

# Report



Associated  
Engineering

GLOBAL PERSPECTIVE  
LOCAL FOCUS

## City of Surrey

### Freshet 2007 Urgent Mitigative Flood Works (M.S. 4807-207C) As-Constructed Report

June 2007





**Associated  
Engineering**

*GLOBAL PERSPECTIVE.  
LOCAL FOCUS.*

**Associated Engineering (B.C.) Ltd.**  
Suite 300 - 4940 Canada Way  
Burnaby, British Columbia, Canada V5G 4M5

TEL 604.293.1411  
FAX 604.291.6163  
www.ae.ca

June 29, 2007

File: 20072016.00.C.05.03

Jeff Arason, P.Eng.  
Project Engineer  
City of Surrey  
Engineering Department  
14245 56th Avenue  
Surrey, BC  
V3X 3A2

**Re: FRESHET 2007 URGENT MITIGATIVE FLOOD WORKS (M.S. 4807-207C)  
AS CONSTRUCTED REPORT**

Dear Mr. Arason:

We are pleased to submit the following "Freshet 2007 Urgent Mitigative Flood Works (M.S. 4807-207C) As Constructed Report". This report outlines the design criteria and issues, property considerations, and estimated costs for the constructed works.

## **1 BACKGROUND**

In April 2007 the Ministry of Public Safety and Solicitor General (PSSG) and the Ministry of Environment (MOE) confirmed the availability of funding to assist local communities prepare for the 2007 Freshet.

In March 2003, Associated Engineering completed a report entitled "Flood Protection Review Fraser River Flood Plain Area". A field investigation, including inventory and inspection, of the existing dyke and flood wall structures was completed as part of the study. The field investigation identified several minor and some major deficiencies. In May 2003, the City was granted Flood Protection Assistance Funding from the Province. Due to limited funding, a limited scope of flood protection upgrades was constructed in 2004.

As a result of the December 2006 Fraser Basin Council report, Flood Construction Levels (FCL) along the lower Fraser River have been adjusted upwards. The current scope of work under the 2007 Urgent Mitigative Flood Works program dealt with some of the flood protection deficiencies remaining after the 2004 works. All upgrades under this program considered the revised 2006 FCL's.



June 28, 2007  
Mr. Jeff Arason  
City of Surrey  
- 2 -

## 2 CONSTRUCTION

The following work was completed in this contract:

Site ID	Chainage	Length (m)	Description
7	4+440 → 4+480	30	Steel stop log closing structure across Lindal Cedar Homes driveway (10880 Dyke Rd), including: <ul style="list-style-type: none"><li>• Concrete end wall with embedded 150 mm metal channel</li><li>• Four stop log post base manholes</li><li>• Four stop log intermediate guide posts</li><li>• 18 standard 6.1 m long, 0.3 m high steel stop logs</li></ul> Concrete seepage cut-off wall minimum 1.3 m deep below grade
6	4+540 → 4+660	115	Concrete floodwall including: <ul style="list-style-type: none"><li>• 5 m top elevation</li><li>• Concrete seepage cut-off wall minimum 1.3 m deep below grade</li><li>• Four catch basins and a 200mm header pipe on land side of wall</li><li>• 300 mm diameter pipe draining land-side catch basins to the Fraser River. Drain pipe equipped with flap gate.</li></ul>
8*	4+860 → 5+120	260	Earth dyke upgrade including: <ul style="list-style-type: none"><li>• 4.6 m top elevation</li><li>• 3.2 m minimum dyke crest width</li><li>• widening on river side of dyke between stations 4+880 and 5+000</li><li>• widening on land side of dyke between stations 5+020 and 5+120</li><li>• rock placed on enhanced river side dyke slope between stations 4+880 and 5+000</li><li>• 3H:1V river side slope between stations 4+880 and 5+000.</li></ul> City placed riprap further up the Manson Canal, approximately to station 5+040. Due to standing water levels in the Canal and



June 28, 2007  
Mr. Jeff Arason  
City of Surrey  
- 3 -

			limitations of the excavator, the City elected to key riprap into bank above the channel bed, thus leaving the bottom 2.5 to 3 m of bank without riprap.
--	--	--	--

\* Construction at site 8 varied from Associated Engineering's design.

### 3 DESIGN CRITERIA

Previous Provincial Flood Construction Levels (FCL's) in the Fraser River flood plain area of Surrey were 600 mm above the 1894 Computed Flood Profile. The Fraser Basin Council's December 2006 Lower Fraser River Hydraulic Model report resulted in increased FCL's in the Fraser River flood plain area. The new FCL's range from 4.2 m G.S.C. at Elevator Road, to 5 m at Bolivar Creek.

We adopted the FCL as the minimum elevation of our flood protection upgrades. In some cases we constructed to higher elevations to allow for settlement, future FCL increases, and potential future river aggradation.

#### 3.1 GEOTECHNICAL CONSIDERATIONS

We retained Golder Associates Ltd. as geotechnical subconsultants. Golder Associates undertook a geotechnical investigation and provided advice regarding geotechnical design issues. We attach Golder Associates' findings and recommendations in Appendix C.

#### 3.2 EARTH DYKE

The Provincial "Dike Design and Construction Guide – Best Management Practices for BC" recommends that all new dyke works be designed and constructed using a minimum 4 m dyke crest width, and 3:1 side slopes are preferred. Waterside slopes of up to 2:1 with riprap protection, or landside slopes of up to 2:1 with adequate seepage control may also be acceptable.

The earth dyke should consist of an impermeable layer or dyke core. A gravel running surface should be provided along with side slopes covered in top soil to promote vegetation growth. All proposed earth dyke works in this project are related to upgrading of existing dyke structures. Some of the existing dyke deficiencies included inadequate dyke elevation, narrow dyke crest, and steep side slopes.

Where the site conditions allowed, our designs upgraded existing dykes to the desired minimum dyke crest width, side slopes, and impermeability. At site 8, we designed a 2.5:1 landside and waterside slope to avoid encroachment onto grassland habitat area. As the dyke is significantly set



June 28, 2007  
Mr. Jeff Arason  
City of Surrey  
- 4 -

back from the river, and would not be directly impinged by flows, riprap is not required at this location. City crews constructed this site to a 3:1 waterside slope, but without any improvements to the existing oversteepened landside slope.

### 3.3 CONCRETE FLOOD WALL

In areas where physical constraints did not allow construction of an earth dyke, concrete flood walls were constructed.

We analysed our wall design for two structural failure modes; concrete wall strength and overturning. A third failure mode, sliding, was also reviewed. Provided that there is some fill on the footing and behind the wall, sliding would not be the governing failure mode.

Listed below are the assumptions used in the analysis:

- The static water level reaches the top of wall (freeboard is ignored). This assumption will ensure water will overtop the wall before the wall fails. This also provides a level of safety against dynamic forces of moving water on the wall.
- Concrete strength  $f_c = 30$  Mpa, Steel yield  $f_y = 400$  MPa (as specified on drawings)
- Bearing capacity on founding soil = 30 MPa
- A minimum of 300 mm of fill above the top of footing is present on both sides of the wall.

As concrete walls can be problematic to raise, we constructed to a top elevation in excess of the 2006 FCL. At site 6, our final wall elevation is 0.4m higher than the 2006 FCL. At Site 7 we took into account the height of standard stoplogs. In order to accommodate an even multiple of stop logs, we designed the concrete abutment wall top elevation 0.2 m higher than the 2006 FCL.

In accordance with advice from our geotechnical subconsultants, we extended the shear-key 1 metre deep from the top of the footing. This provides a seepage cut-off to improve geotechnical stability of the floodwall. As the footing was constructed a minimum of 0.3 m below grade, the minimum seepage cut-off wall depth is 1.3 m.

### 3.4 STOP LOG STRUCTURES

The elevation across the Lindal Cedar Homes driveway to Dyke Road is as much as 1.3 m below the 2006 FCL. During a flood event, this access would need to be closed. This can be accomplished with a stop log closing structure.



June 28, 2007  
Mr. Jeff Arason  
City of Surrey  
- 5 -

The constructed stop log structure consists of a reinforced concrete abutment wall at the east end with an embedded steel guide rail for placement of steel stop logs. Intermediate supports were constructed to accommodate 6.1 m standardized stop log lengths. This length was established during the 2004 works. A standard 6.1 m long stop log can be transported and installed using a typical flatbed truck with a crane attachment. Using a standard length for the majority of the structures also minimizes the number of unique site specific stop logs.

The intermediate stop log supports each consist each of a vertical steel spigot embedded into a steel socket cast into a concrete base in the road. During times of flood risk, the manhole cover would be removed from the intermediate support base, and a steel I-beam-type support would be inserted vertically into the socket. Standard stop logs would be installed between the adjacent intermediate vertical support posts. The west end of the closing structure is formed with a road-level support base in lieu of a reinforced concrete abutment wall. Seaspan plans a barge ramp through this area, thus the Fraser River Port Authority did not want a concrete abutment wall constructed along the eastern portion of their property (11709 Tannery Road), at the western limit of this closing structure. Until permanent works are constructed along the eastern property line of 11709 Tannery Road, temporary flood mitigation works are required at the western limits of the stop log structure.

In accordance with advice from our geotechnical subconsultants, we designed a seepage cut-off wall between adjacent intermediate post bases and the concrete abutment wall. This cut-off wall extends a minimum of 1.3 m below grade. In addition to creating a longer seepage path, this wall also provides lateral support for the water on the river side of the stop-logs.

The steel stop logs were fabricated using galvanized steel C channels and plates.

#### **4 PROPERTY IMPACTS**

The statutory right of ways are not properly defined for some of the dyke and wall locations. We strove to minimize property impacts resulting from the dyke upgrades.

At site 6, the existing dyke right-of-way is along Dyke Road. However, raising the profile of Dyke Road to the FCL is problematic due to expense, and adjoining driveways and utilities. A portion of the existing asphalt yard at 11709 Tannery Road (FRHC's property leased by Apex Terminals) is set aside for habitat compensation for the adjacent proposed Seaspan barge ramp. The FRHC had no objection to constructing a concrete floodwall at the boundary between the future habitat compensation area and the remainder of the paved yard. The City obtained a temporary access and construction area for this floodwall. Permanent registration of this right-of-way with the Land Titles Office was not completed at the time of floodwall construction.



June 28, 2007  
Mr. Jeff Arason  
City of Surrey  
- 6 -

At site 7, the stop log structure is situated within the road right of way. The stop log structure is designed to minimize property impacts, in particular for private driveway crossings. The earth dyke at site 8 is contained within land owned by the City of Surrey. The Department of Fisheries and Oceans (DFO) is concerned about loss of grass habitat at the slope toe. DFO requires habitat compensation. Suggested habitat compensation includes spraying the river side of the dyke with "eco-blanket", or applying a growing medium and seed to promote grass growth after the freshet. DFO also specified planting scattered willow stakes at a density of 0.75 m centre-to-centre.

## **5 COMPLETION**

The concrete works at sites 6 and 7 were completed by Mutual Construction Ltd. The work was completed between May 8, 2007 and June 5, 2007. The works were substantially completed by May 31, 2007. Construction inspection was completed by Gary Nilsson of Associated Engineering. The daily site reports are attached in Appendix A.

The earth works and riprap at sites 8 and 9 were completed by City of Surrey crews. The City completed its works between May 2 and 24. The record drawings are included in Appendix B.

At site #8, the earth works were not completed strictly in accordance with Associated Engineering's design. The dyke crest was raised to the 2006 updated FCL, and the dyke crest was constructed to a 3.2 m minimum width. However, as the waterside slope was cut back to 3:1 rather than the designed 2.5H:1V, insufficient room remained within the dyke footprint to flatten the existing landside slope. The existing landside slope ranges from approximately 1.4H:1V to 1.8H:1V, with no known existing seepage control provisions.

Dyke fill material was sourced from a City stockpile at 160th Street and 64th Avenue. This material was previously approved by Levelton Consultants as suitable dike fill material. The material reportedly has high clay content, but Levelton approved it for dyke bulk fill, if construction occurs during dry weather conditions.

The waterside dyke slope was overlain with a thin layer (approximately 0.5 m) of D50 550 mm riprap. No filter layer was placed underneath the riprap.

Concrete tests were completed for all major pours. Although a 28-day strength of 32 MPa would have been sufficient for our design, we specified a 28-day strength of 35 MPa to achieve a faster curing time. The 7-day compressive strength tests came back with higher than anticipated results, ranging from 29.4 to 42.1, and one 8-day compressive strength result of 48.7 MPa. We specified



June 28, 2007  
Mr. Jeff Arason  
City of Surrey  
- 7 -

6.5%  $\pm$  1.5% air content. Test results generally fell within this range. However, one pour was as low as 3%. Since this pour was within the footing, it will not be exposed to the same degree of freeze/thaw cycles as the wall itself. Another pour had 4% air content. This result was determined after a significant portion of the concrete had already been discharged. This portion of the wall will not be as resilient against freeze/thaw cycles. However, we do not believe the deficiency warrants replacement of this portion of the wall. Concrete test reports are attached in Appendix D.

Prepared by:

Reviewed by:

*JH*  
  
Duane Hendricks, P.Eng.  
Project Engineer

  
John van der Eerden, M.Eng., P.Eng.  
Project Manager

DH/JV/sb

Enclosures: Appendices A through E



**Appendix A – Daily Site Reports**

**Appendix B – Record Drawings**

**Appendix C – Geotechnical Advice**

**Appendix D – Concrete**

**Appendix E – Site Photos**

**Appendix A**  
Daily Site Reports



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_\_  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION MANSON CANAL DATE MAY 2, 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER OVERCAST WITH RAIN NEAU@TIMES TEMP. HIGH 14°E LOW 10°E

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- HITACHI 200 HOE</u>
<u>2- OP. ENGS</u>	<u>1- CAT 312 HOE</u>
<u>4- TEAMSTERS</u>	<u>4- TANDEM DUMPS. (CITY)</u>
<u>2- FENCING CREW</u>	

- CREW STARTED TO REMOVE THE GROUND COVER VEGETATION ALONG THE WEST SIDE OF THE MANSON CANAL. THE CLEARING STARTED AT THE END OF THE MANSON FLOOD BOX RIP-RAP AND WILL END AT THE TIE-IN TO THE EXISTING STEEL WALL ALONG THE FEASEE RIVER.

- FENCING CREW INSTALLED THE TEMPORARY SECURITY FENCE FOR LUMBER STORAGE AROUND THE LOWER PARKING LOT OF PARK.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_\_  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION MANSON CANAL & DYKE EAST TO STA 4+900± DATE MAY 3 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER OVERCAST WITH SUNNY PERIODS TEMP. HIGH 13.0° ± LOW 6° ±

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1- FOREMAN	1- HITACHI 200 HOE
2- OP. ENG'S	1- CAT 312 HOE
4- TEAMSTERS	4- TANDEM DUMPS (3-CITY)
3- LABOURERS	1- CAT 320 HOE
SURVEY CREW (2)	

- COMPLETED THE REMOVAL OF GROUND COVER VEGETATION AND SMALL TREES FROM THE WEST SIDE OF MANSON CANAL AND FRASER FORESHORE TO EXISTING STEEL WALL.

- STARTED STRIPPING RIVER SIDE OF DYKE FROM STA 4+900 WORKING WEST TO STA. 4+990± MATERIAL BEING HAULED OFF SITE

- EXCAVATED FILL AND PLACED FILTER ROCK AND RIP-RAP FROM TOE TO HALF WAY UP THE DYKE FACE FROM STA 5+160± TO STA. 5+130±

- LAY-OUT COMPLETED FOR RIVER SIDE CONSTRUCTION STA 4+900± TO 5+000±

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_\_  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION MANSON CANAL AREA STA. 5+160 TO 4+900 DATE MAY 4 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY WITH CLOUDY PERIODS TEMP. HIGH 15°± LOW 7°±

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1- FOREMAN	1- HITACHI 200 HOE
2- OP. ENGS	1- CAT 312 HOE (NOT WORKING)
3- LABOURERS	1- CAT 320 HOE
7- TEAMSTERS	7- TANDEM DUMPS
2- SURVEYORS - (SITE VISIT WITH LAYOUT FOR CREW)	

- REMOVED TOPSOIL AND ROOTS FROM WATER SIDE OF DYKE FACE, STA 5+070± TO 5+130 ALL SPOIL HAULED OFF SITE
- EXCAVATED FOR FILTER ROCK AND RIP-RAP ALONG THE SIDE SLOPE OF DYKE TO 3.0± M BELOW VEGETATION LINE. THIS SPOIL ALSO HAULED OFF SITE.
- CONTINUED PLACING FILTER ROCK AND RIP-RAP BETWEEN STA'S 5+160± AND 5+110±

\* THE CITY PLAN IS TO EXCAVATE TO 3.0 m± BELOW THE VEGETATION LINE FOR THE RIP-RAP TOE IN THE MANSON CHANNEL (AS PER DISCUSSION WITH JOHN ON MAY, 1 SITE VISIT)

NOTE: - THE THREE CITY LABOURERS HAVE DONE VERY LITTLE WORK ON-SITE FOR THE LAST TWO DAYS  
 - A SECOND BARGE OF RIP-RAP MATERIAL IS DUE TO BE DELIVERED TO SITE ON SAT. MAY 5.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: E. J. Nelson



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_\_  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK. PROJECT NO. 20072016  
 LOCATION MANSON CANAL AREA STA 5160 TO 41900 DATE MAY 7 2007  
 CONTRACTOR CITY OF SURREY / MUTUAL CONST. FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER CLOUDY WITH SUNNY PERIODS TEMP. HIGH 15° ± LOW 11° ±

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1- FOREMAN	1- HITACHI 200 HOE
2- OP. ENG'S	1- CAT 312 HOE (NOT WORKING)
3- LABOURERS (PT. TIME)	1- CAT 320 HOE (DOWN FOR REPAIRS @ 1530)
1- TEAMSTER	1- TANDEM DUMP (CITY)

- COMPLETELY EXPOSED THE 3 STEEL DRAINAGE PIPES AT STA 5101<sup>±</sup> FOR CUTTING & CAPPING
- CONTRACTOR CONTINUES TO NAUL-IN FILTER ROCK, AND PLACE FILTER ROCK AND RIP-RAP FOR MANSON CANAL AREA, TIE-IN LOCATION TO MEET THE EXISTING RIP-RAP BELOW THE PUMP STATION OUTLET.

MUTUAL CONSTRUCTION

1- FOREMAN	
1- OP. ENG	1- KOMATSU ISO BACKHOE
2- LABOURERS / CARPENTERS	
1- FENCING SUB. (2)	

- CONTRACTOR WORKING ON DAMAGED CONCRETE FLOODWALL, SAW CUT <sup>EDGES</sup> AND REMOVED DAMAGED CONCRETE, DRILLED FOR AND REPLACED ANY DAMAGED REINFORCING, INSTALLED FORM WORK AND PLACED CONCRETE FOR REPAIRED WALL (WALL AREA 20x0.7x0.15)
- FENCING CONTRACTOR REPLACING DAMAGED FENCE POSTS AND REINSTALLING FENCE FABRIC FROM WALL REPAIR WORKING DOWNSTREAM.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_\_  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION MANSON CANAL 5+160<sup>±</sup> TO SITE 7 4+420<sup>±</sup> DATE MAY 8 2007  
 CONTRACTOR CITY OF SURREY / MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER CLOUDY WITH SUNNY PERIODS TEMP. HIGH 17<sup>o</sup>± LOW 11<sup>o</sup>±

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

CITY WORK FORCE

1- FOREMAN (PT. TIME)	1- HITACHI 200 HOE
3- LABOURERS (NOT WORKING)	1- CAT 312 (PT. TIME) (NOT WORKING AFTER 1200 HRS)
2- OP. ENG'S	1- CAT 320 (PT. TIME)
1- TEAMSTER	1- TANDEM DUMP (CITY)

- CREW MOVING RIP-RAP FROM STOCKPILE AT MANSON PUMP STATION FOR PLACEMENT ALONG THE TOP SECTION OF CANAL 5+070<sup>±</sup> TO 5+130<sup>±</sup>

- CONTINUED EXCAVATING THE SIDE SLOPE AND RIP-RAP KEY AT TOE OF THE EXISTING DYKE AND PLACED FILTER ROCK AND RIP-RAP STA 5+160<sup>±</sup> TO TIE-IN AT STEEL WALL APPROX. STA. 5+180<sup>±</sup>

MUTUAL CONSTRUCTION

1- FOREMAN	1- KOMATSU 150 BACKHOE
1- OP. ENG'S	1- ASPHALT SAW
3- LABOURER/CARPENTERS	1- TANDEM DUMP
1- ASPHALT CUTTER	
1- TEAMSTER	

• PORT AUTHORITY, CITY OF SURREY & PROPERTY TENANT MET ON SITE THIS MORNING AND ALL AGREED ON THE WALL LOCATION, A.E. GAUE CONTRACTOR FIVE POINTS ON THIS PROPOSED WALL LOCATION

• ASPHALT CUT FOR WALL CONSTRUCTION ASPHALT CUT WIDTH IS 4.0 M TOTAL CUTTING TO-DATE 188 L.M. A SMALL AREA IN THE WEST CORNER HAS NOT BEEN CUT AS YARD DEBRIS IS PILED IN THE WAY

(Continue report on another sheet, if necessary)

- REMOVING ASPHALT AND HAULING OFF-SITE (QUANTITY TO-DATE 260 m<sup>2</sup>)
- REINFORCING STEEL DELIVERED ON-SITE TO-DATE
- A.E. COMPLETED LAYOUT FOR STOP LOG POST BASES AT SITE "7" LINDAL CEDAR

ASSOCIATED ENGINEERING REPRESENTATIVE:



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_\_  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION MANSON CHANNEL AREA S+180<sup>±</sup> TO 4+420<sup>±</sup> DATE MAY 9 2007  
 CONTRACTOR CITY CREW / MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY WITH CLOUDY PERIODS. TEMP. HIGH 16<sup>o±</sup> LOW 7<sup>o±</sup>

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

CITY CREW WORKS

1- FOREMAN	1- HITACHI 200 HOE
2- LABOURERS	1- CAT 320 HOE
1- TEAMSTER	1- KOMATSU 450 CAT (NOT WORKING)
3- LABOURERS	1- TANDEM DUMP (CITY)

- CREW COMPLETED FILTER ROCK AND RIP-RAP FROM STA 5+140<sup>±</sup> TO TIE-IN AT THE EXISTING STEEL WALL 5+180<sup>±</sup>

- REMOVED SMALL TREES 200<sup>+</sup> OR LESS AND UNDER BRUSH VEGETATION FROM STA 4+740<sup>±</sup> TO 4+800<sup>±</sup> FOR RIP-RAP PLACEMENT.

