CANADA - BRITISH COLUMBIA

FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

Water Management Branch
Ministry of Environment
Victoria, British Columbia

Water Planning and Management Branch
Inland Waters Directorate
Pacific Region
Department of the Environment
Vancouver, British Columbia

DISTRICT OF SURREY

Operation and Maintenance Instructions

Flood Control Works

Volume 4

As Constructed Works

for Contract No. 2

Crippen Consultants Ltd.
900 - 401 West Georgia Street
Vancouver, B.C.
V6B 5E1

RECORD of AMENDMENTS

ALL AMENDMENTS ARE TO BE ISSUED THROUGH THE INSPECTOR OF DYKES

AMENDMENT NO.	DATE	DATE ENTERED	ENTERED BY WHOM, REMARKS

District of Surrey

Operation and Maintenance Instructions

Flood Control Works

THE MANUAL

The operation and maintenance instructions for the flood control works for the District of Surrey are provided in three volumes:

VOLUME 1	GENERAL INSTRUCTIONS
***VOLUME 2**	NOT APPLICABLE
VOLUME 3	DESCRIPTION OF WORKS AND LIST OF DRAWINGS FOR CONTRACT NO. 1
VOLUME 4	DESCRIPTION OF WORKS AND LIST OF DRAWINGS FOR CONTRACT NO. 2

*Note

The internal drainage component was removed from the Fraser River Flood Control Program subsequent to 1976; therefore Volume 2 is now no longer applicable.

District of Surrey

Operation and Maintenance Instructions

Flood Control Works

Contents of Manual

District of Surrey

Operation and Maintenance Instructions

Flood Control Works

Volume 4

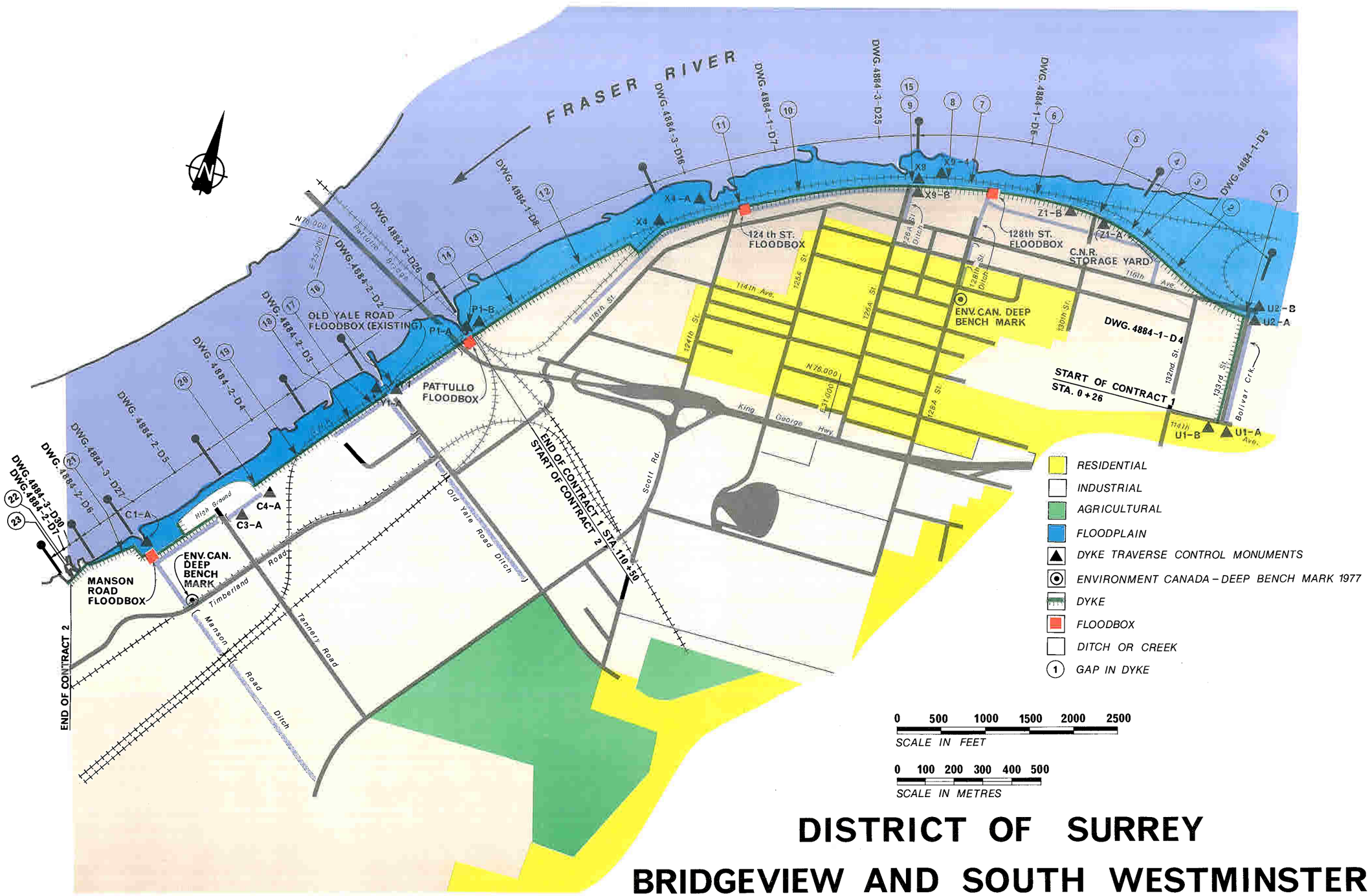
AS CONSTRUCTED WORKS FOR CONTRACT NO. 2

Contents

LIST OF APPENDICES IN VOLUME 4

DISTRICT OF SURREY FLOOD CONTROL PROJECT

KEY PLAN



DISTRICT OF SURREY

BRIDGEVIEW AND SOUTH WESTMINSTER

1. DESCRIPTION OF CONSTRUCTED WORKS

1.1 Dyke

1.1.1 General

Because of the types of sub-surface soil, comprising peat, silt and silty clay, varying amounts of settlements were anticipated along some sections of the dyke. In order to monitor the settlement and detect lateral movements during construction, settlement plates, piezometers and lateral displacement gauges were installed prior to commencing dyke construction.

Settlement plates and piezometers were also installed to monitor the settlement and the piezometric pore pressures during the placing and removal of preload for the Manson Floodbox and the CNR Railway ditch crossing at Sta 23+15.

Lateral movement gauges were installed at the 124th Street and Pattullo Floodbox sites to monitor any effects of construction on the CNR line.

Approximately 30 settlement points were established on pile bents of the Public Works Railway Trestle adjacent to Pattullo Floodbox, in order to monitor any settlement of the piles during the construction of the Floodbox. The results of the readings recorded are shown in Appendix 3 - Instrumentation.

1.1.2 Embankment

a. Dyke Embankment

The dyke embankment was constructed from dredged Fraser River sand stockpiled at Mainland Sand and Gravels Site in South Westminster, Surrey, B.C.

Typical gradation curves and maximum dry (Proctor) density analyses are shown in Appendix 2 - Dyke Materials.

Filter gravel placed on filter cloth on the landside slopes consisted of a 3" minus, naturally rounded material.

Filter cloth -Typar 3401 was used under the filter gravel to prevent loss of dyke material by piping through the dyke fill.

The dyke crest was topped with a 6" thick layer of 1" minus dyke surfacing material consisting of a crushed or naturally occurring gravel-sand mixture.

b. Station -1+05 to -0+15 (Public Works Trestle)

The dyke in this area was built with typical dyke fill material and topped with 6" of dyke surfacing. The dyke was tied into the

existing concrete dyke wall east of the trestle and the new dyke wall east of Pattullo Floodbox. Both the riverside and the landside slopes were covered with 3" topsoil to be seeded later by the District.

c. Station -0+20 to 0+80 (Pattullo Floodbox)

The dyke consists of a low embankment built with typical dyke fill to the same elevation as the base of rail on the CNR line. The landside slope was covered with filter cloth and filter gravel.

d. Station 0+80 to 12+18

The dyke in this area was built with typical dyke fill topped with 6" of dyke surfacing to 6" below the level of the top of the concrete dyke wall to provide a 12' wide access road on the landside of the concrete dyke wall. The ditch between Old Yale Road crossing and Capilano Timber crossing was built up with typical dyke fill and covered with filter cloth and filter gravel. An existing wood stave culvert under Capilano Timber crossing was plugged and a new 18" diameter corrugated steel pipe (CSP) culvert was installed.

e. Station 12+18 to 19+72

The existing ditch in this area was backfilled with dyke fill after the ditch bottom had been stripped of all soft unsuitable material. The dyke embankment was constructed with typical dyke fill to a full crest width of 12'. The new ditch invert and slopes were covered with filter cloth and filter gravel. The dyke riverside slope was covered with topsoil. All slopes were seeded.

f. Station 15+24 to 16+47

The low dyke embankment in this area was constructed of typical dyke fill to the same elevation as base of rail. Ditch invert and slopes were covered with filter cloth and filter gravel. A concrete retaining wall, with an opening for a future spurline, was constructed on the embankment.

g. Station 19+72 to 30+72

The dyke was constructed with typical dyke fill after the ditch had been stripped of all soft, unsuitable material and backfilled with dyke fill. The open ditch was replaced with an 18" diameter CSP culvert to Sta 23+11 and by a 30" diameter CSP culvert with manholes to Sta 30+27. Concrete bag headwalls were constructed at each end of each culvert. The landside slope was covered with filter cloth and filter gravel. The riverside slope was covered with topsoil to be seeded later by the District.

h. Station 22+29 to 23+79

This section of the dyke crossed an existing CNR spurline on a wooden trestle across the ditch. The trestle was removed including the tracks, the area was preloaded and the tracks were replaced. The tracks and preload were removed after 3 months, a new 30" diameter CSP culvert was installed and dyke fill placed. The CNR spurline tracks were replaced and a concrete retaining wall built on the embankment with an opening for the tracks.

i. Station 30+27 to 30+72

A ramp was built of typical dyke fill as an access to Lindal Cedar Homes yard to freeboard elevation and topped with asphalt pavement.

j. Station 30+72 to 35+15

The ditch invert in this area was below the design invert and did not require any work. The high ground inside Imperial Lumber yard was as high as the dyke crest elevation and also did not require any work.

A new 30" diameter CSP culvert was installed across Tannery Road and bagged concrete head walls were built at both ends.

k. Station 35+15 to 39+25

A berm was excavated on the side of the existing ditch to tie in with the new berm towards Manson Floodbox and the ditch was trimmed to the required invert. The proposed dyke was deleted as the existing Imperial Lumber yard was already at flood protection level.

l. Station 39+25 to 43+97

A new ditch was excavated as a continuation of the existing ditch to Manson Floodbox. The dyke was built with typical dyke fill and filter cloth covered with filter gravel was placed on the landside. A considerable amount of hog fuel was removed during the excavation for the dyke. The riverside slopes were covered with topsoil for future seeding.

The existing drainage ditch from the old floodbox was filled in to the tops of the banks and the dyke alignment was turned perpendicular to the new dyke to tie into the high ground at the west end of Imperial Lumber yard. The dyke slopes were covered with topsoil for future seeding.

A 42" diameter CSP culvert was installed across the access ramp to the new floodbox from the new ditch to Manson Canal.

m. Station (43+97) 0+00 to 7+89

The dyke was constructed with typical dyke fill with both landside and riverside slopes covered with topsoil for future seeding, except between Sta 4+10 - 5+70 where a low embankment was built for a concrete dyke wall. This construction allowed the riverside toe of the dyke to be moved inland away from the riverbank and avoided destruction of fish feeding areas.

1.1.3 Concrete Wall

a. Foundations

Stripping and structural excavation for the concrete wall foundations revealed generally good conditions. The concrete wall is generally founded on compacted dyke fill material.

b. Concrete

The Contract called for a Class II, 21 MPa concrete for all dyke walls. The design requirements and concrete mix designs are shown in Table 1, Section 1.2.2 - Concrete.

c. Joints

The expansion joints in the concrete dyke wall were constructed using water stops, joint primer, joint filler, bond breaker and joint sealant. Movement at wall footing joints was controlled by using 32 mm diameter plain steel dowels with one end encased in 1-1/4" diameter standard Polyethylene pipe, Pacific Plastic Type 325, with a styrofoam plug.

Water stop material was PVC Durajoint Type 7C. The joint filler was Rodofoam GR grade, while the joint sealant was Duoflex non-sag polysulphide. The bond breaker between the joint filler and joint sealant was ordinary polyethylene tape. The joint primer used was Polyprimer 2.

d. Station -0+20 to 0+80

The concrete dyke wall consists of 2 sections of 4'-6" high concrete wall each 50' long inside a low dyke fill embankment.

e. Station 0+80 to 10+32

The concrete dyke wall in this area consists of a 5'-0" high concrete wall made up of 16 - 50' sections, 3 - 40' sections and one 32.20' section.

f. Station 10+32 to 12+23

The 4'-6" high concrete wall in this area has two stoplog openings for Old Yale Road and Capilano Timber crossings.

g. Station 15+19 to 16+52

This section consists of 4 sections of 5'-9" high concrete retaining wall with one 16' wide stoplog opening for a future railway spurline to Fraser River Metals Depot.

h. Station 22+24 to 23+84

The concrete retaining wall in this area has 4 sections of 5'-9" high wall of various lengths and one 16' wide stoplog opening for the existing CNR-Brownsville track.

