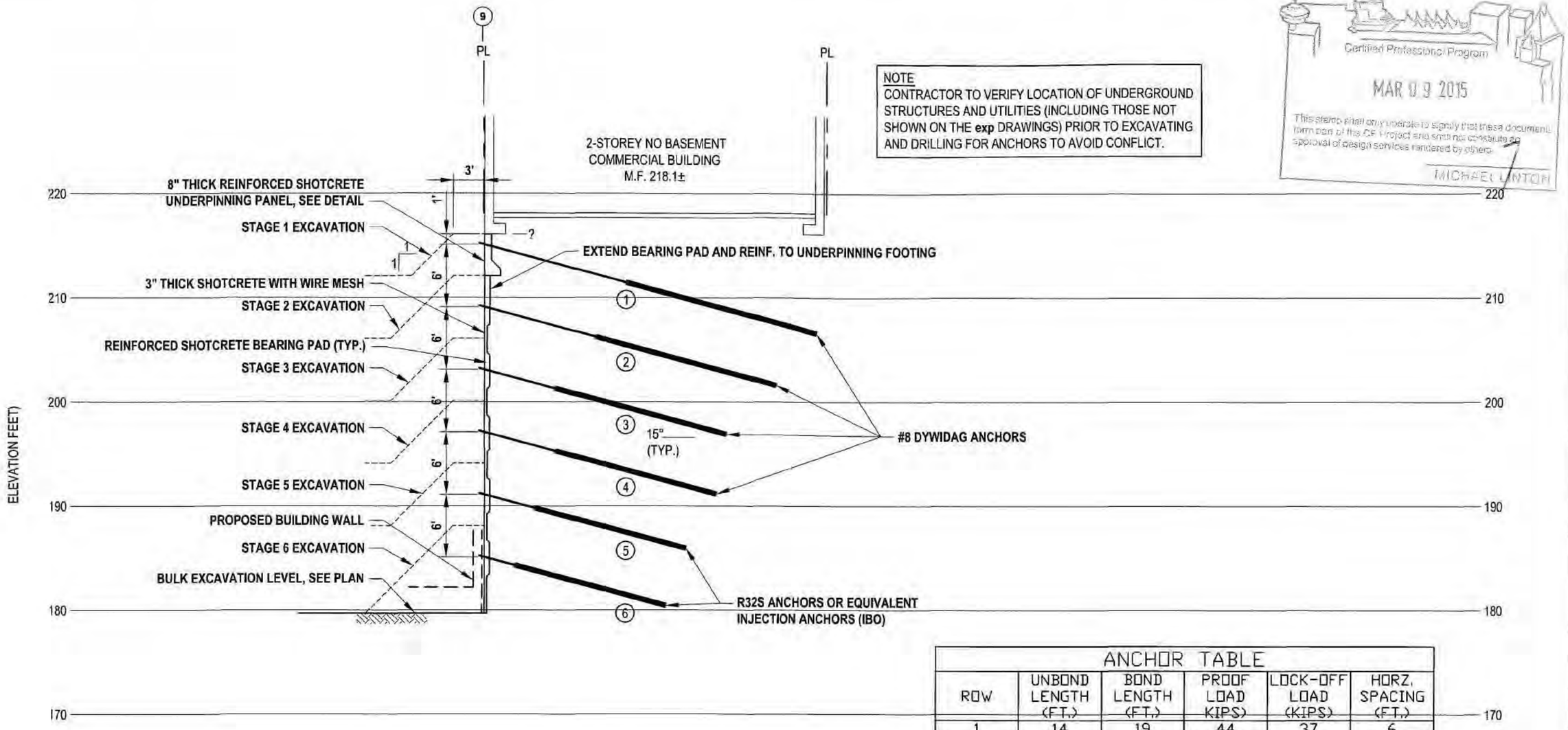
Fax: 604-874-2358
exp.com

DFTR. MG
DSGN. GM
CHK. KSH

REVISIONS

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING SECTION "3"
DATE: 2014-05-16
SCALE: 1"=10'
DWG NO.: G4



NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.

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ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	14	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	5	15	44	37	6
6	3	15	44	37	6

SECTION "4"

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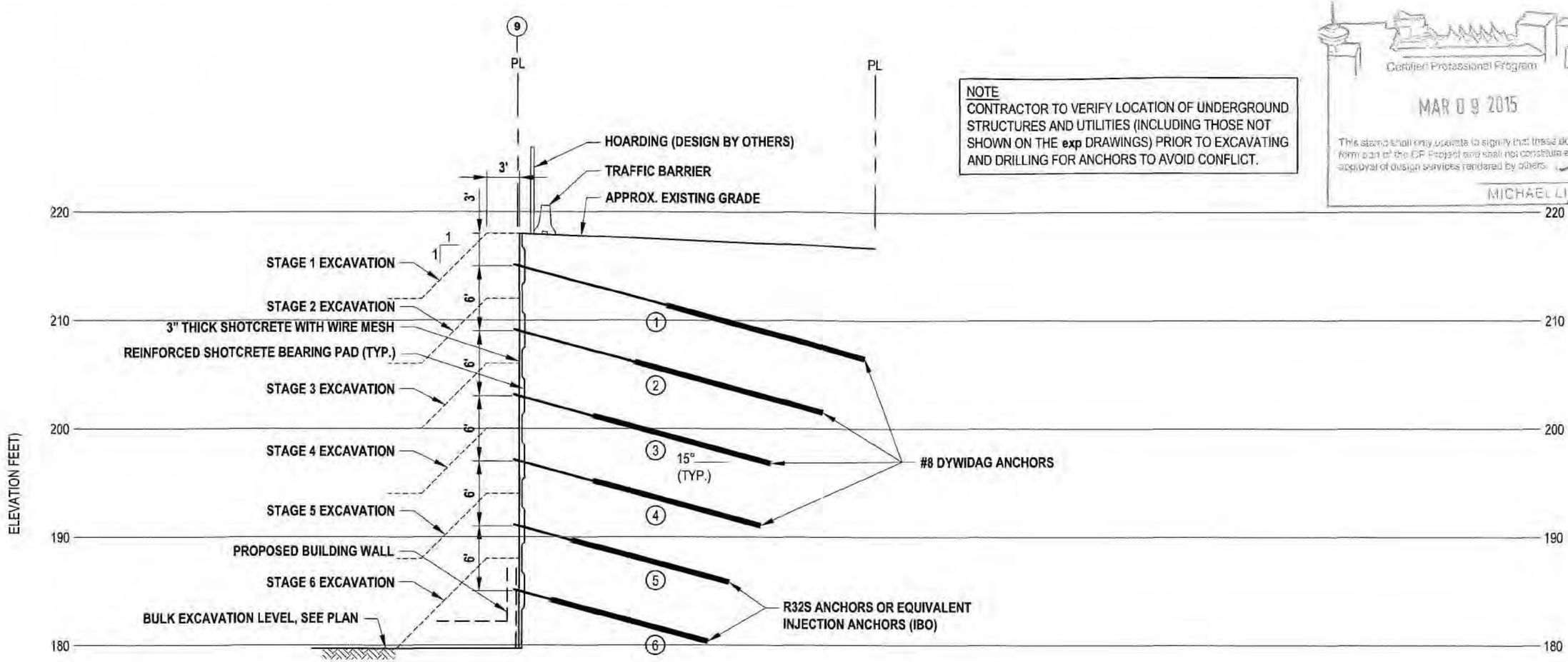
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "4"
DATE: 2014-05-16
SCALE: 1:10
DWG NO.:



NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.

ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	14	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	5	15	44	37	6
6	3	15	44	37	6

SECTION "5"

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

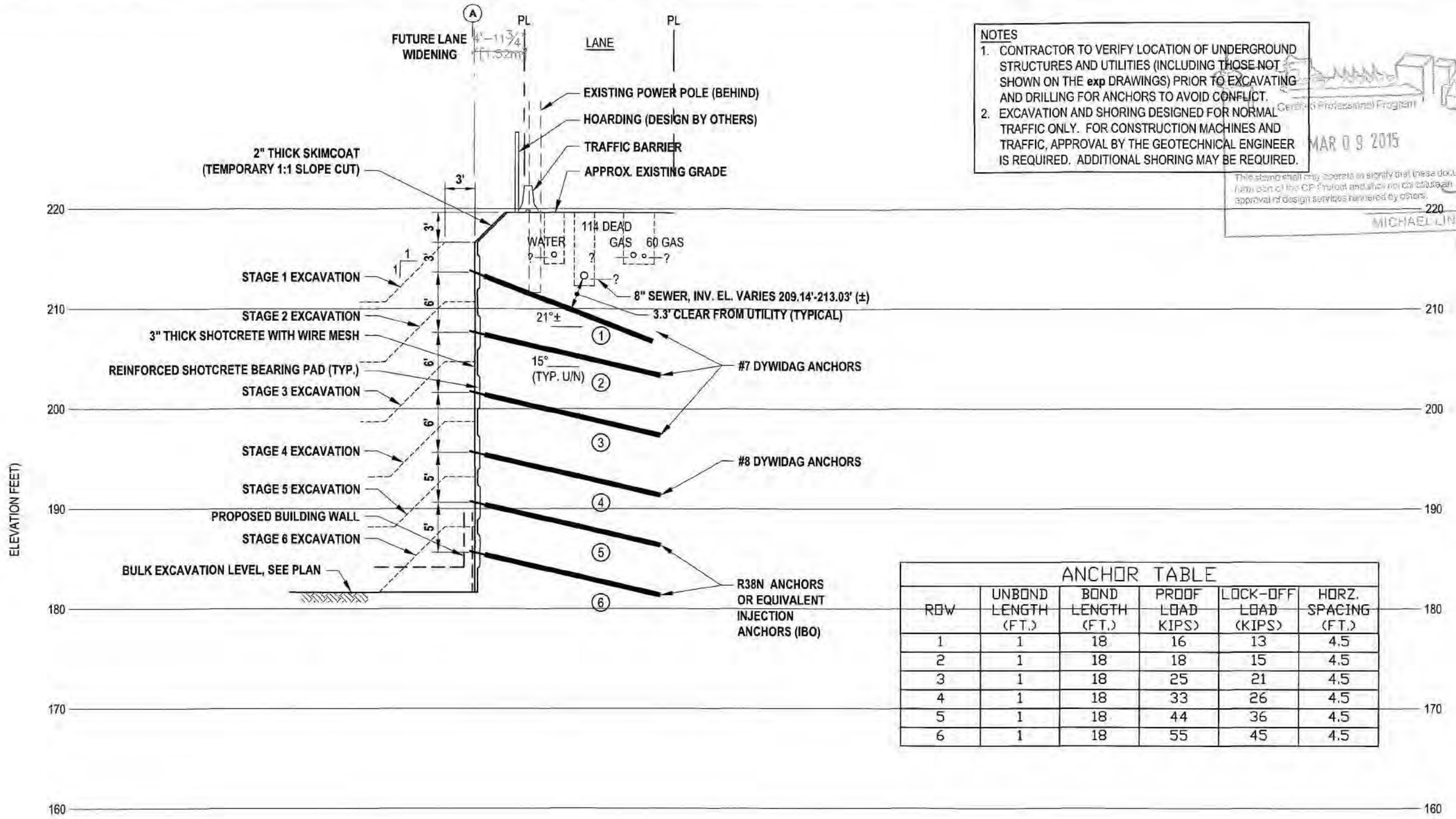
DFTR.	DSGN.	CHK.
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "5"

DATE: 2014-05-16
SCALE: 1"=10'
DWG NO.



NOTES
1. CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.
2. EXCAVATION AND SHORING DESIGNED FOR NORMAL TRAFFIC ONLY. FOR CONSTRUCTION MACHINES AND TRAFFIC, APPROVAL BY THE GEOTECHNICAL ENGINEER IS REQUIRED. ADDITIONAL SHORING MAY BE REQUIRED.

ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	1	18	16	13	4.5
2	1	18	18	15	4.5
3	1	18	25	21	4.5
4	1	18	33	26	4.5
5	1	18	44	36	4.5
6	1	18	55	45	4.5

SECTION "6"

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604-874-1245
Fax: 604-874-2358
exp.com

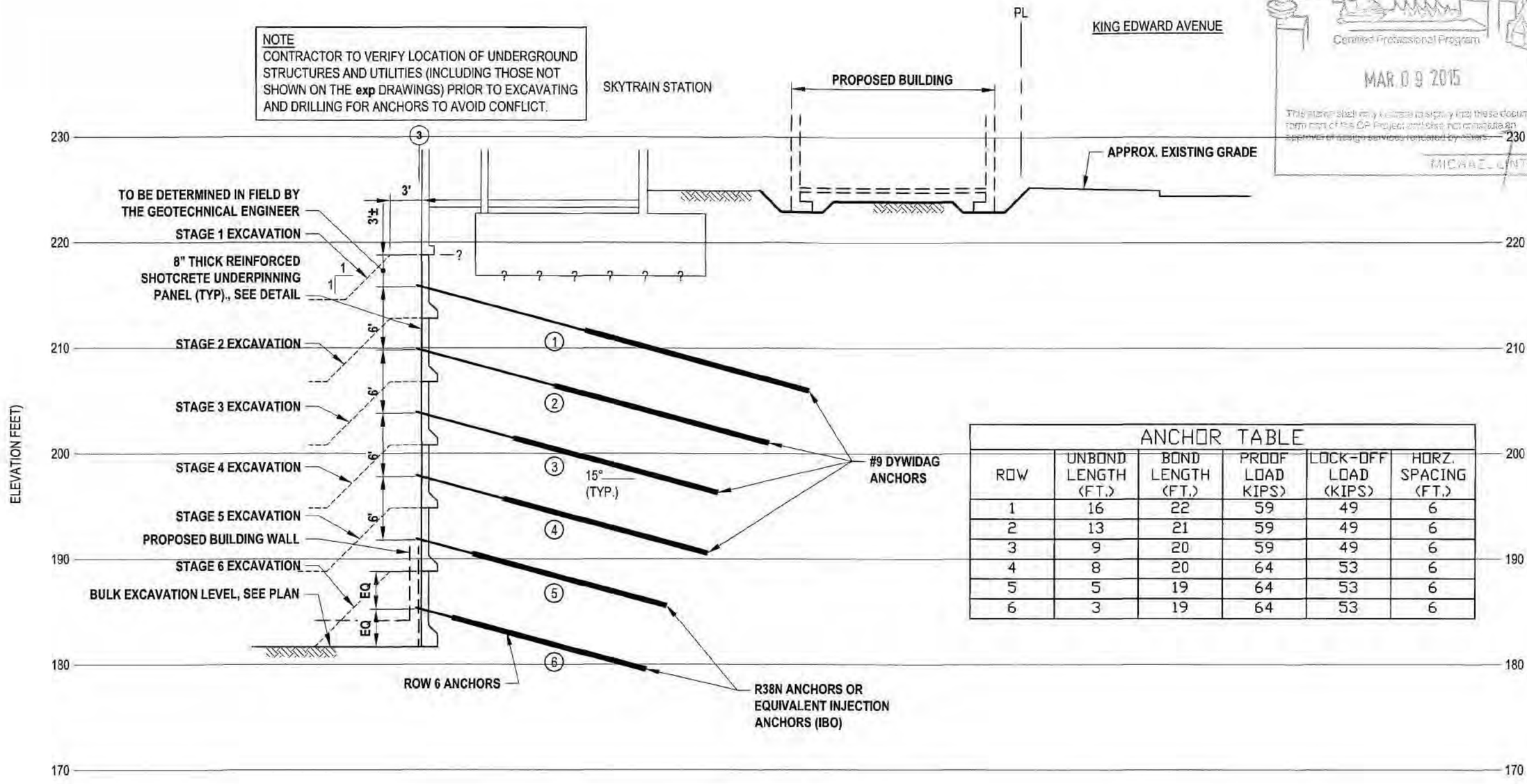
DFTR.	DSGN.	CHK.
MG	GM	KSH

REVISIONS

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING SECTION "6"
DATE: 2014-05-16
SCALE:
DWG NO.

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	16	22	59	49	6
2	13	21	59	49	6
3	9	20	59	49	6
4	8	20	64	53	6
5	5	19	64	53	6
6	3	19	64	53	6

SECTION "7"

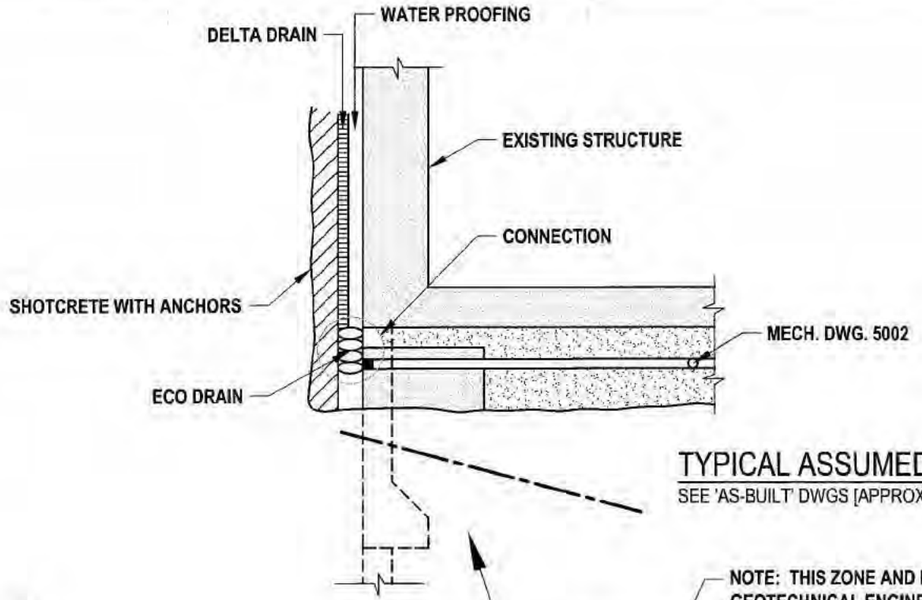
exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