MUTUAL CONSTRUCTION WORKS

1- FOREMAN	
1- OP. ENG	1- KOMATSU 150 BACKHOE
10- LABOURER / CARPENTERS	1- TANDEM DUMP
1- TEAMSTER	

- CONTINUED TO REMOVE ASPHALT FOR WALL CONSTRUCTION 40<sup>+</sup> M<sup>2</sup> TO-DAY

- BENDING REINFORCING STEEL ON-SITE

- STARTED THE EXCAVATION FOR WALL SLAB AND THICKENING ON WATER SIDE, STARTED ON THE EAST END OF PROPERTY 54.0<sup>3</sup> M. EXCAVATED.

- INSTALLED CATCH BASIN AT EAST END OF WALL 106<sup>+</sup> 1/4 EAST OF WEST R AND 3.6 1/4 OF C.B. LEAD

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:





OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 2 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX TERMINALS DATE MAY 10 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & WARM TEMP. HIGH 17<sup>o+</sup> LOW 7<sup>o±</sup>

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1- FOREMAN

1- OP. ENG

1- KOMATSU 150 BACKHOE.

4- LABOURERS

1- ASPHALT SAW

8- CARPENTERS

1- ASPHALT CUTTER

- CONTRACTOR CONTINUES TO EXCAVATE FOR RETAINING WALL SLAB AND DEEPENING
- INSTALLED A SECOND CATCH BASIN AT 65.0<sup>±</sup> M EAST OF WEST R<sub>2</sub>
- INSTALLED REINFORCING STEEL AND FORM WORK FOR FIRST 30.0 M SLAB SECTION STARTING FROM THE EAST R<sub>2</sub> AND WORKING WEST.
- COMPLETED CUTTING ASPHALT FOR WALL TRENCH (135') 41. L/M
- CITY CREW STOCKPILING LOCK-BLOCKS FOR TEMPORARY WALL ALONG THE EAST SIDE OF APEX TERMINALS

NOTE:

CONTRACTOR INSTRUCTED TO REMOVE THE 200 $\phi$  C.B. LEADS INSTALLED FROM C.B. TO RIVERSIDE OF SLAB DEEPENING  
 2 X 3.0 L.M OF 200 $\phi$  P.V.C.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:

*E. J. Nilsson*

OFFICE COPY




OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION 5+000<sup>±</sup> TO 4+900<sup>±</sup> & 4+800<sup>±</sup> TO 4+710<sup>±</sup> DATE MAY 10 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & WARM TEMP. HIGH 17<sup>o+</sup> LOW 7<sup>o±</sup>

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- HITACHI 200 HOE</u>
<u>3- LABOURERS</u>	<u>1- CAT 312 HOE</u>
<u>3- OP. ENGS</u>	<u>1- CAT 320 HOE</u>
<u>10- TEAMSTERS</u>	<u>1- JOHN DEER 450 CAT</u>
	<u>1- BOMAG 313 D3 ROLLER</u>
	<u>10 TANDEM DUMPS. (2-CITY)</u>

- CREW STARTED PLACING AND COMPACTING DYKE FILL MATERIAL, RIVER SIDE STA 5+000 TO 4+900
- GRADED SIDE SLOPE FOR ROCK PLACEMENT FOR SIDE SLOPE IN FRONT OF PARK PARKING LOT.
- HAULING-OUT STOCK PILED CLEAN-UP DEBRIS FROM SIDE SLOPE 4+000 TO 4+710<sup>±</sup>
- PLACED FILTER ROCK AND RIP-RAP ALONG PARKING LOT SLOPE

NOTE:  
 GOLDEN ON-SITE FOR SAMPLE OF DYKE FILL MATERIAL  
 WILL RETURN TOMORROW FOR COMPACTION TESTS.  
 (Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: 



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION 5+000± TO 4+900± & 4+800 TO 4+710± DATE MAY 11 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & WARM TEMP. HIGH 20°± LOW 8°±

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- HITACHI 200 HOE</u>
<u>3- OP. ENG'S</u>	<u>1- CAT 320 HOE</u>
<u>3- LABOURERS (NOT WORKING)</u>	<u>1- CAT 312 HOE</u>
<u>17- TEAMSTERS</u>	<u>1- JOHN DEER 450 CAT</u>
	<u>1- BOMAG ROLLER/COMPACTOR</u>
	<u>16- TANDEM DUMPS (1-CITY)</u>

- CONTRACTOR CONTINUES TO WORK ON DYKE CONSTRUCTION  
 HAULING-IN, PLACING AND COMPACTING TILL MATERIAL  
 FROM STA. 5+000± TO 4+900±

- PLACING RIP-RAP ON SIDE SLOPE IN FRONT OF GRASS SECTION  
 OF PARK STA 4+800 TO 4+760±

GOLDERS ON-SITE FOR DENSITY TESTING THIS MORNING

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 2 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX TERMINALS DATE MAY 11, 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & WARM TEMP. HIGH 20°± LOW 8°±

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

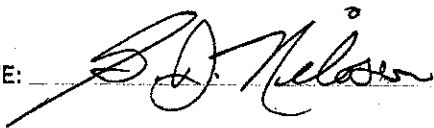
<u>1 - FOREMAN</u>	
<u>1 - OP. ENG.</u>	<u>1 - KOMATSU 150 BACKHOE</u>
<u>8 - CARPENTERS</u>	<u>1 - TANDEM DUMP</u>
<u>3 - LABOURERS</u>	<u>1 - CONCRETE PUMP TRUCK</u>
<u>4 - TEAMSTERS</u>	<u>3 - CONCRETE TRUCKS</u>

- CONTRACTOR REMOVING ASPHALT FROM THE WEST END OF PROPOSED WALL TRENCH LOCATION (140 M<sup>2</sup>)
- CONTINUES TO WORK AT WALL SLAB AND THICKENING EXCAVATION 20.3 M<sup>3</sup>±
- PLACED CONCRETE FOR FIRST 30 M OF WALL SLAB AND THICKENING EAST END OF SITE. (21.0 M<sup>3</sup>±)
- CLEARED TREES AND SHRUBS AS REQUIRED AT THE WEST END OF SITE.

NOTES

METRO TESTING ON SITE AT 0900HRS<sup>±</sup>, 80% OF FIRST LOAD OF CONCRETE WAS ALREADY PLACED IN THE THICKENING SECTION OF THE EASTERLY 30.0 M. SECTION, TEST SHOWED LOW AIR 3% SECOND TRUCK TESTED SHOWED 1.8% FOR TWO TESTS. THIS TRUCK WAS PARKED FOR OCEAN CONC. TESTER TO CHECK. THIRD TRUCK ON-SITE AND BOTH METRO & OCEAN TESTED AIR METRO 4.8% OCEAN 4.5%. THE SECOND TRUCK WAS REJECTED AND SENT OFF-SITE.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: 



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION ST000 TO 4+900<sup>±</sup> & 4+800 TO 4+710<sup>±</sup> DATE MAY 14 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY WITH CLOUDY PERIODS TEMP. HIGH 20<sup>°±</sup> LOW 7<sup>°±</sup>

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- HITACHI 200 HOE</u>
<u>4- OP. ENGS</u>	<u>1- CAT 320 HOE</u>
<u>3- LABOURERS</u>	<u>1- CAT 312 HOE</u>
<u>16- TEAMSTERS</u>	<u>1- JOHN DEER 450 CAT</u>
<u>2- SURVEYORS</u>	<u>1- BOMAC ROUPE/COMPACTOR</u>
	<u>16- TANDEM DUMPS</u>

- CREW CONTINUES TO HAUL-IN, PLACE AND COMPACT DYKE FILL MATERIAL WATER SIDE STA 5+000 TO 4+900
- CONTINUED TO PLACE RIP-RAP STA 4+800 TO 4+740<sup>±</sup> END DUMPING AND MACHINE PLACEMENT AROUND TREES (NO FILTER MATERIAL)
- STARTED TO STRIP THE LAND SIDE OF DYKE STA 5+000 TO 4+900
- SURVEY CREW WORKED ON DYKE CREST LAYOUT FROM STA 5+180<sup>±</sup> TO TIE-IN AT PAVK 4+880<sup>±</sup>

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 2 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX TERMINALS DATE MAY 14 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY WITH CLOUDY PERIODS TEMP. HIGH 20°f LOW 7°f

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1 - FOREMAN	1 - KOMATSU 150 BACKHOE
1 - OP. ENG	1 - CONCRETE PUMP TRUCK
6 - CARPENTERS	3 - CONCRETE TRUCKS
3 - LABOURERS	
4 - TEAMSTERS	

- CONTINUED TO EXCAVATE FOR WALL SLAB AND THICKENING
- COMPLETED REINFORCING PLACEMENT FOR THE FIRST 30 LM SECTION OF WALL AND SECOND 30 LM OF SLAB C/W THICKENING
- COMPLETED FORM WORK FOR SECOND SLAB AND DOUBLED-UP FORM WORK FOR WALL SECTION
- STARTED PLACING REINFORCING FOR THIRD SECTION OF SLAB C/W THICKENING
- INSTALLED 3 M OF 300Ø P.V.C. FROM CATCH BASIN TO RIVER SIDE OF SLAB THICKENING (CENTER CATCH BASIN)
- PLACED CONCRETE FOR SECOND SLAB AND THICKENING SECTION AND FIRST SECTION OF WALL. THE CONCRETE QUANTITY FOR THE SLAB AND THICKENING IS CONSIDERABLY HIGHER THEN NEAT LINE MEASUREMENT.
- METRO TESTING ON-SITE AT 1420 FOR CONCRETE TESTING, LOAD TESTED HAD 6% AIR, OCEAN CONCRETE ALSO ON-SITE FOR QUALITY CONTROL TESTING

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: *[Signature]*



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION ST000 TO 4+880 ± & 4+800 TO 4+710 ± DATE MAY 15 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & WARM TEMP. HIGH 22°+ LOW 8°+

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- HITACHI 200 H05</u>
<u>2- OP. ENGS</u>	<u>1- CAT 312 H05</u>
<u>3- LABOURERS</u>	<u>1- JOHN DEERE 450 CAT</u>
<u>2- TEAMSTERS</u>	<u>1- BOMAG ROLLER/COMPACTOR</u>
	<u>2- TANDEM DUMPS</u>

- CREW HAULING OUT STOCKPILED CLEARING SPOIL
  - COMPLETED RIP-RAP PLACEMENT 4+800 TO 4+760 ±
  - HAULING AND PLACING SURPLUS DYKE MATERIAL AFTER CUTTING SIDE SLOPE (ST000 TO 4+900) TO CAP EXISTING DYKE TO SURFACE GRAVEL ELEVATION STARTING AT TIE-IN TO STEEL WALL AT STA 5+180 AND WORKING UP STREAM
- NOTE:
- CITY CREW WILL NOT FOLLOW DESIGN SECTION FOR LAND SIDE DYKE CONSTRUCTION FROM ST000 ± TO 4+900 ±. CITY WILL NOT REMOVE GRANULAR MATERIAL FROM DYKE SLOPE, WILL ONLY CONSTRUCT TO EXISTING TREE LINE FOR TOE OF SLOPE WILL NOT INSTALL DRAIN ROCK AND FILTER FABRIC AT TOE

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 2 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX TERMINALS & SITE "7" LINDEL DATE MAY 15, 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & WARM TEMP. HIGH 22°+ LOW 8°+

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- KOMATSU 150 BACKHOE</u>
<u>2- OP. ENGR</u>	<u>1- CAT 420 BACKHOE</u>
<u>4- LABOURERS</u>	<u>1- TANDEM DUMP</u>
<u>10- CARPENTERS</u>	
<u>1- TEAMSTER</u>	

- <sup>STARTED</sup> CONTRACTOR STRIPPED WALL AND GRADING SNAP-TIE HOLES
- INSTALLING REINFORCING FOR THIRD SECTION OF SLAB
- INSTALLED REINFORCING FOR SECOND SECTION OF WALL
- CONTINUED SLAB AND THICKENING TRENCH EXCAVATION
- EXCAVATED FOR THE WEST STOP LOG POST BASE
- CUT ASPHALT FOR STOP LOG STRUCTURE AS REQUIRED
- STARTED EXCAVATING FOR SITE "7" TIE-IN WALL AT DYKE
- HAULING-IN, PLACING AND COMPACTING IMPERVIOUS DYKE FILL MATERIAL FOR TRENCH BACKFILL ON THE WATER SIDE OF WALL
- STARTED EXCAVATING FOR STOP LOG WALL TIE-IN AT EXISTING DYKE, WATER MAINLINE VALVE 2000? PLUS A 50MM Ø H.D.P.E. SERVICE WAS FOUND DURING SLAB AND THICKENING EXCAVATION. WORK STOPPED TILL A DECISION IS MADE AS TO HOW TO DEAL WITH WATER LINES CROSSING THE PROPOSED WALL & THICKENING

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:

OFFICE COPY






OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION 5+180 TO 4+900 DATE MAY 16 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SKINNY WITH CLOUDY PERIODS. TEMP. HIGH 19°f LOW 9°f

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- HITACHI 200 HOE</u>
<u>4- LABOURERS</u>	<u>1- CAT 312 HOE</u>
<u>1- WELDER</u>	<u>1- BOMAG ROLLER/COMPACTOR</u>
<u>2- OP. ENGS</u>	<u>1- JOHN DEER 450 CAT</u>
<u>2- TEAMSTERS</u>	<u>2- TANDEM DUMPS (1-CITY)</u>
	<u>1- WELDING TRUCK.</u>

- CREW CUT SECTIONS OUT OF THE THREE OLD DRAINAGE PIPES AT STA. 51000<sup>±</sup> AND WELDED ON END PLATES
- CONTINUED TO WORK AT SITE CLEAN-UP, HAULING-OUT STOCKPILED BRUSH AND VEGETATION FROM SIDE SLOPE STRIPPING
- HAULING SURPLUS DYKE MATERIAL FROM SIDE SLOPING BETWEEN STA 51000 TO 4+900 TO AREA BETWEEN 5+160<sup>±</sup> TO 5+140 TO RAISE DYKE CREST TO SURFACE GRAVEL ELEVATION.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: 



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 2 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX TERMINAL YARD DATE MAY 16 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY WITH CLOUDY PERIODS TEMP. HIGH 19°± LOW 9°±

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- HONDA 150 BACKHOE</u>
<u>1- OP. ENG</u>	<u>1- CONCRETE PUMP TRUCK</u>
<u>7- CARPENTERS</u>	<u>3- CONCRETE TRUCKS</u>
<u>4- LABOURERS</u>	<u>1- TANDEM DUMP</u>
<u>5- TEAMSTERS</u>	

- CONTRACTOR DOUBLED-UP WALL FORMS FOR THE SECOND 30 L/M SECTION OF WALL
  - COMPLETED REINFORCING STEEL INSTALLATION FOR THE THIRD 30 L/M SECTION OF SLAB AND THICKENING
  - INSTALLED FORM WORK FOR SLAB THICKENING ON THIRD SECTION
  - STARTED TO INSTALL REINFORCING STEEL FOR THE FOURTH AND FINAL SECTION OF SLAB AND THICKENING
  - MOVING EXCAVATED MATERIAL TO THE EAST END OF SITE AND PILING AND COMPACTING DYKE FILL MATERIAL IN FRONT OF SLAB THICKENING
  - PLACED CONCRETE FOR SECOND WALL SECTION AND THIRD SECTION OF SLAB AND THICKENING
  - CONTINUED TO HAUL-IN DYKE MATERIAL FOR TRENCH BACKFILLING
- METRO ON-SITE FOR CONCRETE TESTING  
 (Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: A. J. Nelson



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO 20072016  
 LOCATION 5+180 TO 4+900 SITE "6" LOCK BLOCK WALL DATE MAY 17 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER CLOUDY WITH SUNNY PERIODS TEMP. HIGH 17°f LOW 8°f

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1 - FOREMAN	1 - HITACHI 200 HOE
3 - LABOURERS	1 - CAT 215 HOE
3 - OP. ENG'S	1 - BOMAG ROLLER/COMPACTOR
6 - TEAMSTERS	1 - WELDING TRUCK
1 - WELDER	6 TANDEM DUMP 1 - CITY

- CREW MOVED TO SITE "6" TO START WORK ON THE LOCK BLOCK WALL, REMOVING BRUSH AND VEGETATION FROM THE EAST SIDE OF PROPOSED LOCK-BLOCK WALL

- WELDER COMPLETED THE INSTALLATION OF END CAPS ON THE THREE STEEL DRAINAGE PIPE CROSSING THE DYKE AT STA 5000±, CITY CREW BACKFILLED THE EXCAVATION

- ROLLING AND COMPACTING DYKE MATERIAL PLACED ON DYKE SURFACE TO UNDERSIDE OF SURFACE GRAVEL ELEVATION FROM STA 5+180 TO 5000±

- CREW CONTINUE TO WORK AT CUTTING THE RIVER SIDE SIDE SLOPE TO 3:1±

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:




OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 2 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX TERMINAL YARD & SITE "7" DATE MAY 17 2007  
 CONTRACTOR MUTUAL CONSTRUCTION - FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER CLOUDY WITH SUNNY PERIODS TEMP. HIGH 17°c LOW 8°c

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

- |                          |                         |
|--------------------------|-------------------------|
| 1- FOREMAN               | 1- KOMATSU 150 BACKHOE. |
| 1- OP. BLYG              | 1- TANDEM DUMP          |
| 3- LABOURERS             | 1- CONCRETE PUMP TRUCK  |
| 7- CARPENTERS            | 2- CONCRETE TRUCKS      |
| 4- TEAMSTERS             |                         |
| 1- CITY WATER WORKS CREW |                         |

- COMPLETED REINFORCING STEEL INSTALLATION FOR THE FOURTH AND LAST SECTION OF WALL SLAB AND THICKENING.
- STRIPPED WALL FORMS FROM SECOND 30 L/M SECTION OF WALL
- INSTALLING REINFORCING FOR THE THIRD 30 L/M SECTION OF WALL
- INSTALLED FORM WORK FOR THE LAST SECTION OF SLAB & THICKENING & THIRD SECTION OF WALL LAND SIDE FORMS.
- CITY WATER CREW RETRACTED TOP OF 200¢ VALVE AT SITE "7" PROPOSED STOP LOG WALL.
- PLACED CONCRETE FOR FOURTH AND FINAL SECTION OF THE WALL SLAB
- METRO ON-SITE ~~FOR~~ FOR CONC. TESTING

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: 



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 1  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. \_\_\_\_\_  
 LOCATION SITE 6 DATE 18 MAY 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. 20072016.00.C.05.02  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & WARM TEMP. HIGH \_\_\_\_\_ LOW \_\_\_\_\_

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

FOREMAN (MUTUAL CONSTRUCTION)  
ETC

SITE 6:

- LAST PORTION OF FOOTING POURED YESTERDAY
- WORKERS FORMING BACK OF 2<sup>ND</sup> TO LAST 30-m OF WALL
- POUR ARRANGED FOR 12-NOON
- METRO TESTING ARRANGED FOR 12-NOON
- FOREMAN EXPRESSED CONCERN SLEEVES IN TOP OF WALL (FOR FENCEPOSTS) TOO LARGE FOR WALL THICKNESS - CREATING WEAR SPOTS. 1 CRACK FOUND AT SLEEVE LOCATION
- plasticizer being added to increase to 100-stump. This is to make concrete easier to pour into narrow wall.
- Air 4%, Lower than desired range. Pete (mutual) feels 4% is close enough.
- Pete reports ordering an extra 1m<sup>3</sup> concrete but only minimal quantity extra at end of wall section pour. Curious how this could be.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: DUANE HENDRICKS



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 1

PROJECT 2007 URGENT FLOOD MITIGATION WORKS PROJECT NO. \_\_\_\_\_

LOCATION SITE 8 DATE 18 MAY 2007

CONTRACTOR CITY OF SURREY FILE NO. 20072016.00.L.05.00

CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_

WEATHER SUNNY WARM TEMP. HIGH \_\_\_\_\_ LOW \_\_\_\_\_

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

EXCAVATOR & OPERATOR

SOME OTHER GUY IN HI-VIS VEST

RIP RAP BEING PLACED ON WATERSIDE SLOPE WITH NO FILTER LAYER  
COULD NOT SEE MONITORING WELL RISER PIPES - BURIED?