The crossings at Fraser River Metals and Brownsville are sealed off with cut-off zones consisting of a mixture of river sand and 5% Bentonite by weight.

i Station 4+10 to 5+70

A 5'-8" high concrete dyke wall was built in this area in five sections of various lengths and with a 4' wide stoplog opening for access to the river.

j. Dyke Wall West of Weldwood Mill

A 5'-2" high concrete wall was built on a low dyke embankment of typical dyke fill from the west side of the Weldwood Mill to high ground with two 16' wide stoplog openings for access ramps to the river.

The riverside slope of the dyke was protected with a 12" thick layer of six inches minus rock material. The landside of the dyke was constructed with a filter cloth and filter gravel zone. The riverside of the two stoplog openings was made impervious with a cut-off zone consisting of a mixture of dyke fill river sand and 5% Bentonite by weight.

1.1.4 Sheetpile Wall (Weldwood Mill Area)

A steel sheetpile wall to a maximum depth of El -26.0' and topped with a concrete cap at El +14.0' was built from the end of the embankment dyke at Sta 7+89 and tied to the Weldwood Mill retaining wall 208.5' further west.

1.1.5 Weldwood Concrete Wall

A 12" thick concrete retaining wall with an 8'-6" wide spread-footing was built under the Weldwood Mill floor between two rows of existing pile caps.

The wall was built independent from the pile caps on fine silty clay foundation at El -2.00'. A 6" diameter perforated CSP culvert was installed on the landside in the dyke fill which was brought up to El +7.00'. The 6" perforated drain was connected to a 24" diameter

discharge pipe through the concrete wall. The 24" dia pipe was fitted with a 24" dia Armco medium duty flapgate.

1.2 Floodbox Works

1.2.1 General

Dewatering for the floodbox structures at 124th Street, Pattullo and Manson Road was done by means of wellpoint systems. Piezometers were installed inside the cofferdams to monitor the piezometric pore pressures during the excavation and the backfill operations.

The foundation for all three floodboxes consisted of very fine silty sand which was covered with a 3" thick layer of blinding concrete under the outlet concrete structures at 124th Street and Pattullo and over the whole floodbox foundation at Manson Road.

Lateral displacement gauges were installed at 124th Street and Pattullo floodboxes to monitor any movement during the jacking of the concrete pipes through the CNR railway embankment.

The channel slopes at the outlets were protected with a 12" thick layer of 6" minus rock to prevent washouts.

1.2.2 Concrete

The contract called for three different classes of concrete based on strength. A tabulation of the concrete design requirements and concrete mix designs are shown in Table I. The Class I concrete was used for the floodbox structures and the Class II concrete for the concrete dyke walls. The Class III concrete was used for the blinding concrete under the floodboxes.

Table I - Concrete Mix - Requirements and Design

Specifications	Class I	Class II	Class III
Strength	28 MPa	21 MPa	14 MPa
Cement (kg/m^3)	310	270	210
Concrete Sand (kg/m^3)	840	870	925
Coarse Aggregate			
19 mm (kg/m^3)	650	650	640
10 mm (kg/m^3)	420	430	440
Slump	100 mm $\pm$ 20	75 mm $\pm$ 10	100 mm $\pm$ 20

Admixture	Pozzolith	Pozzolith	Pozzolith
Air Content (%)	4 - 6	4 - 6	4 - 6
Maximum Water Cement Ratio	0.45	0.50	0.60

The concrete test cylinder results tabulated in Appendix I - Concrete Test Results, showed that the concrete had adequate strength.

1.2.3 126A Street Pump Station

The existing wooden floodbox was filled with Class III concrete for a distance of 4.5 m at the landside end.

A steel sheetpile wall was built between the pumphouse and the floodbox to support the backfill under a 4'-6" high concrete dyke wall built on dyke fill embankment.

The landside slope was protected by a concrete bag wall above the sheetpile wall.

Two 35' long sections of a 4'-6" high dyke wall were connected with the existing concrete dyke wall and one 50' long dyke wall section, with a 32' wide stoplog opening, was built across 126A Street.

The existing 24" diameter and 18" diameter forcemains from the pump station were extended at the outlet and backfilled to El +12.00'. The existing flapgates were relocated to ends of the extended pipes. The existing wooden bridge was removed.

1.2.4 124 Street Floodbox

a. Structure

This floodbox consists of Inlet and Outlet Concrete Structures connected by a single 72" diameter reinforced concrete pipe culvert.

b. Pipe Culvert

The total length of the pipe culvert is 169'-4" of which 90' was jacked under the CNR railroad embankment in dense sandy silt. Some settlement occurred during the jacking operation which was carried out from the outlet end. The reinforced Class V pipe was required within the CNR right-of-way. Outside the CNR right-of-way at both the Outlet and the Inlet end reinforced Class III pipe was used and was trench installed. Both pipes had tongue and groove type joints which were made waterproof by rubber gaskets.

c. Seepage Collars

Two seepage collars were built around the trench-installed pipes at the Inlet to increase the seepage distance.

d. Dyke Wall

A 3'-6" high concrete dyke wall was constructed on a low dyke fill embankment at the Inlet end and tied into the existing concrete dyke wall on both sides of the floodbox.

Filter cloth and filter gravel were placed around the Inlet structure and on the dyke slopes up to the concrete dyke wall.

e. Channels

The Inlet channel was constructed to connect with the existing 124th Street ditches. The Outlet channel was excavated with a base width of 20 ft for 340' until it met the river.

A security chain link fence, 6'-6" high, was erected around the Outlet structure from the Domtar fence and along the west side of the Outlet Channel for about 340' to the river edge.

1.2.5 Pattullo Floodbox

a. Structure

The floodbox consists of Inlet and Outlet concrete structures connected with twin 72" diameter reinforced concrete pipe culverts.

b. Pipe Culverts

The total length of each pipe culvert is 96'-10" of which 49' was jacked under the CNR railroad embankment for the culvert on the east side. Due to problems caused by unforeseen obstacles such as old piles and a wooden floodbox which prevented the pipes from being jacked, an open cut was made and the west side pipe culverts placed in the trench. Some settlement occurred during the jacking operation which was carried out from the outlet end. The pipe culverts outside the embankment were trench installed on a bedding of 12" thick dyke fill while the pipe culverts inside the embankment rested on dense, sandy silt. All pipe culverts were Class V precast concrete pipes with tongue and groove type joints.

c. Seepage Collars

Two seepage collars were built around the trench-installed pipes at the Inlet.

d. Discharge Pipes

The existing 24" diameter forcemain and the two existing 18" diameter forcemains from the pump station were extended through the embankment to the new Outlet structure.

e. Old Floodbox

The existing wooden floodbox was filled with compacted dyke fill material.

f. Channels

The outlet and the inlet channels were improved to suit the new structures.

1.2.6 Manson Floodbox

a. Foundation

The site was preloaded for 6 months in order to consolidate the foundation. Dyke fill material was used as preload fill. Three sets of settlement plates and piezometers were installed to control the piezometric pore pressure during the placing and removal of the preload and to record the settlement of the silty foundation. An average total settlement of 5' was recorded after a rebound of 0.5' was taken into account. The foundation was covered with a 3" layer of blinding concrete.

b. Structure

The floodbox consists of Outlet and Inlet structures connected with twin 7' x 7' reinforced concrete conduits, each one made up of 4 sections. Five seepage collars were built around the conduits at the expansion joints.

c. Dyke Embankment

The dyke embankment was constructed with typical dyke fill material with a 32' wide crest above the floodbox. The slopes above the floodbox were covered with 3" of topsoil.

d. Channels

The Inlet channel was excavated to tie in with the existing Manson canal and filter cloth and filter gravel were placed on the bottom and on the slopes.

The Outlet channel was excavated with a base width of 20' and tied in to the existing outlet channel after the old floodbox had been removed. The silty slopes were covered with filter cloth and a 12" thick layer of 6" minus rock material from the bottom up to El +10.00' between the new dyke and the old dyke.

LIST OF RECORD DRAWINGS

CONTRACT NO. 2

2. RECORD DRAWINGS

2.1 List of Record Drawings - Contract No. 2

Note: These drawings are listed by structure.
See also Volume 1, Appendix 3.2.

Drawing No.	Title	Provincial 105 mm Negative Number
a.	GENERAL ARRANGEMENT	
4884-2-D1/R2	Location Plan and General Arrangement	280085
4884-2-D11/R2	Settlement Plate & Piezometer Details	280094
b.	EARTHFILL DYKES	
	Dyke at Public Works Canada Trestle at Pattullo Floodbox	
4884-3-D26/R2	Pattullo & Old Yale Road Dykes Plan, Profile and Sections	280122
	Dyke from Capilano Timber Crossing to Imperial Lumber Co. Yard	
4884-2-D3/R3	Dyke - Stations 12+44 to 19+94 Plan, Profile and Sections	280087
4884-2-D4/R2	Dyke - Stations 19+94 to 32+23.86 Plan, Profile and Sections	280088
	Dyke from Imperial Lumber Yard (Tannery Road) to Manson Road Floodbox	
4884-2-D5/R2	Dyke - Stations 32+23.86 to 44+19.33 Plan, Profile and Sections	280089
4884-3-D27/R2	Dyke Road Dyke Plan, Profile and Sections	280123
	Dyke from Manson Road to Weldwood Mill	
4884-2-D6/R3	Manson Road Dykes - Station 0+00 to 7+89 Plan, Profile and Sections	280090

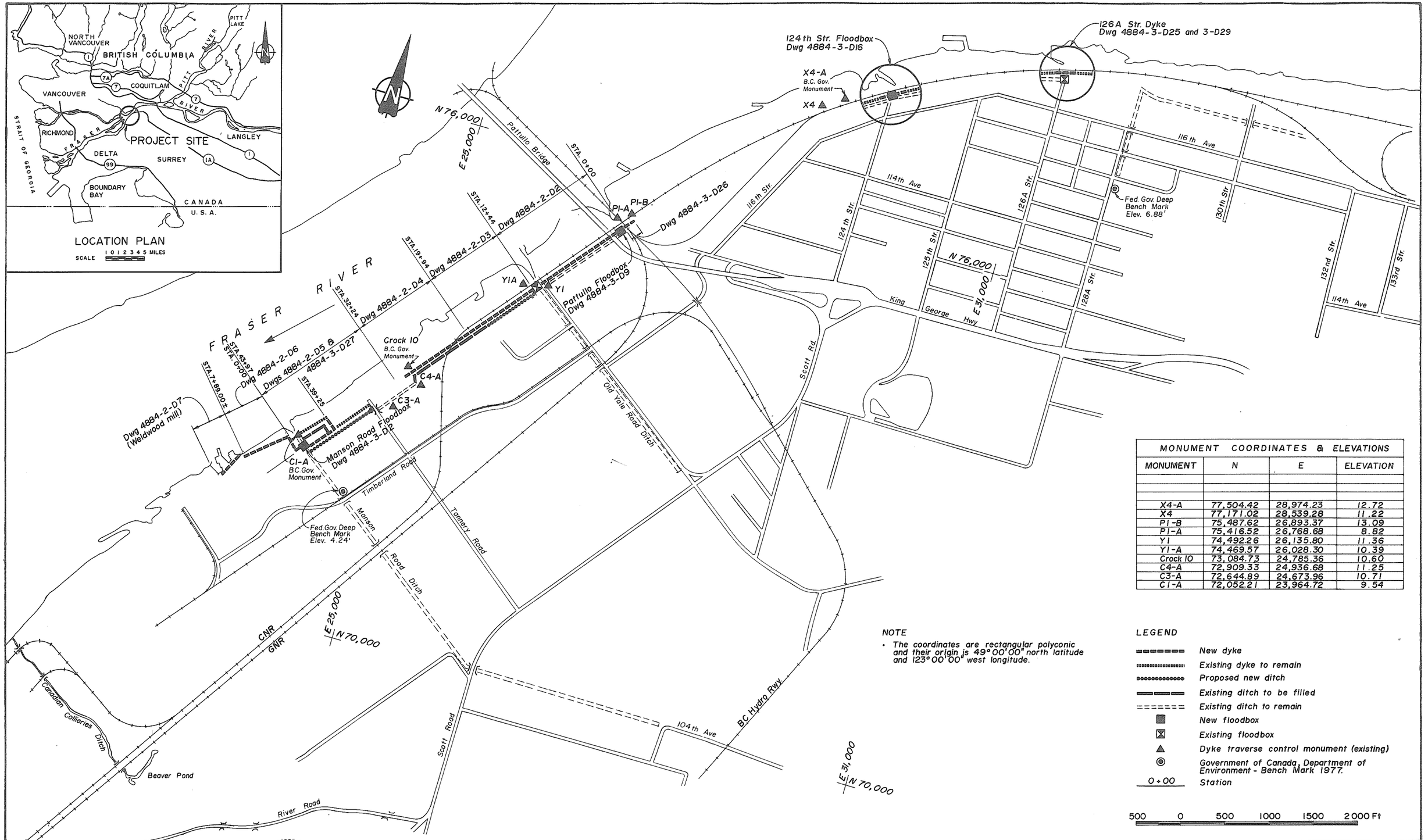
	Drawing No.	Title	Provincial 105 mm Negative Number
c.	CONCRETE DYKE WALL		
	Wall Between Pattullo Floodbox and Capilano Timber Crossing		
	4884-2-D2	Dyke - Stations 0+00 to 12+44 Plan, Profile and Sections	280086
	4884-2-D12/R2	Capilano Timber and Old Yale Road Road Crossings and Stoplog Walls	280095
	4884-2-D15/R2	Dyke Wall & Culvert Headwall Concrete Outline and Reinforcement	280097
	4884-3-D26/R2	Pattullo and Old Yale Road Dykes Plan, Profile and Sections	280122
	4884-3-D28/R2	Miscellaneous Concrete Details	280124
	Wall at Proposed CNR Spurline for Fraser River Metal Depot and Existing CNR Spurline at Orchardson Yard		
	4884-2-D3/R3	Dyke - Stations 12+44 to 19+94 Plan, Profile and Sections	280087
	4884-2-D4/R2	Plan, Profile and Sections	280088
	4884-2-D12/R2	Capilano Timber and Old Yale Road Road Crossings and Stoplog Walls	280095
	4884-2-D15/R2	Dyke Wall & Culvert Headwall Concrete Outline and Reinforcement	280097
	4884-2-D33/R1	Opening for CNR Spurline to Fraser River Metals Depot	280083
	4884-2-D13/R3	CNR Track & Dyke Crossing - Station 23+15 Plan, Sections and Details	280096
	Wall at Manson Road Dyke by Weldwood's Dip Tank		
	4884-2-D6/R3	Manson Road Dykes - 0+00 to 7+89 Plan, Profiles and Sections	280090