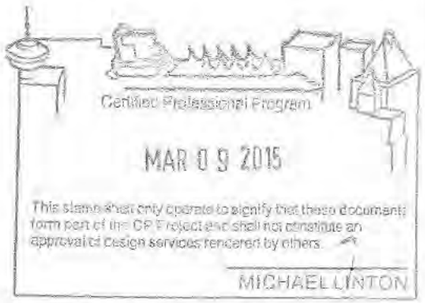
DFTR	MG
DSGN.	GM
CHK.	KSH

REVISIONS

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

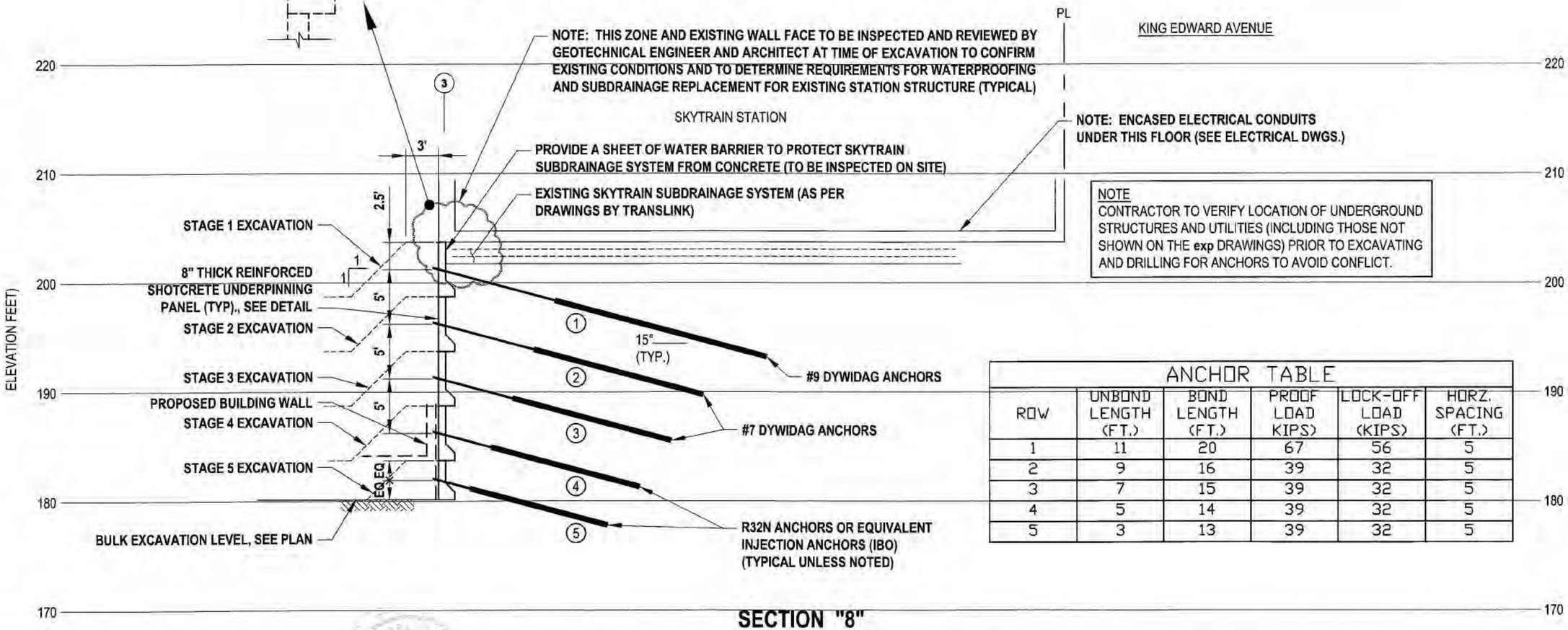
CLIENT	YUANHENG CKE DEVELOPMENTS LTD.
PROJECT	COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.	VAN-00217815-A0
TITLE	BULK EXCAVATION SHORING SECTION "7"
DATE	2014-05-16
SCALE	
DWG NO.	





TYPICAL ASSUMED CONDITIONS (NTS)

SEE 'AS-BUILT' DWGS [APPROX.]



NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.

ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD (KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	11	20	67	56	5
2	9	16	39	32	5
3	7	15	39	32	5
4	5	14	39	32	5
5	3	13	39	32	5

SECTION "8"

exp Services Inc.
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DFTR.	DSGN.	CHK.
MG	GM	KSH

REVISIONS

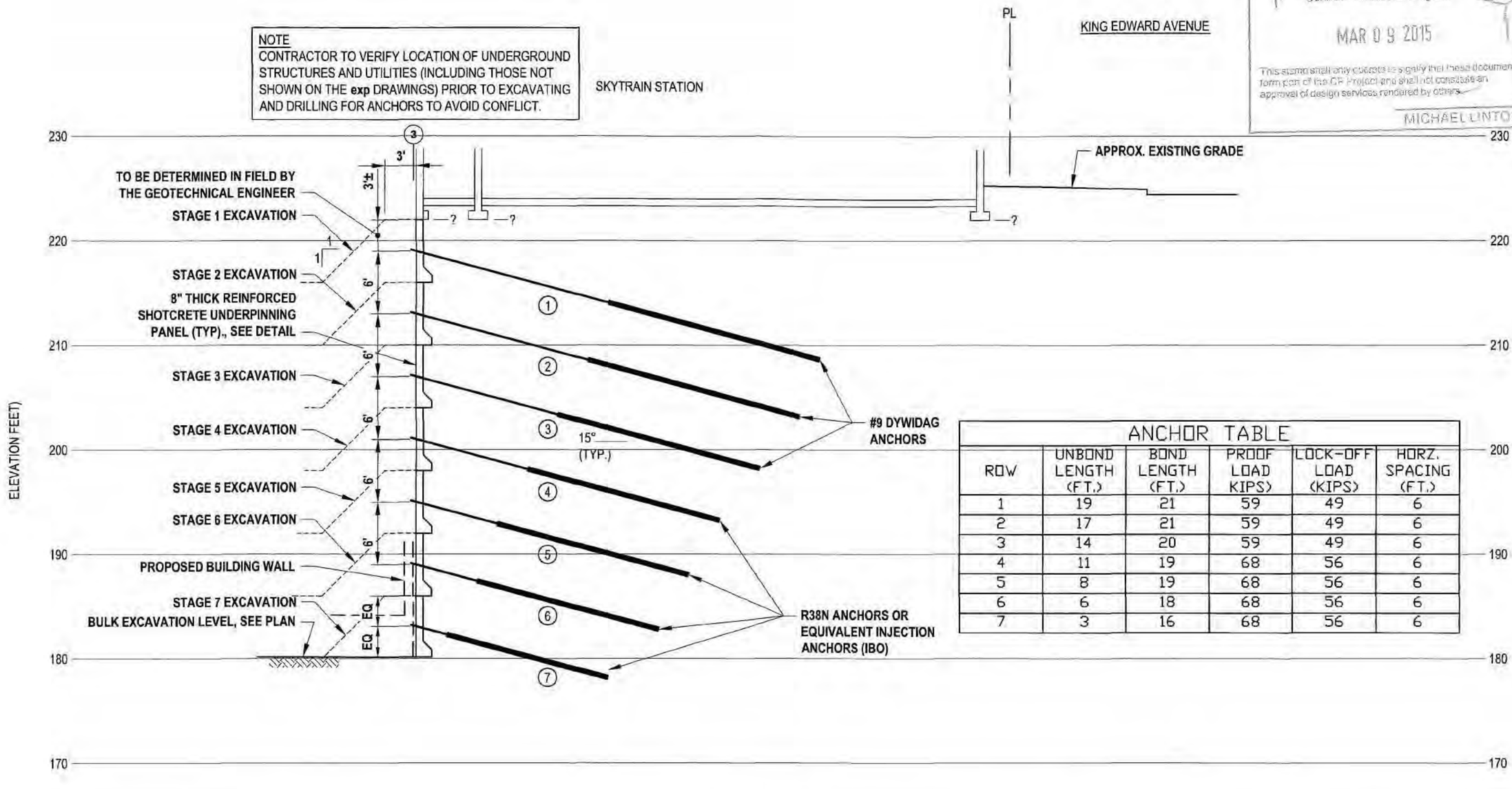
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "8"

DATE: 2014-05-16
SCALE: 1:10
DWG NO.: G9

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	19	21	59	49	6
2	17	21	59	49	6
3	14	20	59	49	6
4	11	19	68	56	6
5	8	19	68	56	6
6	6	18	68	56	6
7	3	16	68	56	6

SECTION "9"

Certified Professional Program
MAR 09 2015
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DFTR.	DSGN.	CHK.
MG	GM	KSH

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
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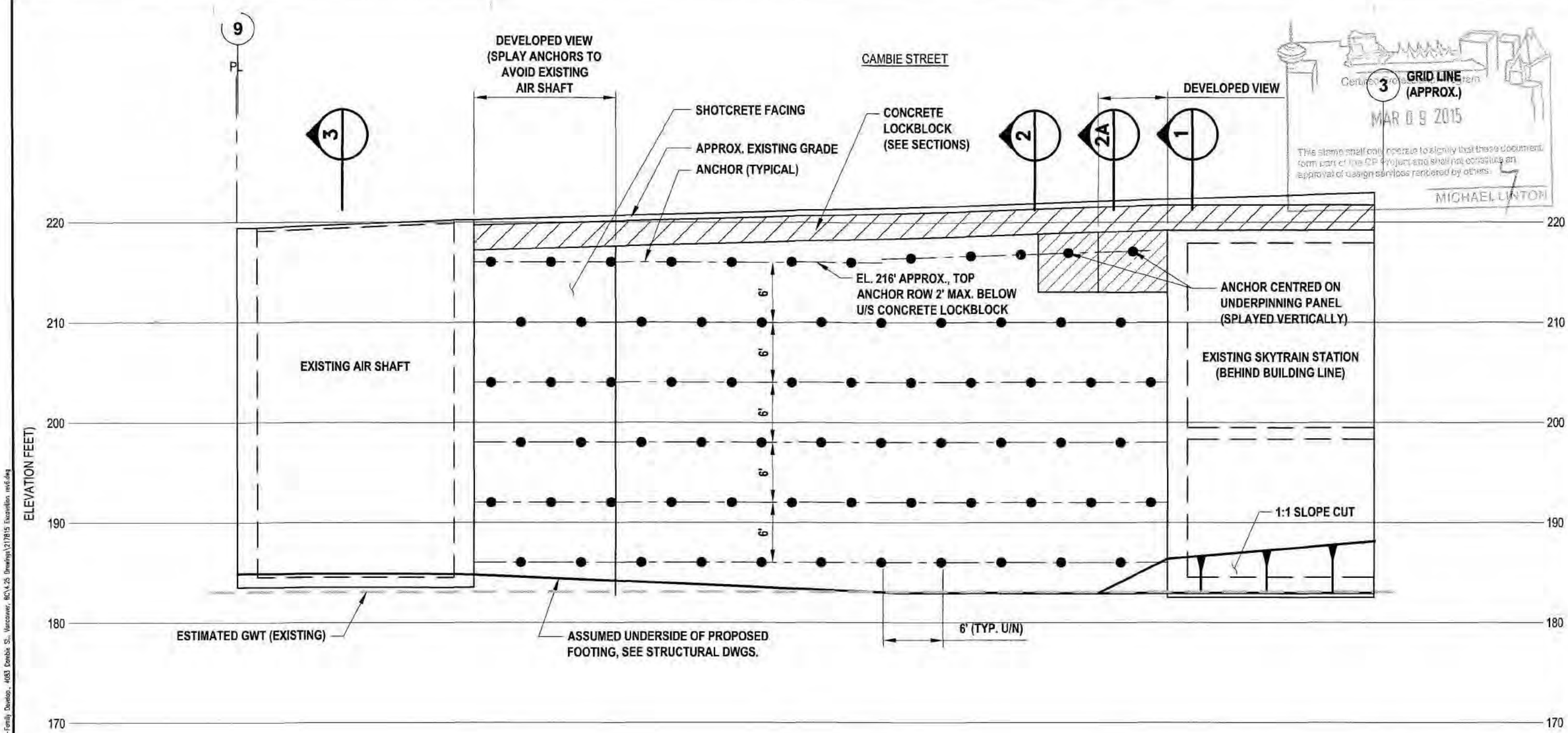
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING SECTION "8"
DATE: 2014-05-16
SCALE: 1:100
DWG NO.: S10



ELEVATION LOOKING EAST

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	MG
DSGN.	GM
CHK.	KSH

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
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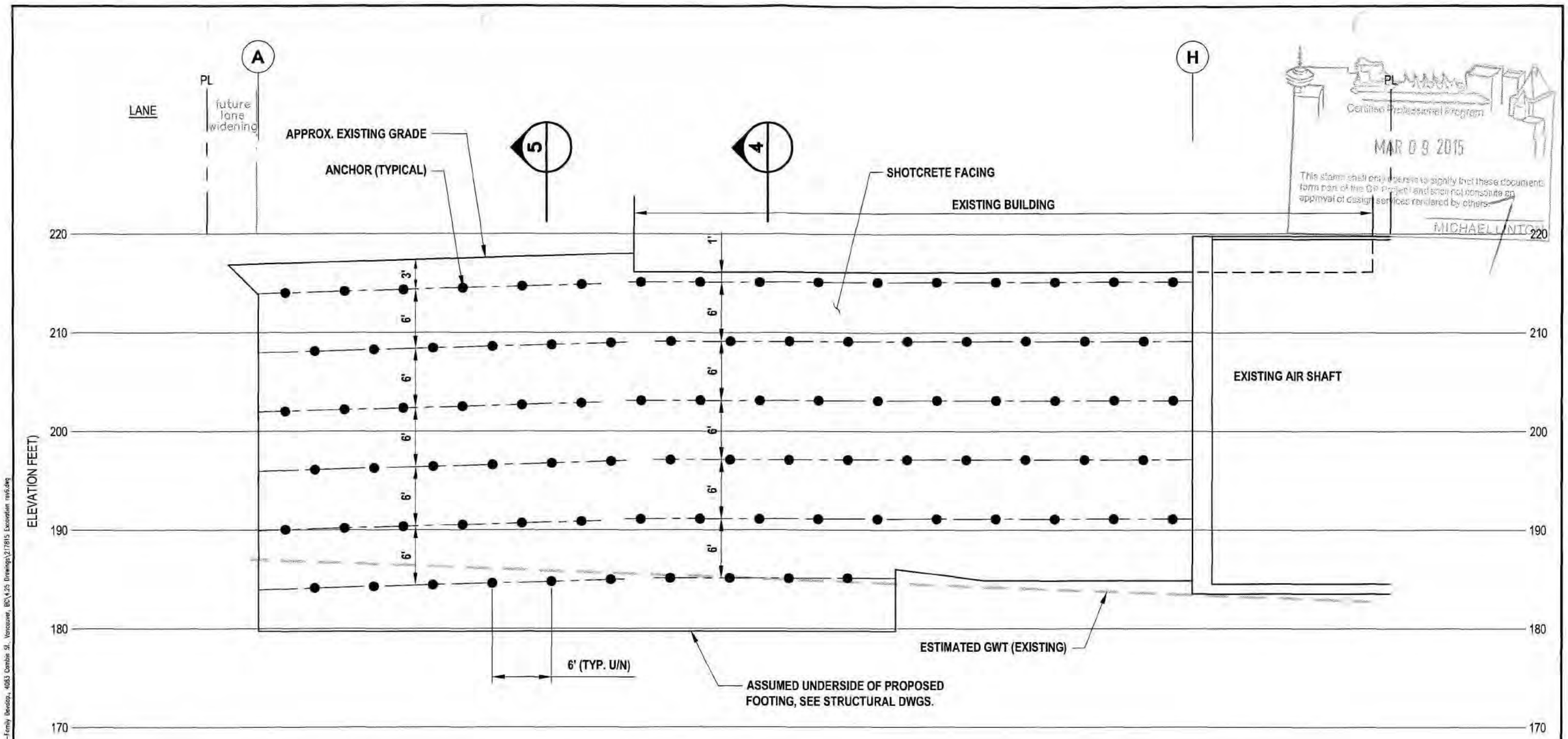
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING
ELEVATION LOOKING EAST

DATE: 2014-05-16
SCALE: 1:100
DWG NO.: C11



Certified Professional Program

MAR 0 9 2015

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MICHAEL LINTON

ELEVATION LOOKING NORTH

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REVISIONS		
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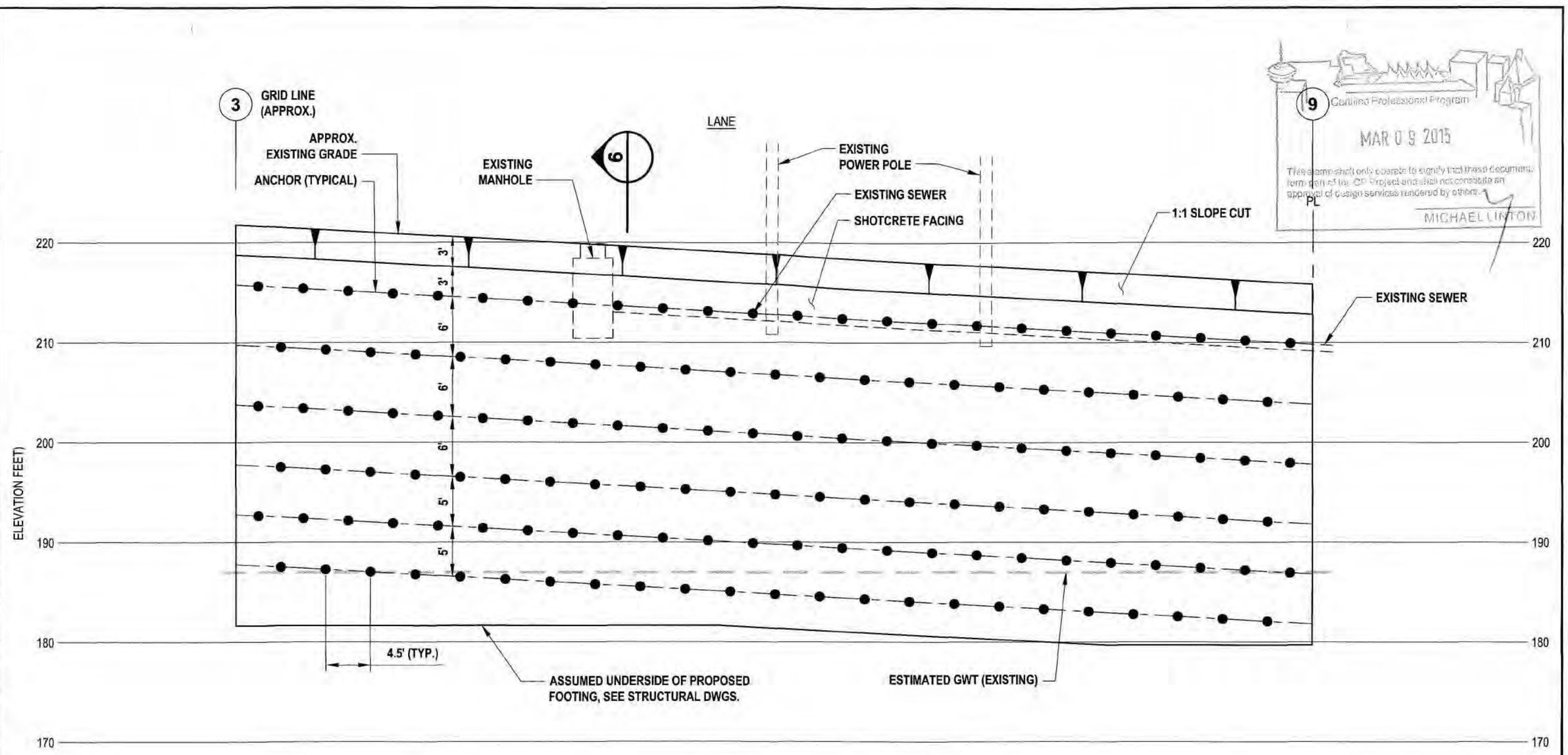
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT	YUANHENG CKE DEVELOPMENTS LTD.
PROJECT	COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.	VAN-00217815-A0
TITLE:	BULK EXCAVATION SHORING ELEVATION LOOKING NORTH
DATE	2014-05-16
SCALE:	1:10
DWG NO.	S12