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: DUANE HENDRICKS




OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION 5+060 TO 4+900 DATE MAY 22 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER OVERCAST WITH SUNNY PERIODS TEMP. HIGH 19°E LOW 9°E

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1- FOREMAN	1- HITACHI 200 KLOB
2- OP. ENG.	1- CAT 215 NOE
3- LABOURERS	- TANDEM DUMPS
- TEAMSTERS	

- CITY CREW COMPLETED PLACING RIP-RAP ON THE RIVER SIDE OF DYKE FROM STA 5+000<sup>±</sup> TO 4+900<sup>±</sup>
- HAULING-IN, PLACING DYKE FILL MATERIAL TO BRING DYKE TO GRAVEL GRADE

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: 



OWNER CITY OF SUREBY REPORT NO. \_\_\_\_\_ SHEET 2 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX TERMINAL YARD & SITE "7" DATE MAY 22 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER OVERCAST WITH SUNNY PERIODS. TEMP. HIGH 19°f LOW 9°f

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- KOMATSU 150 BACKHOE.</u>
<u>1- OP. ELOG.</u>	<u>1- PUMP TRUCK</u>
<u>3- LABOURERS</u>	<u>1- CONCRETE TRUCK</u>
<u>4- CARPENTERS</u>	
<u>2- TEAMSTERS</u>	

- CONTRACTOR STRIPPED FORM WORK FROM THE THIRD 30 Ym WALL SECTION.
- COMPLETED REINFORCING STEEL PLACEMENT FOR THE FOURTH AND LAST SECTION OF WALL
- MOVING EXCAVATED MATERIAL TO THE NORTH/EAST END OF LOT FOR STORAGE
- CONTINUED TO HAUL-IN, PLACE AND COMPACT DYKE FILL MATERIAL IN FRONT OF WALL THICKENING AND ABOVE RIVER SIDE SLAB.
- PLACED CONCRETE FOR THE LAST SECTION OF WALL
- SURVEY CREW ON-SITE TO LAYOUT STOP LOG TIE-IN WALL, THE DESIGN ISSUED MAY 18 WOULD NOT FIT THE EXISTING SITE TOPOGRAPHY AND REQUIRED FIELD REVISION TO FIT EXISTING DYKE.
- METRO TESTING ON-SITE FOR CONCRETE TESTING (5.4% MB)

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:





OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION S+160<sup>±</sup> TO 4+900 DATE MAY 23 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY WITH CLOUDY PERIODS TEMP. HIGH 17<sup>°±</sup> LOW 10<sup>°</sup>

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1-FOREMAN</u>	<u>1- CAT 215 HOE</u>
<u>3- OP. ENG.</u>	<u>1- JOHN DEER 135 HOE</u>
<u>3- LABOURERS (NOT WORKING)</u>	<u>1- BOMAG ROLLER/COMPACTOR</u>
<u>2- TEAMSTERS</u>	<u>2- TANDEM DUMPS</u>

- CREW COMPLETED PLACING RIP-RAP AT STA 4+900<sup>±</sup> TO 4+920<sup>±</sup>

- HAULING-IN PLACING AND COMPACTING SURFACE GRAVEL  
S+160<sup>±</sup> TO 4+900<sup>±</sup>

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:




OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_\_  
 PROJECT 2007 URGENT FLOOD MITIGATION PROJECT NO. 20072016  
 LOCATION SITE "6" AFEX TERMINAL YARD & SITE "7" DATE MAY 23, 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY WITH CLOUDY PERIODS TEMP. HIGH 17° LOW 10°

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- KOMATSU 150 BACKHOE</u>
<u>1- OP. ENG</u>	<u>1- TANDEM DUMP</u>
<u>1- TEAMSTER</u>	
<u>6 CARPENTERS</u>	
<u>3- LABOURERS</u>	

- CONTRACTOR STRIPPED FORMWORK FROM THE LAST SECTION OF WALL
- WORKING AT SITE CLEAN-UP
- CONTINUED TO HAUL-IN, PLACE AND COMPACT DYKE FILL IN THE RIVER SIDE OF WALL EXCAVATION.
- CONTINUED TO PLACE FILTER FABRIC AND RIP-RAP ON COMPACTED DYKE FILL ON THE RIVER SIDE OF WALL.
- STARTED EXCAVATION FOR STOP LOG TIE-IN WALL AT SITE "7"
- STARTED TO CONSTRUCT REINFORCING CAGES FOR THE STOPLOG BEAMS AND STOP LOG WALL

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: 



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION \_\_\_\_\_ DATE MAY 24 2007  
 CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & WARM TEMP. HIGH 20°± LOW 9°

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- JOHN DEERE 135 HOE</u>
<u>2- OP. ENG</u>	<u>2- TANDEM DUMP ?</u>
<u>3- LABOURERS</u>	<u>1- CAT 312 HOE</u>
<u>2- TEAMSTER ?</u>	<u>1- BOMAG ROLLER/COMPACTOR</u>

- CITY CREW PLACING A SECOND LIFT OF SURFACE GRAVEL TO ELEV. 4.8± FROM STA 4+900 TO 5+160± (4.8 BEFORE COMPACTION)
- HAULING-IN AND PLACING DYKE FILL MATERIAL AROUND THE WEST END OF APEX TERMINAL WALL C/W RIP-RAP COVER
- COMPLETED PLACING RIP-RAP ALONG THE SIDE SLOPE IN FRONT OF THE PARKING LOT

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 2 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX TERMINAL YARD & SITE "7" DATE MAY 24 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & WARM TEMP. HIGH 20°± LOW 9°

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1- FOREMAN 1- KOMATSU 150 BACKHOE  
1- OP. ENGR - CONCRETE TRUCKS  
3- LABOURERS  
5- CARPENTERS  
- TEAMSTERS

- CONTRACTOR CONTINUES TO WORK AT SITE CLEAN-UP OF CONSTRUCTION MATERIALS FROM SITE "6"

- EXCAVATING AND SETTING FORM WORK FOR DYKE TIE-IN WALL AT SITE "7"

- EXCAVATED FOR THREE STOP LOG GUIDE POSTS AND THREE STOP LOG BEAMS BETWEEN GUIDE POSTS.

- INSTALLED REINFORCING FOR STOP LOG BEAMS

- PREASSEMBLING REINFORCING FOR DYKE TIE-IN WALL, SLAB AND THICKENING

- PLACED CONCRETE FOR THE THREE WESTERLY GUIDE POST BASES AND FOR THE TWO WESTERLY STOP LOG BEAMS

NOTE:

A 75 mm Ø GAS MAIN WAS LOCATED CROSSING THE SECOND FROM THE EAST STOP LOG BEAM AT A 45° ANGLE. THE BOTTOM TWO HORIZONTAL BARS WERE CUT AND SPUCED TO ALLOW THE MAIN TO BE CAST IN-PLACE WITH A (Continue report on another sheet, if necessary) P.V.C. SLEEVE COVER.

- METRO ON-SITE FOR CONCRETE TESTING

ASSOCIATED ENGINEERING REPRESENTATIVE:



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 2  
PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
LOCATION \_\_\_\_\_ DATE MAY 25, 2007  
CONTRACTOR CITY OF SURREY FILE NO. \_\_\_\_\_  
CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
WEATHER SUNNY & WARM TEMP. HIGH \_\_\_\_\_ LOW \_\_\_\_\_

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

CITY CREW NOT ON SITE TO-DAY

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: \_\_\_\_\_



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 2 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX TERMINAL & SITE "7" DATE MAY 25 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & WARM TEMP. HIGH 20<sup>o</sup>F LOW 10<sup>o</sup>F

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1- FOREMAN 1- KOMATSU 150 BACKHOE  
1- OP. ENG.  
- LABOURERS  
- CARPENTERS

- CONTRACTOR CONTINUED TO WORK AT STOP LOG BEAM EXCAVATION, AT APPROX. 0800 THE BACKHOE HIT AN OLD WATER SERVICE THAT STARTED TO LEAK 6.0 L/M FROM WHERE THE PIPE WAS HIT. THIS CAUSED WATER TO RUN DOWN THE WING WALL EXCAVATION AND INTO THE STOP LOG EXCAVATION. SURREY WATER DEPT. CALLED FOR REPAIR AND A TWO MAN CREW ARRIVED ON SITE AT 1045 HRS AND STARTED TO LOOK FOR SERVICE SHUT OFF VALVE. REPAIR CREW ON SITE THIS AFTERNOON TO FIX LEAK

- INSTALLING REINFORCING FOR THE SECOND SECTION OF THE DYKE TIE-IN WALL

- WORKING AT PLUGGING SNAP-TIE HOLES FOR SITE "6" WALL

- STARTED TO INSTALL THE ~~3000~~ P.V.C. STORM OUTFALL PIPE.  
 3-4M LENGTHS INSTALLED

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 1  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX YARD & SITE "7" LINDEL YARD DATE MAY 26 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER OVERCAST TEMP. HIGH \_\_\_\_\_ LOW 8° F

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- KOMATSU 150 BACKHOE</u>
<u>2- LABOURERS</u>	<u>1- CONCRETE PUMP TRUCK</u>
<u>1- OP. ENG.</u>	<u>2- CONCRETE TRUCKS</u>
<u>3- TEAMSTERS</u>	

- CONTRACTOR CONTINUES TO WORK ON 300φ P.V.C. STORM OUTFALL INSTALLATION, PIPE INSTALLED TO HEADWALL LOCATION.
- PLACED CONCRETE FOR THICKENINGS AND SLABS FOR DYKE TIE-IN WALL AT SITE "7"
- WORKING AT SITE CLEAN UP, MOVING EXCAVATED SPOIL TO THE NORTH/EAST CORNER OF SITE "6"
- INSTALLING DYKE FILL MATERIAL AND RIP-RAP ALONG THE RIVER SIDE OF DYKE, WEST END OF NEW WALL.
- METRO ON-SITE FOR CONCRETE TESTING (AIR 54%)

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 1  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX YARD & SITE "7" LINDEL YARD DATE MAY 28 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER CLOUDY WITH SUNNY PERIODS TEMP. HIGH 15°t LOW 8°t

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1- FOREMAN 1- KOMATSU 150 BACKHOE  
1- OP. ENG  
3- LABOURERS  
3- CARPENTERS

- CONTRACTOR WORKING AT INSTALLATION OF WALL FORMS FOR THE DYKE TIE-IN WALL
- GROUTING SNAP-TIE HOLES FOR SITE "6" WALL
- COMPLETED EXCAVATING FOR THE LAST TWO STOP LOG BEAMS AND GUIDE POST MANHOLE.
- CONTRACTOR IS ASSEMBLING PARTS REQUIRED TO REPAIR THE DAMAGED 2 1/2" GAL WATER LINE.

NOTE:

- CITY CREW STARTED INSTALLATION OF THE LOCK BLOCK WALL ALONG THE EAST SIDE OF APEX TERMINAL YARD.
- CITY WATER CREW ON-SITE TO REPAIR 2 1/2" GAL. WATER MAIN 6'± L/M FROM STOP LOG BEAM EXCAVATION, WILL NOT REPAIR DAMAGED WATER LINE IN EXCAVATION AS THIS AREA IS ON PRIVATE PROPERTY

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: B. J. Nelson





OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 1  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX YARD & SITE "7" LINDEL YARD DATE MAY 29, 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & WARM TEMP. HIGH 25.0<sup>+</sup> LOW 12.0<sup>+</sup>

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

<u>1- FOREMAN</u>	<u>1- KOMATSU 150 BACKHOE.</u>
<u>1- OP. EUG</u>	<u>1- CONCRETE PUMP TRUCK</u>
<u>3- LABOURERS</u>	<u>2- CONCRETE TRUCKS</u>
<u>3- CARPENTERS</u>	
<u>1- CEMENT FINISHER</u>	
<u>3- TEAMSTERS</u>	

- CONTRACTOR WORKING AT SITE CLEAN-UP
- CEMENT FINISHING, GROUTING SNAP-TIE HOLES ON SITE "6" WALL
- CREW ON-SITE AT 0530 HRS TO REPAIR THE DAMAGED 2 1/2" Ø GAL. WATER LINE AT SITE "7" WATER TURNED ON AT 0800 HRS A SECOND LEAK WAS FOUND A FURTHER 600<sup>+</sup>MM SOUTH LINE SHUT DOWN AND A LONGER LENGTH OF 2 1/2" ORDERED AND INSTALLED, WATER TURNED ON AT 1100<sup>+</sup> HRS NO LEAKAGE.
- COMPLETED DOUBLING-UP WALL FORMS FOR SITE "7" DYKE TIE-IN WALL
- INSTALLED REINFORCING CAGES FOR THE LAST TWO STOP LOG BEAMS
- PLACED CONCRETE FOR BOTH THE DYKE TIE-IN WALL AND THE TWO REMAINING STOP LOG BEAMS C/W ONE STOP LOG GUIDE MANHOLE.

NOTE:  
CITY CREW CONTINUE TO WORK AT LOCK BLOCK WALL CONSTRUCTION AND RIP-RAP PLACEMENT ALONG THE EAST SIDE OF APEX TERMINALS  
 (Continue report on another sheet, if necessary)

- METRO ON-SITE FOR CONCRETE TESTING

ASSOCIATED ENGINEERING REPRESENTATIVE: *D.J. Nelson*



OWNER CITY OF SURREY REPORT NO. \_\_\_\_\_ SHEET 1 OF 2  
 PROJECT 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 20072016  
 LOCATION SITE "6" APEX YARD & SITE "7" LINDEL YARD DATE MAY 30 2007  
 CONTRACTOR MUTUAL CONSTRUCTION FILE NO. \_\_\_\_\_  
 CONTRACT \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_  
 WEATHER SUNNY & HOT TEMP. HIGH 25°± LOW 14°±

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1- FOREMAN	1- KOMATSU 150 BACKHOE
2- OP. ENG	1- CAT 226 (BOBCAT)
3- LABOURERS	1- TANDEN DUMP.
3- CARPENTERS	
1- CEMENT FINISHER	
1- TEAMSTER	

- CONCRETE FINISHER WORKING ON SITE "6" WALL, GROUTING SNAP-TIE HOLES

- CONTRACTOR STRIPPED FORM WORK FROM SITE "7" DYKE TIE-IN WALL (COVERED AND WATERED)

- COMPLETED PLACING AND COMPACTING DYKE FILL MATERIAL ON THE WATER SIDE OF SITE "6" WALL, PLACED FILTER FABRIC AND 200MM RIP-RAP.

- STARTED TO INSTALL 2000 P.U.C. CATCH BASIN LEADS WORKING FROM EAST TO WEST.

- CREW WORKING AT SITE CLEAN-UP.

NOTE:

- CITY CREW CONTINUE TO PLACE RIP-RAP ALONG THE OUTSIDE OF THE TEMPORARY LOCK BLOCK WALL, EAST SIDE OF APEX YARD.  
 (Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:

**Appendix B**  
Record Drawings

**CITY OF SURREY**



**SURREY**  
CITY OF PARKS

**ENGINEERING  
DEPARTMENT**

# 2007 URGENT FLOOD MITIGATION WORKS

**Contract M.S. 4807-207C**

AE Project No. 20072016  
Record Drawings

DRAWING LIST	
	GENERAL
2016-1-100	COVER AND DRAWING LIST
	CIVIL
2016-1-101	PROJECT KEY PLAN
2016-1-102	SITE #7
2016-1-103	SITE #8 AND #9
2016-1-104	SITE #6 FLOODWALL
2016-1-104a	SITE #6 DRAINAGE DETAILS
2016-1-150	CIVIL DETAILS
2016-1-201	TYPICAL SITE #8 AND #9 SECTIONS
	STRUCTURAL
2016-1-301	SITE #7 CONCRETE REINFORCEMENT
2016-1-302	STOP LOG DETAILS
2016-1-303	STOP LOG POST BASES, GUIDE POST
2016-1-304	SITE #6 DETAILS

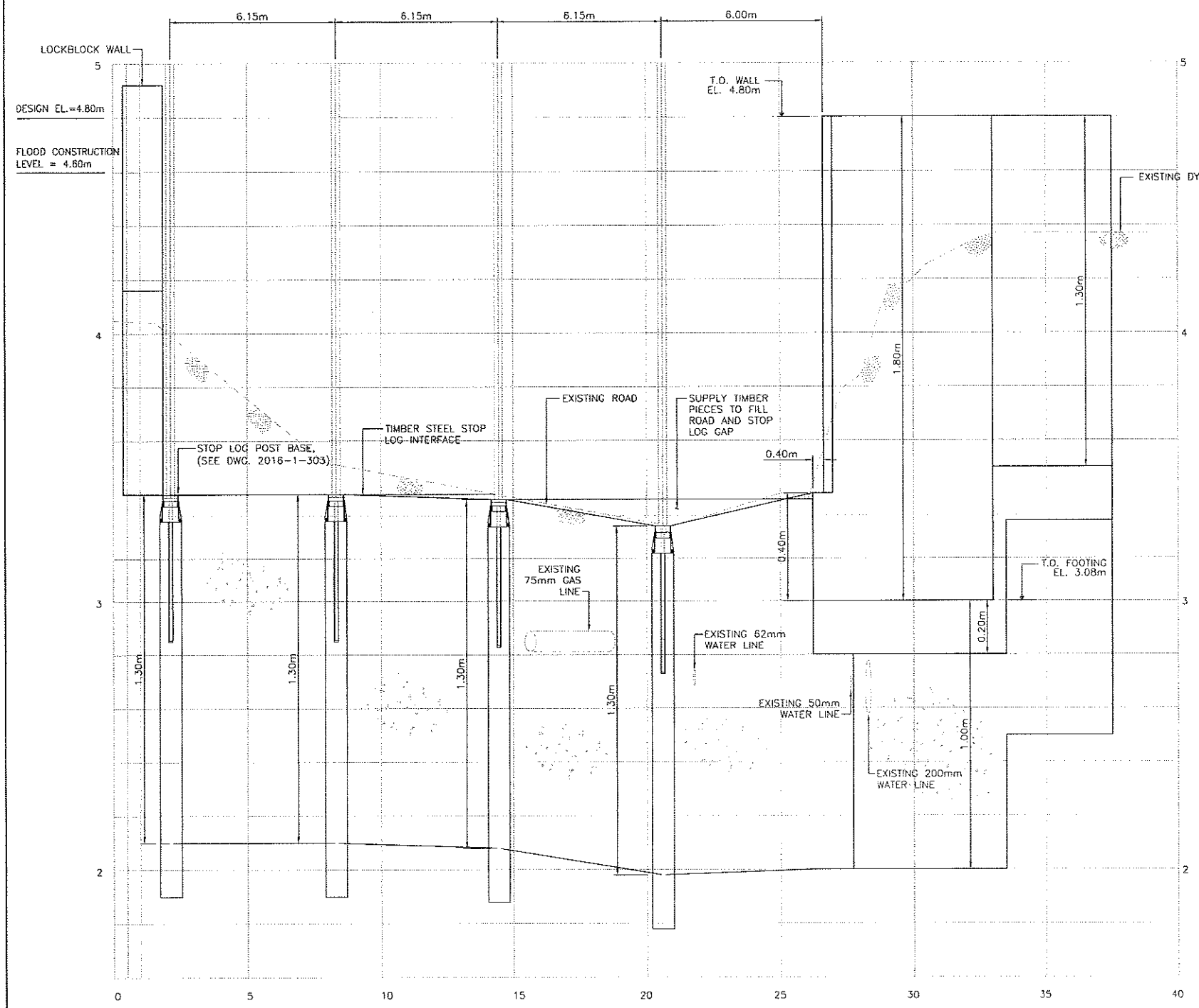


**Associated  
Engineering**

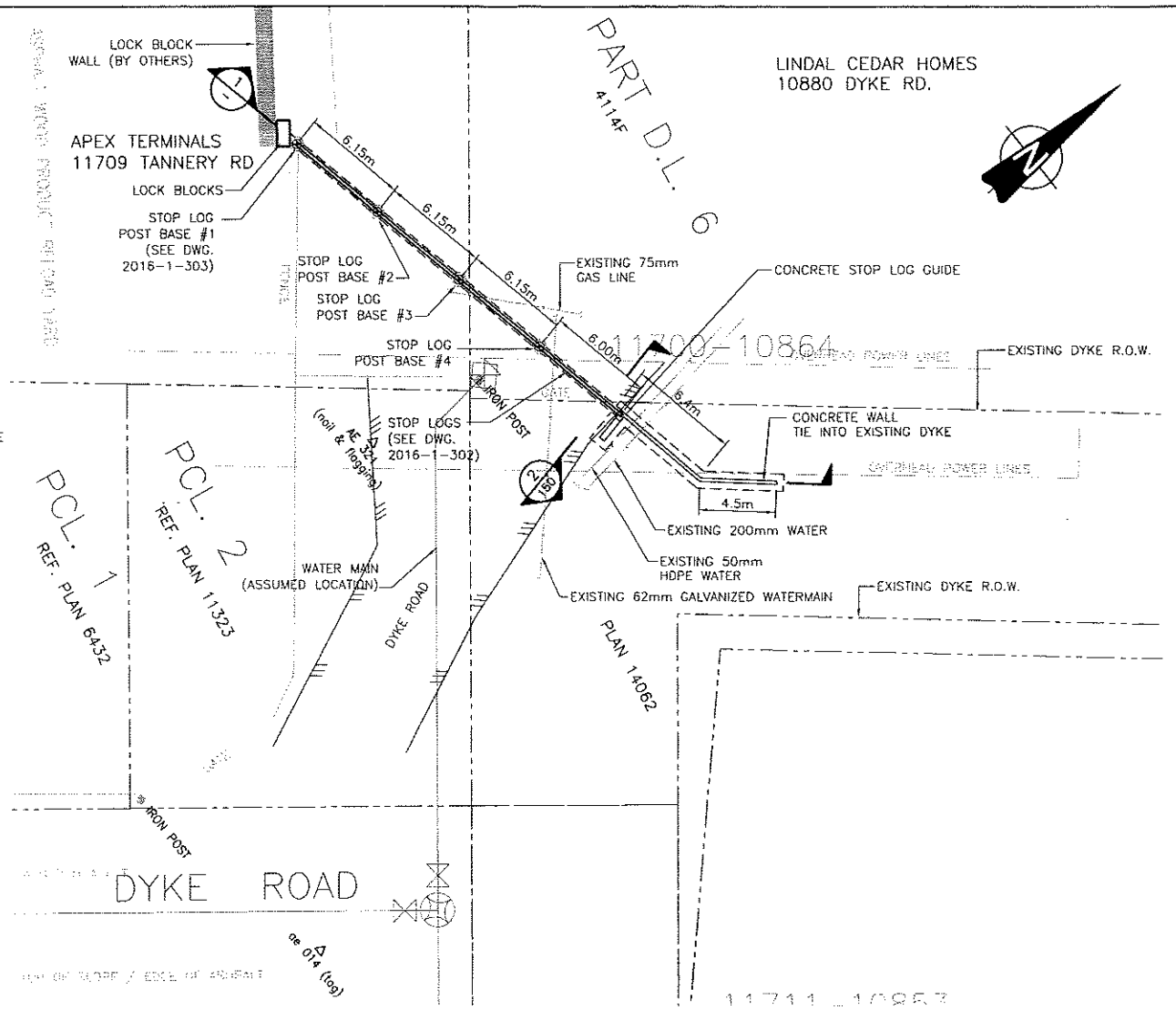
*GLOBAL PERSPECTIVE.  
LOCAL FOCUS.*



STOP LOGS WILL NOT FORM SEAL WITH UNEVEN GROUND PROFILE NOR WITH ADJACENT LOCK BLOCK WALL. PLACE SANDBAGS AGAINST LAND SIDE FACE OF STOPLOG STRUCTURE AND GAP BETWEEN STRUCTURE AND LOCK BLOCK WALL. BASE WIDTH OF SANDBAG WALL TO EQUAL 1.5 TIMES HEIGHT.