Drawing No.	Title	Provincial 105 mm Negative Number
	Retaining Wall and Dyke Wall at Weldwood Mill	
4884-2-D7/R4	Weldwood Mill Retailing Wall & Dyke Wall General Arrangement	280091
4884-2-D8/R4	Weldwood Mill Retaining Wall Concrete Outline and Reinforcement Sheet 1	280092
4884-2-D10/R3	Weldwood - Dyke Wall Details	280093
4884-2-D16/R2	Dyke Wall Concrete Outline, Reinforcement and Details	280098
4884-3-D28/R2	Miscellaneous Concrete Details	280124
d.	FLOODBOXES	
	126A Street	
4884-2-D16/R2	Dyke Wall Concrete Outline, Reinforcement and Details	280098
4884-3-D25/R2	126A Street Dyke Plan, Profile and Sections	280121
4884-3-D29/R3	126A Street Dyke Sheetpile Wall Plan, Sections and Details	280125
	124th Street Floodbox	
4884-3-D16/R3	General Arrangement	280113
4884-3-D17/R2	Excavation and Backfill Sheet 1 of 2	280114
4884-3-D18/R2	Excavation and Backfill Sheet 2 of 2	280115
4884-3-D19/R2	Concrete Outline	280116
4884-3-D20/R2	Reinforcement	280117

Drawing No.	Title	Provincial 105 mm Negative Number
4884-3-D21/R2	124th Street and Pattullo Floodboxes - Floodgates	280118
4884-3-D22/R2	124th Street, Manson & Pattullo Floodboxes - Handrails	280119
4884-3-D23/R2	124th Street, Manson & Pattullo Floodboxes Trashracks & Miscellaneous Metalwork	280120
Pattullo Floodbox		
4884-3-D9/R2	General Arrangement	280106
4884-3-D10/R2	Excavation and Backfill Sheet 1 of 2	280107
4884-3-D11/R2	Excavation & Backfill Sheet 2 of 2	280108
4884-3-D12/R2	Concrete Outline Plan & Sections	280109
4884-3-D13/R2	Concrete Outline Sections & Details	280110
4884-3-D14/R2	Inlet Reinforcement	280111
4884-3-D15/R2	Outlet Reinforcement	280112
4884-2-D34/R1	Wingwall Extension	280084
4884-2-D21/R2	124 Street & Pattullo Floodboxes & Floodgates	280118
4884-3-D22/R2	124 Street, Manson & Pattullo Floodboxes - Handrails	280119
4884-3-D23/R2	124 Street, Manson & Pattullo Floodboxes Trashracks & Miscellaneous Metalwork	280120

Drawing No.	Title	Provincial 105 mm Negative Number
4884-3-D26/R2	Pattullo & Old Yale Road Dykes Plan Profile & Sections	280122
Manson Floodbox		
4884-3-D2/R2	General Arrangement	280099
4884-3-D3/R2	Excavation and Backfill Sheet 1 of 2	280100
4884-3-D4/R2	Excavation and Backfill Sheet 2 of 2	280101
4884-3-D5/R2	Concrete Outline	280102
4884-3-D6/R2	Inlet - Reinforcement	280103
4884-3-D7/R2	Outlet - Reinforcement	280104
4884-3-D8/R2	Floodgates	280105
4884-3-D22/R2	124 Street, Manson & Pattullo Floodboxes - Handrails	280119
4884-3-D23/R2	124 Street, Manson & Pattullo Floodboxes Trashracks & Miscellaneous Metalwork	280120
4884-3-D27/R2	Dyke Road Dyke Plan Profile & Section	280123
e. WELDWOOD SHEETPILE WALL		
4884-3-D30/R4	Weldwood Sheetpile Wall General Arrangement and Details	280126

A. GENERAL



MONUMENT COORDINATES & ELEVATIONS

MONUMENT	N	E	ELEVATION
X4-A	77,504.42	28,974.23	12.72
X4	77,171.02	28,539.28	11.22
PI-B	75,487.62	26,893.37	13.09
PI-A	75,416.52	26,768.68	8.82
Y1	74,492.26	26,135.80	11.36
Y1-A	74,469.57	26,028.30	10.39
Crock 10	73,084.73	24,785.36	10.60
C4-A	72,909.33	24,936.68	11.25
C3-A	72,644.89	24,673.96	10.71
C1-A	72,052.21	23,964.72	9.54

NOTE

- The coordinates are rectangular polyconic and their origin is 49° 00' 00" north latitude and 123° 00' 00" west longitude.

LEGEND

- New dyke
- Existing dyke to remain
- Proposed new ditch
- Existing ditch to be filled
- Existing ditch to remain
- New floodbox
- Existing floodbox
- Dyke traverse control monument (existing)
- Government of Canada, Department of Environment - Bench Mark 1977.
- 0+00 Station

500 0 500 1000 1500 2000 Ft

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10407

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing APPROVED FOR CONSTRUCTION JUL 25 84	MP	jm		
1.	Floodboxes added & Prepared for Tender (Combined contracts)				5-Jun 84

REVISIONS

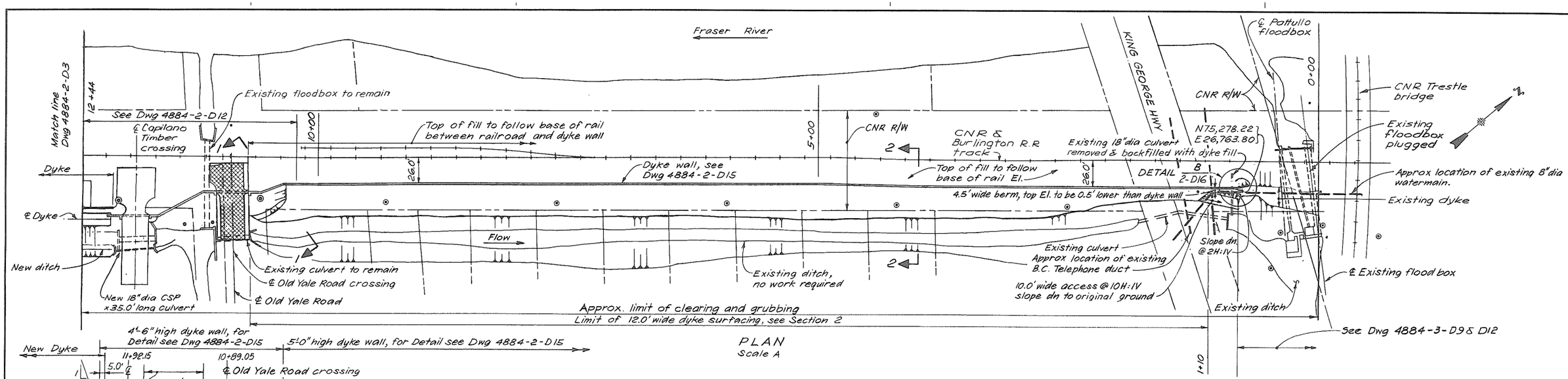
RECOMMENDED PROJECT MANAGER
DATE June 6 1984.
APPROVED DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

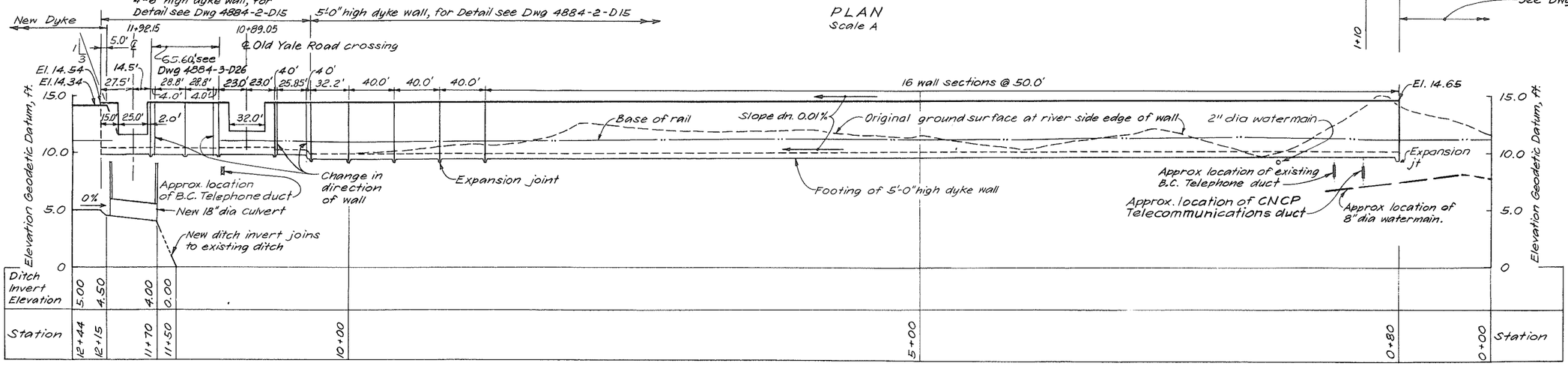
BRITISH COLUMBIA
MINISTRY OF ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA - BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

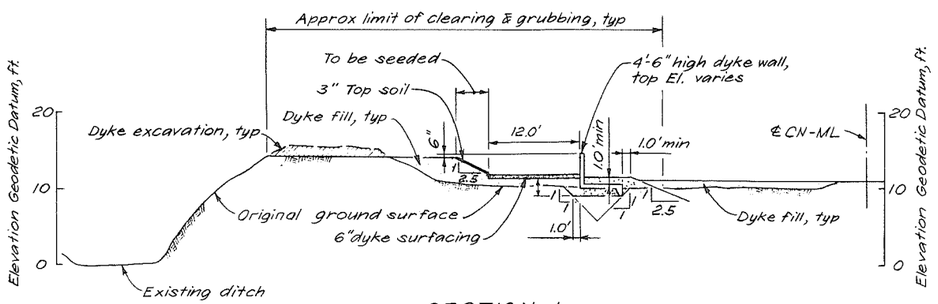
PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
LOCATION PLAN AND
GENERAL ARRANGEMENT

DESIGNED FRB	SURVEYED
DRAWN L.S.	DATE
CHECKED	FILE NO. 0281550-C12D-2
SCALE As shown	DATE 29 February 1984
DWG. NO. 4884-2-D1R2	SHEET 1 OF 43 SHEETS

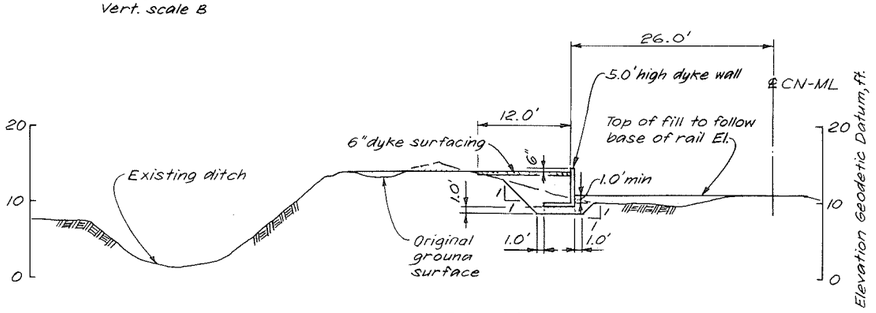
280085







SECTION 1
Typical between Sta 10+35.79 and Sta 10+75
Scale C



SECTION 2
Typical between Sta 0+80 and Sta 10+31.79
Scale C

NOTES

1. For general notes and legend see Dwg 4884-2-D3.
2. For typical detail of retaining wall excavation & structural fill payment lines see Dwg 4884-2-D13

Scale C 10 0 10 20 30 40 50 FT.
Scale B 5 0 5 10 15 20 25 FT.
Scale A 50 0 50 100 150 200 250 FT.