ELEVATION LOOKING WEST

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MG	GM	KSH

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
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4	ISSUED FOR TENDER	2015-01-30
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CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
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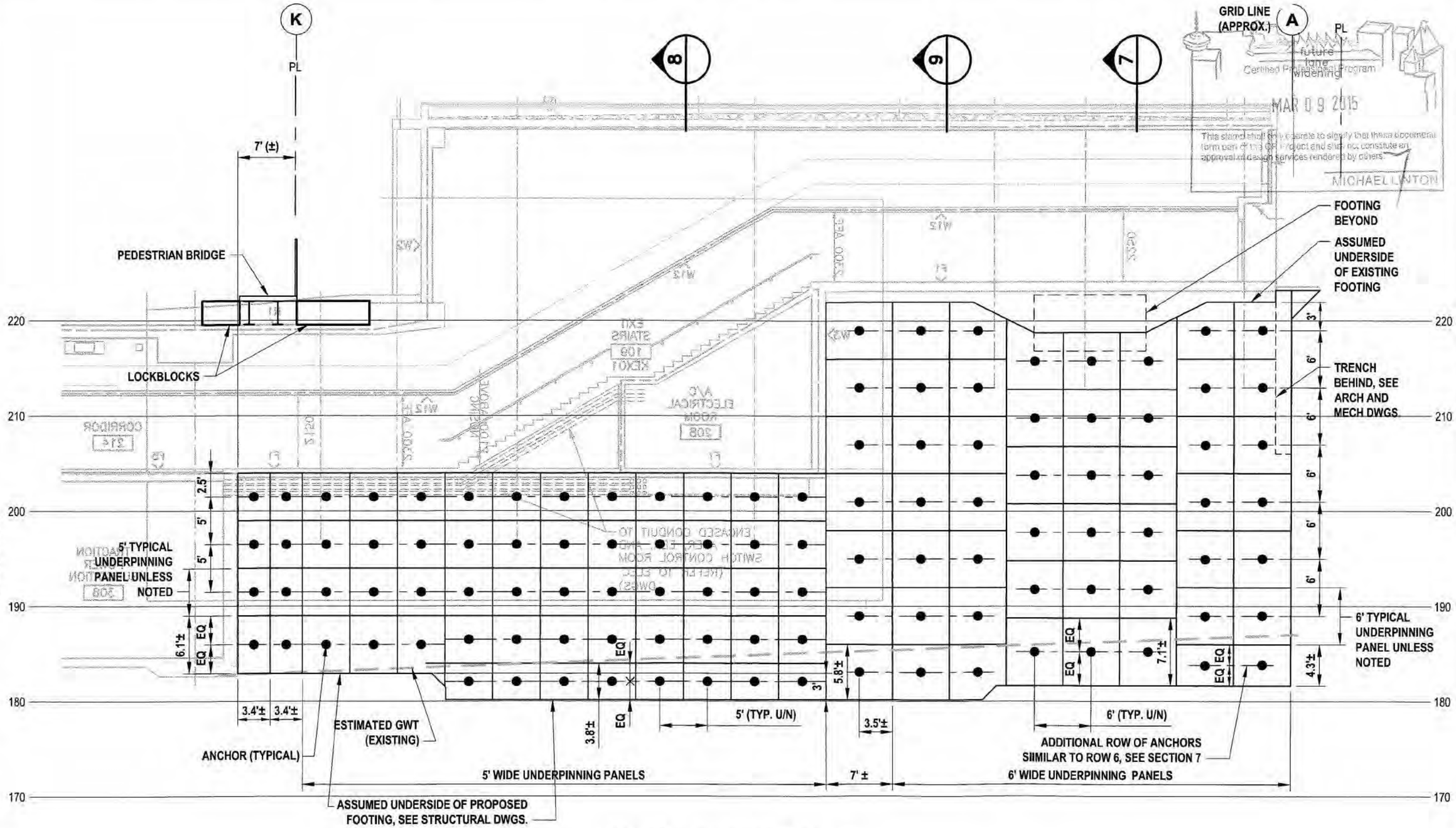
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING ELEVATION LOOKING WEST

DATE: 2014-05-16
SCALE: 1:100
DWG NO.: C1.2



ELEVATION LOOKING SOUTH

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CHK.	KSH

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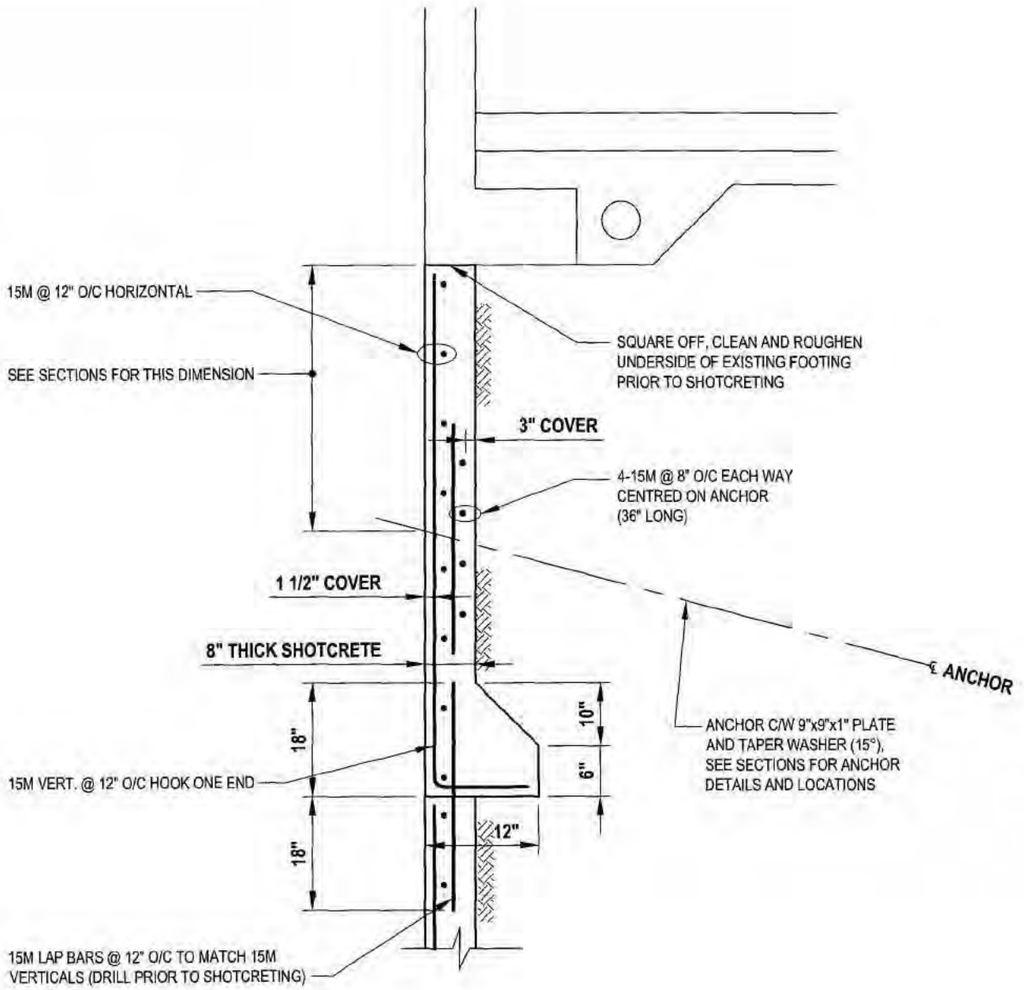
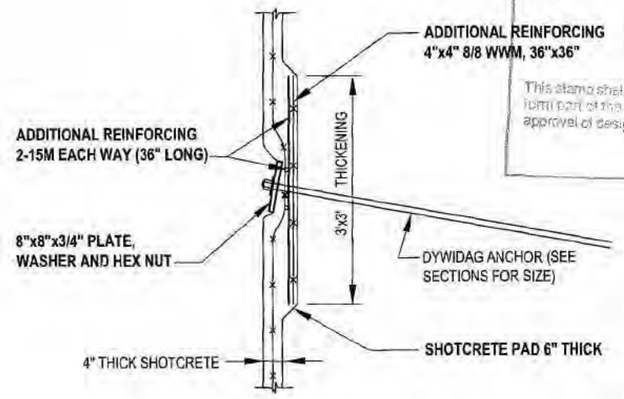
CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING ELEVATION LOOKING SOUTH

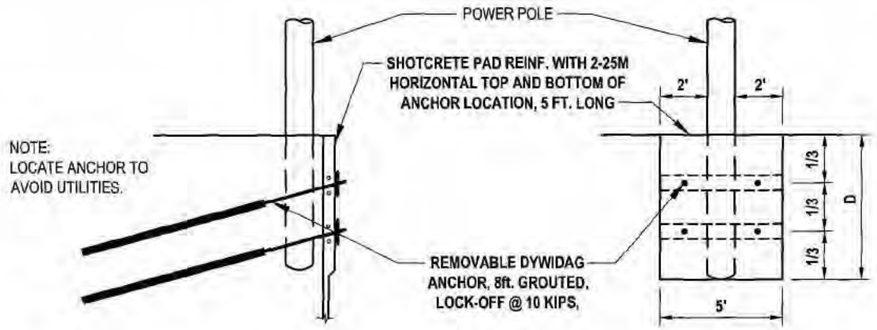
DATE: 2014-05-16
SCALE: 1:100
DWG NO.: S14



SHOTCRETE UNDERPINNING DETAIL



SHOTCRETE BEARING PAD SECTION



TYPICAL POWER POLE SUPPORT DETAIL

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REVISIONS		
No.	DESCRIPTION	DATE
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CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING DETAILS

DATE: 2014-05-16 | SCALE: N.T.S. | DWG NO.: S18

EXCAVATION SHORING SPECIFICATIONS

PART A - INITIAL REQUIREMENTS

1.0 Location of all services to be completed by contractor. Report all discrepancies between actual conditions and excavation drawings to **exp** Services Inc. immediately. Drilling for installation of anchors is not to commence until all service locations have been established and a memo stating such has been forwarded by the contractor to **exp** Services Inc.

2.0 All relevant permits from governing authorities must be in place prior to start of construction.

3.0 All relevant information which may affect the performance of the shoring system must be reported in writing to **exp** Services Inc. prior to start of construction. This includes location of site trailers or storage areas near the edge of the excavation.

4.0 Permission from adjacent property owners must be obtained and written confirmation of such permission forwarded to **exp** Services Inc. at least 2 days prior to commencing work on the adjacent properties.

5.0 Contractors to notify **exp** Services Inc., FortisBC, BC Hydro Electric and Telus in writing at least 3 days prior to start of construction.

6.0 A preconstruction survey of adjacent buildings must be completed prior to excavation. Survey control points to monitor horizontal and vertical movements should be installed in the adjacent roads and on adjacent buildings.

PART B - GENERAL CONSTRUCTION REQUIREMENTS

1.0 The contractor will undertake proper survey control to ensure the excavation shoring system is installed according to the excavation shoring drawings with respect to property lines, building lines, ground surface, and finished grades. Report any dimensional discrepancies to **exp** Services Inc.

2.0 Site to be enclosed by fencing or hoarding prior to start of excavation. Hoarding/fencing to be acceptable to municipal bylaws.

3.0 Where specialized dewatering systems are required, the excavation/shoring contractor work must be undertaken in such a manner and sequence to ensure damage to the system does not occur. Specialized dewatering does not form part of the shoring contract.

4.0 Where excavation shoring is required, the excavation contractor will ensure that adequate equipment is available to carry out the necessary detail excavation. Where detailed excavation is required prior to placement of shotcrete, excavation will be completed at such time to allow completion of the necessary shoring work prior to the end of the working day.

5.0 All interior excavation slopes not shown on the excavation shoring drawings shall be completed in conformance with the WorkSafe BC Occupational Health and Safety Regulations.

6.0 All significant slope or shoring deterioration to be reported to **exp** Services Inc.

7.0 All slope cuts to be protected with 6 mil polyethylene securely fastened unless noted otherwise on drawings.

8.0 The contractor shall maintain the overall responsibility for site safety.

9.0 All blasting must be completed by a certified blaster. Blasting may not occur within 10 feet of adjacent buildings. Notification of blasting must be provided to the excavation engineer 24 hours prior to blasting to allow installation of monitoring equipment. Unless otherwise indicated in the soils report, material which can be removed by excavation or ripping with a Caterpillar 345 excavator or equivalent with a single ripper tooth, with a production rate of at least 10 cubic yards per hour is not considered to require blasting for removal.

PART C - MATERIALS REQUIREMENTS

1.0 SHOTCRETE

Compressive strength requirements are:
- 15 MPa in 24 hours
- 20 MPa in 3 days

2.0 TIE-BACK ANCHORS
- Anchor diameters shown on drawings based on Dywidag Threadbar 517/690 MPa ultimate tensile strength
- Mukusol Threadbar 500 MPa ultimate tensile strength or Dywidag Threadbar 100 ksi ultimate tensile strength are acceptable alternatives with bar diameters corrected for tensile ultimate load capacity
- TITAN 30/16, TITAN 30/11, IBO R32/20 injection anchors to be used where conditions do not allow conventional drilling or where noted on drawings.

3.0 WELDED WIRE MESH
- Minimum yield 400 MPa, size 4: x 4: 8/8 unless noted otherwise. CSA G30.5 M1983.

4.0 REINFORCING
- Minimum yield 400 MPa, CSA G30.12 M197.

5.0 ANCHOR GROUT
- Non-shrinkage cementitious grout or equivalent
- Compressive strength requirements:

20 MPa in 24 hours
35 MPa in 28 days

6.0 DRAINS
- 2" diameter PVC with suitable filter fabric to ensure that no soil transfer occurs with groundwater flow.
- Where shown on drawing 1 ½" diameter slotted (.01") pipes, closed one end placed in minimum 2 ½" diameter holes to be sealed at shotcrete face.

7.0 BEARING PLATES
- Minimum yield 260 MPa CSA G40.21-M 87
- Alternate plates to those shown on the drawings will not be acceptable unless approval has been obtained from **exp** Services Inc.

8.0 STRUCTURAL STEEL
- All structural steel to be G40.21 300 MPa minimum yield.
- Fabrication and erection to CAN3 - S16.1

PART D - CONSTRUCTION DETAILS

1.0 ANCHOR INSTALLATION

Specified anchors to be placed in minimum 4" diameter holes. Hole to be thoroughly cleaned by appropriate means prior to placement of grout.
Hole drilling technique required will depend on soil conditions. Percussion rock drill may not be suitable to install holes for soils containing predominantly silt or clay content unless combined with pressure grouting or after grout systems. The contractor should prove that test anchors can be installed using this method that will sustain the required test and lockoff loads prior to installing production anchors. Anchors to be provided with suitable centralizers at 10' o/c to ensure the anchor is completely encircled by grout. Grout to be installed by Tremie grouting from bottom of hole or by pressure grouting. All grout extending into the unbonded portion of anchor must be removed or alternatively a protective sleeve placed over the unbonded length of anchor.

2.0 WELDED WIRE MESH PLACEMENT

All mesh joints must be a minimum overlap of 2 squares. Mesh must be suitably supported from soil face and positioned to provide required cover as shown on the detail drawings.

3.0 REINFORCEMENT PLACEMENT

Reinforcement to overlap a minimum 24 diameters for tension splices and 18 diameters for compression splices with minimum 1.5" of cover unless noted otherwise on drawings.

4.0 SHOTCRETE DRAINS

Drains through the shotcrete to consist of 2" diameter PVC placed every 5' on centre vertically and horizontally to relieve hydrostatic pressure.

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	3	ISSUED FOR BUILDING PERMIT	2014-11-04

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PROJECT NO: VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING NOTES
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5.0 SHOTCRETE PLA[illegible]ENT

5.1 GENERAL

Shotcrete thicknesses shown on the detailed drawings are minimum.

Shotcrete to be placed in such a manner that segregation of materials or post placement slumping does not occur. Upward placement of shotcrete for underpinning panels is not acceptable.

All reinforcing and welded mesh to be fully contained in the shotcrete with at least 1 ½" cover in all areas. Removal of defect shotcrete to be at contractor's expense.

5.2 COLD WEATHER CONDITIONS

Special requirements for shotcrete protection will be necessary during cold weather. These include:

AMBIENT NIGHT TIME TEMPERATURES	REQUIREMENTS
Greater than 1°C	No special provisions other than potential sequencing changes to allow additional shotcrete curing times.
-3° to 1°C	Protect fresh shotcrete with thermal blankets for 24 hours
-10 to -3	Provide vented heat to fresh shotcrete for 24 hours
Below -10°C	No shotcreting allowed

In all cases, shotcrete may not be placed on frozen ground.

6.0 TESTING

6.1 Anchors

Anchors shall be tensioned as soon as practicable but no sooner than 24 hours after the construction of the applicable shotcrete panel. Contractor will provide required testing apparatus including recently calibrated jack and ram compatible with the anchor test load, nuts, plates, couplers, wrenches, and tensioning chair, together with personnel to set up and operate the equipment. The required lockoff loads are shown on the excavation drawings.

All anchors will be tested to 1.25 times the lockoff load for 2 minutes. An acceptable performance test occurs where less than 2.5% of the test load is lost over the 2 minute period. Of these anchors, approximately 10% will be proof tested by maintaining 1.25 times the lockoff load for 15 minutes in accordance with PTI manual.

Anchors which fail any of the above tests shall be replaced. A failure rate of 3% of the total anchors installed will be assumed as typical and will be at the contractor's expense. Failure rates in excess of 3% will be investigated to determine the cause of the failures and will form an extra only where soil conditions/groundwater conditions can be proved to be significantly different than those reported in the project soils report.

Lift-off tests to determine long-term performance of the anchors will be carried out on 5% of the anchors except where soil conditions are predominantly clay or silt in which case an allowance of 50% of the anchors should be provided. Retensioning of anchors to required lockoff will be completed following the lift-off test.

Costs of anchor testing to be at contractor's expense.

6.2 Shotcrete

Shotcrete samples placed in 2' x 2' x 4" panels will be provided by the contractor:
A. during the first day shotcrete is used on the site.
B. approximately halfway through the project.
C. when requested by the **exp** Services Inc. personnel.

Contractor shall inform **exp** Services Inc. of sample scheduling. Samples will be suitably protected from construction activity or weather damage. Costs of shotcrete sampling and testing to be at owner's expense.

6.3 Grout

Contractor to provide grout samples:
A. during first day of anchor installation.
B. at halfway point of project.
C. as requested by **exp** Services Inc. personnel.

Costs of sampling and testing to be at owner's expense.