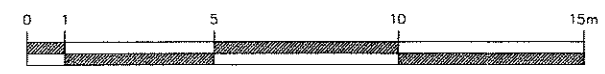
SECTION 1  
H:1:100 V:1:10  
DWG



SITE 7 PLAN  
1:200

LEGEND

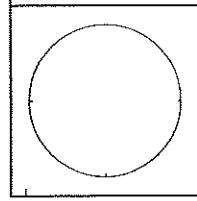
- TOP OF DYKE
- PAVEMENT EDGE
- EXISTING PAVEMENT
- EXISTING TOP OF DYKE
- EXISTING T.O.E. OF DYKE
- EXISTING PROPERTY LINE
- EXISTING HYDRO POLES
- EXISTING FENCE



NOTES:

1. CONFIRM LAYOUT ON SITE
2. ASSUMED CITY OF SURREY UTILITY PLAN LOCATION. CONTRACTOR TO LOCATE UTILITIES PRIOR TO CONSTRUCTION.
3. CONTRACTOR TO COORDINATE ALL SERVICE RE-CONNECTIONS WITH UTILITY COMPANIES AND CITY STAFF
4. GALVANIZE ALL STEEL COMPONENTS AFTER FABRICATION
5. FIELD ASSEMBLE AND FIT STOP LOG STRUCTURES
6. STAMP CROSSING NUMBER "0" IN CONCRETE WALL AND ON STOP LOGS AND POST BASES AS DIRECTED BY CONTRACT ADMINISTRATOR. STAMP POST NUMBER ON EACH POST
7. HYDROSEED ALL DISTURBED EARTH DYKE BANKS
8. WHERE EXISTING ASPHALT PAVEMENT TO BE REMOVED SAWCUT EXISTING TO VERTICAL FACE FOR BUTT JOINT AND PAVEMENT RESTORATION.
9. RESTORE EXISTING PAVEMENT STRUCTURE TO MATCH EXISTING OR BETTER AND TO THE FOLLOWING MINIMUM REQUIREMENTS:  
 -100mm HOT MIX ASPHALT CONCRETE  
 -150mm GRANULAR BASE COURSE  
 -300mm GRANULAR SUB-BASE
10. MATERIALS, COMPACTION AND WORKMANSHIP TO MMCD 2000 STANDARDS.
11. REPLACE FENCE WHERE REMOVED UNLESS OTHERWISE DIRECTED BY CONTRACT ADMINISTRATOR

Date: 2007/06/25  
 Plot Scale: 1:100  
 Author: J. Van der Eerden  
 Date: 2007/06/25



REVISIONS	DESCRIPTION	BY	DATE	APPROVED
5				
4				
3				
2	RECORD DRAWINGS	G.G.	JUNE 2007	
1	ISSUED FOR CONSTRUCTION	E.F.	23 MAY 2007	

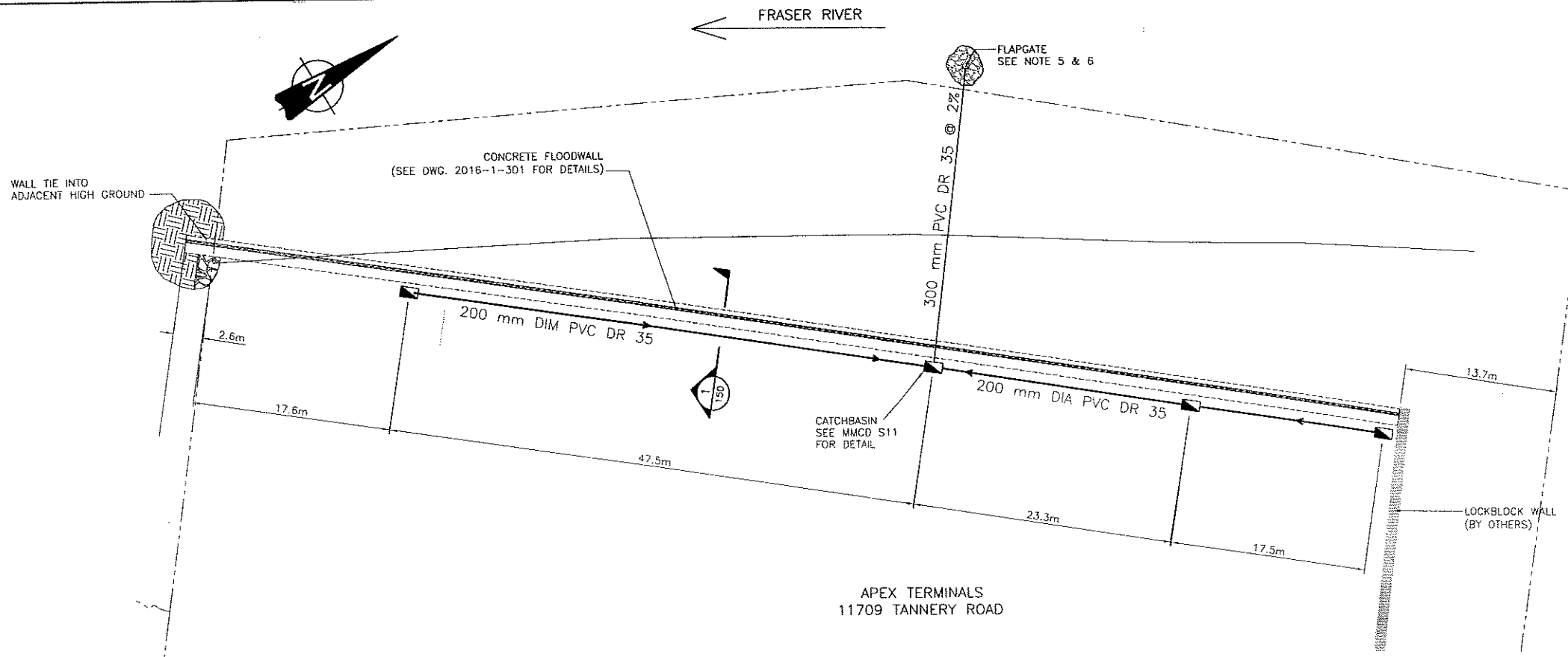


ENGINEERING DEPARTMENT

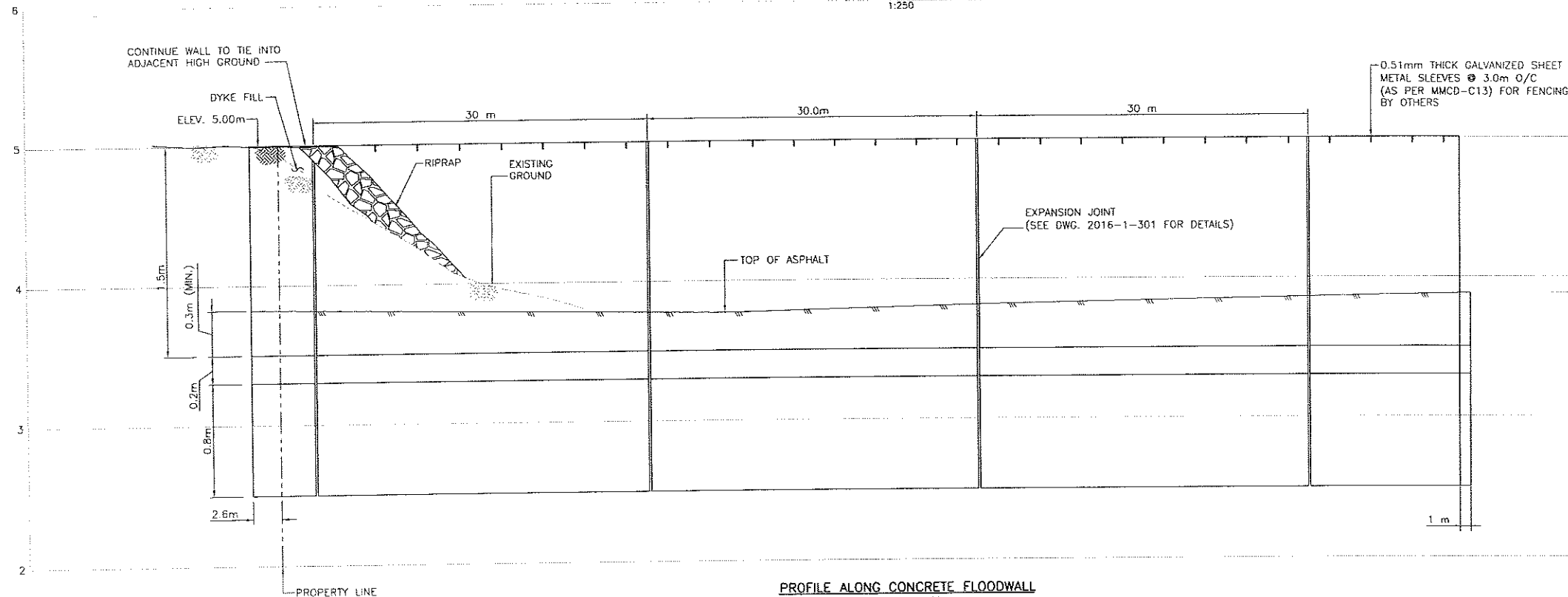
BENCH MARK - S.M. #	ELEV.	SCALE: HOR. 1:200 VERT. 1:200	DATE	PROJECT NUMBER <b>4807-207</b>
TITLE <b>2007 URGENT FLOOD MITIGATION WORKS SITE #7 CROSSING # "0"</b>		DESIGNED BY E.F./G.Q.	L.B.	DRAWING NUMBER 2016-1-102
APPROVED		CHECKED BY D.H.	CONTRACT	SHEET OF 2
P.W. P.U.		AS BUILT	DESTROY ALL PRINTS BEARING PREVIOUS NUMBERS	REVISION 2







SITE 6 PLAN  
1:250

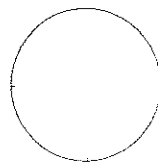


PROFILE ALONG CONCRETE FLOODWALL  
SCALE H 1:250  
SCALE V 1:20

**NOTES:**

1. REMOVE EXISTING ASPHALT AS NECESSARY FOR WALL CONSTRUCTION
2. WALL TO BE BACKFILLED WITH IMPORTED DYKE FILL
3. REINSTATE ASPHALT TO BASE OF WALL (LAND SIDE)
4. EXCESS EXCAVATED SOIL TO BE STOCKPILED AND TESTED ACCORDING TO DIRECTION OF ENVIRONMENTAL CONSULTANT
5. FLAPGATE INSTALLED ON DRAIN OUTLET, ARITEC 10C
6. PLACE RIPRAP AT DRAIN OUTLET, EMBED INTO BANK 250 KG CLASS, 750MM WIDE STRIP TO SLOPE TOE
7. REINSTATE FENCE TO EXISTING OR BETTER CONDITION

File: 11104\_2016-1-104-DWG (CS)  
 at: \\sage\11104\_2016-1-104-DWG (CS)  
 Date: 15/06/2016 10:00:00  
 User: JHVE



REVISIONS	DESCRIPTION	BY	DATE	APPROVED
5				
4				
3				
2				
1	RECORD DRAWING	G.D.	JUNE 2007	

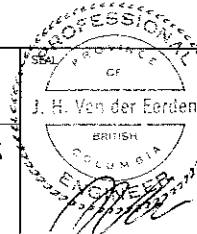


ENGINEERING DEPARTMENT

BENCH MARK - S.M. #

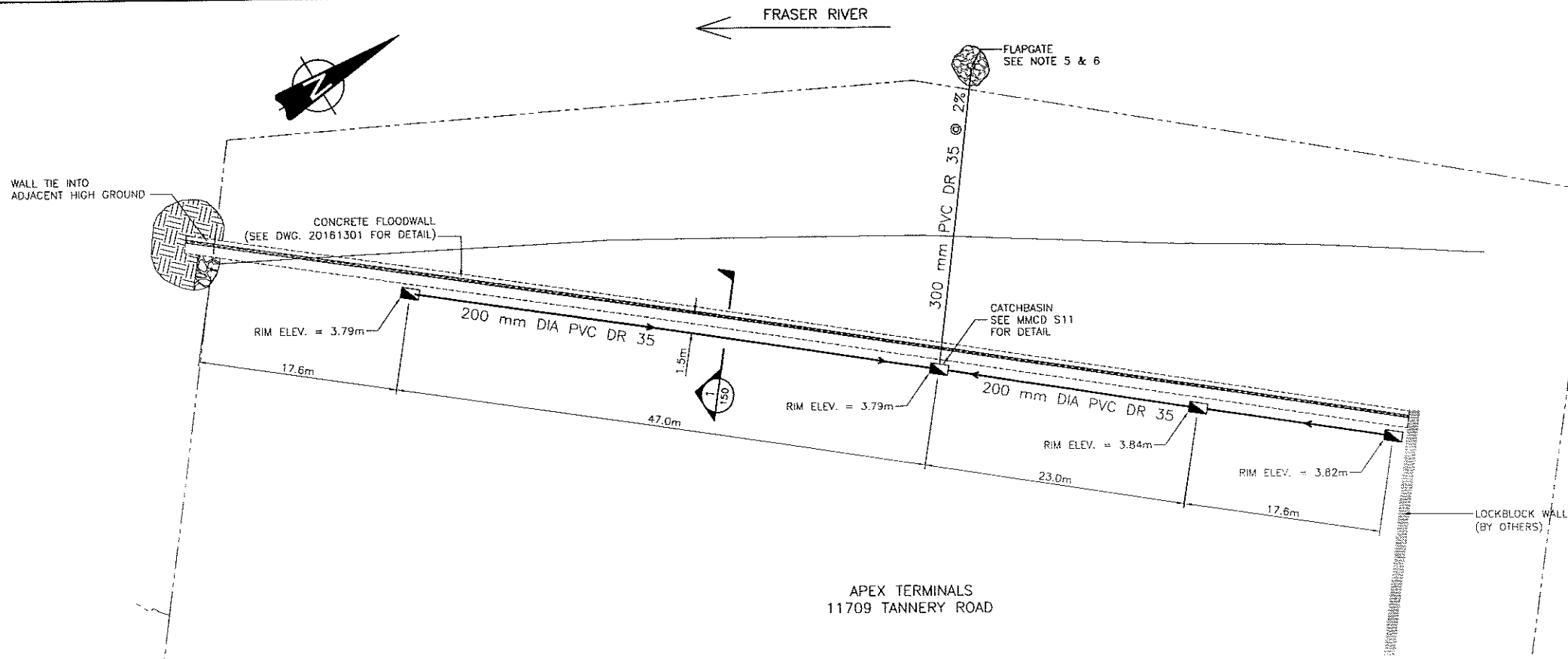
ELEV.

2007 URGENT FLOOD MITIGATION WORKS  
SITE #6 FLOODWALL



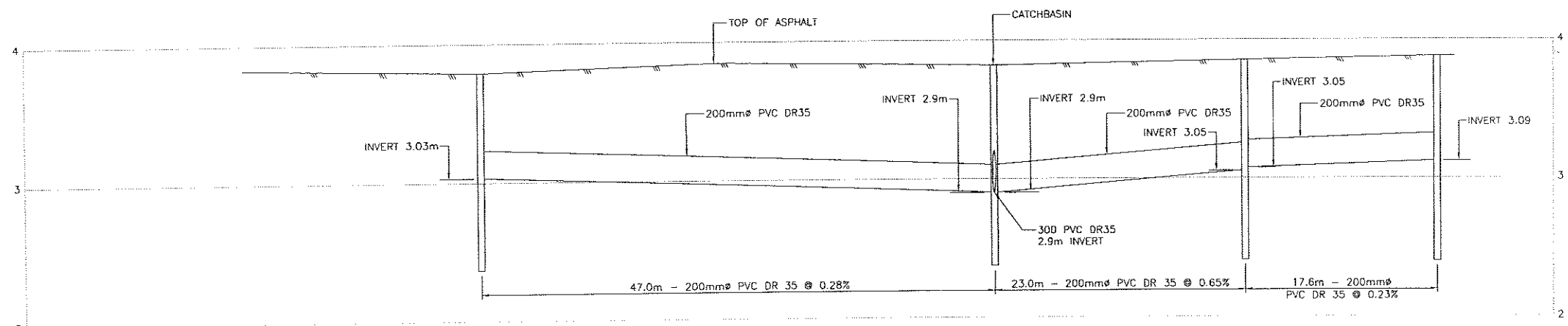
SCALE: HOR. AS NOTED VERT.	DATE	PROJECT NUMBER <b>4807-207</b>
DRAWN CHECKED	E.F./G.O. D.H.	DRAWING NUMBER 2016-1-104
DESIGNED CHECKED	M.B.	CONTRACT
P.W. P.U.	AS BUILT	SHEET OF
APPROVED	DESTROY ALL PRINTS BEARING PREVIOUS NUMBERS	REVISION 1





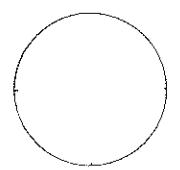
**SITE 6 PLAN**  
1:250

- NOTES:**
1. REMOVE EXISTING ASPHALT AS NECESSARY FOR WALL CONSTRUCTION
  2. WALL TO BE BACKFILLED WITH IMPORTED DYKE FILL
  3. REINSTATE ASPHALT TO BASE OF WALL (LAND SIDE)
  4. EXCESS EXCAVATED SOIL TO BE STOCKPILED AND TESTED ACCORDING TO DIRECTION OF ENVIRONMENTAL CONSULTANT
  5. FLAPGATE INSTALLED ON DRAIN OUTLET, ARMETEC 100
  6. PLACE RIPRAP AT DRAIN OUTLET, EMBED INTO BANK 250 KG CLASS, 750MM WIDE STRIP TO SLOPE TOE
  7. REINSTATE FENCE TO EXISTING OR BETTER CONDITION



**PROFILE ALONG DRAINS**  
SCALE H 1:250  
SCALE V 1:20

5/21/07 16:28  
 C:\Users\jvan\Documents\Projects\2007\URGENT FLOOD MITIGATION WORKS\DWG\1044.DWG (GO)  
 PLOT: 20101044.dwg, 20101044



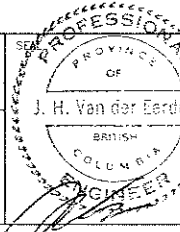
REVISIONS	DESCRIPTION	BY	DATE	APPROVED
5				
4				
3				
2				
1	RECORD DRAWINGS	GO	JUNE 2007	