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405
DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER J.B. Wilson

NO	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing APPROVED FOR CONSTRUCTION JUL 25 84	MW			8-11-85
1.	Prepared for Tender (Combined contracts)	RB			5-6-84

REVISIONS

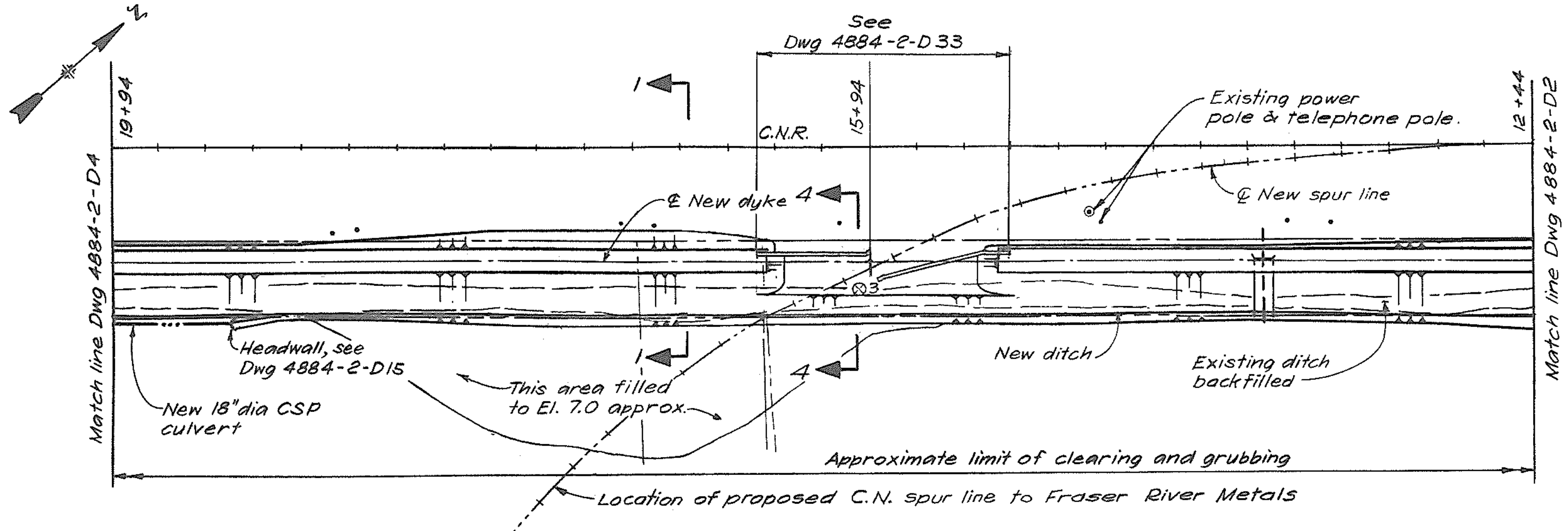
RECOMMENDED PROJECT MANAGER
DATE June 6 1984
APPROVED DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

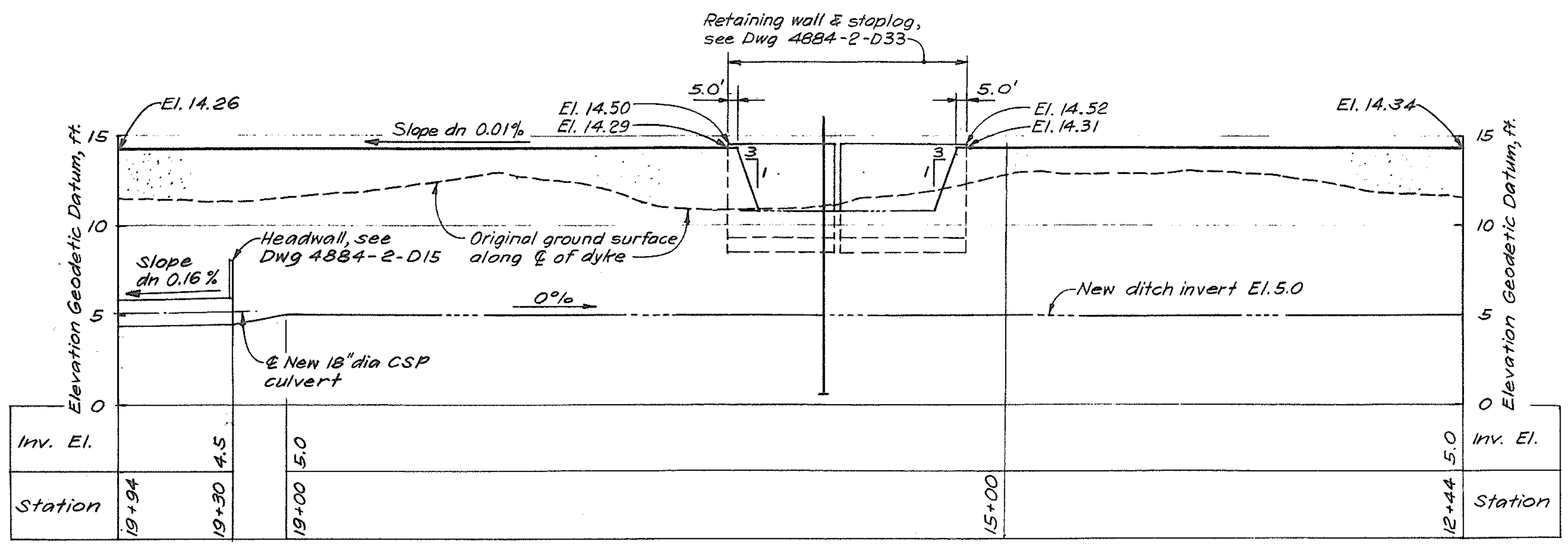
PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
DYKE STATIONS: 0+00 TO 12+44
PLAN, PROFILE & SECTIONS

DESIGNED	SURVEYED
DRAWN FL.	DATE
CHECKED	FILE NO. 0281550-C12D-2
SCALE As shown	DATE 9 Jan 1979
DWG. NO. 4884-2-D2/R2	SHEET 2 OF 43 SHEETS

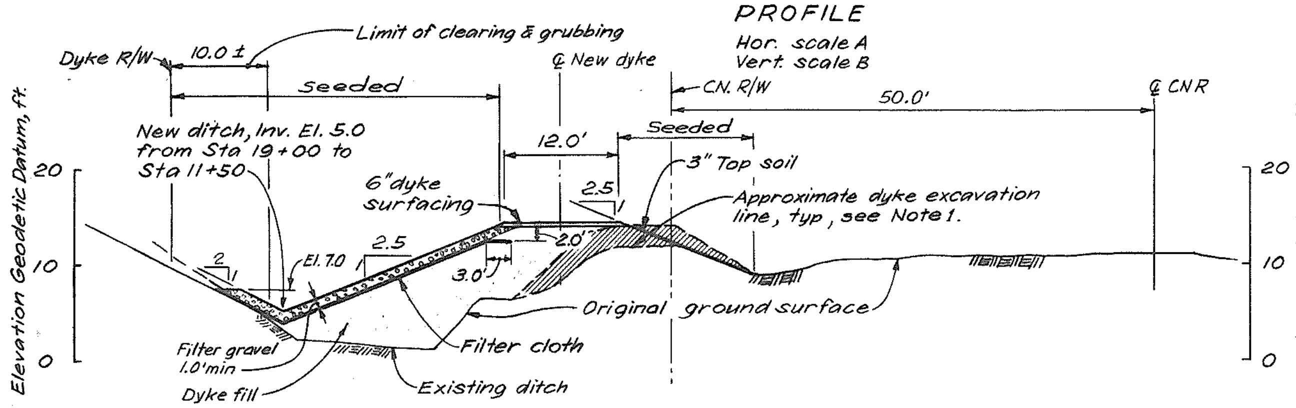
280086



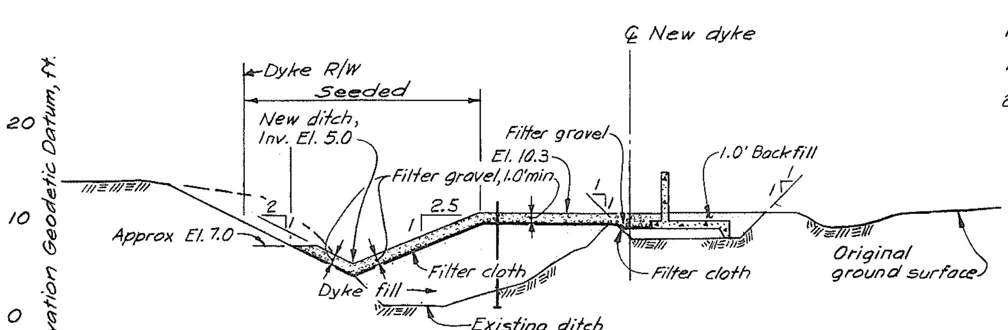
PLAN
Scale A



PROFILE
Hor. scale A
Vert. scale B



SECTION 1
Typical between Sta 12+05 and Sta 19+30
Scale C



SECTION 4
Scale C

LEGEND

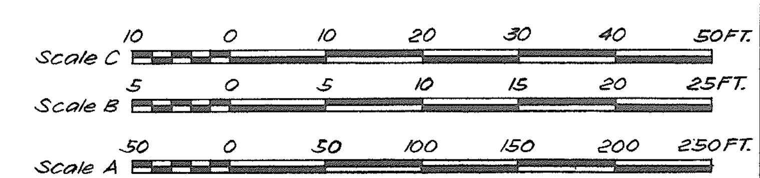
R/W	Right of way
CNR	Canadian National Railroad
CN-ML	CN-Main line
	Railroad
	Asphaltic concrete pavement
CSP	Corrugated steel pipe, asphalt coated
	New culvert on plan
	Centreline
	Legal boundary
	Base of rail
	New ditch invert
⊗ 3	Settlement plate and piezometer on plan, nominal depth of piezometer below existing ground level in ft.
	Settlement plate and piezometer in section
	Excavation
	Fill
	Dyke coordinate
	Fire hydrant
	Power pole
	Telephone pole
	Lateral movement gauge location (Slope indicator casing on plan)
El.-20.0	Lateral movement gauge location in section (Slope indicator casing in section) Bottom El. of casing
B.V.C.	Begin vertical curve
E.V.C.	End vertical curve
V.P.I.	Vertical point of intersection

GENERAL NOTES

1. Dyke station measured along land side edge of dyke wall or ℄ of new dyke.
2. All sections taken normal to dyke wall centreline or new dyke centreline.
3. Dyke outline shown in cross-section is section of dyke required. Additional settlement allowance not shown.
4. Limits of clearing and grubbing as shown on sections are typical for areas as indicated on plans and are maximum limits. Actual limits will be determined in field by the Engineer.
5. Dyke and dyke wall alignment have been set by coordinate points and for the dyke section adjacent to the CNR tracks by offsets measured at right angles to and from centreline of south railroad track.
6. Seeding
Areas to be seeded by District of Surrey in Spring 1986 which were deleted from the Contract, are noted "To be seeded." Areas seeded are noted "Seeded."