7.0 GROUNDWATER CONTROL

Contractor is required to provide conventional groundwater control including, but not exclusive to, sumps and ditches. Excavation is to proceed in such a manner that the water does not pond at the base of the shotcrete or excavated panels.

Loss of soil from groundwater movement must be controlled by use of filter fabrics, drainage mats and where necessary casing of drill holes or use of alternate drilling technique. Where material is lost behind the shotcrete face, the void must be backfilled using shotcrete, grout, or gravel as directed by the excavation engineer. Where specialized groundwater techniques are required as determined by the excavation engineer, installation of such a system shall be an extra to the shoring contract.

PART E - COMPLETION REQUIREMENTS

1.0 BACKFILL

All backfill types and procedures for placement must meet applicable municipal requirements and recommendations provided in the project soils report. In the absence of a project soils report or municipal requirement, backfill should consist of clean pitrun sand and gravel or river sand with less than 5% passing the No. 200 sieve. The material should be placed in maximum 12" lifts with each lift compacted to a minimum 95% Modified Proctor density (ASTM D1557). Where access is limited, backfill may consist of pea gravel (1/4" nominal size) placed in maximum 2' lifts with each lift compacted using a concrete vibrator with water jetting. Foundation walls must be adequately supported prior to placement of backfill. In-situ compaction testing will be carried out by **exp** Services Inc. personnel.

Special requirements for specific municipalities are outlined below. The list is not exhaustive and requirements can be expected to change during the project duration. The contractor is to determine and ensure his work conforms to the jurisdiction having authority at the specific project location.

Vancouver

A. When the excavation encroaches onto City of Vancouver property or the depth of the excavation below finished grades is greater than or equal to the shortest horizontal distance from the edge of the excavation to the adjacent City property line, all backfilling shall conform to the following:

A.1 For excavations less than 4 feet wide.

Birdseye Material plus Controlled Density Fill

Birdseye Material shall be placed from the bottom of the excavation to a grade below the finished surface grade, determined as follows:

- 1.0' below the finished surface grade, plus an additional depth below this grade determined as the greater of 1.5 times the width of the excavation or 4.0'.

Birdseye gravel shall be confined to its original area of placement using geosynthetic sand bags placed near adjacent sites. Approval from the streets administration branch of the city engineering services department shall be obtained prior to backfilling.

Controlled Density Fill shall be placed above the Birdseye material to no nearer than 1' of finished surface grade. The top 1' of the backfill may be backfilled with Granular Base, or may contain landscaping materials subject to the review and approval of the Site Engineer.

Birdseye must be vibrated into place with immersion vibrators, and must be compacted to at least 90% of Modified Proctor density (ASTM D1557). "End dumping" of birdseye is not an approved method of compaction.

A.2 For excavations wider than 4 feet wide.

Select granular fill with less than 5% passing the no.200 sieve shall be placed for the full depth of the excavation to within 4 feet of finished grade compacted to at least 90% modified proctor density. The top 4 feet shall consist of granular base compacted to at least 95% modified proctor.

B. When the depth of the excavation is less than the shortest horizontal distance from the edge of the excavation to the adjacent City property line, granular backfill material used shall be compacted to the greater of 90% of Modified Proctor density (ASTM D1557) or as indicated in the project soils report.

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KSH	3	ISSUED FOR BUILDING PERMIT	2014-11-04

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2.0 BACKFILL MATERIALS

"Birdseye" Material - 2.5mm to 10mm rounded granular aggregate

This material shall be of uniform quality, thoroughly washed free of sand, silt and clay and shall contain no more than 15% non-rounded particles. The particles shall be durable, capable of withstanding the effects of handling, placement and compaction without the production of deleterious fines. The grading limits shall be:

Total Passing	3/8" (9.5mm)	100%
Total Passing	¼ (6.35mm)	60% - 75%
Total Passing	No. 4 (4.75mm)	5% - 50%
Total Passing	No. 8 (2.36mm)	0% - 13%
Total Passing	No. 16 (1.18mm)	0% - 1%

Controlled Density Fill

As per Master Municipal Specifications Section 02236, Controlled Density Fill is a low-strength, high-slump cementitious material. This material is also referred to as "fillcrete", "unshrinkable fill" and "controlled low strength material (CLSM)".
To have maximum unconfined compressive strength of 0.5 MPa, (500Kpa) at 28 days and maximum cement content of 25Kg per m3 with fly ash and water reducing admixtures for initial settlement control. Place material using methods which do not lead to segregation. Inspection and testing of the fill is required by the Engineer.

"Granular Base" - 19mm Minus Crushed Aggregate

As per Master Municipal Specifications Section 02226.2.10. conforming to following gradations:

Sieve Designation	Percent Passing
19mm	100
12.5mm	75-100
9.5mm	60-90
4.75mm	40-70
2.36mm	27-55
1.18mm	16-42
0.600mm	8-30
0.300mm	5-20
0.075mm	2-8

3.0 BACKFILL TESTING

Sufficient testing of the backfills is required as the site engineer deems necessary so as to be able to provide the Letters of Assurance as described below.

Samples of all fills to be used on the site are to be provided to the engineer to allow tests of gradation for any granular material placed (road base or birdseye and controlled density fill). These samples must be provided prior to delivery of materials to the site and at least 48 hours prior to their use on the project.

Density testing of placed backfill material is required on representative locations of any backfill that was placed on any day when the site engineer or his/her representative did not observe backfilling at the site.

4.0 LETTERS OF ASSURANCE

At the end of the project, the City requires that the site engineer provide an Assurance of "Geotechnical Field Review and Compliance". Additionally, during the project, an interim letter may be submitted by the site engineer covering only a portion of the excavation backfill in order to facilitate construction of street works such as sidewalks over or adjacent to portions of the backfill.

In both cases, the City requires that the letter must be supported by the following material:

- all daily field review reports
- gradation test results on each type of backfill material used
- batching slips for all controlled density fill material delivered to the site
- density test results on backfill placed on days in which the site engineer (or representative) was not in attendance, accompanied by an explanation of why the engineer (or representative) was not in attendance and a description of what remedial steps were taken to satisfy the site engineer as to the adequacy of the backfill and its compaction where compliance with the job specification had not been attained.

The contractor/owner will take all measures required to ensure this information is provided.

5.0 ANCHOR DETENSIONING AND REMOVAL

Except as noted below all anchors installed on city property within 5' of finished ground surface must be removed and those below 5' detensioned. Alternatively below 5' the anchors may remain tensioned if they are fully grouted after the lockoff load has been applied. Detensioning and removal of anchors must be done concurrently with backfill placement. The backfill should be placed to within 1' of the anchor location prior to its detensioning or removal. In easement area or city right-of-way anchors within 3.3' of any underground services must be removed.

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6.0 SHOTCRETE REMOVAL

Except as noted below shotcrete placed within 5' of finished ground surface on city property must be removed. The removal operation must be completed in stages and in such a manner that damage to the adjacent utilities does not occur. Shotcrete placed on easement area or city right-a-way within 3.3' of underground services must be removed.

7.0 NOTIFICATION OF WORK

exp Services Inc. must be notified at least 48 hours prior to placement of backfill, anchor detensioning and removal, and shotcrete removal in order that certification of the work may be provided. Failure of adequate notification may result in the requirement for re-excavation of backfilled areas, loss of damage deposits at the contractors expense, or failure to allow provision of Letters of Completion by the project engineer.

SHORING INSTALLATION STAGING

SECTIONS 1, 2, 3, 5 and 6

1. Excavate to Stage 1
2. Install first row anchors as shown on drawings.
3. Excavate vertically in maximum 2 anchor widths, maintaining adjacent berms.
4. Place required mesh, reinforcement, and shotcrete.
5. Tension anchors as described in section D6.1.
6. Following successful tensioning of anchors, excavate adjacent panels, and repeat steps 4 and 5.
7. Excavate to successive berms, install anchors and repeat steps 3 to 6.

SECTIONS 4, 7, 8 and 9

1. Excavate to Stage 1 berms and install first row anchors as shown on the drawings.
2. Excavate panels 1 anchor width, maintaining at least 3 anchor panels and adjacent berms. Adjacent berm sides at working panels must be maintained near vertical. Temporary shoring for protection of workers may be required.
3. Place required mesh, reinforcement, and shotcrete.
4. Tension anchors as described in specification Section Part D 6.1, at least 24 hours after shotcrete has been placed.
5. Following successful tensioning of anchors, excavate adjacent panel as per Step 2 and repeat Steps 3 and 4.
6. Repeat step 5 until row is complete.
7. Excavate to successive berms, install anchors and repeat steps 2 to 6.

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TITLE: BULK EXCAVATION SHORING NOTES

DATE: 2014-05-16 SCALE: NTS DWG NO. G18

GENERAL NOTES

1.0 DESIGN PARAMETERS

The excavation drawings are based on the following:

A. This shoring design has been based on the assumption that the site can be adequately dewatered. Where dewatering is unsuccessful, significant shoring design revisions should be expected which may include alternate shoring systems such as sheetpiles or soldier piles and lagging.

B. Soil conditions as per soils report by **exp** Services Inc. dated April 11, 2014. Where unexpected soil conditions are encountered, revisions to the excavation drawings may be required.

C. See drawing G1 for reference drawings. All attempts have been made to ensure that these drawings are the latest revisions. However, the contractor should ensure that discrepancies do not exist between the excavation drawings and those provided by the other consultants. All discrepancies or dimension inaccuracies to be reported to **exp** Services Inc. prior to commencement of the work. Contractors using the drawings for quantity take-offs do so at their own risk.

D. Locations of adjacent structures are obtained by site inspections and where possible review of available drawings. We accept no responsibility for the accuracy of this data.

E. Utility data is provided by the appropriate municipality and from the Site Survey Plan. Site inspections to determine location of utilities either shown or not shown on the drawings are the responsibility of the contractor. Information placed on the drawings is to be used as a preliminary guide only. Report any discrepancies between the drawings and actual utility locations. Installation of anchors is not to proceed until discrepancies have been resolved.

2.0 DRAWING REVISIONS

Revisions to shoring installation sequence or shoring details can be made only with written confirmation by **exp** Services Inc. personnel.

3.0 CONTRACTOR EXPERIENCE

exp Services Inc. reserves the right to withdraw their services if in their opinion an excavation/shoring contractor is selected which does not have adequate experience to complete the work in a safe manner.

4.0 PRECONSTRUCTION SURVEYS/MONITORING

It is strongly recommended that preconstruction surveys be completed on adjacent structures in order that deficiencies of these structures can be documented prior to start of construction. Continued monitoring of these buildings by survey control points should be undertaken during construction.

5.0 DRAWING USE

These drawings have been prepared for the exclusive use of the client named on the title page of the Shoring Design package. The design shown indicates minimum requirements based on limited or assumed soil conditions only, with design revisions likely required to suit actual conditions encountered during construction. These drawings must not be used for construction unless the design engineer or his repressntatives monitors installation of the shoring system.

6.0 LEGAL

These design documents are prepared solely for use by the party with whom the design professional entered into a contract. No representations of any kind are made by the design professional to any party with whom the design professional has not entered into contract.

The owner and contractor are responsible for determining and conforming to the appropriate environmental regulations.

7.0 ALLOWANCES

The Contractor should provide allowances in his bid by unit rates for additional shotcrete anchors and installation of 1 1/2" diameter slotted drains.

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CHK.: KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.

PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.

PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING NOTES

DATE: 2014-05-16

SCALE: NTS

DWG NO.: G13

BC hydro

FOR GENERATIONS

Distribution Engineering & Design
Phone: (604) 528-7831
Fax: (604) 528-2232

April 9th, 2015

Kai-Sing Hui, P.Eng
Exp Services Inc.
275 – 3001 Wayburne Drive
Burnaby BC V5G 4W3

Dear Kai-Sing:

RE: PROPOSED EXCAVATION
4083 Cambie St, Vancouver

This is to confirm that BC Hydro has received the dwg No. G1 to G19 of Exp File#VAN-00217815-A0 which you have submitted for the proposed excavation activities at 4083 Cambie St, Vancouver. The drawings indicate the facilities of BC Hydro that could be affected by the proposed excavation.

Please note that the locations of BC Hydro facilities must be confirmed by manual digging before using any mechanized excavation equipment. Please take precaution when working within 1m of BC Hydro pole. All work to be carried out is done at the risk of the party undertaking the work.

All work also must be done according to WorkSafe BC and Municipal regulations.

The excavation plans are subject to review if the excavation shall not commence within one year from the date of this letter as there may be changes in our underground or overhead facilities in the area.

Yours truly,

Jeff Chua
Design Specialist
Lower Mainland North Process Centre

CITY OF VANCOUVER

CITY OF **VANCOUVER**
ENGINEERING SERVICES
Peter Judd, P.Eng., General Manager

FAX

TO:	CFT Engineering Inc. Attn: Michael Linton	FROM:	Alan Reese, Project Coordinator Engineering Development Services
FAX:		DATE:	Jan 5, 2015

SUBJECT: Engineering Holds & Requirements for BU 463163 - 4083 Cambie St , Vancouver B.C.

We are unable to Approve the over Excavation of Cambie st as per section 1/ G2 as this will totally close sidewalk to all pedestrians. Excavation needs to be done in a way in which the sidewalk along Cambie st is maintained at all times for pedestrians in this extremely busy Transit location. Please revise and re-submit.

After the City Sewer Department's review of the Excavation and Shoring plans it was determined that Sewer Inverts are incorrect, please use the attached Sewer as-built info and revise and re-submit the excavation plans.

Please have Translink and Intransit B.C. review Excavation and Shoring plans for review of conflicts of anchor rod's and their Tunnel structure at the emails below and forward Approvals to us.

Guy.Akester@translink.ca

John.Leighton@intransitbc.ca

Alan Reese, Project Coordinator
Engineering Development Services
Phone: 604.873.7423

AR/ar

APPENDIX A – TEST HOLE LOGS

CITY ENGINEERING DEPARTMENT
PROJECTS BRANCH DIVISION

EXCAVATION ONTO CITY PROPERTY

THE ATTACHED PROPOSAL TO CONSTRUCT A TEMPORARY EXCAVATION, FOR CONSTRUCTION PURPOSES, ENCROACHING ONTO CITY PROPERTY HAS BEEN RECEIVED. PLEASE REVIEW AND STATE YOUR REQUIREMENTS OR APPROVAL.

DATE: DEC 2 20 14.

SITE ADDRESS: 4083 Cambie ST PLAN NO. _____

LEGAL : _____

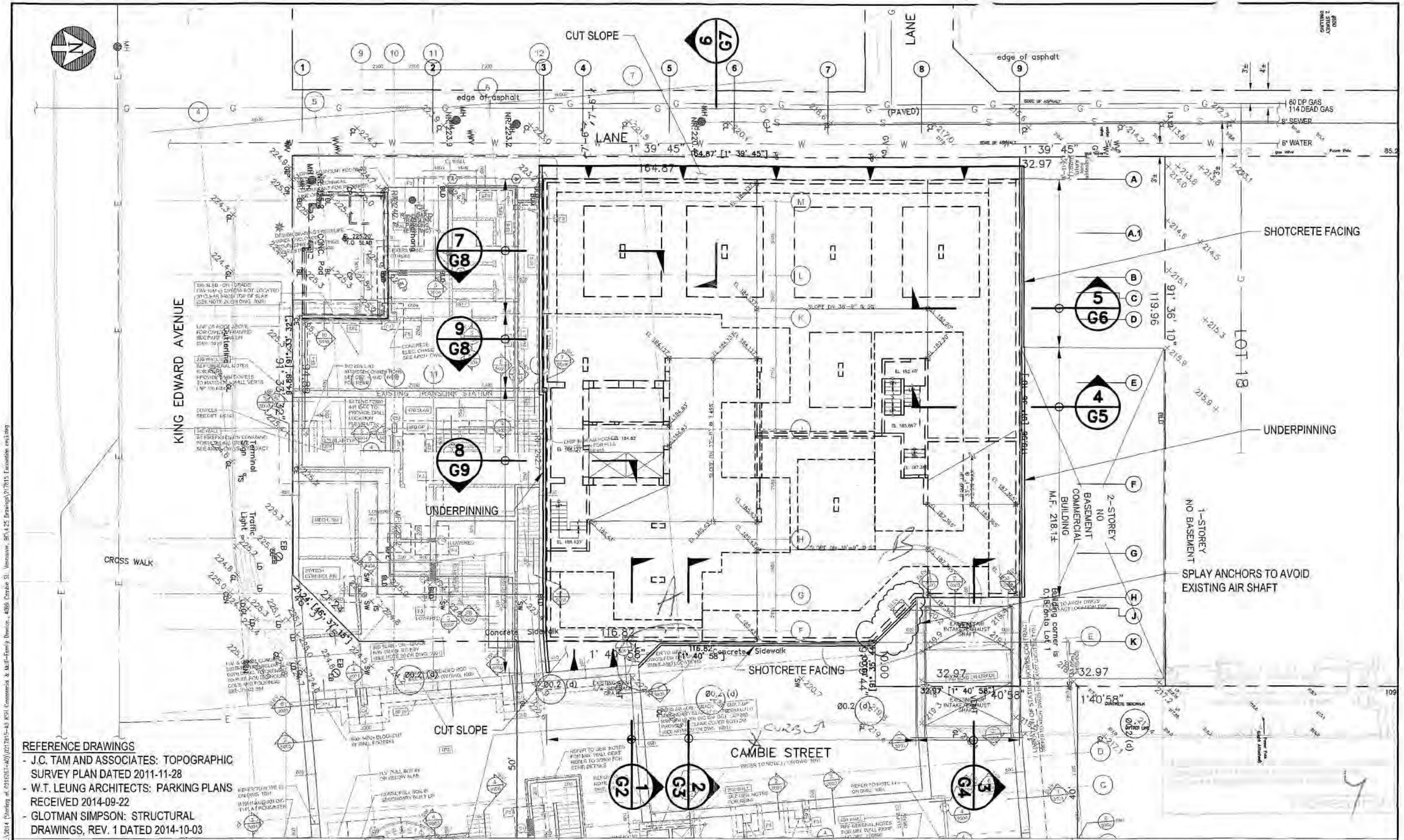
PLEASE PROCESS AND FORWARD TO THE FOLLOWING FOR COMMENTS:

SEWERS: CHECKED BY: R. DATE: _____ 20__

UTILITIES: CHECKED BY: RODEL DATE: DEC 03 20 14

BC HYDRO

DEVELOPMENT SERVICES: CHECKED BY: _____ DATE: _____ 20__



REFERENCE DRAWINGS

- J.C. TAM AND ASSOCIATES: TOPOGRAPHIC SURVEY PLAN DATED 2011-11-28
- W.T. LEUNG ARCHITECTS: PARKING PLANS RECEIVED 2014-09-22
- GLOTMAN SIMPSON: STRUCTURAL DRAWINGS, REV. 1 DATED 2014-10-03

exp Services Inc.
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Fax: 604–874–2358
exp.com