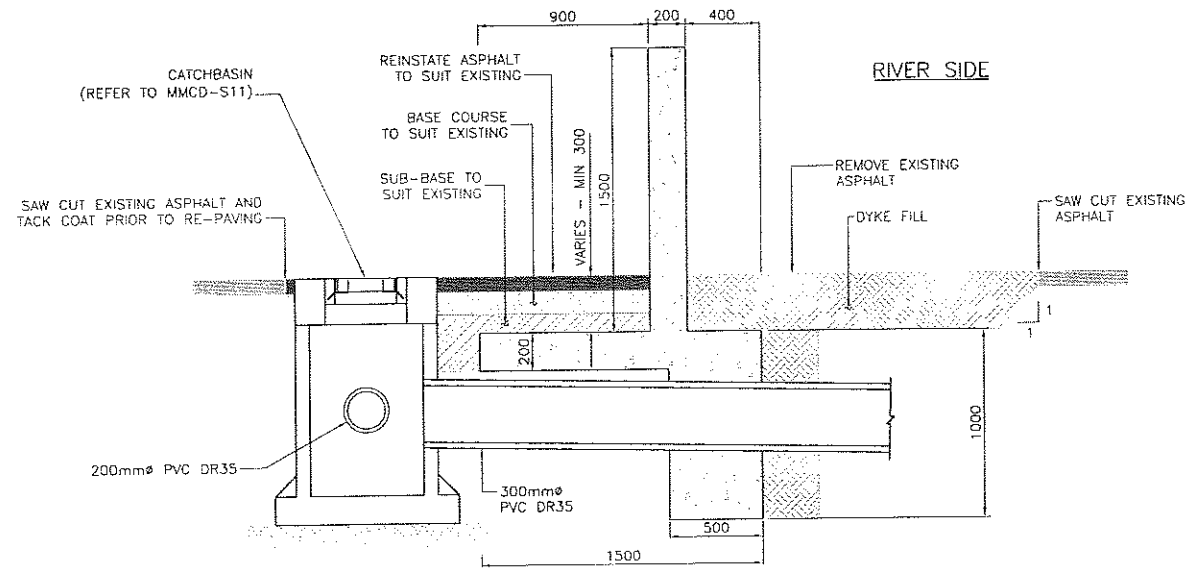
ENGINEERING DEPARTMENT

BENCH MARK - S.M. # \_\_\_\_\_ ELEV. \_\_\_\_\_

TITLE: **2007 URGENT FLOOD MITIGATION WORKS  
SITE #6 DRAINAGE DETAILS**



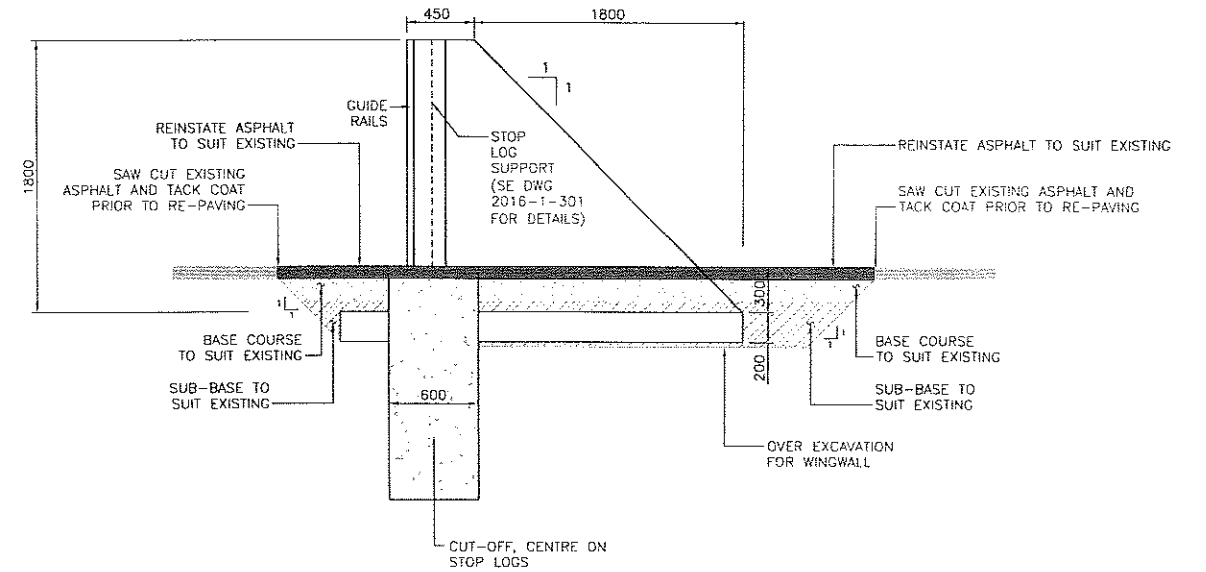
SCALE: HOR. AS NOTED VERT. _____	DATE	PROJECT NUMBER <b>4807-207</b>
DRAWN CHECKED DESIGNED CHECKED	E.F./G.O. D.H. D.H. D.H.	L.B. CONTRACT
APPROVED	AS BUILT	DRAWING NUMBER <b>2016-1-104a</b>
DESTROY ALL PRINTS BEARING PREVIOUS NUMBERS		SHEET _____ OF _____ REVISION <b>1</b>



SITE 6: TYPICAL WALL SECTION

SECTION 1  
1:20 1040

RIVER SIDE



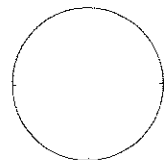
SITE 7: TYPICAL END WALL DETAIL

SECTION 2  
1:20 102

**NOTES:**

- WHERE EXISTING ASPHALT PAVEMENT IS REMOVED SAWCUT EXISTING TO VERTICAL FACE FOR BUILT JOINT AND PAVEMENT RESTORATION
- RESTORE EXISTING PAVEMENT STRUCTURE TO MATCH EXISTING OR BETTER AND TO THE FOLLOWING MINIMUM REQUIREMENTS:
  - 100mm HOT MIX ASPHALT CONCRETE
  - 150mm GRANULAR BASE COURSE
  - 300mm GRANULAR SUB-BASE
- MATERIALS, COMPACT AND WORKMANSHIP TO MMCD 2000 STANDARDS

File: 2007/06/25 (Paper Space) 1:1 Scale: 1:1 Plot: 20070616/00\_PAPER\_RIVER\_DYKE\_WORKING\_DWG(S).100\_CIVIL\_20161130.DWG (GD)

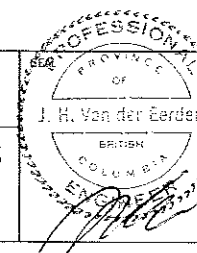


REVISIONS	DESCRIPTION	BY	DATE	APPROVED
5				
4				
3				
2	RECORD	J.B.	14 JUN 2007	
1	SEAL FOR CONSTRUCTION	J.B.	25 MAY 2007	

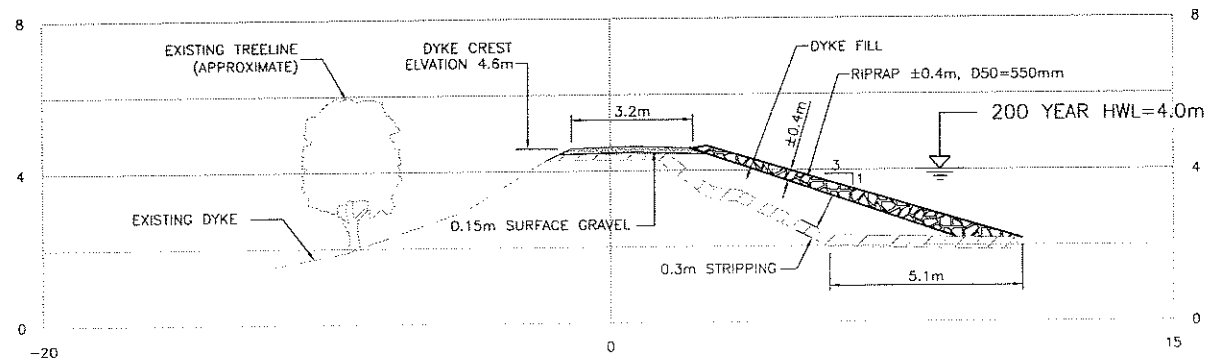


ENGINEERING DEPARTMENT

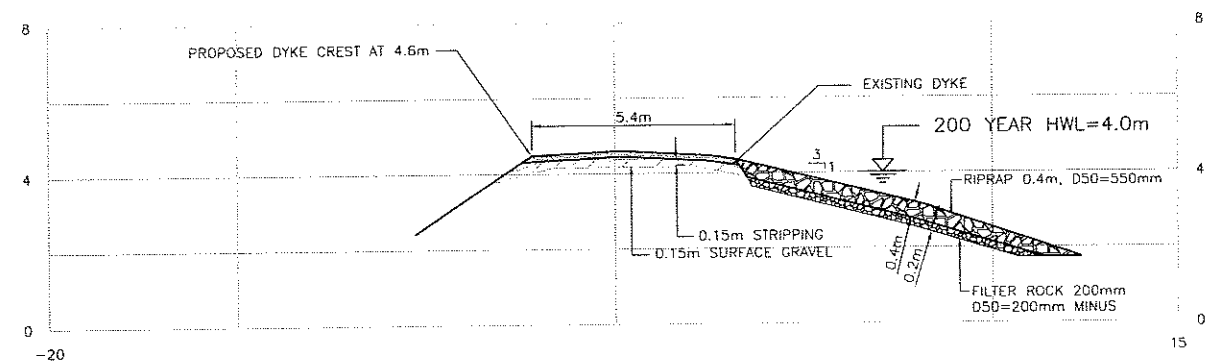
BENCH MARK - S.M. # \_\_\_\_\_ ELEV. \_\_\_\_\_  
 TITLE 2007 URGENT FLOOD MITIGATION WORKS CIVIL DETAILS



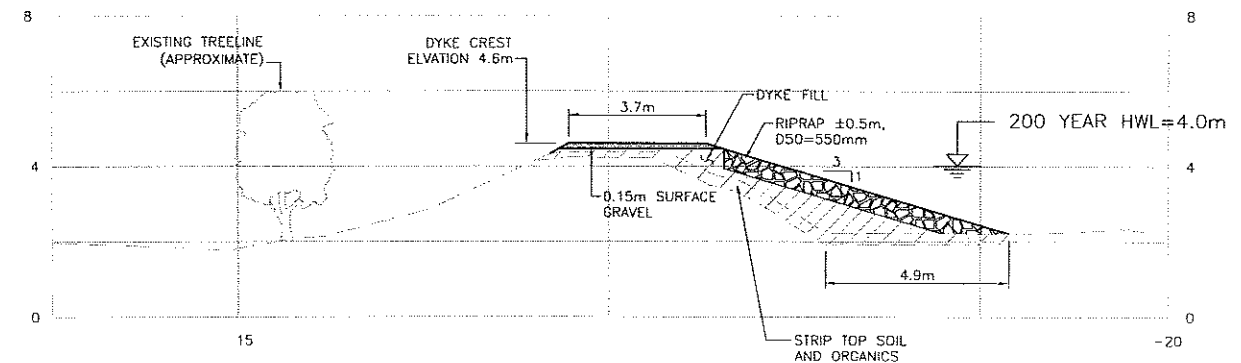
SCALE: HOR. VERT.	DATE	PROJECT NUMBER
DRAWN J.B./G.O.	L.B.	4807-207
CHECKED D.H.	CONTRACT	DRAWING NUMBER
DESIGNED D.H.		2016-1-150
P.W. P.U.	AS BUILT	SHEET 1 OF 1
APPROVED	DESTROY ALL PRINTS BEARING PREVIOUS NUMBERS	REVISION 2



SECTION 2  
1:100

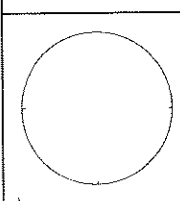


SECTION 1  
1:100



SECTION 3  
1:100

Time: 13:54  
 Plot Scale: 1:1  
 AutoCAD File: P:\20072016\01\_FRASER\_RIVER\_DIKE\WORKING\_DWG\103\_CIVIL\20161201.DWG (BD)



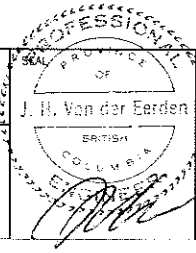
REVISIONS	DESCRIPTION	BY	DATE	APPROVED
3				
4				
3				
2				
1	RECEIVED DRAWINGS	S.C.	JUNE 2007	



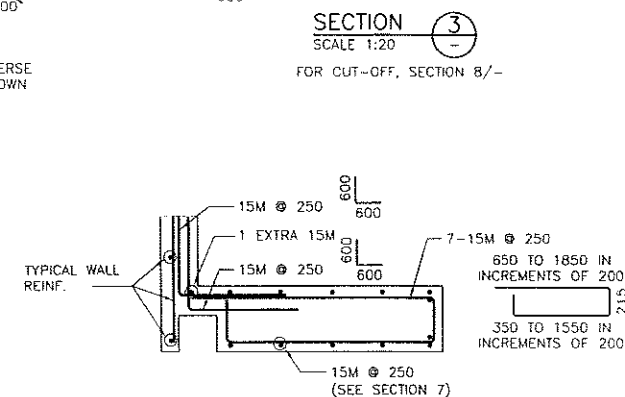
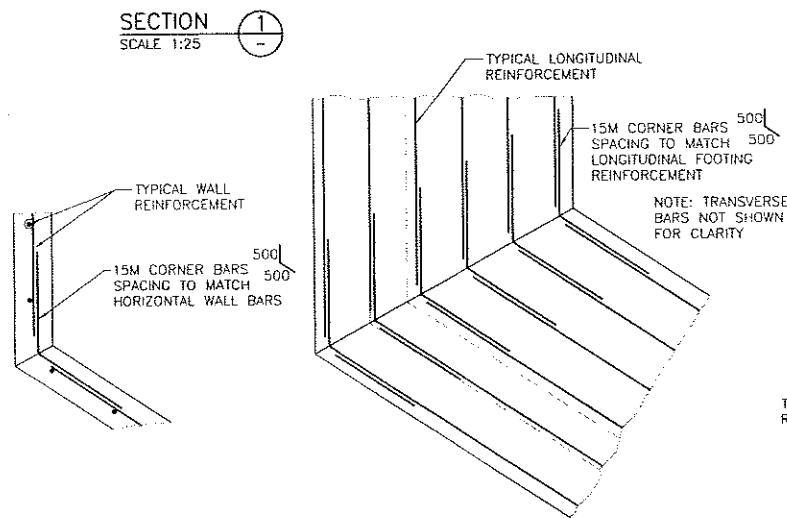
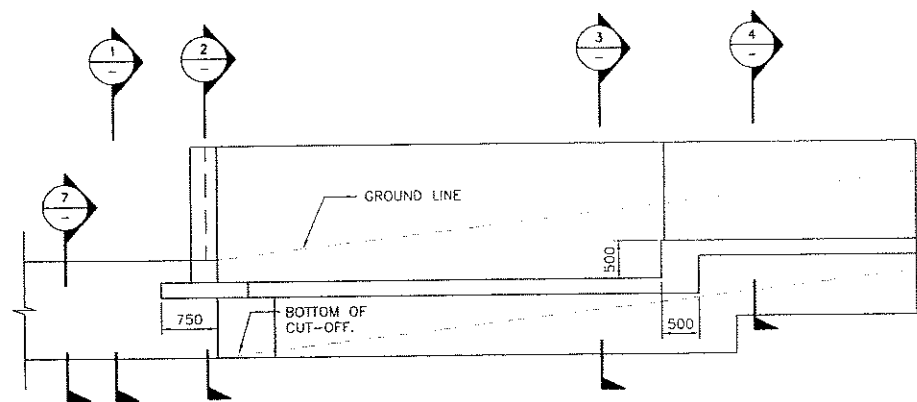
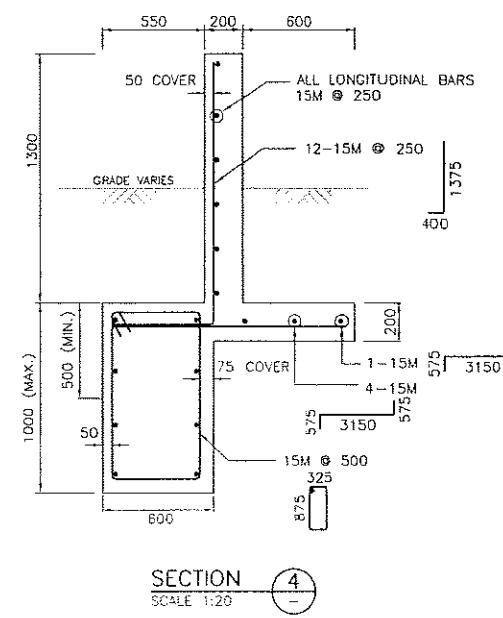
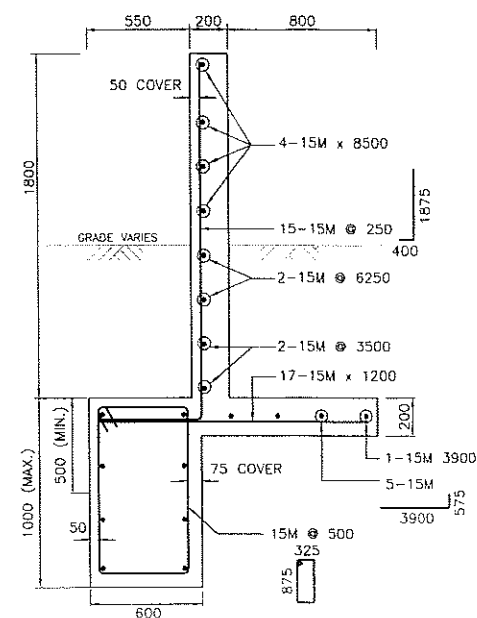
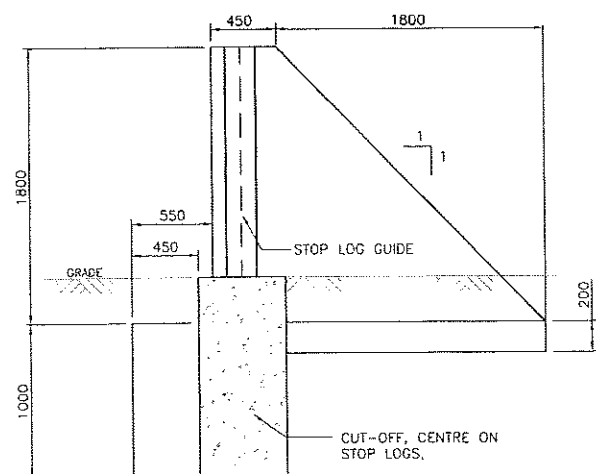
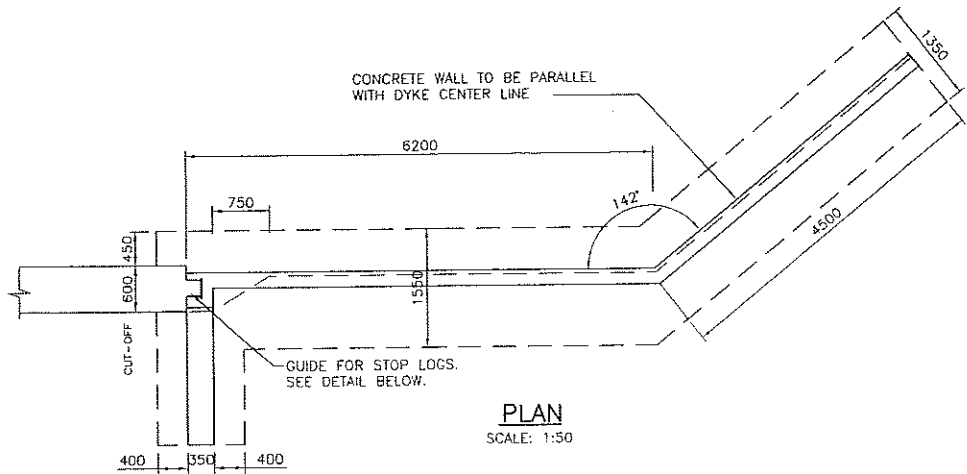
ENGINEERING DEPARTMENT

BENCH MARK - S.M. # \_\_\_\_\_ ELEV. \_\_\_\_\_

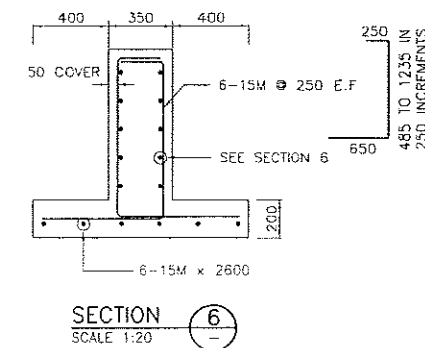
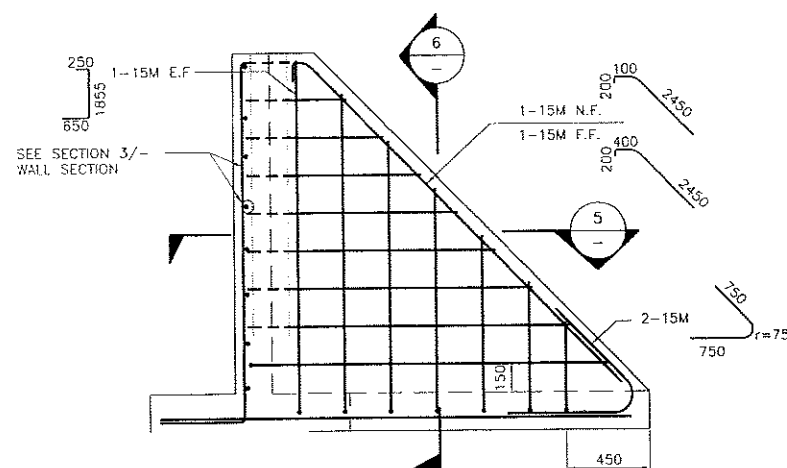
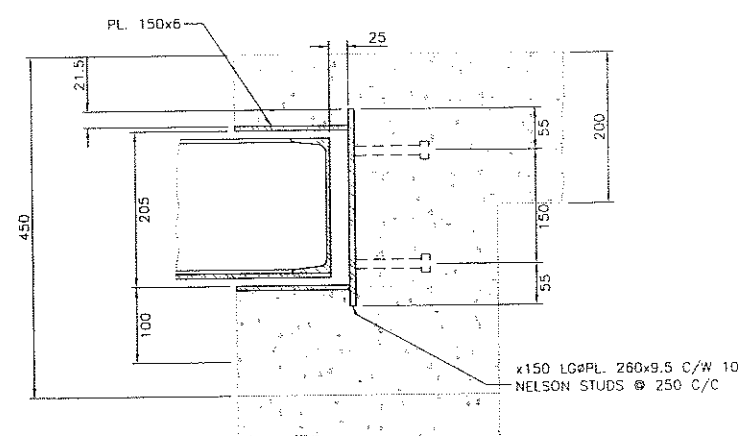
TITLE  
2007 URGENT FLOOD MITIGATION WORKS  
SITE #8 AND #9  
SECTIONS



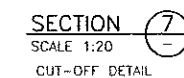
SCALE: HOR. 1:100 VERT. 1:100	DATE	PROJECT NUMBER 4807-207
DRAWN CHECKED	R.Z./C.G. D.H.	DRAWING NUMBER 2016-1-201
DESIGNED CHECKED	CONTRACT	SHEET OF
P.W. P.U.	AS BUILT	REVISION
APPROVED	DESTROY ALL PRINTS BEARING PREVIOUS NUMBERS	1



	No.	DIMENSION CL.
SECTION 3:	6	390 TO 840 IN 90 INCREMENTS PLUS 2 @ 840
SECTION 4:	6	390 TO 840 IN 90 INCREMENTS



- NOTES:
- ALL REINFORCEMENT - 15M GRADE 400W TO CSA G30.18.
  - CONCRETE - CLASS C1 TO CSA A23.1.