NOTE

1. Dyke excavation shall be determined in the field.
2. Spur line copied from C.N. Drawing 5720-2.377-1 dated 16-1-'85.



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEADS H. Nussbaum C.R. Bland
PROJECT ENGINEER M.A. [illegible]
CHIEF ENGINEER J. [illegible]

NO.	DESCRIPTION	BY	CHD	APPR	DATE
3.	Record Drawing.	MP			
2.	Opening for C.N.R Spur line, Section 2 & Note 2 added.	MP			4-4-85
	APPROVED FOR CONSTRUCTION				
1.	Prepared for Tender (combined contracts)				5-6-84

REVISIONS

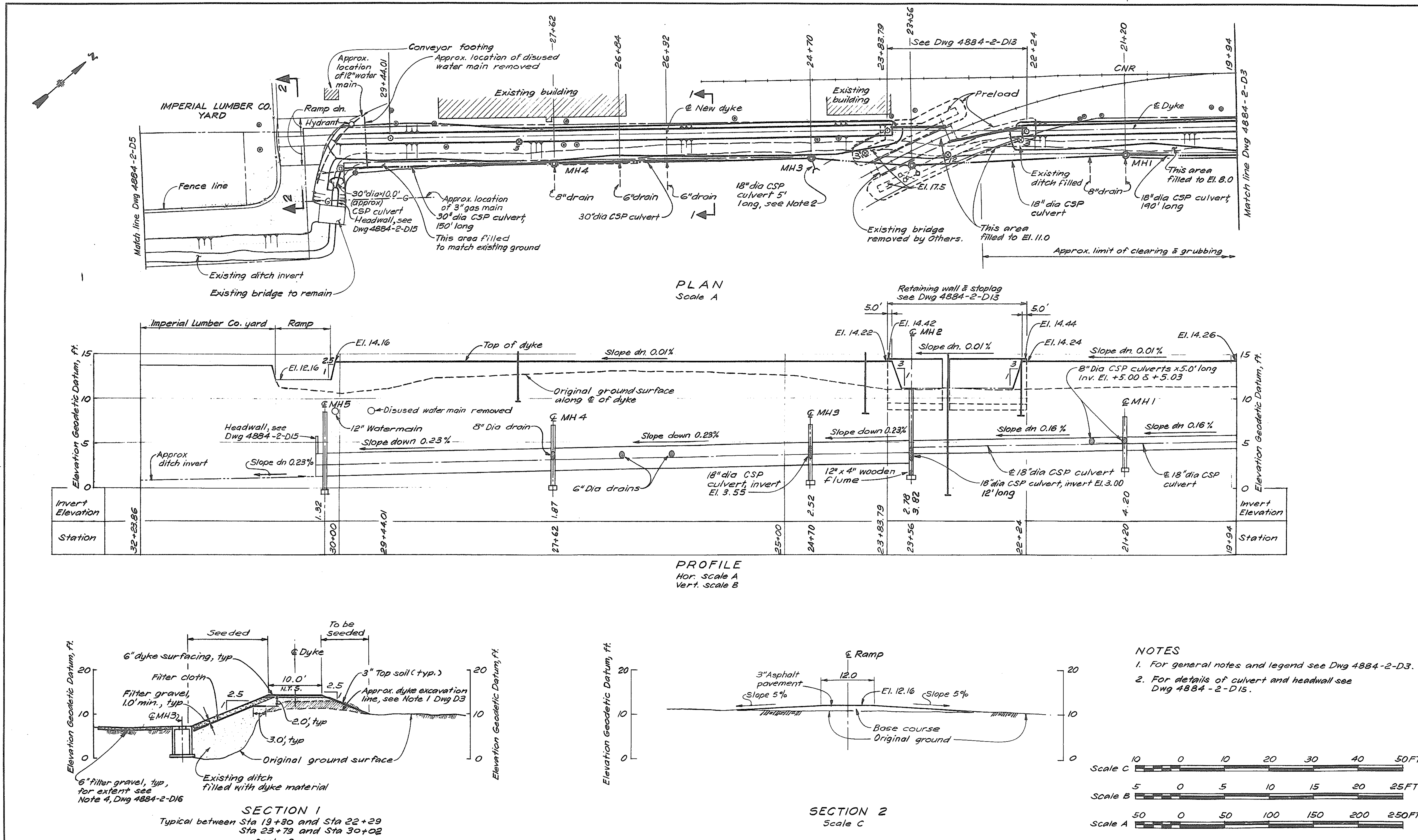
RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984
APPROVED [signature] DIRECTOR, WATER INVESTIGATIONS
DATE Jun 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
DYKE STATIONS: 12+44 TO 19+94
PLAN, PROFILE & SECTION

DESIGNED [signature]		SURVEYED	
DRAWN FL		DATE	
CHECKED NMC RCD		FILE NO. 0281550-C12D-2	
SCALE As shown		DATE 9 Jan 1979	
DWG. NO. 4884-2-D3/R3		SHEET 3 OF 43 SHEETS	

280087



PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEADS H. I. [signature] C. R. Bland
PROJECT ENGINEER [signature]
CHIEF ENGINEER [signature]

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing	MAW			12-3-85
1.	Prepared for Tender (Combined contracts)	FRB			5-6-84

REVISIONS

RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984
APPROVED [signature] DIRECTOR, WATER INVESTIGATIONS
DATE Jun 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA - BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
DYKE STATIONS: 19+94 TO 32+23.86
PLAN, PROFILE & SECTION

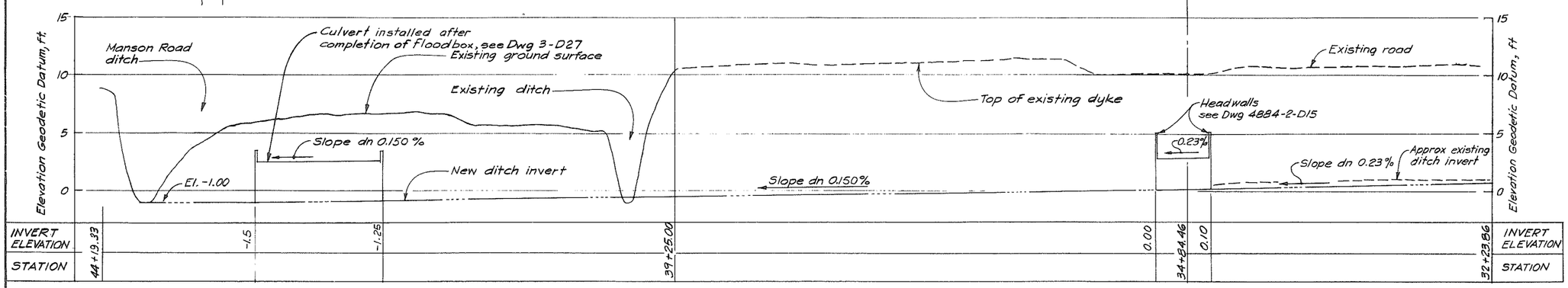
DESIGNED [signature] | SURVEYED
DRAWN FL | DATE
CHECKED NAC RCD | FILE NO. 0281550-C12D-2
SCALE As shown | DATE 9 Jan 1979
DWG. NO. 4884-2-D4/R2 | SHEET 4 OF 43 SHEETS

280088

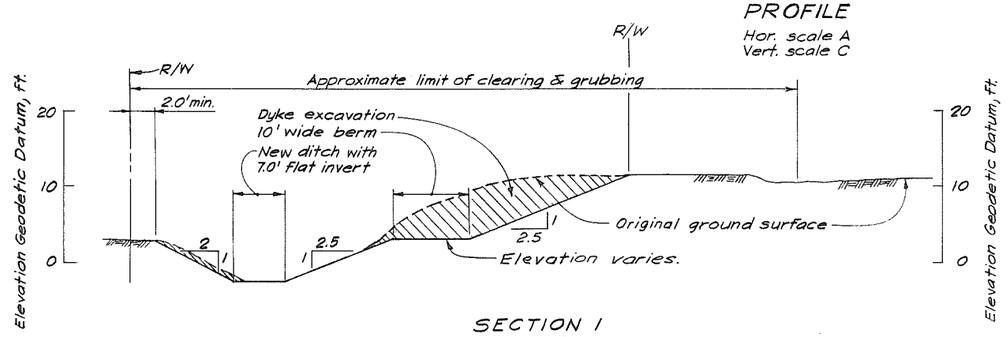
Existing Floodbox and Pumphouse
Manson P/L FF/O (D 189)
R.P. 14925
Bottom of ditch
39+25.00
Existing dyke
REM C Plan 546
REM B Plan 546
Tannery Road
34+84.46
℄ Tannery Road
Slope locally steepened
N 72,023.08
E 24,061.72
2H:1V
10.0'
50.0'
El. 12.90
37.0'
PROPOSED FILL AREA
Existing ditch enlarged as directed by the Engineer, see Note 2
Details of dyke shown on Dwg 4884-3-D27
Pine Road
Existing dyke to remain
Edge of existing roadway
N 72,287.68
E 24,384.34
Existing dyke
N 72,627.50
E 24,664.70
45.0' x 30" dia CSP culvert
Match line Dwg 4884-2-D4
N 71,944.12
E 24,162.47
10' Access for Dist. of Surrey
El. 7.0
Slope dn 0.3%
Slope dn 5%
Backfill surfaced with 6" thick road gravel & 3" asphalt pavement Level to match existing road.
℄ Preload and future Floodbox
1.75H:1V
Flow
El. 8.0
6" minus gravel slope protection material
R=30
REM I Plan 11985
Dyke Road
Land side of existing dyke and existing ditch re-profiled as shown
Existing ditch
For details of culvert headwalls see Dwg 4884-2-D15
Existing concrete bag wall made good after culvert installation
Existing timber access bridge remains
Existing ditch
Existing Pump station
Existing utility poles relocated by others
Manson Road
15.0'
43°
2H:1V
Bottom of Manson Road ditch
℄ culvert

PLAN
Scale A

ARRANGEMENT WHILE PRELOAD IN PLACE



PROFILE
Hor. scale A
Vert. scale C



SECTION 1
Scale B

NOTES

1. For general notes and legend see Dwg 4884-2-D3.
2. The contractor enlarged this ditch to ensure adequate drainage of the Manson channel during the time that the Manson preload was in place.

Scale C 5 0 5 10 15 20 FT
Scale B 10 0 10 20 30 40 FT
Scale A 50 0 50 100 150 200 FT

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10407

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2	Record Drawing	MW	JM		12-9-85
1	Prepared for tender (Combined contracts)	FRB			5 Jun '84

REVISIONS

APPROVED FOR CONSTRUCTION JUL 25 84

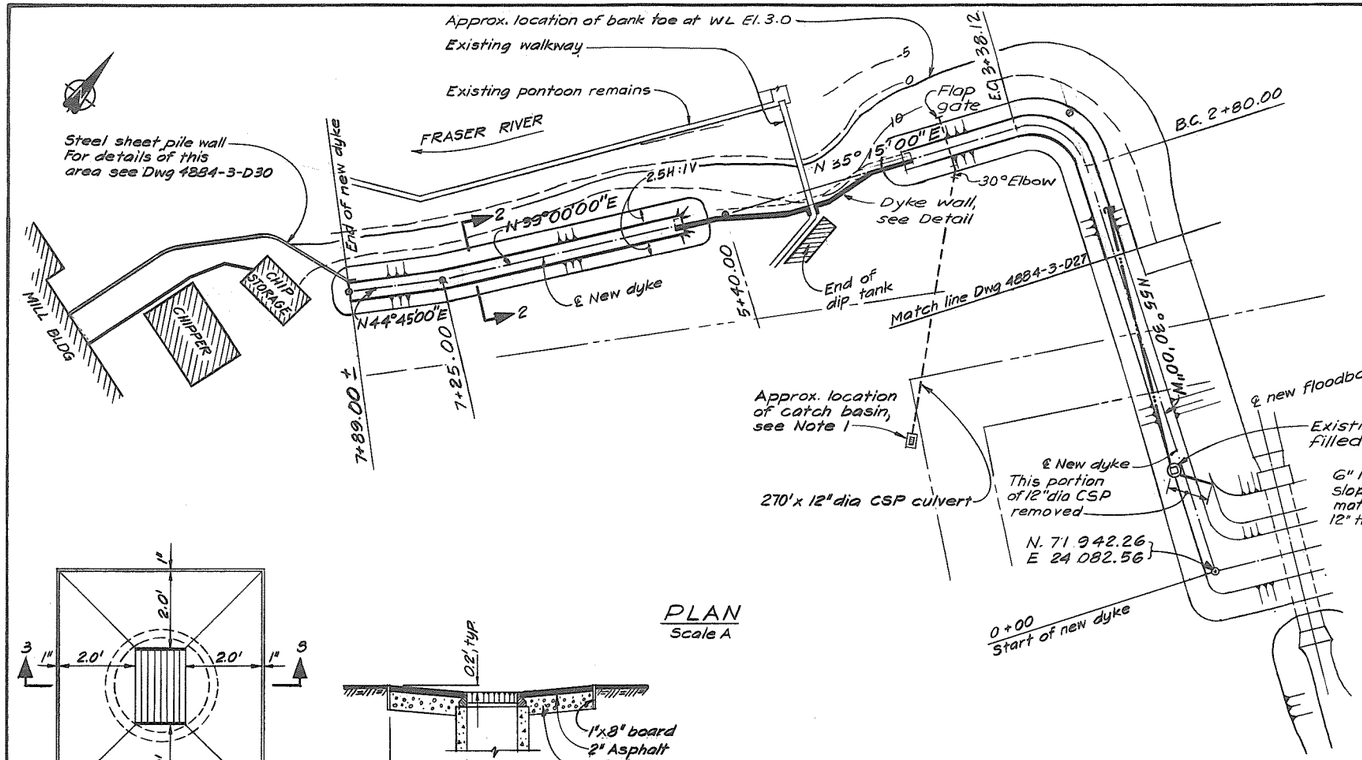
RECOMMENDED ____ PROJECT MANAGER
DATE June 6 1984
APPROVED ____ DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

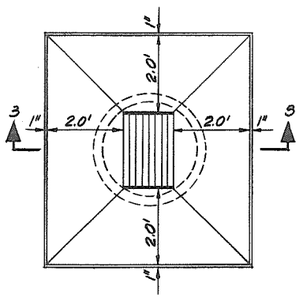
PROJECT 10.4 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
DYKE STATIONS 32+23.86 TO 44+19.33
PLAN, PROFILE, SECTION