DRN.	DSGN.	CHK.
MG	GM	KSH

REVISIONS

NO.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

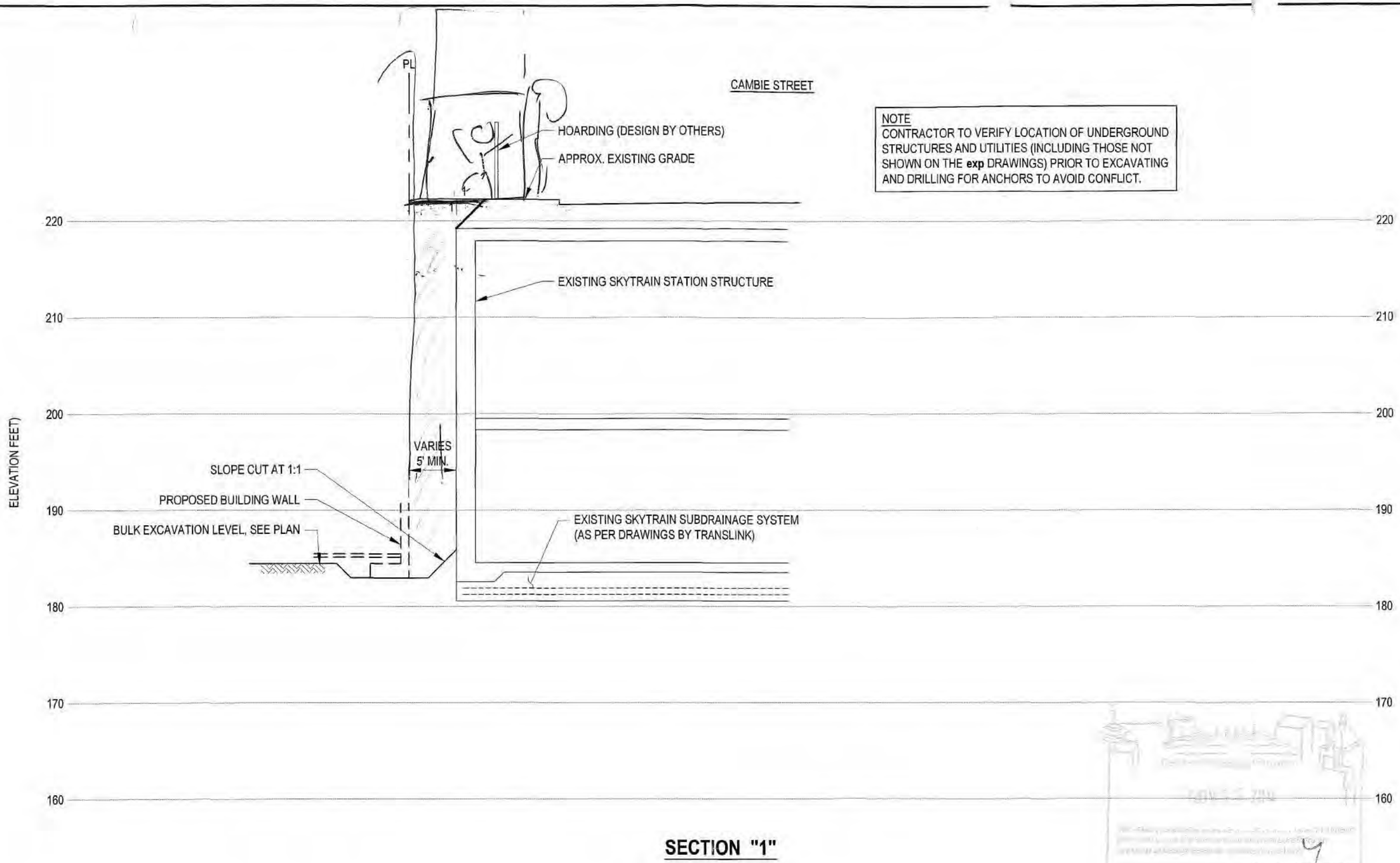
CLIENT: YUANHENG CKE DEVELOPMENTS LTD.

PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.

PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING PLAN

DATE: 2014-05-16 | SCALE: 1:=20' | DWG NO.: G1



NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.

SECTION "1"

exp Services Inc.
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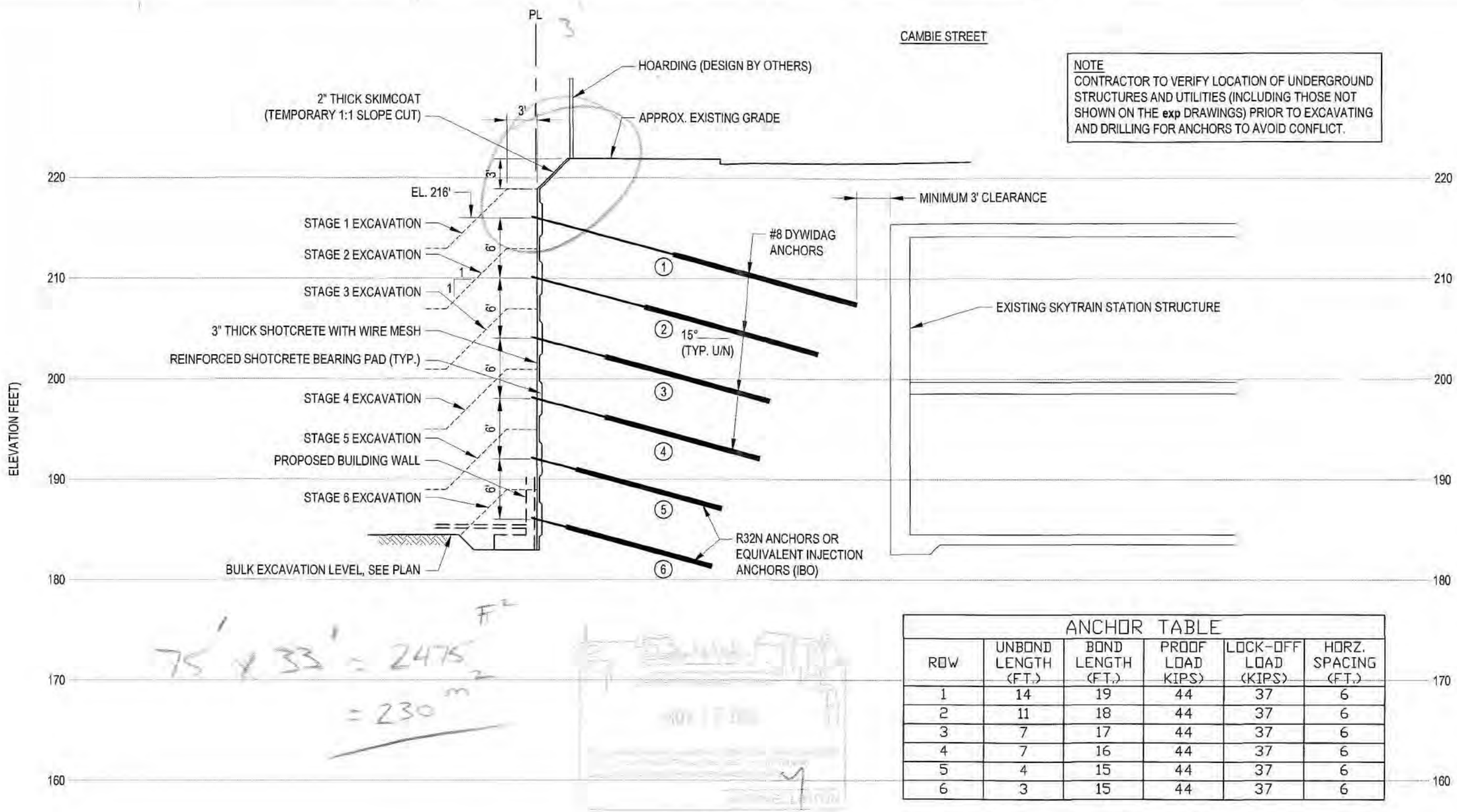
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR	MG
DSGN.	GM
CHK.	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "1"
DATE: 2014-05-16
SCALE:
DWG NO.:



NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.

75' x 33' = 2475 F^2
= 230 m^2

ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	14	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	4	15	44	37	6
6	3	15	44	37	6

SECTION "2"

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DFTR.	MG
DSGN.	GM
CHK.	KSH

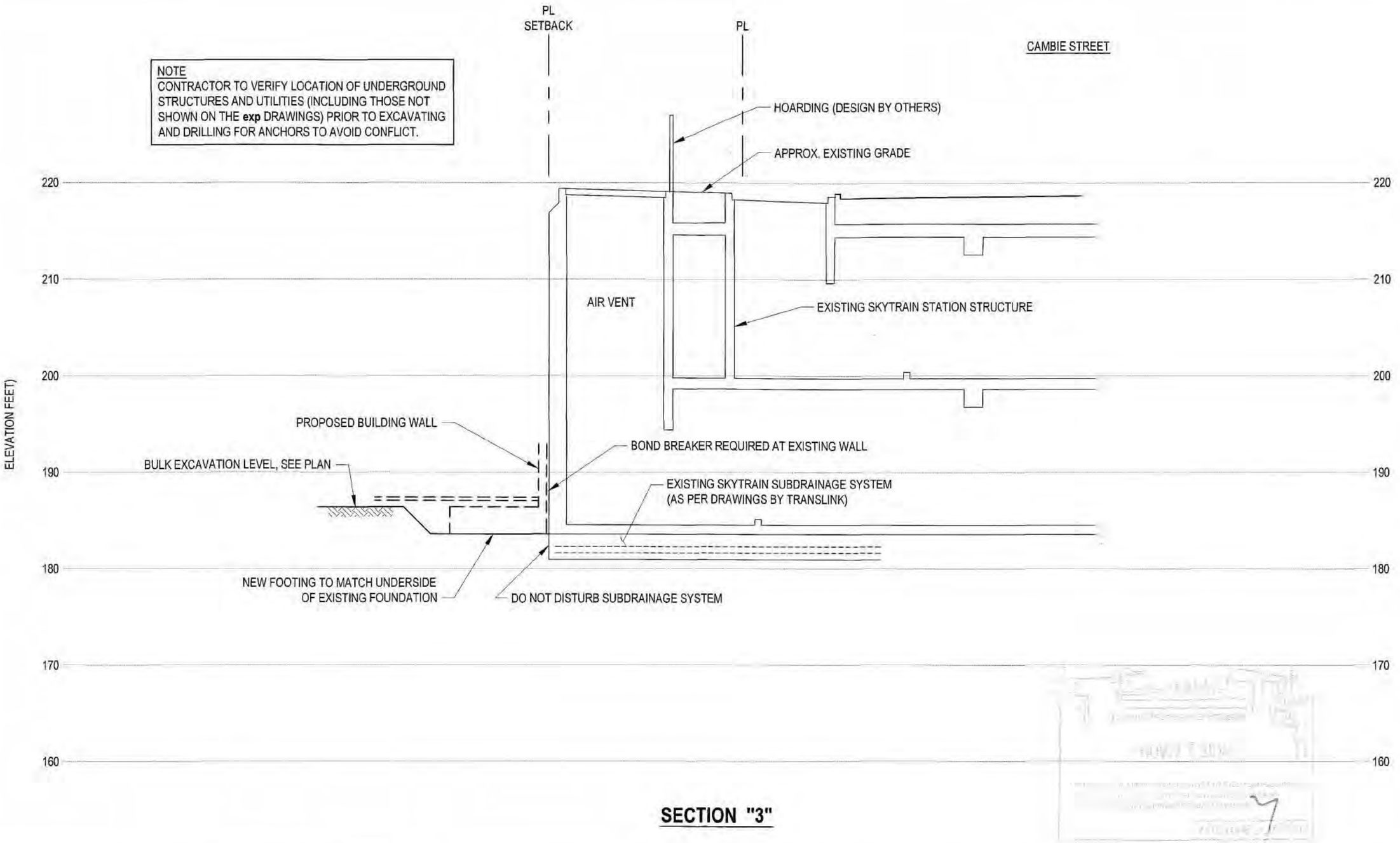
REVISIONS			
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "2"

DATE: 2014-05-16 SCALE: 1:100 DWG NO.: S3

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



SECTION "3"

exp Services Inc.
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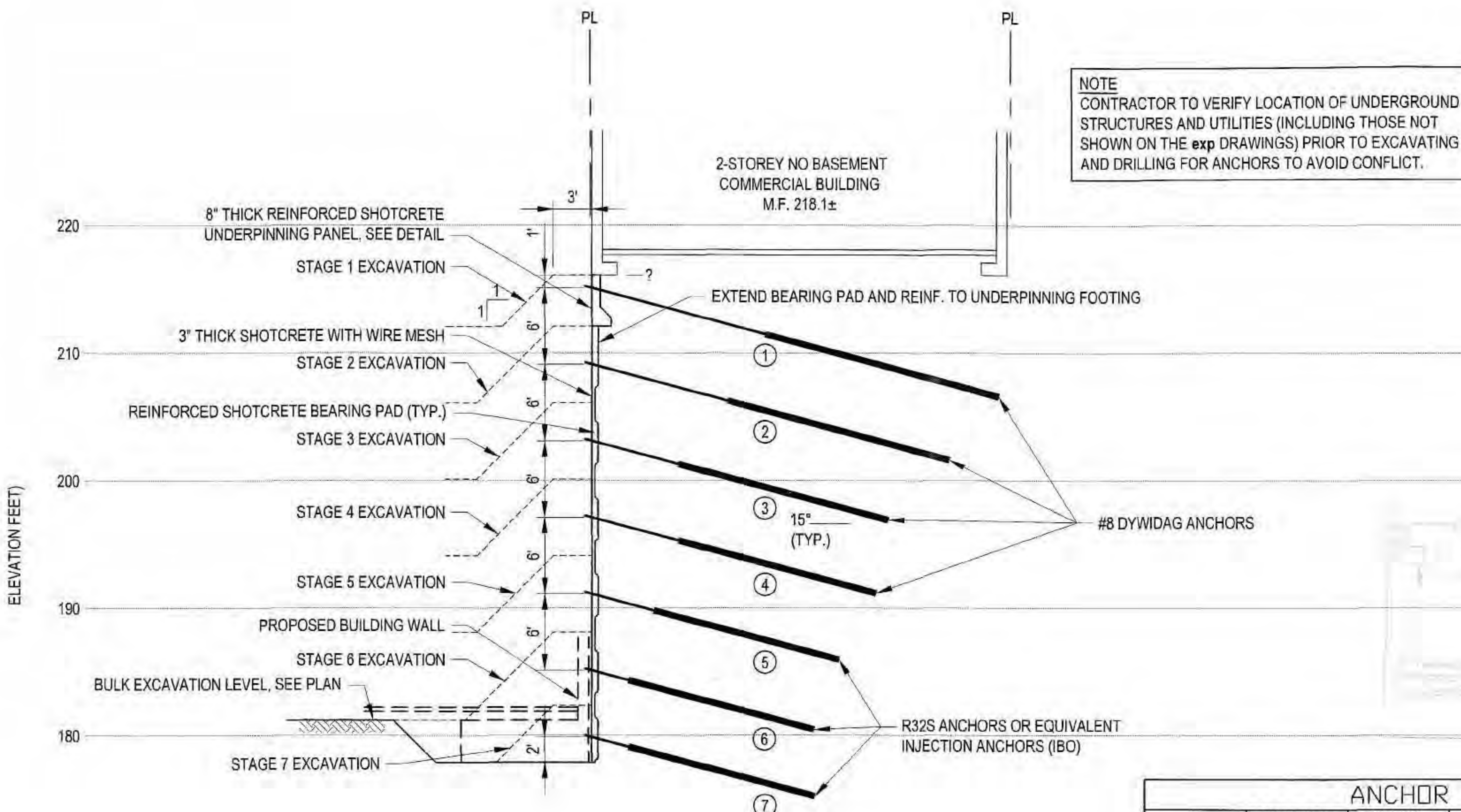
Fax: 604–874–2358
exp.com

DFTR.	MG
DSGN.	GM
CHK.	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "3"
DATE: 2014-05-16
SCALE: 1 = 10
DWG NO.:



ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	14	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	5	15	44	37	6
6	3	15	44	37	6
7	3	15	44	37	6

SECTION "4"

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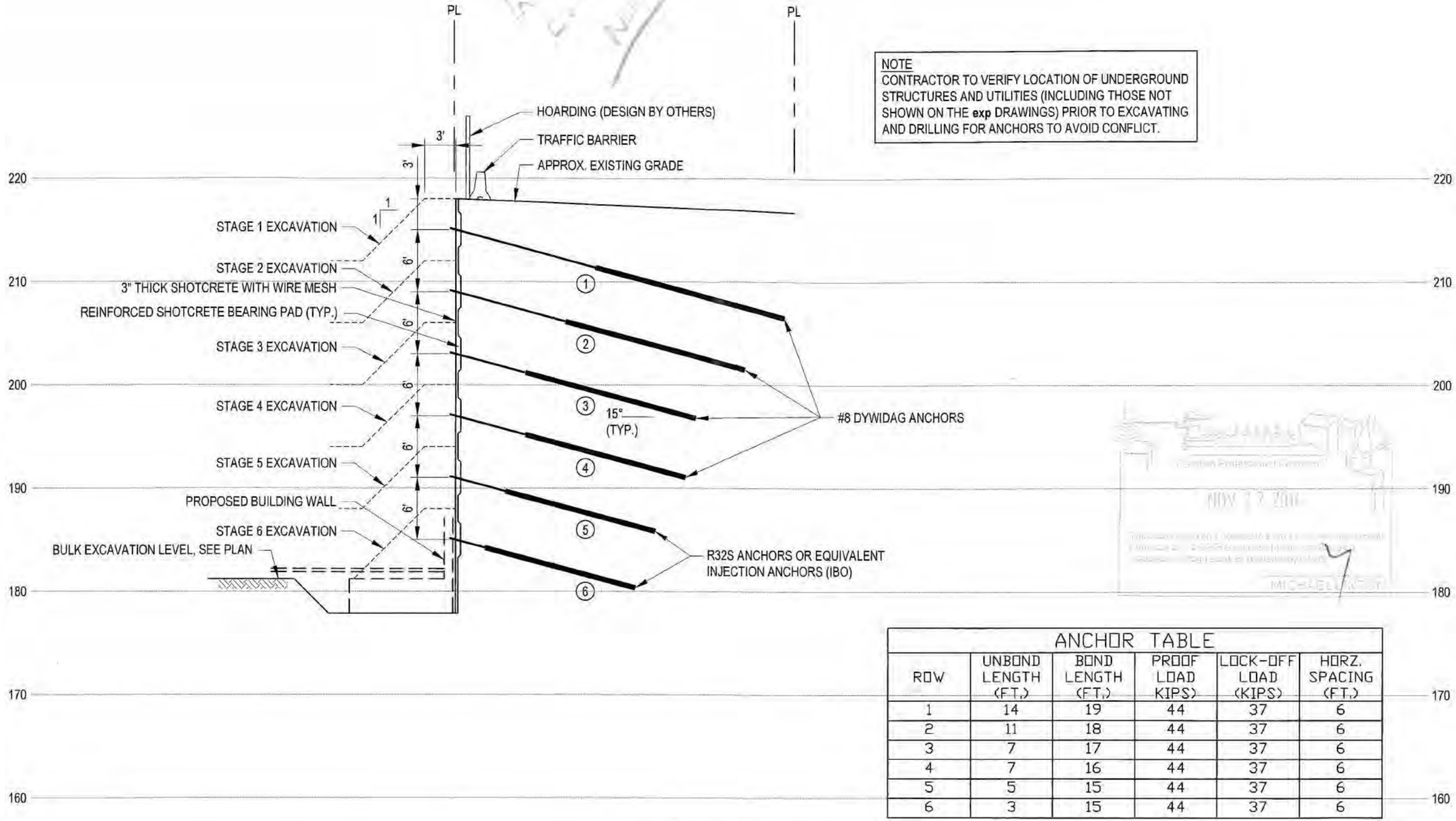
DFTR: MG
DSGN: GM
CHK: KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO: VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING SECTION "4"
DATE: 2014-05-16
SCALE: 1"=10'
DWG NO: G5



NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.

ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	14	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	5	15	44	37	6
6	3	15	44	37	6

SECTION "5"

exp Services Inc.
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Telephone: 604–874–1245
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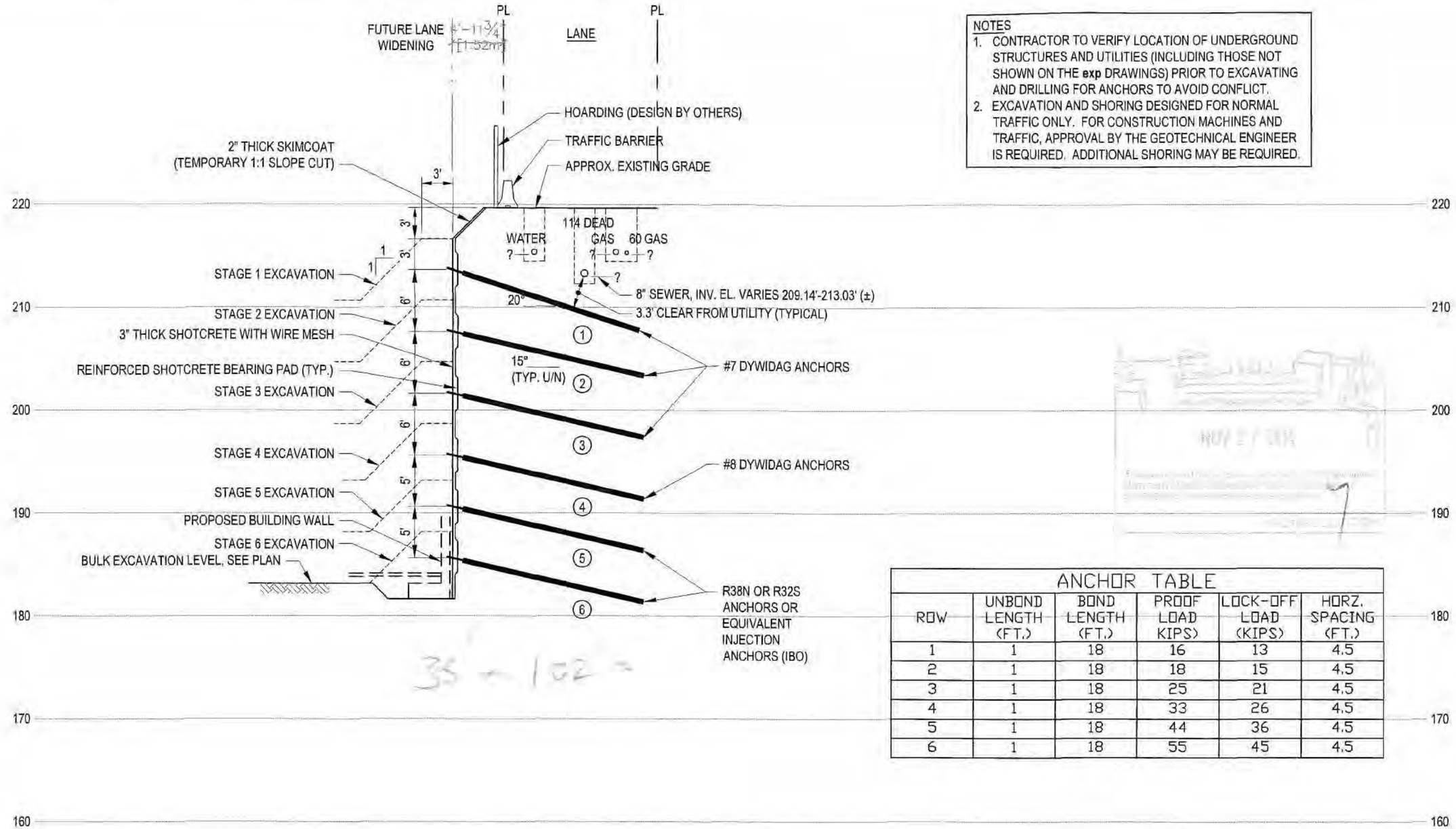
DFTR. MG
DSGN. GM
CHK. KSH

No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING SECTION "5"
DATE: 2014-05-16
SCALE: 1"=10'
DWG. NO.: G6



NOTES
1. CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.
2. EXCAVATION AND SHORING DESIGNED FOR NORMAL TRAFFIC ONLY. FOR CONSTRUCTION MACHINES AND TRAFFIC, APPROVAL BY THE GEOTECHNICAL ENGINEER IS REQUIRED. ADDITIONAL SHORING MAY BE REQUIRED.

ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	1	18	16	13	4.5
2	1	18	18	15	4.5
3	1	18	25	21	4.5
4	1	18	33	26	4.5
5	1	18	44	36	4.5
6	1	18	55	45	4.5

SECTION "6"

exp Services Inc.
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Telephone: 604–874–1245
Fax: 604–874–2358
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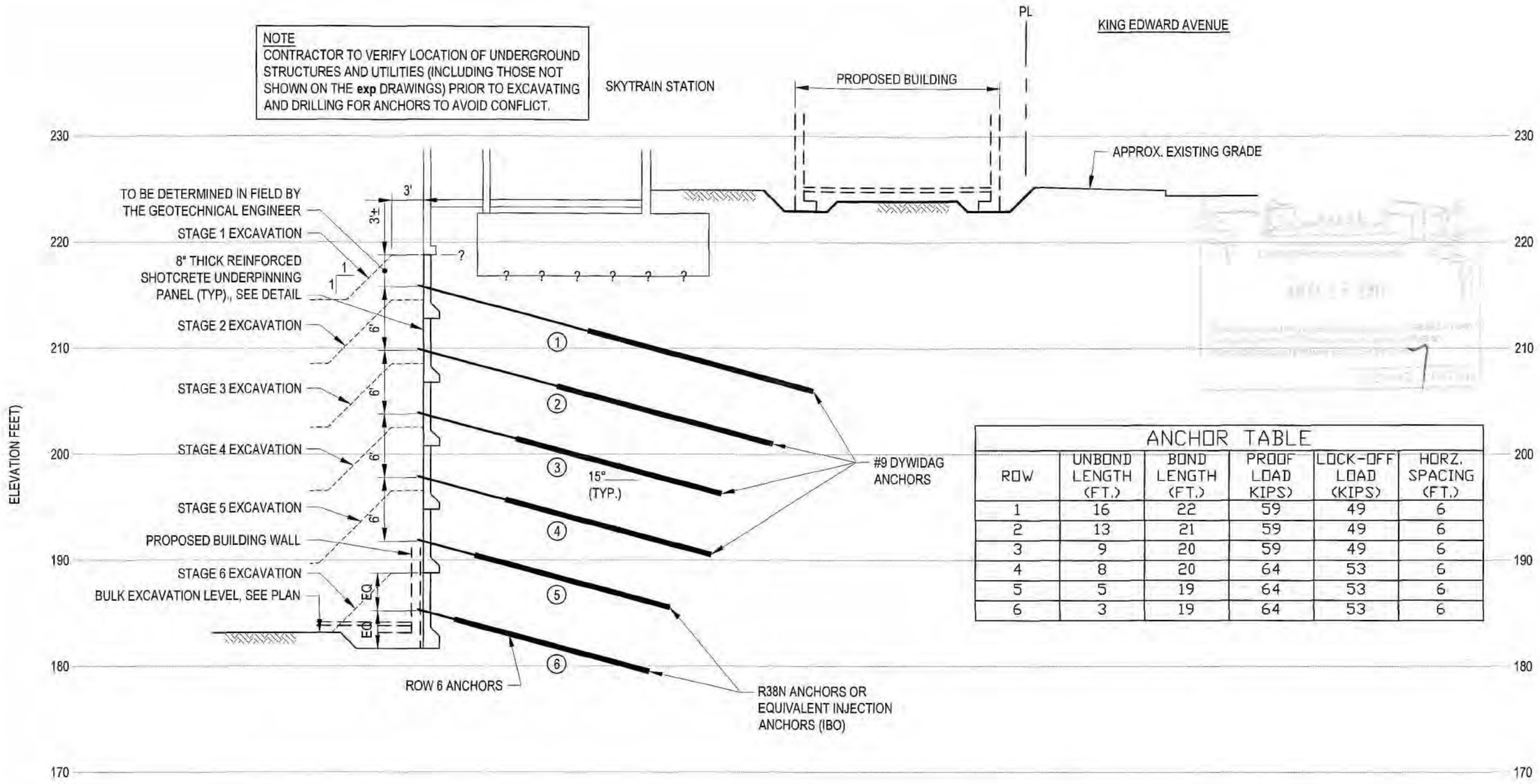
DFTR:	DSGN:	CHK:
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "6"
DATE: 2014-05-16
SCALE: 1:10
DWG NO.: S7

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	16	22	59	49	6
2	13	21	59	49	6
3	9	20	59	49	6
4	8	20	64	53	6
5	5	19	64	53	6
6	3	19	64	53	6

SECTION "7"

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Fax: 604-874-2358
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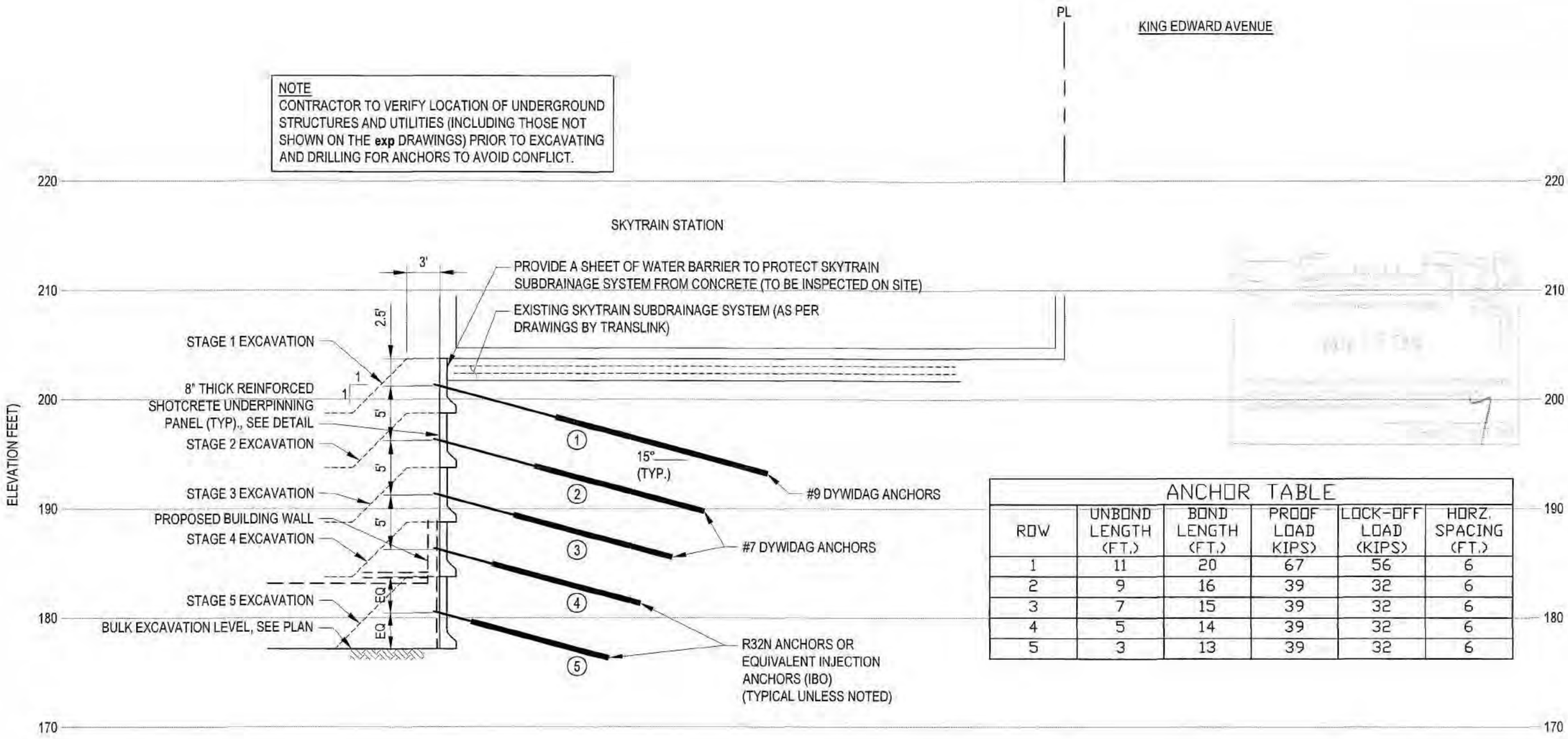
DFTR	DSGN.	CHK.
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "7"
DATE: 2014-05-16
SCALE: 1"=10'
DWG. NO.: G8



ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	11	20	67	56	6
2	9	16	39	32	6
3	7	15	39	32	6
4	5	14	39	32	6
5	3	13	39	32	6

SECTION "8"

exp Services Inc.
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Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

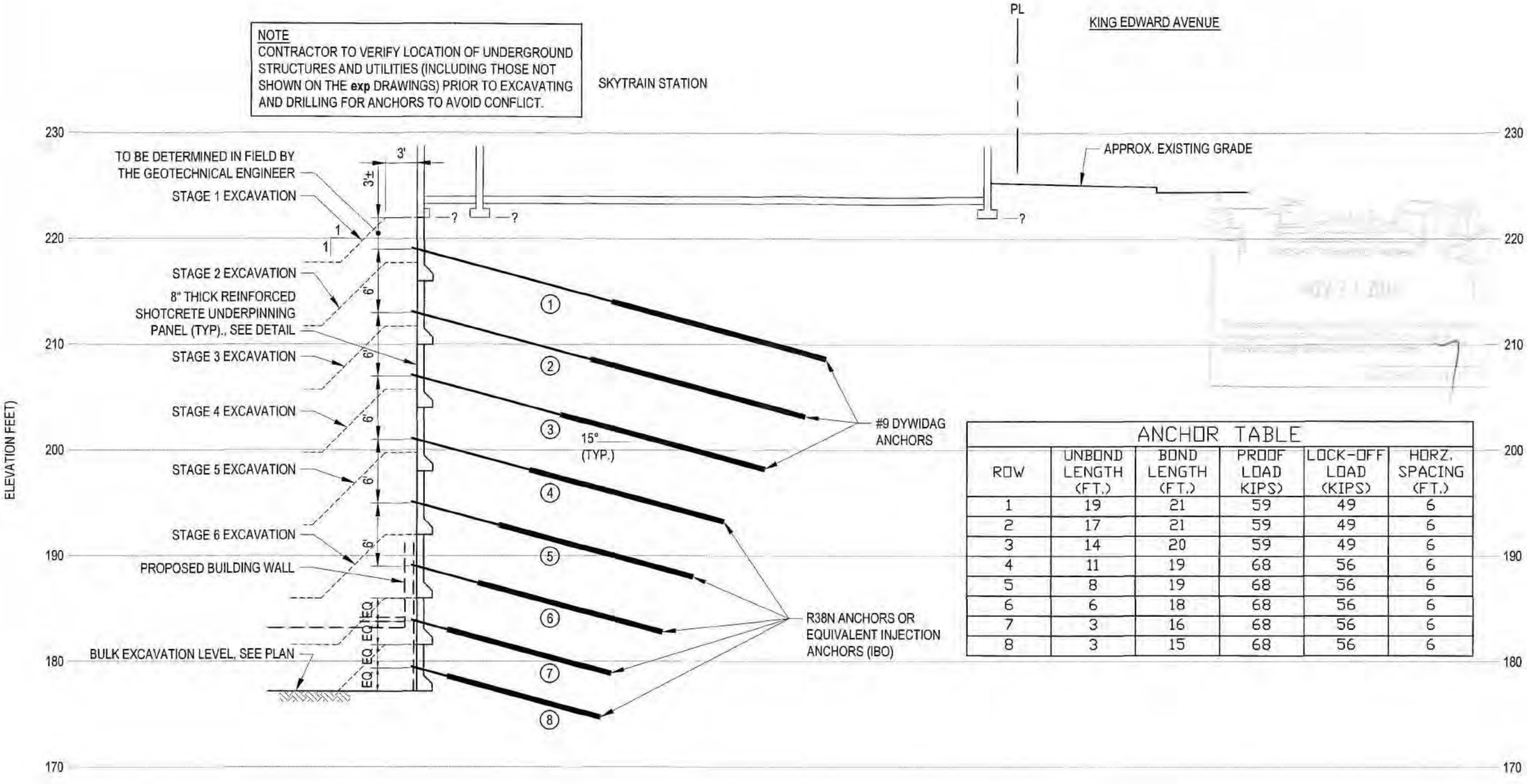
DFTR:	DESIGN:	CHK:
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "8"
DATE: 2014-05-16
SCALE: 1:10
DWG NO.:

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	19	21	59	49	6
2	17	21	59	49	6
3	14	20	59	49	6
4	11	19	68	56	6
5	8	19	68	56	6
6	6	18	68	56	6
7	3	16	68	56	6
8	3	15	68	56	6