STOP LOG GUIDE DETAIL SCALE: 1:5

SECTION 2 SCALE: 1:20

SECTION 7 CUT-OFF DETAIL SCALE: 1:20

SECTION 6 SCALE: 1:20

Date: 2007/06/25  
 Drawn: J.B./G.C.  
 Checked: M.B.  
 P.W. P.U.  
 Approved: R.M.B.  
 File: P:\2007\2016\URGENT\_FLOOD\_MITIGATION\_WORKS\_SITE\_7\_DETAILS\_DRAWING.dwg (60)



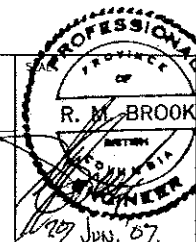
REVISIONS	DESCRIPTION	BY	DATE	APPROVED
5				
4				
3				
2	RECORD	J.B.	14 JUN 2007	
1	ISSUED FOR CONSTRUCTION	E.F.	24 MAY 2007	



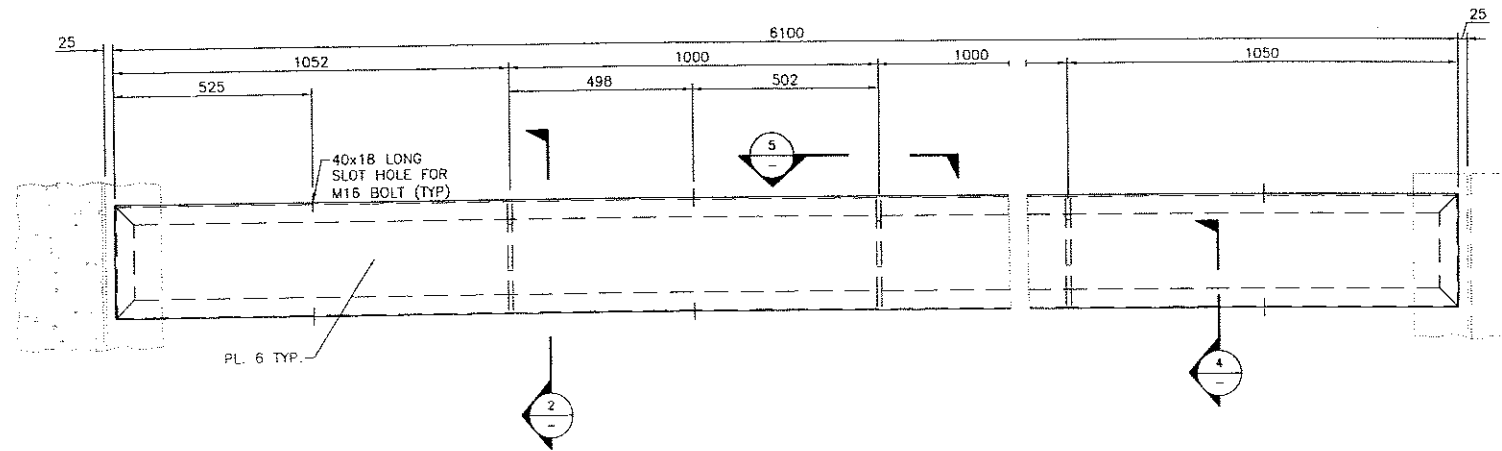
ENGINEERING DEPARTMENT

BENCH MARK - S.M. #

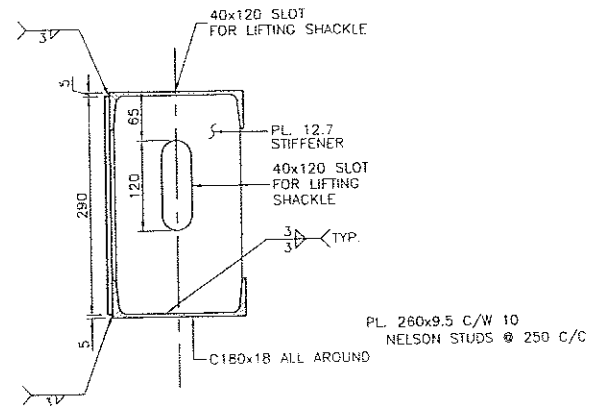
TITLE  
2007 URGENT FLOOD MITIGATION WORKS  
SITE 7 DETAILS



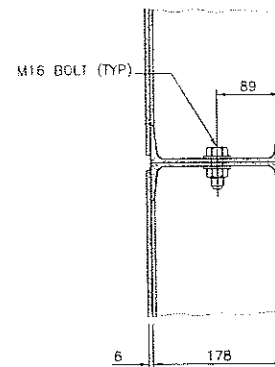
SCALE:	DATE	PROJECT NUMBER
HOR. 1:200 VERT. 1:200		4807-207
DRAWN E.F./J.B./G.C. CHECKED D.H.	L.R.	DRAWING NUMBER
DESIGNED M.B. CHECKED	CONTRACT	2016-1-301
P.W. P.U.	AS BUILT	SHEET OF
APPROVED	DESTROY ALL PRINTS BEARING PREVIOUS NUMBERS	REVISION 2



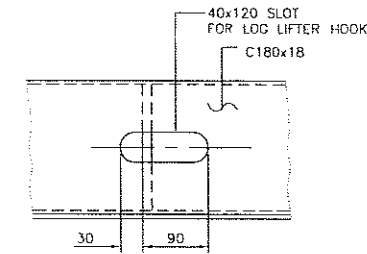
TYPICAL STEEL STOP LOG ELEVATION  
1:10



SECTION 2  
SCALE 1:5



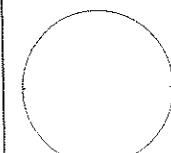
SECTION 4  
SCALE 1:5



SLOT DETAIL

SECTION 5  
SCALE 1:10

11.01  
 2007/10/21  
 1:1  
 0 File: P:\AS2010\10\10\FRASEL\_RIVER\_DIKE\_WORKING\_DRAWING\_IDO\_CIVIL\2018\302.DWG (00)



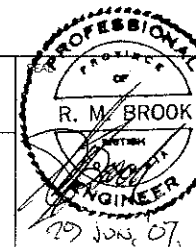
REVISIONS	DESCRIPTION	BY	DATE	APPROVED
3				
4				
3				
2				
1				



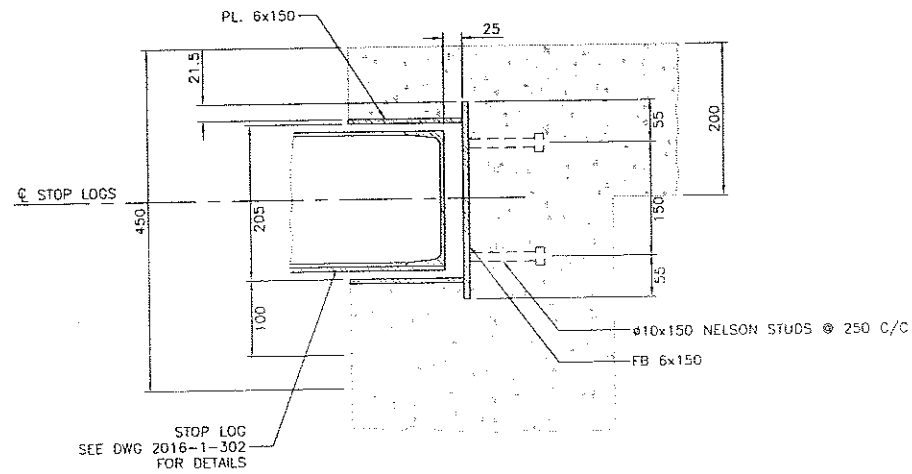
ENGINEERING  
DEPARTMENT

BENCH MARK - S.M. # \_\_\_\_\_ ELEV. \_\_\_\_\_

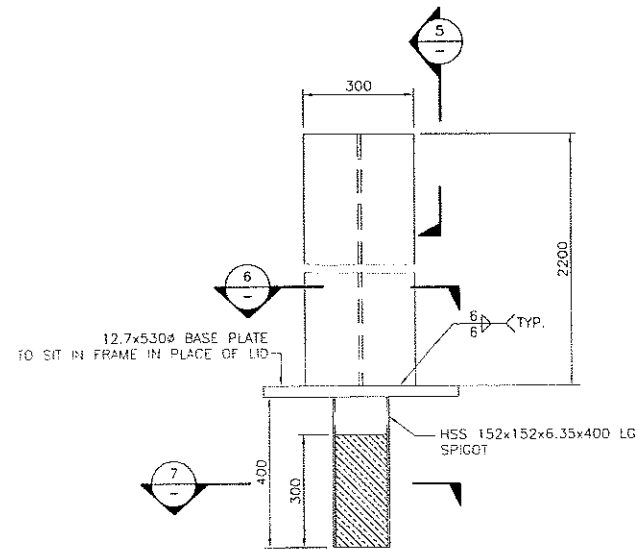
TITLE  
2007 URGENT FLOOD MITIGATION WORKS  
STOP LOG DETAILS



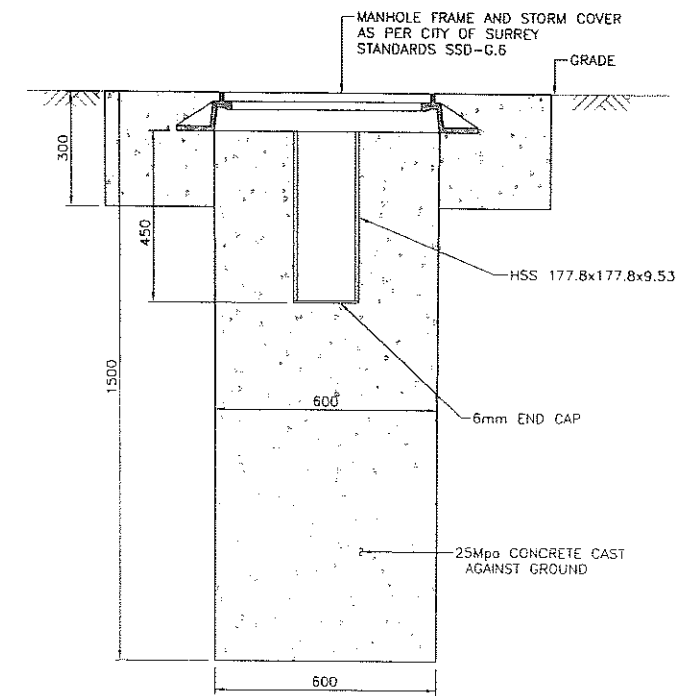
SCALE: HOR. 1:200 VERT. 1:200	DATE	PROJECT NUMBER 4807-207
DRAWN C.O. CHECKED D.H.	L.B.	DRAWING NUMBER 2016-1-302
DESIGNED M.B. CHECKED	CONTRACT	SHEET OF
P.W. P.U.	AS BUILT	
APPROVED	DESTROY ALL PRINTS BEARING PREVIOUS NUMBERS	REVISION 1



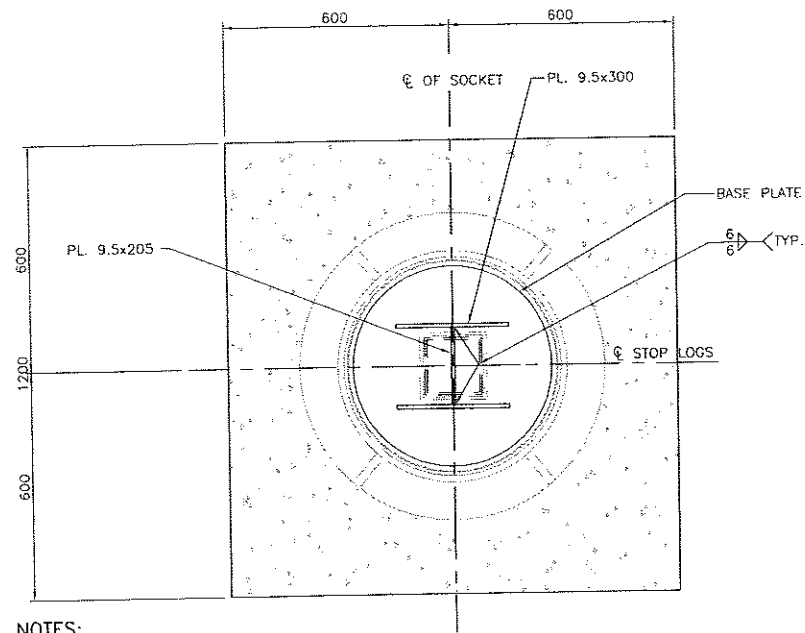
SITE 7: STOP LOG GUIDE DETAIL  
SCALE: 1:5



SITE 7: TYPICAL STOP LOG INTERIOR POST  
SCALE: 1:10

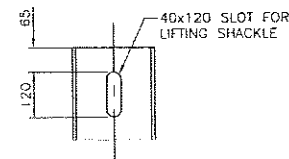


SITE 7: TYPICAL STOP LOG POST BASE  
SCALE: 1:10

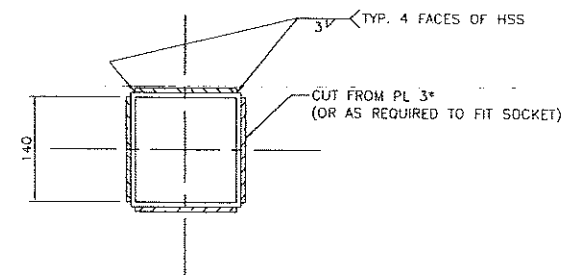


NOTES:  
1. CENTRE MANHOLES FRAMES ON SOCKETS  
2. GROUT FRAME INTO CONCRETE

SECTION 6  
SCALE 1:10



SECTION 5  
SCALE 1:10

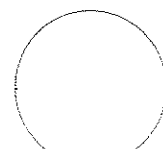


SECTION 7  
SCALE 1:5

NOTES:

1. GRIND WELD INSIDE SOCKET FLAT
2. \*SELECT PLATE THICKNESS TO ALLOW SNUG FIT IN SOCKET
3. COAT INSIDE FINISHED SOCKET AND OUTSIDE OF SPIGOT AND BASE PLATE WITH ZINGA OR APPROVED ZINC RICH PAINT
4. CROSSING "O" AND POST NUMBER TO BE STAMPED ON EACH POST

1:10 1/4" = 1" (Paper: Sheet)  
 5 Files: P:\20072016\100\_PRCRGE\_RIVER\_DWG\WORKING\_DWG\100\_CIVIL\_20161203.DWG (03)



REVISIONS	DESCRIPTION	BY	DATE	APPROVED
5				
4				
3				
2				

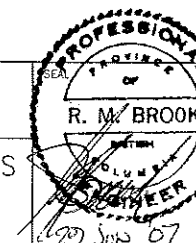


ENGINEERING DEPARTMENT

BENCH MARK - S.M. #

ELEV.

TITLE  
2007 URGENT FLOOD MITIGATION WORKS  
STOP LOG POST BASES AND GUIDE  
POST DETAILS



SCALE: HOR. 1:200 VERT. 1:200	DATE	PROJECT NUMBER 4807-207
DRAWN G.D. CHECKED D.H.	L.B.	DRAWING NUMBER 2016-1-303
DESIGNED M.B. CHECKED	CONTRACT	SHEET OF
P.W. P.U.	AS BUILT	REVISION 1
APPROVED	DESTROY ALL PRINTS BEARING REVISION NUMBER	



**Appendix C**  
Geotechnical Advice



**Golder Associates Ltd.**

500 - 4260 Still Creek Drive  
Burnaby, British Columbia V5C 6C6  
Telephone 604-296-4200  
Fax 604-298-5253



May 15, 2007

E/07/1101  
07-1411-0116

Associated Engineering  
Suite 300 – 4940 Canada Way  
Burnaby, BC  
V5G 4M5

Attention: Mr. Wayne Zhan, P.Eng.

**RE: GEOTECHNICAL DESIGN INPUT  
MANSON CANNEL DYKE UPGRADE 2007  
FRASER RIVER DYKES - TANNERY ROAD AREA  
SURREY, BC**

Dear Sir:

Golder Associates Limited (Golder) has completed a review of the geotechnical site conditions at the sites of the proposed dyke upgrades in north Surrey. The geotechnical review is part of the effort for the dyke upgrade work currently underway as part of 'Urgent Dyke Upgrade' program by the Province of British Columbia.

The results of our review at the Manson Cannel dyke in north Surrey in the area of Tannery Road is presented below:

**Site 8 - Manson Cannel**

This area is located just west of Tannery Road in the area to the east of the Manson Cannel Floodbox. The dyke in this area requires placement of a zone of new dyke fill up to 1.0 m thick on the river side of the existing dyke. Inspection of the foreshore area at this section of dyke on May 4, 2007 indicates the dyke and surrounding area is underlain by a compact sand to silty sand. Based on available regional geotechnical data, the sand at the site extends to depth under this section of the Fraser River.



Based on the inspection on May 4, 2007, it is anticipated that the proposed dyke widening can proceed as planned. The new fill will result in estimated settlements of the present dyke structure of some 150 to 200 mm, so an overbuild of 300 mm is suggested. The current dyke section will provide the low permeable zone to minimize seepage through the dyke at this site.

Further, we understand that dyke fills of less than 200 mm are proposed over the Manson Cannel floodbox. These thin fills proposed over the floodbox may result in some minor settlement of the floodbox. The settlement should be less than 20 mm but the pipes at the pump station and floodbox should be inspected this summer.

We trust this letter provides the information you require at this time.

Yours very truly,

**GOLDER ASSOCIATES LTD.**

**ORIGINAL SIGNED BY**

John A. Hull, P.Eng.  
Principal

JAH/jnt  
07-1411-0116

O:\FINAL\2007\1411\07-1411-0116\LET-0515\_07 AE-MANSON CANNEL DYKE UPGRADE.DOC

**Golder Associates Ltd.**

500 – 4260 Still Creek Drive  
Burnaby, British Columbia, Canada V5C 6C6  
Telephone (604) 296-4200  
Fax (604) 298-5253



E/07/1139  
07-1411-0116

May 18, 2007

Associated Engineering  
Suite 300 – 4940 Canada Way  
Burnaby, BC V5G 4M5

Attention: Mr. Wayne Zhan, P.Eng.

**RE: GEOTECHNICAL DESIGN INPUT  
SITE 6-APEX TERMINALS DYKE UPGRADE 2007  
FRASER RIVER DYKES TANNERY ROAD AREA  
SURREY, BC**

Dear Sir:

Golder Associates Ltd. (Golder) has completed a review of the geotechnical site conditions at the sites of the proposed dyke upgrades in north Surrey. The geotechnical review is part of the effort for the dyke upgrade work currently underway as part of 'Urgent Dyke Upgrade' program by the Province of British Columbia.