DESIGNED	FRB	SURVEYED	
DRAWN	L.S.	DATE	
CHECKED		FILE NO.	0281550-C12D-2
SCALE	As shown	DATE	Feb. 29, 1984
DWG. NO.	4884-2-D5/R2	SHEET	5 OF 43 SHEETS

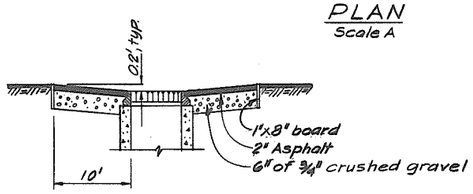
280089



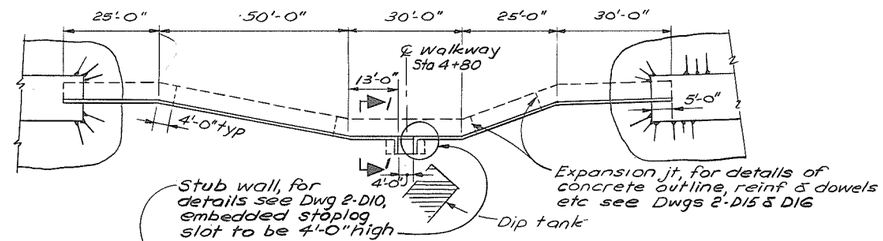
PLAN
Scale A



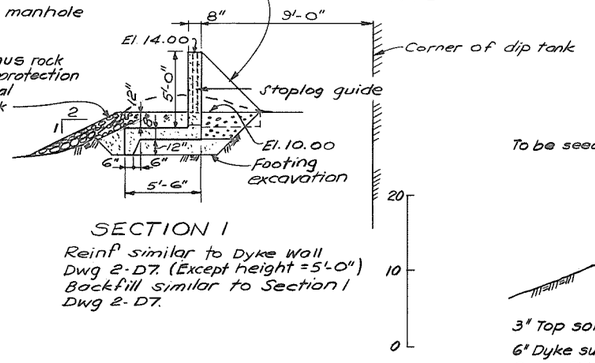
CATCH BASIN - PLAN
Scale NTS



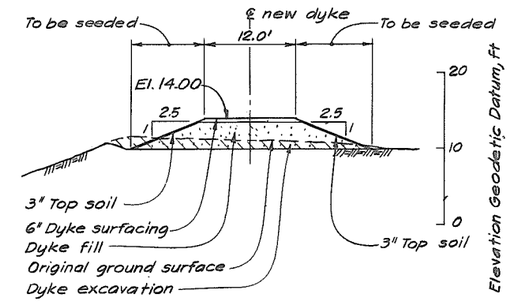
SECTION 3
Scale NTS



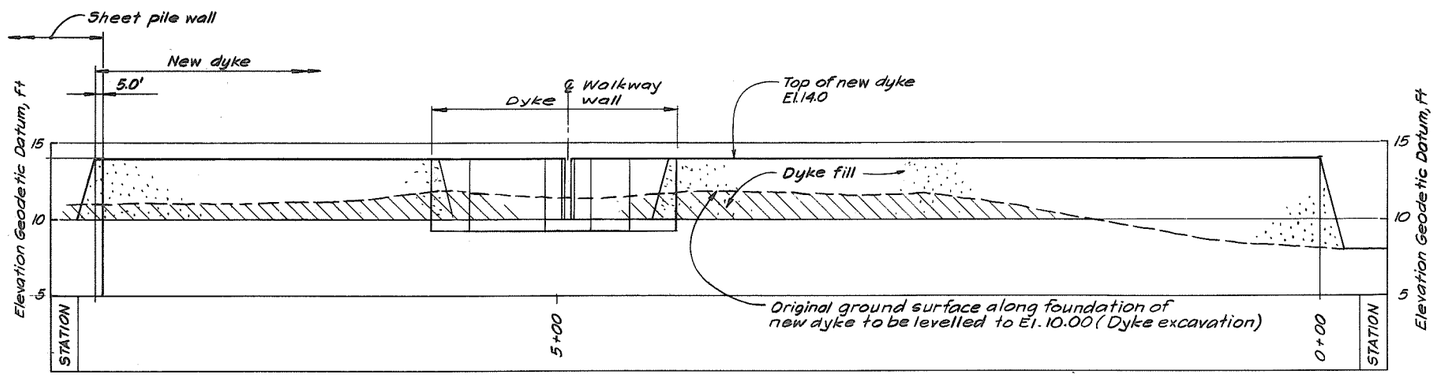
DYKE WALL
NTS



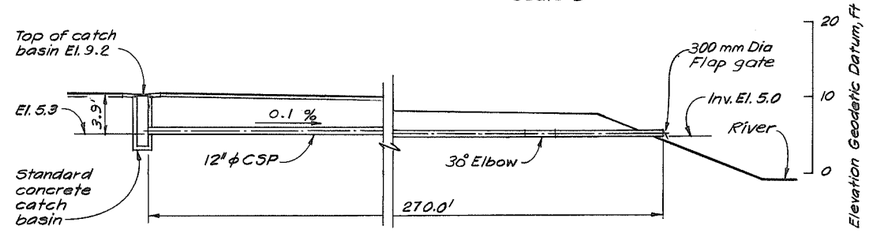
SECTION 1
Reinf similar to Dyke Wall Dwg 2-D7. (Except height = 5'-0")
Backfill similar to Section 1 Dwg 2-D7.



SECTION 2
Scale B



PROFILE
Hor. scale A
Vert. scale C



CULVERT PROFILE
Scale B

Scale C 5 0 5 10 15 20 25ft
Scale B 10 0 10 20 30 40 50ft
Scale A 50 0 50 100 150 200 250ft

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MELLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10407

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO	DESCRIPTION	BY	CHD	APPR	DATE
3	Record Drawing APPROVED FOR CONSTRUCTION JUL 25 '84	MHH			23-9-83
2	Dyke wall added	MHH	PRB	MAM	27-84
1	Combined Contracts & Alignment of dyke revised; redrawn.	L.S.	MAM	MAM	5-6-84

REVISIONS

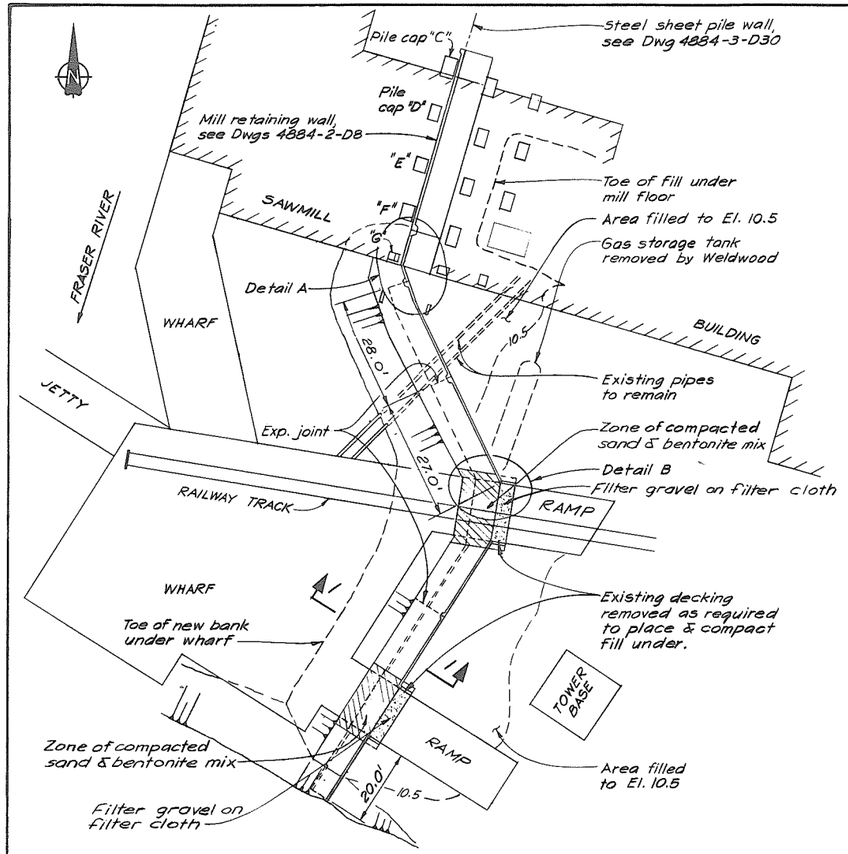
RECOMMENDED — PROJECT MANAGER
DATE June 6 1984.
APPROVED — A/DIRECTOR, WATER INVESTIGATIONS
DATE

BRITISH COLUMBIA
MINISTRY OF ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1988 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
MANSON ROAD DYKES - 0+00 TO 7+89
PLAN, PROFILES & SECTIONS

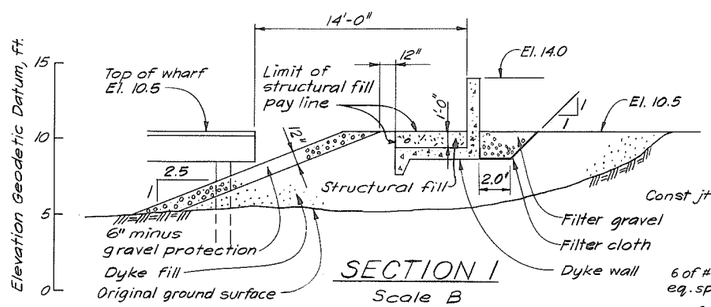
DESIGNED PRB	SURVEYED
DRAWN L.S.	DATE
CHECKED CR	FILE NO. 0281550-C12D-2
SCALE As shown	DATE Feb. 29, 1984
DWG. NO. 4884-2-D6/R3	SHEET 6 OF 43 SHEETS