SECTION "9"

exp Services Inc.
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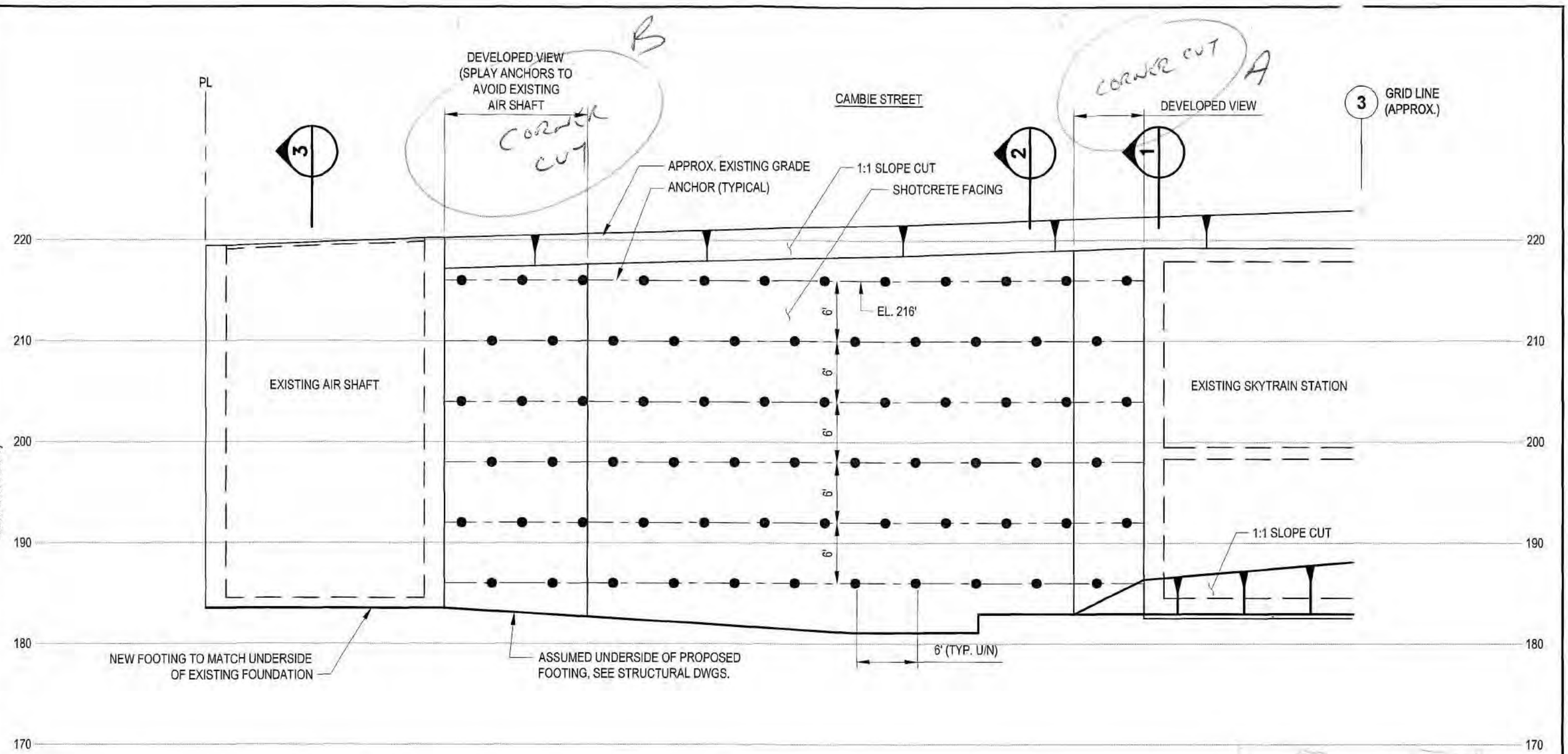
DSGN. GM
CHK. KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-06
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "8"
DATE: 2014-05-16
SCALE: 1:10
DWG. NO.: S10



ELEVATION LOOKING EAST

exp Services Inc.
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Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
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exp.com

DFTR.	MG
DSGN.	GM
CHK.	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING ELEVATION LOOKING EAST

DATE: 2014-05-16 | SCALE: 1:40 | DWG NO.: S11

PL

LANE

future lane widening

APPROX. EXISTING GRADE

ANCHOR (TYPICAL)

5

4

SHOTCRETE FACING

EXISTING BUILDING

PL

220

210

200

190

180

170

ELEVATION (FEET)

3'

6'

6'

6'

6'

6'

1'

6'

6'

6'

6'

2'

EXISTING AIR SHAFT

6' (TYP. U/N)

ASSUMED UNDERSIDE OF PROPOSED FOOTING, SEE STRUCTURAL DWGS.

ELEVATION LOOKING NORTH

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Fax: 604–874–2358
exp.com

DFTR.	DSGN.	CHK.
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

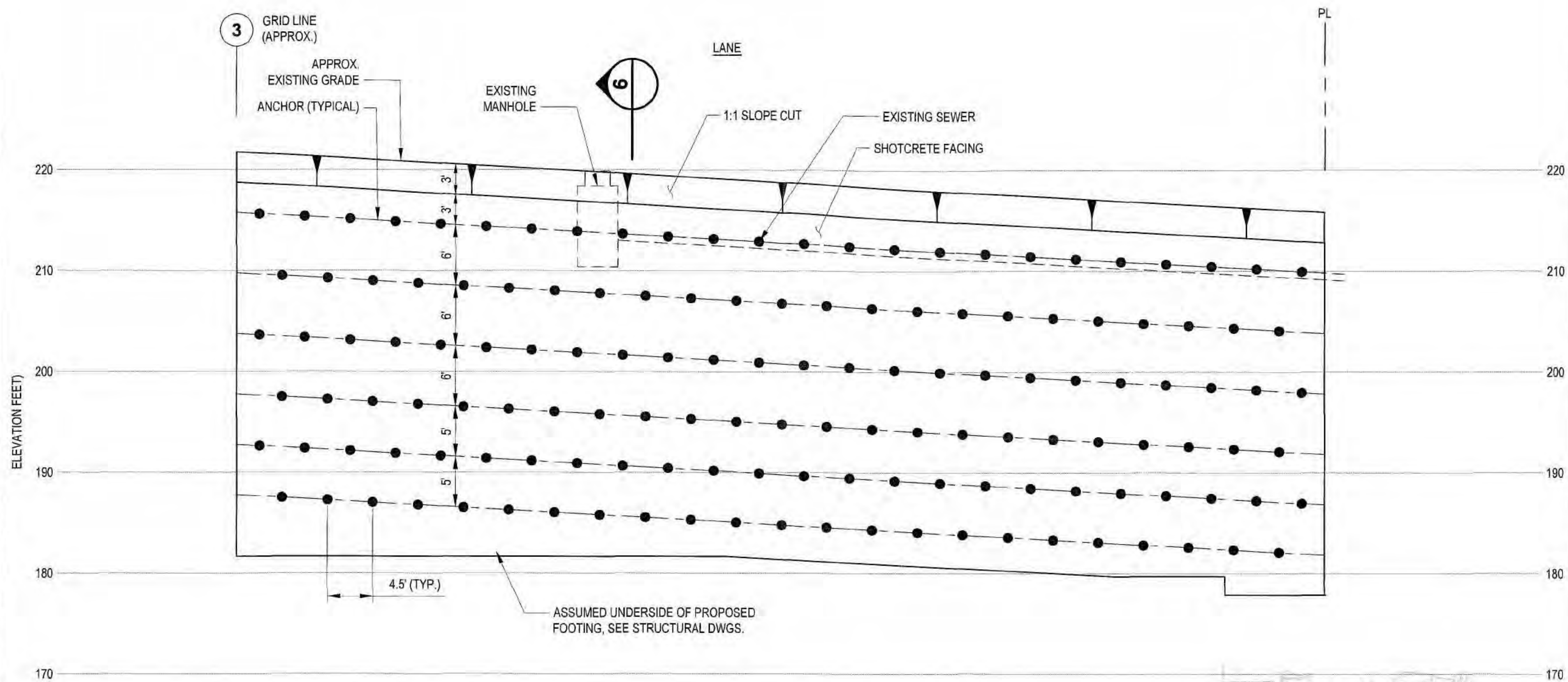
CLIENT: YUANHENG CKE DEVELOPMENTS LTD.

PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.

PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING ELEVATION LOOKING NORTH

DATE	SCALE	DWG NO.
2014-05-16	1"=10'	G12



ELEVATION LOOKING WEST

exp Services Inc.
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Telephone: 604-874-1245
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exp.com

DFTR. MG
DSGN. GM
CHK. KSH

REVISIONS

No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.

PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.

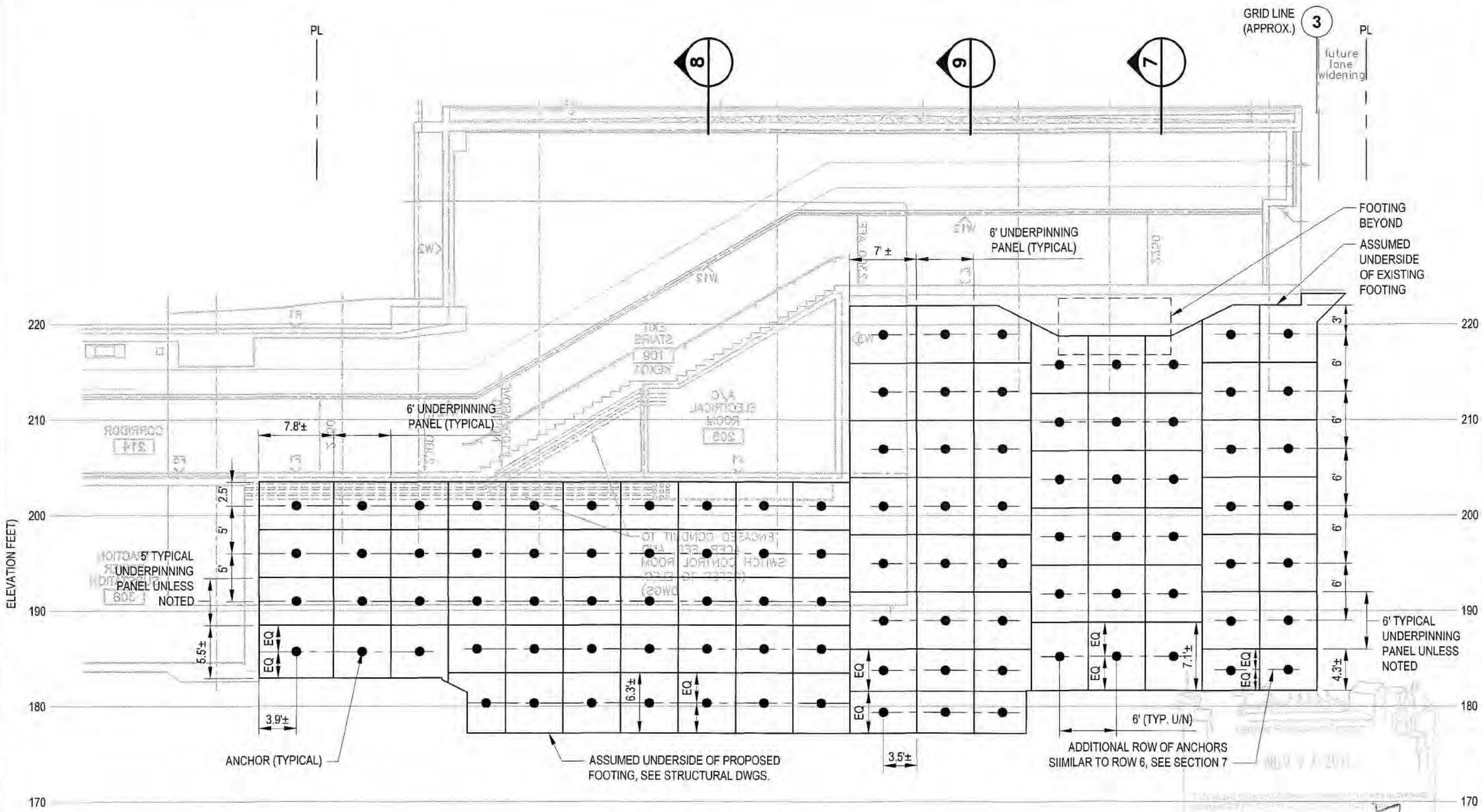
PROJECT NO. VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING ELEVATION LOOKING WEST

DATE: 2014-05-16

SCALE: 1"=10'

DWG NO. G13



ELEVATION LOOKING SOUTH

exp Services Inc.
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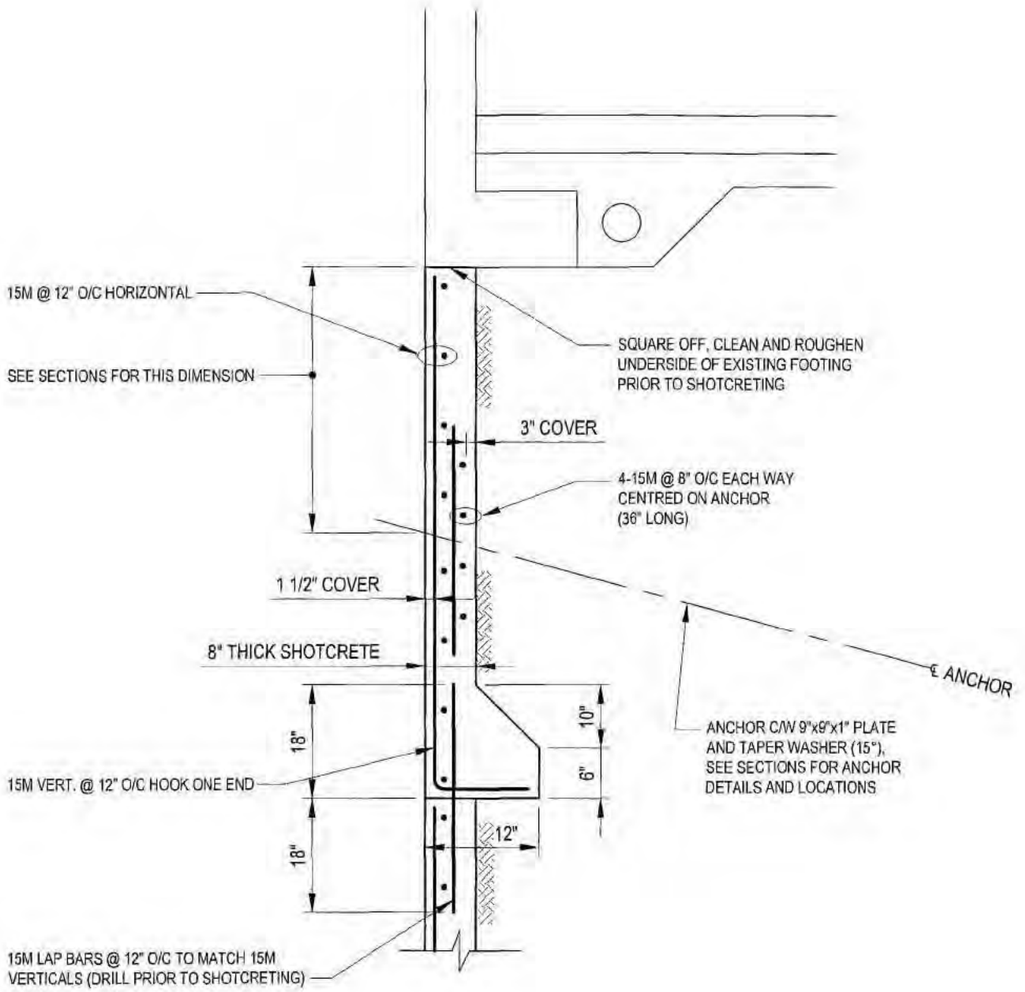
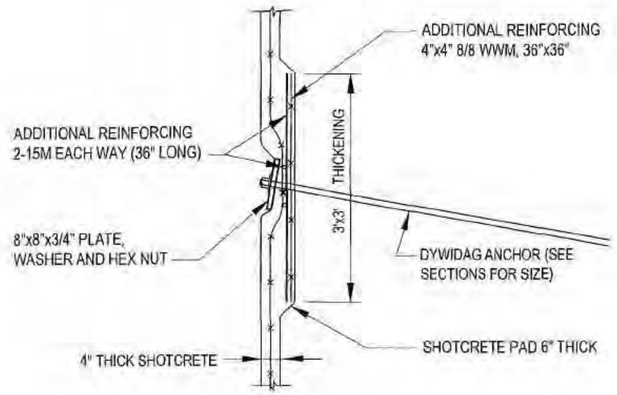
REVISIONS			
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

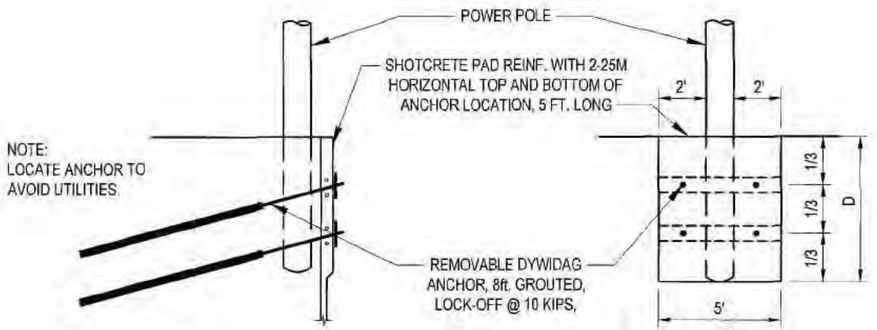
CLIENT	YUANHENG CKE DEVELOPMENTS LTD.
PROJECT	COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.	VAN-00217815-A0
TITLE:	BULK EXCAVATION SHORING ELEVATION LOOKING SOUTH
DATE	2014-05-16
SCALE	1"=10'
DWG. NO.	G14



SHOTCRETE UNDERPINNING DETAIL



SHOTCRETE BEARING PAD SECTION



TYPICAL POWER POLE SUPPORT DETAIL

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CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING DETAILS
DATE: 2014-05-16
SCALE: NTS
DWG NO: S15

EXCAVATION SHORING SPECIFICATIONS

PART A - INITIAL REQUIREMENTS

1.0 Location of all services to be completed by contractor. Report all discrepancies between actual conditions and excavation drawings to **exp** Services Inc. immediately. Drilling for installation of anchors is not to commence until all service locations have been established and a memo stating such has been forwarded by the contractor to **exp** Services Inc.

2.0 All relevant permits from governing authorities must be in place prior to start of construction.

3.0 All relevant information which may affect the performance of the shoring system must be reported in writing to **exp** Services Inc. prior to start of construction. This includes location of site trailers or storage areas near the edge of the excavation.

4.0 Permission from adjacent property owners must be obtained and written confirmation of such permission forwarded to **exp** Services Inc. at least 2 days prior to commencing work on the adjacent properties.

5.0 Contractors to notify **exp** Services Inc., FortisBC, BC Hydro Electric and Telus in writing at least 3 days prior to start of construction.

6.0 A preconstruction survey of adjacent buildings must be completed prior to excavation. Survey control points to monitor horizontal and vertical movements should be installed in the adjacent roads and on adjacent buildings.

PART B - GENERAL CONSTRUCTION REQUIREMENTS

1.0 The contractor will undertake proper survey control to ensure the excavation shoring system is installed according to the excavation shoring drawings with respect to property lines, building lines, ground surface, and finished grades. Report any dimensional discrepancies to **exp** Services Inc.

2.0 Site to be enclosed by fencing or hoarding prior to start of excavation. Hoarding/fencing to be acceptable to municipal bylaws.