The results of our review at the Apex Terminal site in north Surrey in the area of Tannery Road is presented below:

**1.0 SITE 6-APEX TERMINAL**

This section of dyke is located at the Apex Terminal yard which is located just east of Tannery Road. We understand that the terminal yard area is at approximately elevation 3.7 m or just below the design flood level at 4.1 m (200 year design flood level). Further, the yard grade is some 2 to 3 m above the elevation of the foreshore river bank area. The yard area is paved and the pavement appears to be in good shape. The yard has been used to store finished wood products and it is understood the bundles of wood have been stacked up to approximately 4 m high.



Based on the site inspection by Golder on May 8<sup>th</sup>, the yard area appears to be underlain by a dredged sand fill or a clean sand and gravel fill. This material has a high hydraulic conductivity that will allow seepage to the landside or rear to any dyke proposed at this location. Thus, any dyke or wall at the site that is to act as a dyke will require a cut-off zone of clay or equivalent down through the granular yard fills and into the underlying silts. Alternatively, a cut off wall of sufficient depth to reduce the seepage flows and water pressures on the land side of the proposed dyke or wall would provide reasonable protection.

## 2.0 GEOTECHNICAL DESIGN

For the purpose of the seepage pressure assessment, it has been assumed that the asphalt pavement is at least 75 mm thick and has a minimum density of 22.8 kN/m<sup>3</sup>. The hydraulic conductivity of the existing dredge materials was assumed to be approximately 1 order of magnitude higher than the asphalt.

The seepage analysis at this site indicates that for the concrete dyke / wall to retain up to 50 cm of water for a sustained period, the dyke concrete wall will require a cut off at least 1.0 m deep. The cut off could be an extension of the wall footing and should be on the river side of the wall. It is noted that if the wall is to retain more than 50 cm of water for a sustained period of time, the stability the wall under these water level conditions and the predicted seepage flow conditions may be compromised. This is a result of the seepage flows under the wall starting to cause internal erosion of the sands that underlie the wall. Consequently, it will be necessary to place a gravel berm 2 m wide and 50 cm thick at the rear of the wall to address the high seepage flows and uplift pressures.

The wall footing may be designed for an allowable bearing capacity of 30 kPa. This does not consider the possibility that under a design earthquake and if the water level under the wall is at the ground surface behind the wall that the underlying soils may liquefy.

We trust this letter provides the information you require at this time.

Yours very truly,  
**GOLDER ASSOCIATES LTD.**

**ORIGINAL SIGNED BY**

John A. Hull, P.Eng.  
Principal

JAH/nnv  
07-1411-0116

O:\Final\2007\1411\07-1411-0116\let-0518\_07 AE-Site 6 Apex Terminals.doc

**Golder Associates Ltd.**

500 – 4260 Still Creek Drive  
Burnaby, British Columbia, Canada V5C 6C6  
Telephone (604) 296-4200  
Fax (604) 298-5253



E/07/1226  
07-1411-0116

May 31, 2007

Associated Engineering  
Suite 300-4940 Canada Way  
Burnaby, BC, V5G 4M5

Attention: Mr. Wayne Zhan, P.Eng.

**RE: GEOTECHNICAL DESIGN INPUT  
SITE 7-DYKE ROAD-DYKE UPGRADES 2007  
FRASER RIVER DYKES-TANNERY ROAD AREA  
SURREY, BC**

Dear Sir:

Golder Associates Ltd. (Golder) has completed a review of the geotechnical site conditions at the site of the above proposed dyke upgrade in north Surrey. The geotechnical review is part of the effort for the dyke upgrade work currently underway as part of 'Urgent Dyke Upgrade' program by the Province of British Columbia.

The results of our review at Dyke Road / Lindal Cedar mill in north Surrey in the area of Tannery Road is presented below:

**1.0 SITE 7-ROAD TO LINDAL CEDAR**

This site is located east of Apex Terminal and based on available survey data the ground surface (road) at the wall site is at elevation 3.4 m. Further, the 200 year flood elevation at this site is at 4.1 m. The site conditions are based on a few test pits excavated in the area of the proposed wall / dyke. The results of the excavations indicate the site appears to be underlain by a layer of gravel fill and a sand or silty sand which extends to depths of between 1.2 m and 1.7 m. The sand fill is underlain by grey clay and clayey silt. The test pits were stopped in the clay layer.



At this site the upgraded dyke would consist of a temporary dyke / wall structure and would include stop logs supported by 2 or 3 posts. The stop logs would only be installed if the river level increases and requires the road to be closed to minimize flooding to the area south of the site. The dyke / wall structure will require a cut-off element or it may be possible to construct an upstream low permeable zone to lengthen the seepage path under the temporary stop-log wall / dyke structure.

## **2.0 GEOTECHNICAL DESIGN**

The seepage analysis indicates that for the wall to retain up to 70 cm of water for a sustained period, the wall will require a cut off at least 1.0 m deep. The cut off would be an extension of or a continuation of the concrete section extending from the stop log post supports. The cut off wall and the 1.2 m deep post supports would provide the lateral support for the 70 cm of water which is anticipated at on the river at this site. It is anticipated that the pavement at the site which has been removed to construct the wall will be replaced.

The cut-off wall for this section of dyke extends into the clay layer at the site which should reduce seepage forces; however it is noted that if the wall is to retain more than 70 cm of water for a sustained period the Factor of Safety for the wall /dyke under these water level conditions and the predicted seepage flow conditions would approach 1.0. Thus, seepage flows under the wall may start to cause erosion of the sands that underlie the wall. Further, in the case where excessive seepage is observed, it is recommended that a gravel berm 2 m wide and at least 50 cm thick be placed at the rear of the wall to manage seepage flows and minimize erosion of the soils from under the wall.

We trust this letter provides the information you require and is consistent with our project needs and project schedule.

Yours very truly,

**GOLDER ASSOCIATES LTD.**

**ORIGINAL SIGNED BY**

John Hull, P.Eng  
Principal

JAH/nnv  
07-1411-0116

# Appendix D

## Concrete

**METRO TESTING LABORATORIES**#104 - 12882 85th Avenue, Surrey, B.C. V3W 0K8  
Phone: (604) 543-8871 Fax: (604) 543-8847**CONCRETE TEST REPORT**

PROJECT NO. S-819

CLIENT ASSOCIATED ENGINEERING (B.C.)  
C.C.TO ASSOCIATED ENGINEERING (B.C.)  
300 - 4940 CANADA WAY  
BURNABY, BC  
V5G 4M5

ATTN: JOHN VAN RIORDAN

PROJECT FRASER RIVER DYKE - URGENT FLOOD WORKS  
CONCRETEAPEX TERMINAL, TANNERY ROAD  
SURREY

SET NO. 1 NO. OF SPECIMENS 3 DATE RECEIVED 2007.May.14 DATE CAST 2007.May.11

SPCM NO.	SPECIMEN TYPE	CURE COND.	DATE TESTED	AGE AT TEST (DAYS)	AVERAGE DIAMETER (mm) OR SIDE (mm x mm)	AVERAGE LENGTH OR SPAN (mm)	MAXIMUM LOAD (KN)	COMPRESSIVE OR FLEXURAL STRENGTH (MPa) Average	FAILURE TYPE
A	Cylinder	Lab	May.18	7	101.6	203.2	341	42.1	
B	Cylinder	Lab	Jun.08	28	101.6	203.2	398	49.1	
C	Cylinder	Lab	Jun.08	28	101.6	203.2	401	49.5 49.3	

SPECIFIED STRENGTH	30 MPa @ 28 DAYS	CONCRETE TEMP	16.0 °C	AIR TEMP	13.0 °C		
CEMENT CONTENT	kg/m <sup>3</sup> TYPE GU	SLUMP	80 mm	SPEC.	80 ± 20		
POZZOLAN CONTENT	kg/m <sup>3</sup> TYPE FA	AIR	3.0 %	SPEC.	6.5 ± 1.5		
MAXIMUM SIZE AGGREGATE	20 mm	PLASTIC DENSITY	kg/m <sup>3</sup>	HARDENED DENSITY	kg/m <sup>3</sup>		
BATCH TIME	07:52	CAST TIME	09:10	CAST BY	MTL RG	MOULD TYPE PLASTIC	
ADMIXTURES		CURING CONDITIONS	CURING BOX	INITIAL CURING TEMP: MAXIMUM	22.0 °C	MINIMUM	16.0 °C
SUPPLIER	OCEAN READY MIX	LOCATION	FLOOD CONTROL WALL FOOTING				
MIX NO.	330PF6	COMMENTS	CONTRACTOR & SUPPLIER WERE NOTIFIED OF LOW AIR CONTENT				
TRUCK NO.	703	TICKET NO.	1881863				
LOAD VOL.	12 m <sup>3</sup>	CUM. VOL.	12 m <sup>3</sup>				
WATER ADDED	I	AUTH. BY	2007.Jun.12				
Page 1 of 1		METRO TESTING LABORATORIES	PER.				





METRO TESTING LABORATORIES

#104 - 12882 85th Avenue, Surrey, B.C. V3W 0K8  
Phone: (604) 543-8871 Fax: (604) 543-8847

CONCRETE TEST REPORT

PROJECT NO. S-819

CLIENT ASSOCIATED ENGINEERING (B.C.)  
C.C.

TO ASSOCIATED ENGINEERING (B.C.)  
300 - 4940 CANADA WAY  
BURNABY, BC  
V5G 4M5

ATTN: JOHN VAN RIORDAN

PROJECT FRASER RIVER DYKE - URGENT FLOOD WORKS . APEX TERMINAL, TANNERY ROAD  
CONCRETE SURREY

SET NO. 2 NO. OF SPECIMENS 3 DATE RECEIVED 2007.May.15 DATE CAST 2007.May.14

SPCM NO.	SPECIMEN TYPE	CURE CONDN	DATE TESTED	AGE AT TEST (DAYS)	AVERAGE DIAMETER (mm) OR SIDE (mm x mm)	AVERAGE LENGTH OR SPAN (mm)	MAXIMUM LOAD (kN)	COMPRESSIVE OR FLEXURAL STRENGTH (MPa) Average	FAILURE TYPE
A	Cylinder	Lab	May.22	8	101.6	203.2	395	48.7	
B	Cylinder	Lab	Jun.11	28	101.6	203.2	444	54.8	
C	Cylinder	Lab	Jun.11	28	101.6	203.2	453	55.9 55.3	

SPECIFIED STRENGTH 30 MPa @ 28 DAYS		CONCRETE TEMP 21.0 °C AIR TEMP 21.0 °C		
CEMENT CONTENT kg/m <sup>3</sup> TYPE GU	SLUMP 150 mm SPEC. 80 ± 20	POZZOLAN CONTENT kg/m <sup>3</sup> TYPE FA	AIR 6.0 % SPEC. 6.5 ± 1.5	
MAXIMUM SIZE AGGREGATE 20 mm	PLASTIC DENSITY kg/m <sup>3</sup>	HARDENED DENSITY kg/m <sup>3</sup>		
BATCH TIME 12:47	CAST TIME 14:30	MOULD TYPE PLASTIC		
ADMIXTURES	CAST BY MTL RG	CURING CONDITIONS CURING BOX		
INITIAL CURING TEMP: MAXIMUM 22.0 °C MINIMUM 16.0 °C		LOCATION		
SUPPLIER OCEAN READY MIX		SECOND FOOTING 30M.		
MIX NO. 330PF6		COMMENTS		
TRUCK NO. 133 TICKET NO. 1882372		SUPERINTENDENT, SUPPLIER AND OCEAN Q.C. WERE NOTIFIED OF THE TEST RESULT.		
LOAD VOL. 10 m <sup>3</sup> CUM. VOL. 10 m <sup>3</sup>				
WATER ADDED I AUTH. BY				
Page 1 of 1 2007.Jun.12		METRO TESTING LABORATORIES PER. <i>W.R.</i>		

*O.K.*  
*[Signature]*



**METRO TESTING LABORATORIES**

#104 - 12882 85th Avenue, Surrey, B.C. V3W 0K8  
 Phone: (604) 543-8871 Fax: (604) 543-8847

**CONCRETE TEST REPORT**

PROJECT NO. S-819

CLIENT ASSOCIATED ENGINEERING (B.C.)  
 C.C.

TO ASSOCIATED ENGINEERING (B.C.)  
 300 - 4940 CANADA WAY  
 BURNABY, BC  
 V5G 4M5

ATTN: JOHN VAN RIORDAN

PROJECT FRASER RIVER DYKE - URGENT FLOOD WORKS  
 CONCRETE

APEX TERMINAL, TANNERY ROAD  
 SURREY

SET NO. 3 NO. OF SPECIMENS 3 DATE RECEIVED 2007.May.17 DATE CAST 2007.May.16

SPCM NO.	SPECIMEN TYPE	CURE COND.	DATE TESTED	AGE AT TEST (DAYS)	AVERAGE DIAMETER (mm) OR SIDE (mm x mm)	AVERAGE LENGTH OR SPAN (mm)	MAXIMUM LOAD (kN)	COMPRESSIVE OR FLEXURAL STRENGTH (MPa) Average	FAILURE TYPE
A	Cylinder	Lab	May.23	7	101.6	203.2	283	34.9	
B	Cylinder	Lab	Jun.13	28	101.6	203.2	359	44.3	
C	Cylinder	Lab	Jun.13	28	101.6	203.2	348	42.9 43.6	

SPECIFIED STRENGTH 30 MPa @ 28 DAYS		CONCRETE TEMP 24.0 °C AIR TEMP 18.0 °C		
CEMENT CONTENT kg/m <sup>3</sup> TYPE GU	SLUMP 100 mm SPEC. 80 ± 20	POZZOLAN CONTENT kg/m <sup>3</sup> TYPE FA	AIR 5.3 % SPEC. 6.5 ± 1.5	
MAXIMUM SIZE AGGREGATE 20 mm	PLASTIC DENSITY kg/m <sup>3</sup>	BATCH TIME 13:00	HARDENED DENSITY kg/m <sup>3</sup>	MOULD TYPE PLASTIC
ADMIXTURES	CAST TIME 14:07	CAST BY MTL RG	CURING CONDITIONS CURING BOX	
INITIAL CURING TEMP: MAXIMUM 22.0 °C MINIMUM 16.0 °C		LOCATION		
SUPPLIER OCEAN READY MIX		WALLS, SECTION 2, FOOTINGS SECTION 3.		
MIX NO. 330PF6		COMMENTS		
TRUCK NO. 118 TICKET NO. 1882872				
LOAD VOL. 10.4 m <sup>3</sup> CUM. VOL. 10.4 m <sup>3</sup>				
WATER ADDED AUTH. BY				
Page 1 of 1 2007.Jun.15		METRO TESTING LABORATORIES PER. <i>W. Z.</i>		

*OK*  
*M*



**METRO TESTING LABORATORIES**

#104 - 12882 85th Avenue, Surrey, B.C. V3W 0K8  
Phone: (604) 543-8871 Fax: (604) 543-8847

**CONCRETE  
TEST REPORT**

PROJECT NO. S-819

CLIENT ASSOCIATED ENGINEERING (B.C.)  
C.C.

TO  
ASSOCIATED ENGINEERING (B.C.)  
300 - 4940 CANADA WAY  
BURNABY, BC  
V5G 4M5

ATTN: JOHN VAN RIORDAN

PROJECT FRASER RIVER DYKE - URGENT FLOOD WORKS  
CONCRETE

APEX TERMINAL, TANNERY ROAD  
SURREY

SET NO. 4 NO. OF SPECIMENS 3 DATE RECEIVED 2007.May.18 DATE CAST 2007.May.17

SPCM NO.	SPECIMEN TYPE	CURE COND.	DATE TESTED	AGE AT TEST (DAYS)	AVERAGE DIAMETER (mm) OR SIDE (mm x mm)	AVERAGE LENGTH OR SPAN (mm)	MAXIMUM LOAD (kN)	COMPRESSIVE OR FLEXURAL STRENGTH (MPa) Average	FAILURE TYPE
A	Cylinder	Lab	May.24	7	101.6	203.2	242	29.9	
B	Cylinder	Lab	Jun.14	28	101.6	203.2	374	46.1	
C	Cylinder	Lab	Jun.14	28	101.6	203.2	382	47.1 46.6	

SPECIFIED STRENGTH 30 MPa @ 28 DAYS		CONCRETE TEMP 20.0 °C AIR TEMP 19.0 °C			
CEMENT CONTENT kg/m <sup>3</sup> TYPE GU	SLUMP 80 mm SPEC. 80 ± 20				
POZZOLAN CONTENT kg/m <sup>3</sup> TYPE FA	AIR 5.0 % SPEC. 6.5 ± 1.5				
MAXIMUM SIZE AGGREGATE 20 mm	PLASTIC DENSITY kg/m <sup>3</sup>				
BATCH TIME 13:53	HARDENED DENSITY kg/m <sup>3</sup>	CAST TIME 14:40		MOULD TYPE PLASTIC	
ADMIXTURES	CAST BY MTL RG	CURING CONDITIONS CURING BOX		INITIAL CURING TEMP: MAXIMUM 22.0 °C MINIMUM 16.0 °C	
SUPPLIER OCEAN READY MIX		LOCATION FOOTINGS, SECTION 4			
MIX NO. 330PF6		COMMENTS			
TRUCK NO. 123 TICKET NO. 1883269					
LOAD VOL. 10.4 m <sup>3</sup> CUM. VOL. 10.4 m <sup>3</sup>					
WATER ADDED   AUTH. BY					
Page 1 of 1 2007.Jun.15		METRO TESTING LABORATORIES		PER. <i>W. G.</i>	

*OK*  
*[Signature]*



**METRO TESTING LABORATORIES**

#104 - 12882 85th Avenue, Surrey, B.C. V3W 0K8  
Phone: (604) 543-8871 Fax: (604) 543-8847

**CONCRETE  
TEST REPORT**

PROJECT NO. S-819

CLIENT ASSOCIATED ENGINEERING (B.C.)  
C.C.

TO  
ASSOCIATED ENGINEERING (B.C.)  
300 - 4940 CANADA WAY  
BURNABY, BC  
V5G 4M5

ATTN: JOHN VAN RIORDAN

PROJECT FRASER RIVER DYKE - URGENT FLOOD WORKS  
CONCRETE

APEX TERMINAL, TANNERY ROAD  
SURREY

SET NO. 5 NO. OF SPECIMENS 3 DATE RECEIVED 2007.May.22 DATE CAST 2007.May.18

SPCM NO.	SPECIMEN TYPE	CURE COND.	DATE TESTED	AGE AT TEST (DAYS)	AVERAGE DIAMETER (mm) OR SIDE (mm x mm)	AVERAGE LENGTH OR SPAN (mm)	MAXIMUM LOAD (KN)	COMPRESSIVE OR FLEXURAL STRENGTH (MPa) Average	FAILURE TYPE
A	Cylinder	Lab	May.25	7	101.6	203.2	303	37.4	
B	Cylinder	Lab	Jun.15	28	101.6	203.2	426	52.5	
C	Cylinder	Lab	Jun.15	28	101.6	203.2	420	51.8 52.2	

SPECIFIED STRENGTH		35 MPa @ 28 DAYS		CONCRETE TEMP 22.0 °C		AIR TEMP 16.0 °C			
CEMENT CONTENT	kg/m <sup>3</sup> TYPE	GU	SLUMP	80 mm	SPEC.	80 ± 20			
POZZOLAN CONTENT	kg/m <sup>3</sup> TYPE	FA	AIR	4.0 %	SPEC.	6.5 ± 1.5			
MAXIMUM SIZE AGGREGATE	20 mm		PLASTIC DENSITY	kg/m <sup>3</sup>					
BATCH TIME	11:50		HARDENED DENSITY	kg/m <sup>3</sup>					
ADMIXTURES			CAST TIME	13:05					
			CAST BY	MTL GV				MOULD TYPE PLASTIC	
			CURING CONDITIONS	CURING BOX					
INITIAL CURING TEMP: MAXIMUM				22.0 °C		MINIMUM		16.0 °C	
LOCATION				WALLS, SECTION 3.					
SUPPLIER OCEAN READY MIX				COMMENTS					
MIX NO. 335PF6									
TRUCK NO. 115 TICKET NO. 1883552									
LOAD VOL. 10 m <sup>3</sup> CUM. VOL. 10 m <sup>3</sup>									
WATER ADDED I AUTH. BY									
Page 1 of 1 2007.Jun.19				METRO TESTING LABORATORIES		PER.		<i>W.G.</i>	

*OK*  
*W.G.*



**METRO TESTING LABORATORIES**

#104 - 12882 85th Avenue, Surrey, B.C. V3W 0K8  
Phone: (604) 543-8871 Fax: (604) 543-8847

**CONCRETE TEST REPORT**

PROJECT NO. S-819

CLIENT ASSOCIATED ENGINEERING (B.C.)  
C.C.