280090

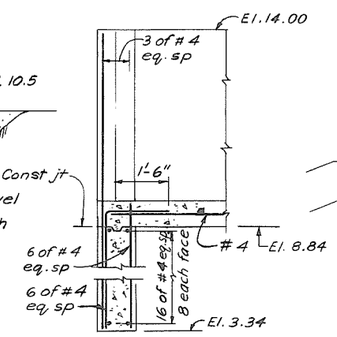


PLAN
Scale A

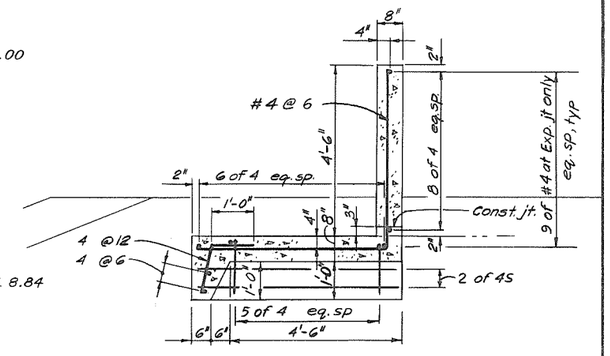
PROFILE
Hor. scale A
Vert. scale B



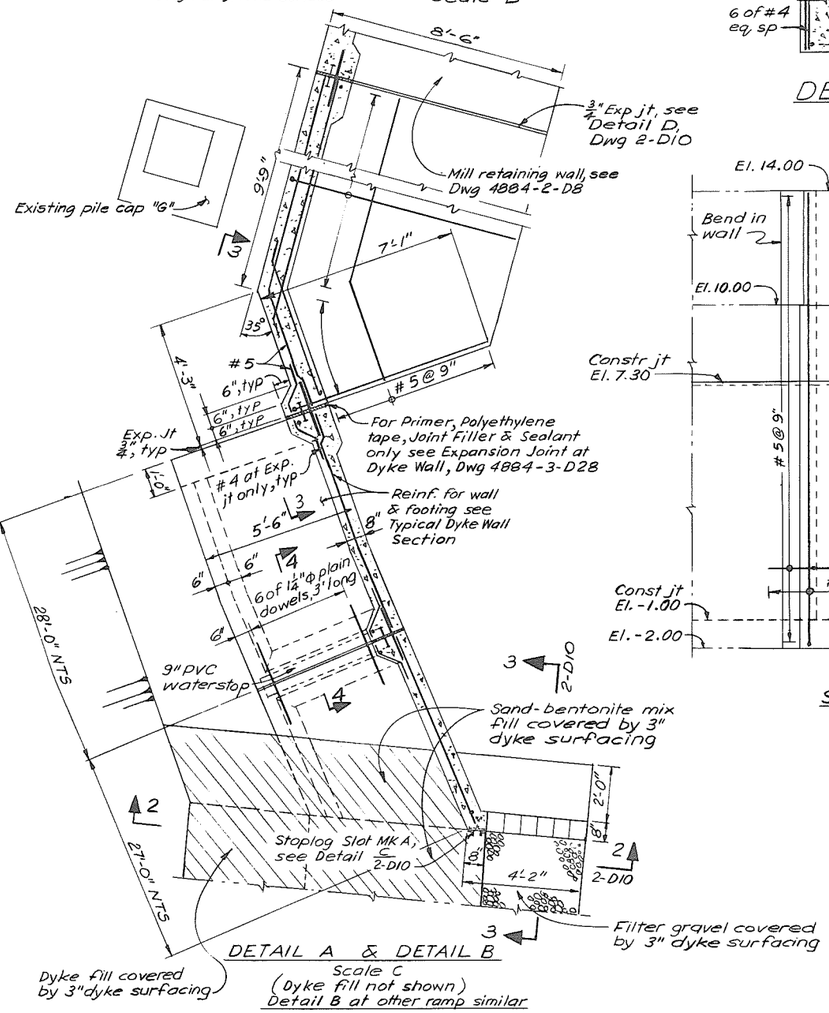
SECTION 1
Scale B



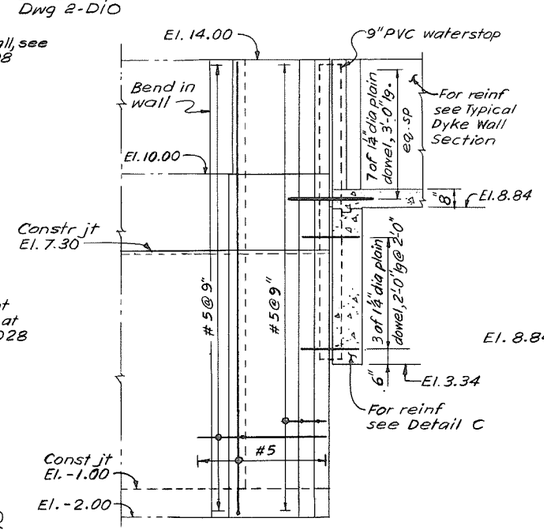
DETAIL C
N.T.S



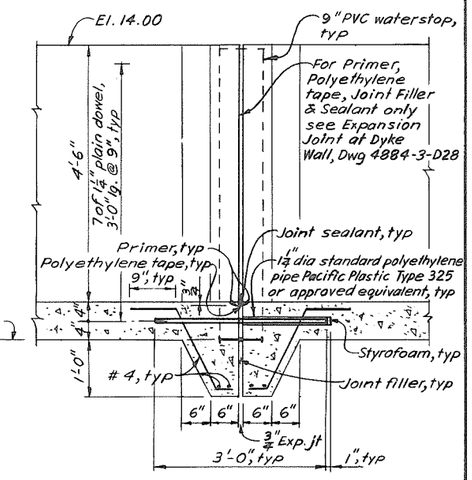
TYPICAL DYKE WALL SECTION
Scale D



DETAIL A & DETAIL B
Scale C
(Dyke fill not shown)
Detail B at other ramp similar



SECTION 3
Scale C



SECTION 4
N.T.S

Scale D 1 0 1 2 3 4 5 6 7 8 Ft
Scale C 1 0 1 2 3 4 5 6 7 8 9 10 11 Ft
Scale B 5 0 5 10 15 Ft
Scale A 20 0 20 40 60 Ft

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER B.C.
PROJECT NO 10417
DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

4.	Record Drawing	MAH	jm		4-12-85
3.	Plan, Profile, Section 1, Typical Dyke Wall Section & Detail A modified. Sections 3 & 4 and Detail C added.	S.K.C	JRS	jm	19-12-84
2.	Mill retaining wall extended & pile cap "C" added. APPROVED FOR CONSTRUCTION JUL 25 '84	MP	FRB	jm	13-10-84
1.	Prepared for Tender (Combined Contracts)		MAH	MAH	5-6-84
No.	REVISIONS	BY	CHD	APPR	DATE

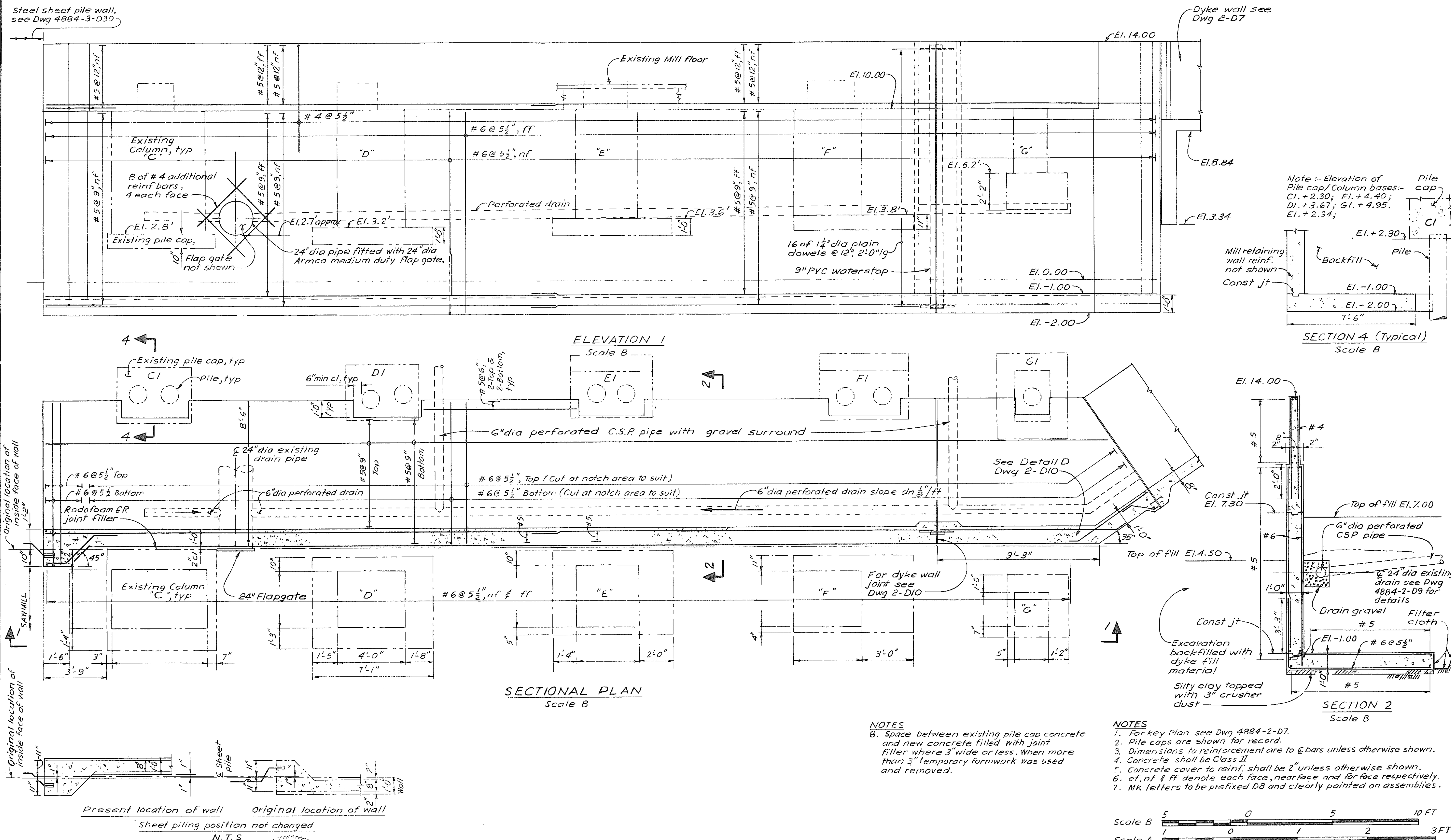
RECOMMENDED _____ PROJECT MANAGER
DATE June 6 1984
APPROVED _____ for DIRECTOR, WATER INVESTIGATIONS
DATE June 6/1984

BRITISH COLUMBIA
MINISTRY OF ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
WELDWOOD - MILL RETAINING WALL & DYKE WALL - GENERAL ARRANGEMENT

DESIGNED FRB	SURVEYED
DRAWN L.S.	DATE
CHECKED CR	FILE NO 0281550-CI2D-2
SCALE As shown	DATE 20 March 1984
DWG NO 4884-2-D7 R4	SHEET 7 OF 43 SHEETS

280091



Steel sheet pile wall, see Dwg 4884-3-D30
Dyke wall see Dwg 2-D7
El. 14.00
Existing Mill floor
El. 10.00
#5@12",ff
#5@12",nf
#4@5½"
#6@5½", ff
#6@5½", nf
Existing Column, "C", typ
"D"
"E"
"F"
"G"
El. 8.84
8 of #4 additional reinf bars, 4 each face
#5@9",nf
#5@9",ff
Perforated drain
El. 6.2'
El. 2.8'
Existing pile cap,
El. 2.7' approx
El. 3.2'
El. 3.6'
El. 3.8'
El. 3.34
24" dia pipe fitted with 24" dia Armco medium duty flap gate.
Flap gate not shown
16 of 1¼" dia plain dowels @12", 2'-0" lg
9" PVC waterstop
El. 0.00
El. -1.00
El. -2.00
ELEVATION 1
Scale B
Note :- Elevation of Pile cap/Column bases:- C1. + 2.30; F1. + 4.40; D1. + 3.67; G1. + 4.95. E1. + 2.94;
Pile cap
C1
El. + 2.30
Pile
Mill retaining wall reinf. not shown
Backfill
Const jt
El. -1.00
El. -2.00
7'-6"
SECTION 4 (Typical)
Scale B
Existing pile cap, typ
C1
Pile, typ
D1
E1
F1
G1
6" min cl. typ
#5@6", 2-Top & 2-Bottom, typ
6" dia perforated C.S.P. pipe with gravel surround
24" dia existing drain pipe
#5@9" Top
#5@9" Bottom
See Detail D Dwg 2-D10
#6@5½" Top
#6@5½" Bottom
#6@5½", Top (Cut at notch area to suit)
#6@5½" Bottom (Cut at notch area to suit)
6" dia perforated drain
6" dia perforated drain slope dn ⅛"/ft
Rodofoam 6R joint filler
Original location of inside face of wall
SAWMILL
Existing Column "C", typ
24" Flapgate
#6@5½", nf & ff
For dyke wall joint see Dwg 2-D10
Top of fill El. 4.50
9'-3"
1'-6"
3'-9"
1'-5"
4'-0"
1'-8"
7'-1"
1'-4"
2'-0"
3'-0"
1'-2"
SECTIONAL PLAN
Scale B
El. 14.00
#4
Const jt El. 7.30
Top of fill El. 7.00
6" dia perforated CSP pipe
℄ 24" dia existing drain see Dwg 4884-2-D9 for details
Drain gravel
Filter cloth
#6
#5
Const jt
El. -1.00
#6@5½"
Excavation backfilled with dyke fill material
Silty clay topped with 3" crusher dust
SECTION 2
Scale B
Original location of inside face of wall
℄ Sheet pile
Present location of wall
Original location of wall
Sheet piling position not changed
N.T.S
Scale B 5 0 5 10 FT
Scale A 1 0 1 2 3 FT

NOTES

8. Space between existing pile cap concrete and new concrete filled with joint filler where 3" wide or less. When more than 3" temporary formwork was used and removed.

NOTES

1. For key Plan see Dwg 4884-2-D7.
2. Pile caps are shown for record.
3. Dimensions to reinforcement are to ℄ bars unless otherwise shown.
4. Concrete shall be Class II
5. Concrete cover to reinf. shall be 2" unless otherwise shown.
6. ef, nf & ff denote each face, near face and far face respectively.
7. MK letters to be prefixed D8 and clearly painted on assemblies.