3.0 Where specialized dewatering systems are required, the excavation/shoring contractor work must be undertaken in such a manner and sequence to ensure damage to the system does not occur. Specialized dewatering does not form part of the shoring contract.

4.0 Where excavation shoring is required, the excavation contractor will ensure that adequate equipment is available to carry out the necessary detail excavation. Where detailed excavation is required prior to placement of shotcrete, excavation will be completed at such time to allow completion of the necessary shoring work prior to the end of the working day.

5.0 All interior excavation slopes not shown on the excavation shoring drawings shall be completed in conformance with the WorkSafe BC Occupational Health and Safety Regulations.

6.0 All significant slope or shoring deterioration to be reported to **exp** Services Inc.

7.0 All slope cuts to be protected with 6 mil polyethylene securely fastened unless noted otherwise on drawings.

8.0 The contractor shall maintain the overall responsibility for site safety.

9.0 All blasting must be completed by a certified blaster. Blasting may not occur within 10 feet of adjacent buildings. Notification of blasting must be provided to the excavation engineer 24 hours prior to blasting to allow installation of monitoring equipment. Unless otherwise indicated in the soils report, material which can be removed by excavation or ripping with a Caterpillar 345 excavator or equivalent with a single ripper tooth, with a production rate of at least 10 cubic yards per hour is not considered to require blasting for removal.

PART C - MATERIALS REQUIREMENTS

1.0 SHOTCRETE

Compressive strength requirements are:
- 15 MPa in 24 hours
- 20 MPa in 3 days

2.0 TIE-BACK ANCHORS
- Anchor diameters shown on drawings based on Dywidag Threadbar 517/690 MPa ultimate tensile strength
- Mukusol Threadbar 500 MPa ultimate tensile strength or Dywidag Threadbar 100 ksi ultimate tensile strength are acceptable alternatives with bar diameters corrected for tensile ultimate load capacity
- TITAN 30/16, TITAN 30/11, IBO R32/20 injection anchors to be used where conditions do not allow conventional drilling or where noted on drawings.

3.0 WELDED WIRE MESH
- Minimum yield 400 MPa, size 4: x 4: 8/8 unless noted otherwise. CSA G30.5 M1983.

4.0 REINFORCING
- Minimum yield 400 MPa, CSA G30.12 M197.

5.0 ANCHOR GROUT
- Non-shrinkage cementitious grout or equivalent
- Compressive strength requirements:

20 MPa in 24 hours
35 MPa in 28 days

6.0 DRAINS
- 2" diameter PVC with suitable filter fabric to ensure that no soil transfer occurs with groundwater flow.
- Where shown on drawing 1 ½" diameter slotted (.01") pipes, closed one end placed in minimum 2 ½" diameter holes to be sealed at shotcrete face.

7.0 BEARING PLATES
- Minimum yield 260 MPa CSA G40.21-M 87
- Alternate plates to those shown on the drawings will not be acceptable unless approval has been obtained from **exp** Services Inc.

8.0 STRUCTURAL STEEL
- All structural steel to be G40.21 300 MPa minimum yield.
- Fabrication and erection to CAN3 - S16.1

PART D - CONSTRUCTION DETAILS

1.0 ANCHOR INSTALLATION

Specified anchors to be placed in minimum 4" diameter holes. Hole to be thoroughly cleaned by appropriate means prior to placement of grout.
Hole drilling technique required will depend on soil conditions. Percussion rock drill may not be suitable to install holes for soils containing predominantly silt or clay content unless combined with pressure grouting or after grout systems. The contractor should prove that test anchors can be installed using this method that will sustain the required test and lockoff loads prior to installing production anchors. Anchors to be provided with suitable centralizers at 10' o/c to ensure the anchor is completely encircled by grout. Grout to be installed by Tremie grouting from bottom of hole or by pressure grouting. All grout extending into the unbonded portion of anchor must be removed or alternatively a protective sleeve placed over the unbonded length of anchor.

2.0 WELDED WIRE MESH PLACEMENT

All mesh joints must be a minimum overlap of 2 squares. Mesh must be suitably supported from soil face and positioned to provide required cover as shown on the detail drawings.

3.0 REINFORCEMENT PLACEMENT

Reinforcement to overlap a minimum 24 diameters for tension splices and 18 diameters for compression splices with minimum 1.5" of cover unless noted otherwise on drawings.

4.0 SHOTCRETE DRAINS

Drains through the shotcrete to consist of 2" diameter PVC placed every 5' on centre vertically and horizontally to relieve hydrostatic pressure.

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KSH			

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING NOTES

DATE: 2014-05-16 | SCALE: NTS | DWG NO.

5.0 SHOTCRETE PLA ENT

5.1 GENERAL

Shotcrete thicknesses shown on the detailed drawings are minimum.

Shotcrete to be placed in such a manner that segregation of materials or post placement slumping does not occur. Upward placement of shotcrete for underpinning panels is not acceptable.

All reinforcing and welded mesh to be fully contained in the shotcrete with at least 1 ½" cover in all areas. Removal of defect shotcrete to be at contractor's expense.

5.2 COLD WEATHER CONDITIONS

Special requirements for shotcrete protection will be necessary during cold weather. These include:

AMBIENT NIGHT TIME TEMPERATURES	REQUIREMENTS
Greater than 1°C	No special provisions other than potential sequencing changes to allow additional shotcrete curing times.
-3° to 1°C	Protect fresh shotcrete with thermal blankets for 24 hours
-10 to -3	Provide vented heat to fresh shotcrete for 24 hours
Below -10°C	No shotcreting allowed

In all cases, shotcrete may not be placed on frozen ground.

6.0 TESTING

6.1 Anchors

Anchors shall be tensioned as soon as practicable but no sooner than 24 hours after the construction of the applicable shotcrete panel. Contractor will provide required testing apparatus including recently calibrated jack and ram compatible with the anchor test load, nuts, plates, couplers, wrenches, and tensioning chair, together with personnel to set up and operate the equipment. The required lockoff loads are shown on the excavation drawings.

All anchors will be tested to 1.25 times the lockoff load for 2 minutes. An acceptable performance test occurs where less than 2.5% of the test load is lost over the 2 minute period. Of these anchors, approximately 10% will be proof tested by maintaining 1.25 times the lockoff load for 15 minutes in accordance with PTI manual.

Anchors which fail any of the above tests shall be replaced. A failure rate of 3% of the total anchors installed will be assumed as typical and will be at the contractor's expense. Failure rates in excess of 3% will be investigated to determine the cause of the failures and will form an extra only where soil conditions/groundwater conditions can be proved to be significantly different than those reported in the project soils report.

Lift-off tests to determine long-term performance of the anchors will be carried out on 5% of the anchors except where soil conditions are predominantly clay or silt in which case an allowance of 50% of the anchors should be provided. Retensioning of anchors to required lockoff will be completed following the lift-off test.

Costs of anchor testing to be at contractor's expense.

6.2 Shotcrete

Shotcrete samples placed in 2' x 2' x 4" panels will be provided by the contractor:
A. during the first day shotcrete is used on the site.
B. approximately halfway through the project.
C. when requested by the **exp** Services Inc. personnel.

Contractor shall inform **exp** Services Inc. of sample scheduling. Samples will be suitably protected from construction activity or weather damage. Costs of shotcrete sampling and testing to be at owner's expense.

6.3 Grout

Contractor to provide grout samples:
A. during first day of anchor installation.
B. at halfway point of project.
C. as requested by **exp** Services Inc. personnel.

Costs of sampling and testing to be at owner's expense.

7.0 GROUNDWATER CONTROL

Contractor is required to provide conventional groundwater control including, but not exclusive to, sumps and ditches. Excavation is to proceed in such a manner that the water does not pond at the base of the shotcrete or excavated panels.

Loss of soil from groundwater movement must be controlled by use of filter fabrics, drainage mats and where necessary casing of drill holes or use of alternate drilling technique. Where material is lost behind the shotcrete face, the void must be backfilled using shotcrete, grout, or gravel as directed by the excavation engineer. Where specialized groundwater techniques are required as determined by the excavation engineer, installation of such a system shall be an extra to the shoring contract.

PART E - COMPLETION REQUIREMENTS

1.0 BACKFILL

All backfill types and procedures for placement must meet applicable municipal requirements and recommendations provided in the project soils report. In the absence of a project soils report or municipal requirement, backfill should consist of clean pitrun sand and gravel or river sand with less than 5% passing the No. 200 sieve. The material should be placed in maximum 12" lifts with each lift compacted to a minimum 95% Modified Proctor density (ASTM D1557). Where access is limited, backfill may consist of pea gravel (1/4" nominal size) placed in maximum 2' lifts with each lift compacted using a concrete vibrator with water jetting. Foundation walls must be adequately supported prior to placement of backfill. In-situ compaction testing will be carried out by **exp** Services Inc. personnel.

Special requirements for specific municipalities are outlined below. The list is not exhaustive and requirements can be expected to change during the project duration. The contractor is to determine and ensure his work conforms to the jurisdiction having authority at the specific project location.

Vancouver

A. When the excavation encroaches onto City of Vancouver property or the depth of the excavation below finished grades is greater than or equal to the shortest horizontal distance from the edge of the excavation to the adjacent City property line, all backfilling shall conform to the following:

A.1 For excavations less than 4 feet wide.

Birdseye Material plus Controlled Density Fill

Birdseye Material shall be placed from the bottom of the excavation to a grade below the finished surface grade, determined as follows:

- 1.0' below the finished surface grade, plus an additional depth below this grade determined as the greater of 1.5 times the width of the excavation or 4.0'.

Birdseye gravel shall be confined to its original area of placement using geosynthetic sand bags placed near adjacent sites. Approval from the streets administration branch of the city engineering services department shall be obtained prior to backfilling.

Controlled Density Fill shall be placed above the Birdseye material to no nearer than 1' of finished surface grade. The top 1' of the backfill may be backfilled with Granular Base, or may contain landscaping materials subject to the review and approval of the Site Engineer.

Birdseye must be vibrated into place with immersion vibrators, and must be compacted to at least 90% of Modified Proctor density (ASTM D1557). "End dumping" of birdseye is not an approved method of compaction.

A.2 For excavations wider than 4 feet wide.

Select granular fill with less than 5% passing the no.200 sieve shall be placed for the full depth of the excavation to within 4 feet of finished grade compacted to at least 90% modified proctor density. The top 4 feet shall consist of granular base compacted to at least 95% modified proctor.

B. When the depth of the excavation is less than the shortest horizontal distance from the edge of the excavation to the adjacent City property line, granular backfill material used shall be compacted to the greater of 90% of Modified Proctor density (ASTM D1557) or as indicated in the project soils report.

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DFTR: MG	REVISIONS			CLIENT: YUANHENG CKE DEVELOPMENTS LTD.	TITLE: BULK EXCAVATION SHORING NOTES
DSGN: GM	No.	DESCRIPTION	DATE	PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.	
CHK: KSH	3	ISSUED FOR BUILDING PERMIT	2014-11-04		
	2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08		
	1	ISSUED FOR REVIEW	2014-08-22	PROJECT NO: VAN-00217815-A0	DATE: 2014-05-16 SCALE: NTS DWG NO: E1.02

2.0 BACKFILL MATERIAL

"Birdseye" Material - 2.5mm to 10mm rounded granular aggregate

This material shall be of uniform quality, thoroughly washed free of sand, silt and clay and shall contain no more than 15% non-rounded particles. The particles shall be durable, capable of withstanding the effects of handling, placement and compaction without the production of deleterious fines. The grading limits shall be:

Total Passing	3/8" (9.5mm)	100%
Total Passing	¼ (6.35mm)	60% - 75%
Total Passing	No. 4 (4.75mm)	5% - 50%
Total Passing	No. 8 (2.36mm)	0% - 13%
Total Passing	No. 16 (1.18mm)	0% - 1%

Controlled Density Fill

As per Master Municipal Specifications Section 02236, Controlled Density Fill is a low-strength, high-slump cementitious material. This material is also referred to as "fillcrete", "unshrinkable fill" and "controlled low strength material (CLSM)".
To have maximum unconfined compressive strength of 0.5 MPa, (500Kpa) at 28 days and maximum cement content of 25Kg per m3 with fly ash and water reducing admixtures for initial settlement control. Place material using methods which do not lead to segregation. Inspection and testing of the fill is required by the Engineer.

"Granular Base" - 19mm Minus Crushed Aggregate

As per Master Municipal Specifications Section 02226.2.10. conforming to following gradations:

Sieve Designation	Percent Passing
19mm	100
12.5mm	75-100
9.5mm	60-90
4.75mm	40-70
2.36mm	27-55
1.18mm	16-42
0.600mm	8-30
0.300mm	5-20
0.075mm	2-8

3.0 BACKFILL TESTING

Sufficient testing of the backfills is required as the site engineer deems necessary so as to be able to provide the Letters of Assurance as described below.

Samples of all fills to be used on the site are to be provided to the engineer to allow tests of gradation for any granular material placed (road base or birdseye and controlled density fill). These samples must be provided prior to delivery of materials to the site and at least 48 hours prior to their use on the project.

Density testing of placed backfill material is required on representative locations of any backfill that was placed on any day when the site engineer or his/her representative did not observe backfilling at the site.

4.0 LETTERS OF ASSURANCE

At the end of the project, the City requires that the site engineer provide an Assurance of "Geotechnical Field Review and Compliance" . Additionally, during the project, an interim letter may be submitted by the site engineer covering only a portion of the excavation backfill in order to facilitate construction of street works such as sidewalks over or adjacent to portions of the backfill.

In both cases, the City requires that the letter must be supported by the following material:

- all daily field review reports
- gradation test results on each type of backfill material used
- batching slips for all controlled density fill material delivered to the site
- density test results on backfill placed on days in which the site engineer (or representative) was not in attendance, accompanied by an explanation of why the engineer (or representative) was not in attendance and a description of what remedial steps were taken to satisfy the site engineer as to the adequacy of the backfill and its compaction where compliance with the job specification had not been attained.

The contractor/owner will take all measures required to ensure this information is provided.

5.0 ANCHOR DETENSIONING AND REMOVAL

Except as noted below all anchors installed on city property within 5' of finished ground surface must be removed and those below 5' detensioned. Alternatively below 5' the anchors may remain tensioned if they are fully grouted after the lockoff load has been applied. Detensioning and removal of anchors must be done concurrently with backfill placement. The backfill should be placed to within 1' of the anchor location prior to its detensioning or removal. In easement area or city right-of-way anchors within 3.3' of any underground services must be removed.

6.0 SHOTCRETE REMOVAL

Except as noted below shotcrete placed within 5' of finished ground surface on city property must be removed. The removal operation must be completed in stages and in such a manner that damage to the adjacent utilities does not occur. Shotcrete placed on easement area or city right-a-way within 3.3' of underground services must be removed.

7.0 NOTIFICATION OF WORK

exp Services Inc. must be notified at least 48 hours prior to placement of backfill, anchor detensioning and removal, and shotcrete removal in order that certification of the work may be provided. Failure of adequate notification may result in the requirement for re-excavation of backfilled areas, loss of damage deposits at the contractors expense, or failure to allow provision of Letters of Completion by the project engineer.

SHORING INSTALLATION STAGING

SECTIONS 1, 2, 3, 5 and 6

1. Excavate to Stage 1
2. Install first row anchors as shown on drawings.
3. Excavate vertically in maximum 2 anchor widths, maintaining adjacent berms.
4. Place required mesh, reinforcement, and shotcrete.
5. Tension anchors as described in section D6.1.
6. Following successful tensioning of anchors, excavate adjacent panels, and repeat steps 4 and 5.
7. Excavate to successive berms, install anchors and repeat steps 3 to 6.

SECTIONS 4, 7, 8 and 9

1. Excavate to Stage 1 berms and install first row anchors as shown on the drawings.
2. Excavate panels 1 anchor width, maintaining at least 3 anchor panels and adjacent berms. Adjacent berm sides at working panels must be maintained near vertical. Temporary shoring for protection of workers may be required.
3. Place required mesh, reinforcement, and shotcrete.
4. Tension anchors as described in specification Section Part D 6.1, at least 24 hours after shotcrete has been placed.
5. Following successful tensioning of anchors, excavate adjacent panel as per Step 2 and repeat Steps 3 and 4.
6. Repeat step 5 until row is complete.
7. Excavate to successive berms, install anchors and repeat steps 2 to 6.

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PROJECT NO: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING NOTES
DATE: 2014-05-16
SCALE: NTS
DWG NO.

GENERAL NOTES

1.0 DESIGN PARAMETERS

The excavation drawings are based on the following:

A. This shoring design has been based on the assumption that the site can be adequately dewatered. Where dewatering is unsuccessful, significant shoring design revisions should be expected which may include alternate shoring systems such as sheetpiles or soldier piles and lagging.

B. Soil conditions as per soils report by **exp** Services Inc. dated April 11, 2014. Where unexpected soil conditions are encountered, revisions to the excavation drawings may be required.

C. See drawing G1 for reference drawings. All attempts have been made to ensure that these drawings are the latest revisions. However, the contractor should ensure that discrepancies do not exist between the excavation drawings and those provided by the other consultants. All discrepancies or dimension inaccuracies to be reported to **exp** Services Inc. prior to commencement of the work. Contractors using the drawings for quantity take-offs do so at their own risk.

D. Locations of adjacent structures are obtained by site inspections and where possible review of available drawings. We accept no responsibility for the accuracy of this data.

E. Utility data is provided by the appropriate municipality and from the Site Survey Plan. Site inspections to determine location of utilities either shown or not shown on the drawings is the responsibility of the contractor. Information placed on the drawings is to be used as a preliminary guide only. Report any discrepancies between the drawings and actual utility locations. Installation of anchors is not to proceed until discrepancies have been resolved.

2.0 DRAWING REVISIONS

Revisions to shoring installation sequence or shoring details can be made only with written confirmation by **exp** Services Inc. personnel.

3.0 CONTRACTOR EXPERIENCE

exp Services Inc. reserves the right to withdraw their services if in their opinion an excavation/shoring contractor is selected which does not have adequate experience to complete the work in a safe manner.

4.0 PRECONSTRUCTION SURVEYS/MONITORING

It is strongly recommended that preconstruction surveys be completed on adjacent structures in order that deficiencies of these structures can be documented prior to start of construction. Continued monitoring of these buildings by survey control points should be undertaken during construction.

5.0 DRAWING USE

These drawings have been prepared for the exclusive use of the client named on the title page of the Shoring Design package. The design shown indicates minimum requirements based on limited or assumed soil conditions only, with design revisions likely required to suit actual conditions encountered during construction. These drawings must not be used for construction unless the design engineer or his repressntatives monitors installation of the shoring system.

6.0 LEGAL

These design documents are prepared solely for use by the party with whom the design professional entered into a contract. No representations of any kind are made by the design professional to any party with whom the design professional has not entered into contract.

The owner and contractor are responsible for determining and conforming to the appropriate environmental regulations.

7.0 ALLOWANCES

The Contractor should provide allowances in his bid by unit rates for additional anchors and installation of 1 1/2" diameter slotted drains.

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