TO ASSOCIATED ENGINEERING (B.C.)  
300 - 4940 CANADA WAY  
BURNABY, BC  
V5G 4M5

ATTN: JOHN VAN RIORDAN

PROJECT FRASER RIVER DYKE - URGENT FLOOD WORKS  
CONCRETE

APEX TERMINAL, TANNERY ROAD  
SURREY

SET NO. 6 NO. OF SPECIMENS 3 DATE RECEIVED 2007.May.23 DATE CAST 2007.May.22

SPCM NO.	SPECIMEN TYPE	CURE CONDN	DATE TESTED	AGE AT TEST (DAYS)	AVERAGE DIAMETER (mm) OR SIDE (mm x mm)	AVERAGE LENGTH OR SPAN (mm)	MAXIMUM LOAD (KN)	COMPRESSIVE OR FLEXURAL STRENGTH (MPa) Average	FAILURE TYPE
A	Cylinder	Lab	May.29	7	101.6	203.2	285	35.2	
B	Cylinder	Lab	Jun.19	28	101.6	203.2	365	45.0	
C	Cylinder	Lab	Jun.19	28	101.6	203.2	352	43.4 44.2	

SPECIFIED STRENGTH		35 MPa @ 28 DAYS		CONCRETE TEMP 25.0 °C		AIR TEMP 19.0 °C			
CEMENT CONTENT	kg/m <sup>3</sup>	TYPE	GU	SLUMP	80 mm	SPEC.	80 ± 20		
POZZOLAN CONTENT	kg/m <sup>3</sup>	TYPE	FA	AIR	5.9 %	SPEC.	6.5 ± 1.5		
MAXIMUM SIZE AGGREGATE	20 mm			PLASTIC DENSITY	kg/m <sup>3</sup>				
BATCH TIME				HARDENED DENSITY	kg/m <sup>3</sup>				
ADMIXTURES				CAST TIME	14:02				
				CAST BY	MTL, YEK			MOULD TYPE PLASTIC	
				CURING CONDITIONS	CURING BOX				
				INITIAL CURING TEMP: MAXIMUM	22.0 °C		MINIMUM	16.0 °C	
SUPPLIER OCEAN READY MIX				LOCATION WALL, WEST SECTION					
MIX NO. 335PF6				COMMENTS					
TRUCK NO. 194 TICKET NO. 1883817									
LOAD VOL. 8.4 m <sup>3</sup> CUM. VOL. 8.4 m <sup>3</sup>									
WATER ADDED 1 AUTH. BY									
Page 1 of 1 2007.Jun.21				METRO TESTING LABORATORIES		PER.			

OK  
11



**METRO TESTING LABORATORIES**

#104 - 12882 85th Avenue, Surrey, B.C. V3W 0K8  
Phone: (604) 543-8871 Fax: (604) 543-8847

**CONCRETE  
TEST REPORT**

PROJECT NO. S-819

CLIENT ASSOCIATED ENGINEERING (B.C.)  
C.C.

TO ASSOCIATED ENGINEERING (B.C.)  
300 - 4940 CANADA WAY  
BURNABY, BC  
V5G 4M5

ATTN: JOHN VAN RIORDAN

PROJECT FRASER RIVER DYKE - URGENT FLOOD WORKS  
CONCRETE

APEX TERMINAL, TANNERY ROAD  
SURREY

SET NO. 7 NO. OF SPECIMENS 3 DATE RECEIVED 2007.May.25 DATE CAST 2007.May.24

SPCM NO.	SPECIMEN TYPE	CURE COND.	DATE TESTED	AGE AT TEST (DAYS)	AVERAGE DIAMETER (mm) OR SIDE (mm x mm)	AVERAGE LENGTH OR SPAN (mm)	MAXIMUM LOAD (kN)	COMPRESSIVE OR FLEXURAL STRENGTH (MPa) Average	FAILURE TYPE
A	Cylinder	Lab	May.31	7	101.6	203.2	239	29.5	
B	Cylinder	Lab	Jun.21	28	101.6	203.2	296	36.5	
C	Cylinder	Lab	Jun.21	28	101.6	203.2	310	38.2 37.4	

SPECIFIED STRENGTH		35 MPa @ 28 DAYS		CONCRETE TEMP 25.0 °C		AIR TEMP 17.0 °C			
CEMENT CONTENT	kg/m <sup>3</sup> TYPE	GU	SLUMP	70 mm	SPEC.	80 ± 20			
POZZOLAN CONTENT	kg/m <sup>3</sup> TYPE	FA	AIR	4.6 %	SPEC.	6.5 ± 1.5			
MAXIMUM SIZE AGGREGATE	20 mm		PLASTIC DENSITY	kg/m <sup>3</sup>					
BATCH TIME	13:25		HARDENED DENSITY	kg/m <sup>3</sup>					
ADMIXTURES			CAST TIME	14:45					
			CAST BY	MTL GV					
			CURING CONDITIONS	CURING BOX					
			INITIAL CURING TEMP: MAXIMUM	22.0 °C	MINIMUM	16.0 °C			
			LOCATION	SITE 7, STOP LOB BEAMS					
SUPPLIER	OCEAN READY MIX		COMMENTS	LOW AIR CONTENT					
MIX NO.	335PF6								
TRUCK NO.	194	TICKET NO.	1884276						
LOAD VOL.	10.4 m <sup>3</sup>	CUM. VOL.	10.4 m <sup>3</sup>						
WATER ADDED		AUTH. BY							
Page 1 of 1		2007.Jun.21	METRO TESTING LABORATORIES	PER.	<i>W. Z.</i>				

*OK*  
*AA*



**METRO TESTING LABORATORIES**

#104 - 12882 85th Avenue, Surrey, B.C. V3W 0K8  
Phone: (604) 543-8871 Fax: (604) 543-8847

**CONCRETE TEST REPORT**

PROJECT NO. S-819

CLIENT ASSOCIATED ENGINEERING (B.C.)  
C.C.

TO ASSOCIATED ENGINEERING (B.C.)  
300 - 4940 CANADA WAY  
BURNABY, BC  
V5G 4M5

ATTN: JOHN VAN RIORDAN

PROJECT FRASER RIVER DYKE - URGENT FLOOD WORKS  
CONCRETE

APEX TERMINAL, TANNERY ROAD  
SURREY

SET NO. 8 NO. OF SPECIMENS 3 DATE RECEIVED 2007.May.28 DATE CAST 2007.May.26

SPCM NO.	SPECIMEN TYPE	CURE CONDN	DATE TESTED	AGE AT TEST (DAYS)	AVERAGE DIAMETER (mm) OR SIDE (mm x mm)	AVERAGE LENGTH OR SPAN (mm)	MAXIMUM LOAD (kN)	COMPRESSIVE OR FLEXURAL STRENGTH (MPa) Average	FAILURE TYPE
A	Cylinder	Lab	Jun.02	7	101.6	203.2	257	31.7	
B	Cylinder	Lab	Jun.23	28	101.6	203.2	309	38.1	
C	Cylinder	Lab	Jun.23	28	101.6	203.2	309	38.1 38.1	

SPECIFIED STRENGTH 30 MPa @ 28 DAYS		CONCRETE TEMP 23.0 °C AIR TEMP 11.0 °C			
CEMENT CONTENT	kg/m <sup>3</sup> TYPE GU	SLUMP	90 mm SPEC. 80 ± 20		
POZZOLAN CONTENT	kg/m <sup>3</sup> TYPE FA	AIR	5.4 % SPEC. 6.5 ± 1.5		
MAXIMUM SIZE AGGREGATE	20 mm	PLASTIC DENSITY	kg/m <sup>3</sup>		
BATCH TIME	06:29	HARDENED DENSITY	kg/m <sup>3</sup>	MOULD TYPE PLASTIC	
ADMIXTURES		CAST TIME	07:48	INITIAL CURING TEMP: MAXIMUM 22.0 °C MINIMUM 16.0 °C	
		CAST BY	MTL GV	LOCATION	
		CURING CONDITIONS	CURING BOX	DYKE TIE-IN WALL AREA "7".	
SUPPLIER	OCEAN READY MIX	COMMENTS			
MIX NO.	330PF6				
TRUCK NO.	209	TICKET NO.	1884600		
LOAD VOL.	g m <sup>3</sup>	CUM. VOL.	g m <sup>3</sup>		
WATER ADDED	1	AUTH. BY			
Page 1 of 1		2007.Jun.25		METRO TESTING LABORATORIES PER. <i>W. G.</i>	

*Handwritten signatures and initials*

**METRO TESTING LABORATORIES**#104 - 12882 85th Avenue, Surrey, B.C. V3W 0K8  
Phone: (604) 543-8871 Fax: (604) 543-8847**CONCRETE TEST REPORT**

PROJECT NO. S-819

CLIENT ASSOCIATED ENGINEERING (B.C.)  
C.C.TO  
ASSOCIATED ENGINEERING (B.C.)  
300 - 4940 CANADA WAY  
BURNABY, BC  
V5G 4M5

ATTN: JOHN VAN RIORDAN

PROJECT FRASER RIVER DYKE - URGENT FLOOD WORKS  
CONCRETEAPEX TERMINAL, TANNERY ROAD  
SURREY

SET NO. 9 NO. OF SPECIMENS 3 DATE RECEIVED 2007.May.30 DATE CAST 2007.May.29

SPCM NO.	SPECIMEN TYPE	CURE COND.	DATE TESTED	AGE AT TEST (DAYS)	AVERAGE DIAMETER (mm) OR SIDE (mm x mm)	AVERAGE LENGTH OR SPAN (mm)	MAXIMUM LOAD (KN)	COMPRESSIVE OR FLEXURAL STRENGTH (MPa) Average	FAILURE TYPE
A	Cylinder	Lab	Jun.05	7	101.6	203.2	334	41.2	
B	Cylinder	Lab	Jun.26	28	101.6	203.2	440	54.3	
C	Cylinder	Lab	Jun.26	28	101.6	203.2	452	55.8 55.0	

SPECIFIED STRENGTH		35 MPa @ 28 DAYS		CONCRETE TEMP 22.5 °C		AIR TEMP 18.0 °C			
CEMENT CONTENT	kg/m <sup>3</sup>	TYPE	GU	SLUMP	120 mm	SPEC.	80 ± 20		
POZZOLAN CONTENT	kg/m <sup>3</sup>	TYPE	FA	AIR	5.3 %	SPEC.	6.5 ± 1.5	MOULD TYPE PLASTIC	
MAXIMUM SIZE AGGREGATE	20 mm			PLASTIC DENSITY	kg/m <sup>3</sup>				
BATCH TIME	11:37			HARDENED DENSITY	kg/m <sup>3</sup>			INITIAL CURING TEMP: MAXIMUM 22.0 °C MINIMUM 16.0 °C	
ADMIXTURES				CAST TIME	12:35				
				CAST BY	MTL GV			LOCATION STOP LOG WALL.	
				CURING CONDITIONS	CURING BOX				
SUPPLIER OCEAN READY MIX				COMMENTS FIRST AIR TEST=4%. AIR ADDED ON SITE - SECOND AIR TEST=5.3%					
MIX NO. 335PF6									
TRUCK NO. 195		TICKET NO. 1885021		METRO TESTING LABORATORIES PER. <i>W.G.</i>					
LOAD VOL. 6 m <sup>3</sup>		CUM. VOL. 6 m <sup>3</sup>							
WATER ADDED		AUTH. BY							
Page 1 of 1		2007.Jun.27							

*OK!!!*  
*M*

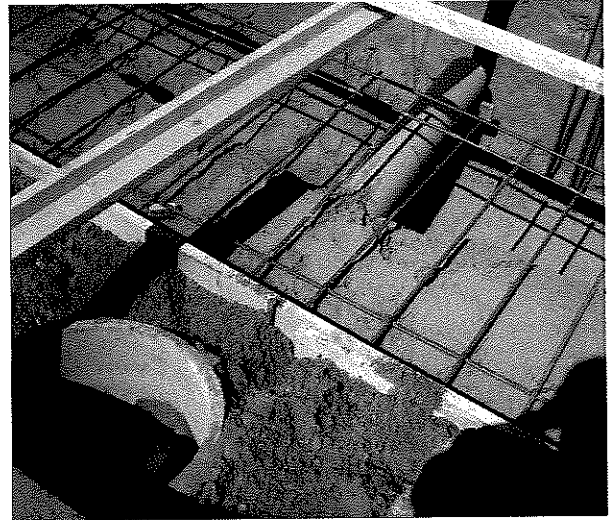


**Appendix E**  
**Site Photos**

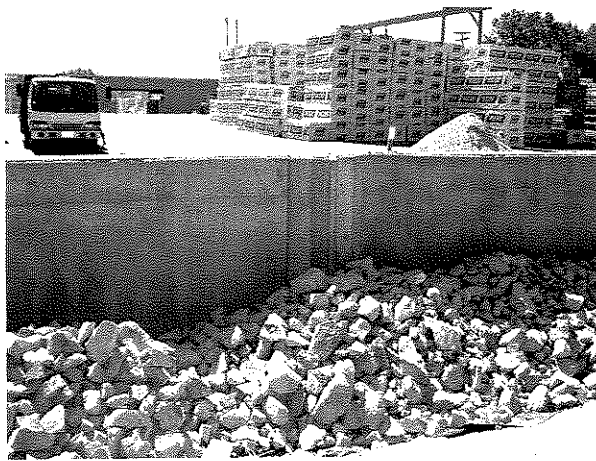
Site 6: Apex Terminals Floodwall



Forming and reinforcement



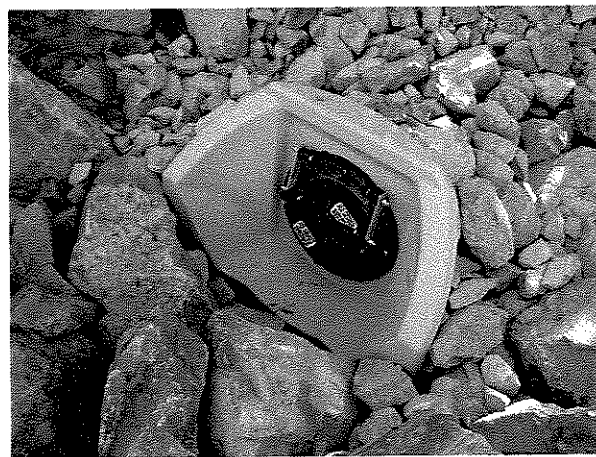
300mm drain through footing



Expansion joint. Erosion protection on river side.



Backfilling river side with compacted dyke fill



Flap gated drainage outlet



Tie in to adjacent high ground

Site 7: Lindal Cedar Homes Road Closing Structure



Reinforcing for buried seepage cut-off wall



Finished buried seepage cut-off wall



Excavation for tie-in to existing dyke



Finished concrete abutment wall



Reinforcement for abutment wing wall

Site 8: Manson Canal Dyke



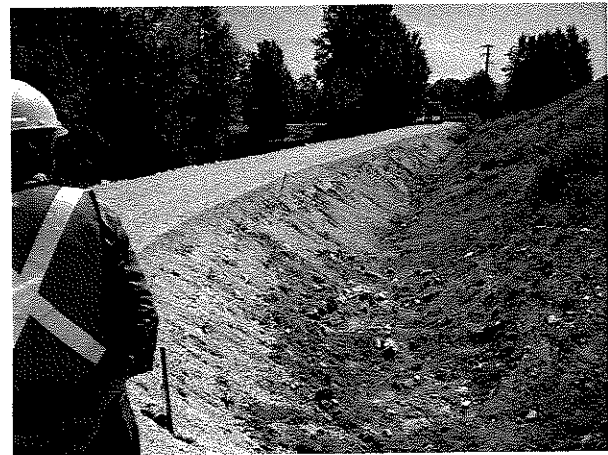
Stripping on river side of existing dyke



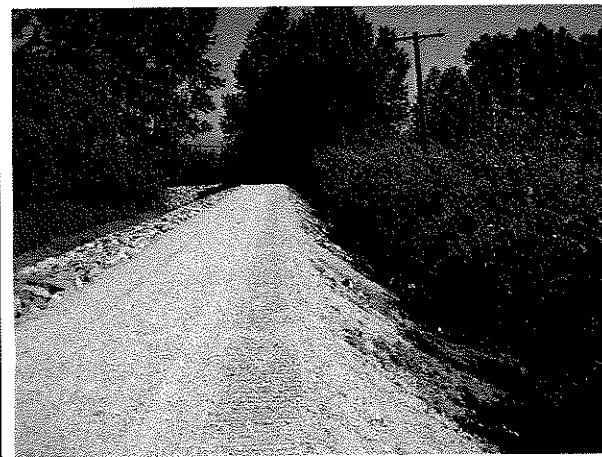
Completed upgrades on river side of dyke



Placing riprap on enhanced river side slope



Land side of Manson Canal dyke

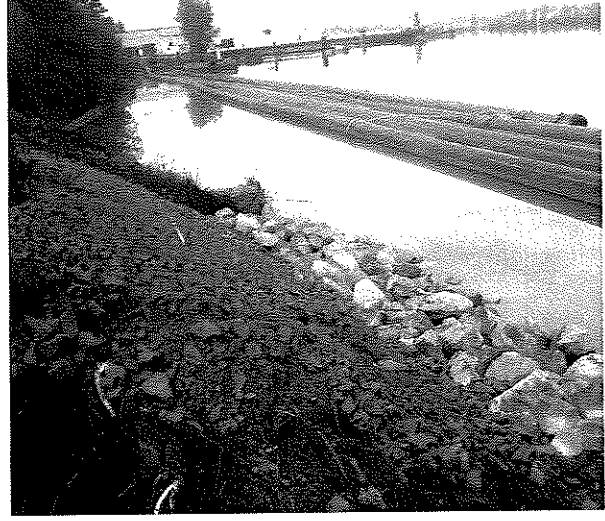


Land side of set-back dyke

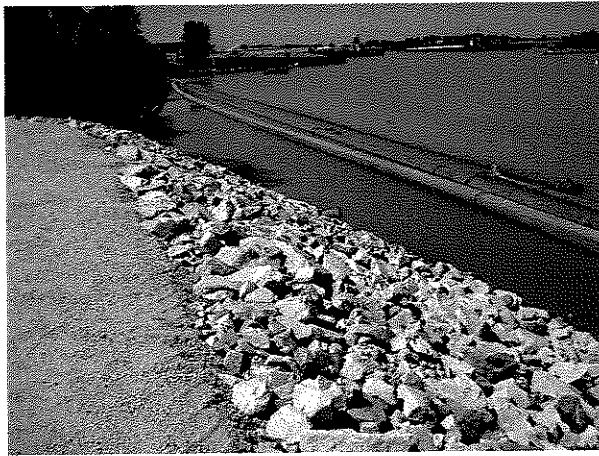
Site 9: Fraser River @ Manson Canal Riprap



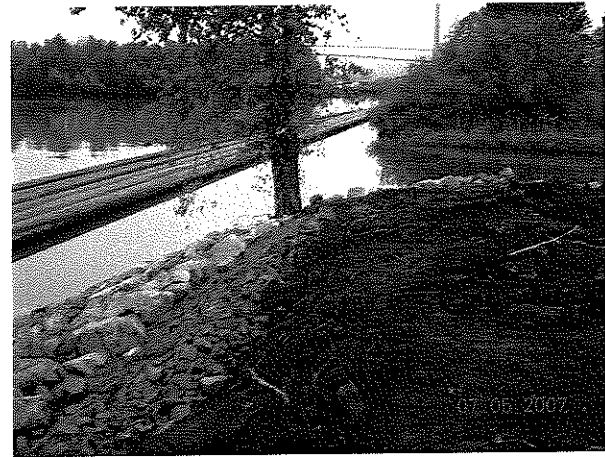
Stripping existing slope



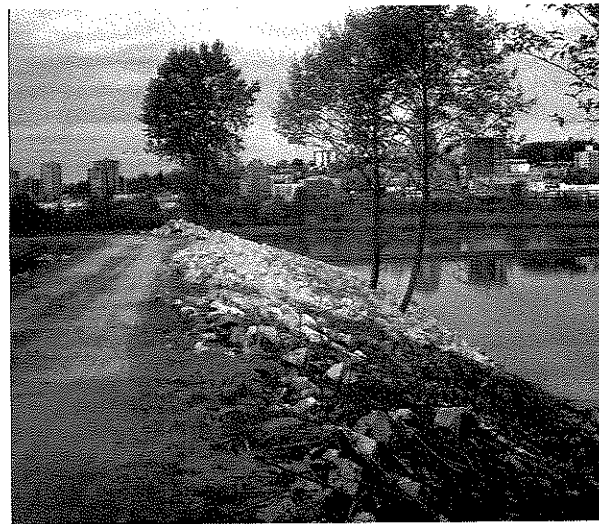
Filter layer with riprap placed at slope toe



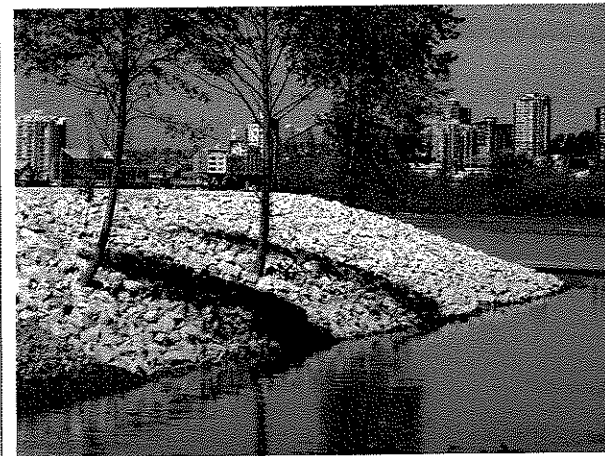
Finished riprap



Filter layer with riprap placed at slope toe



Riprap placed on Manson Canal slope



Riprap placed on Manson Canal slope