CRIPPEN ENGINEERING LTD.
PROJECT NO. 1040
DEPARTMENT HEAD
PROJECT ENGINEER J. B. Milne
CHIEF ENGINEER

NO	DESCRIPTION	BY	CHD	APPR	DATE
4	Record Drawing	MW			2-12-85
3	Re-drawn	S.K.C		JBM	11.12.84

REVISIONS

RECOMMENDED — PROJECT MANAGER
DATE 11. Dec. 1984
APPROVED — DIRECTOR, WATER INVESTIGATIONS
DATE

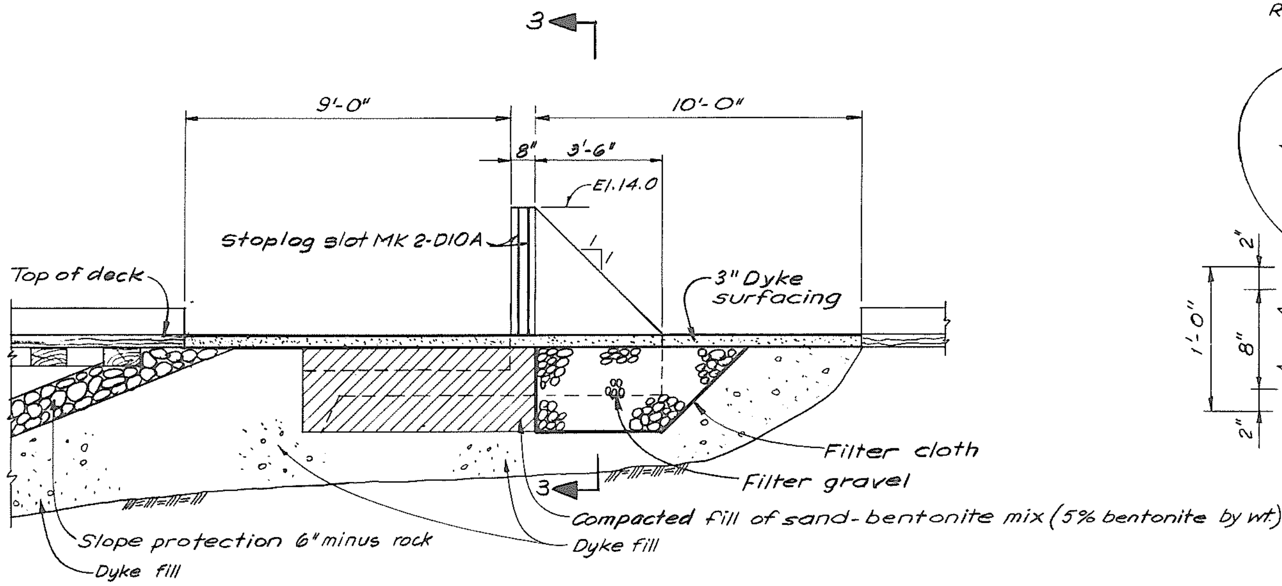
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA - BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
WELDWOOD - MILL RETAINING WALL
CONCRETE OUTLINE & REINFORCEMENT - SHEET 1

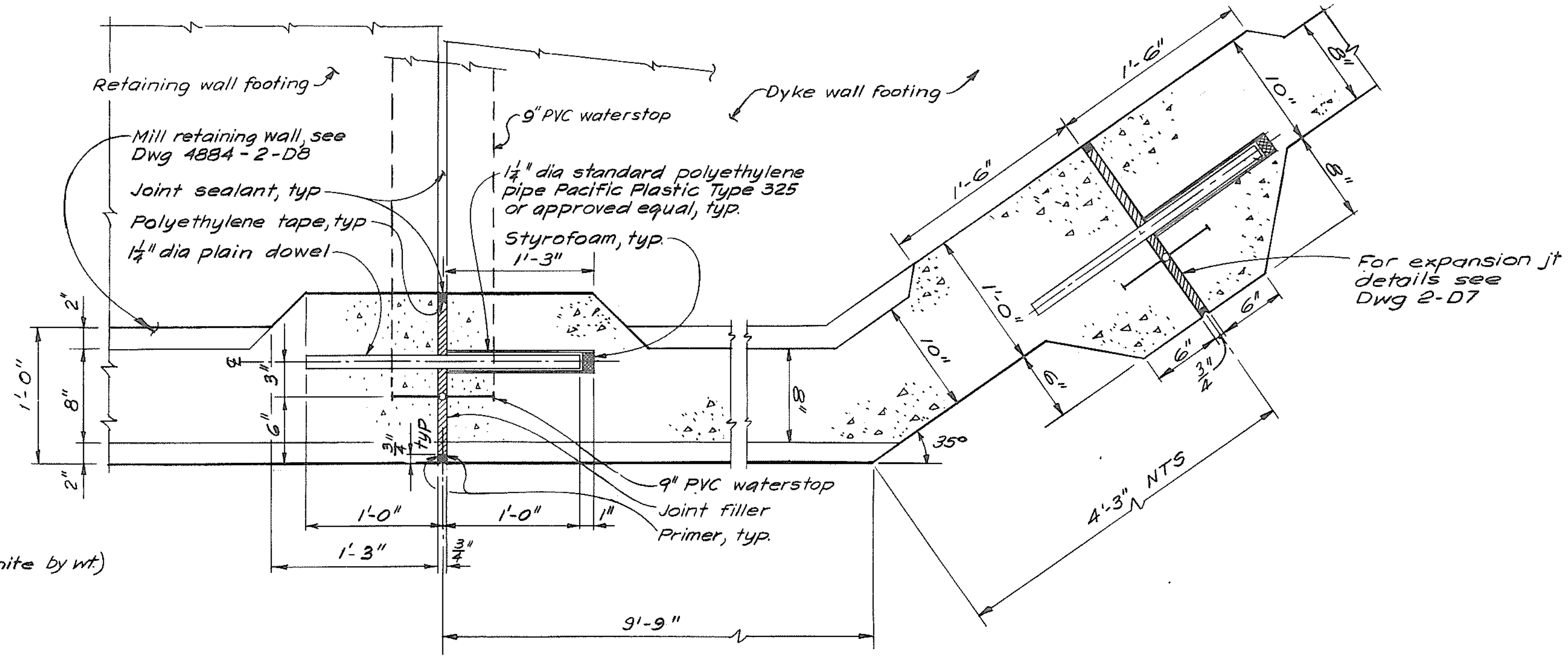
DESIGNED J.B.M; J.L.
DRAWN S.K.C
CHECKED C.T.L; R.S.S
SCALE As shown
DWG. NO 4884-2-D8/R4

SURVEYED
DATE 11 Dec. 1984
FILE NO 0281550-C12D-2
DATE 11 Dec. 1984
SHEET 8 OF 43 SHEETS

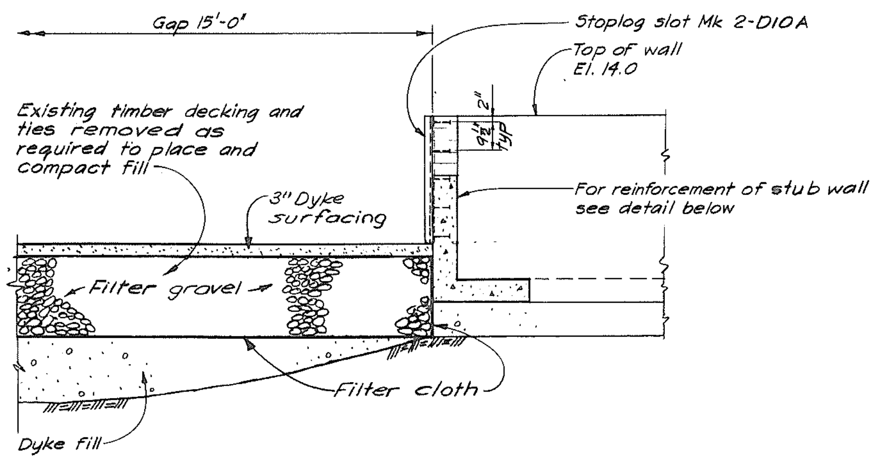
280092



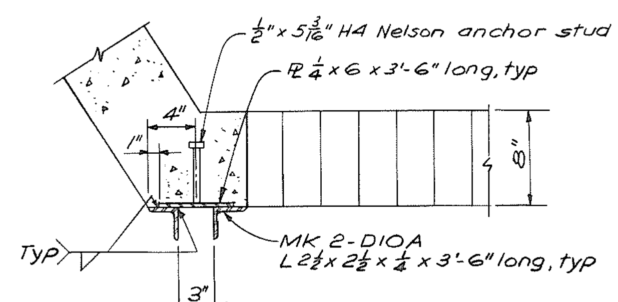
SECTION $\frac{2}{2\text{-}D7}$
Scale A



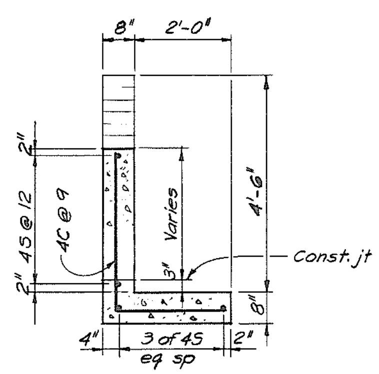
DETAIL $\frac{D}{2\text{-}D7}$
Scale C



SECTION $\frac{3}{2\text{-}D7}$
Scale A



DETAIL $\frac{C}{2\text{-}D7}$
Scale C



DETAIL OF STUB WALL
Scale B

Scale C 1 0 1 2 Ft
Scale B 1 0 1 2 3 4 5 6 7 8 9 Ft
Scale A 1 0 1 2 3 4 5 6 7 8 9 10 Ft

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

No.	Revision				Date
3	Record Drawing				4-12-85
2	Detail D revised	S.K.C.		JBM	11.12.84
	APPROVED FOR CONSTRUCTION				
1	Prepared for Tender (Combined Contracts)				5-6-84

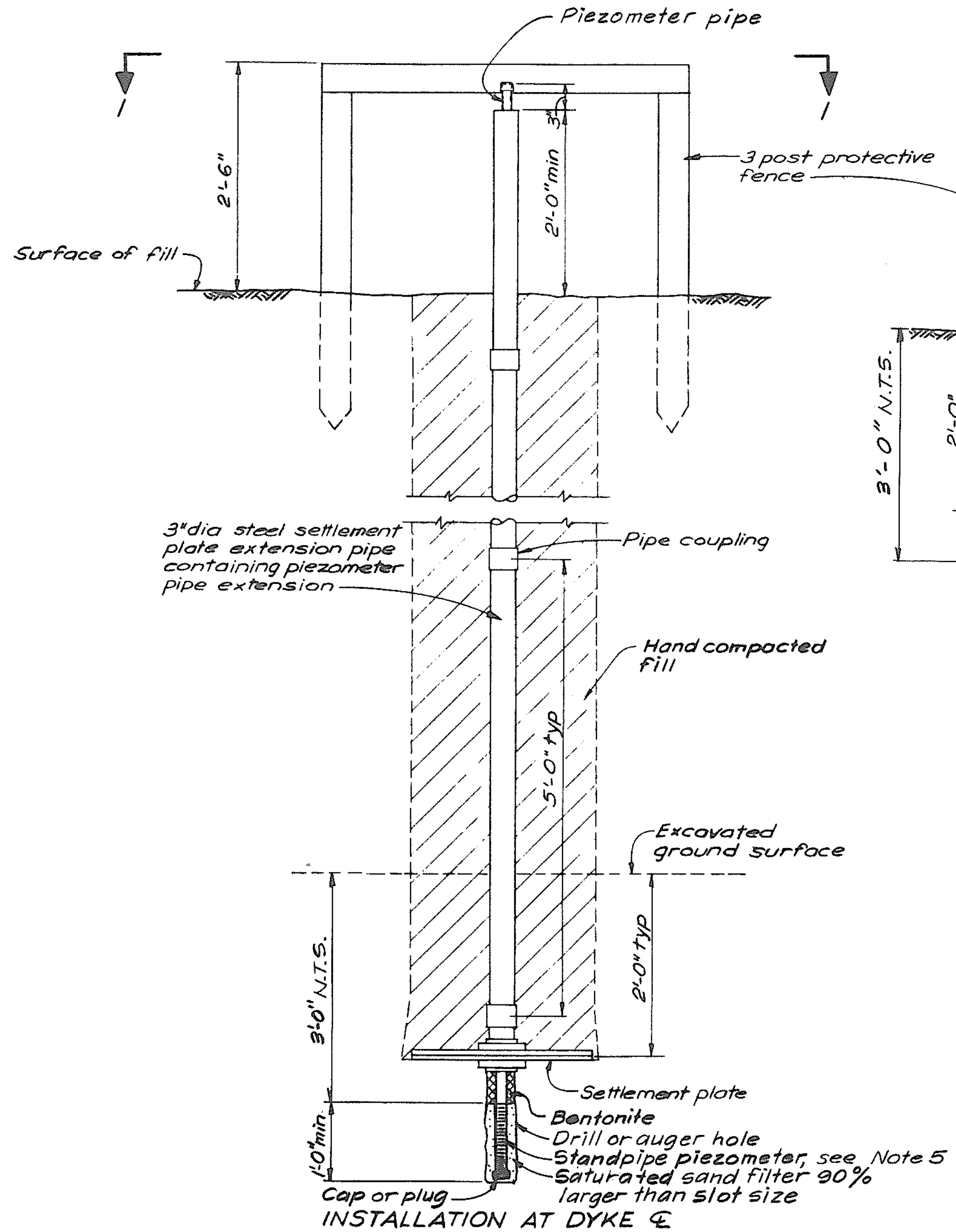
RECOMMENDED — PROJECT MANAGER
DATE June 6 1984.
APPROVED — DIRECTOR WATER INVESTIGATIONS
DATE Jun 6/84

BRITISH COLUMBIA
MINISTRY OF ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA - BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

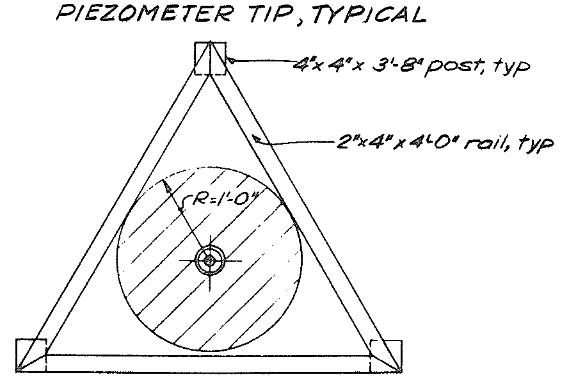
PROJECT 10.4 CONTRACT 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
WELDWOOD - DYKE WALL
DETAILS

DESIGNED PRB
DRAWN L.S.
CHECKED CR
SCALE As shown
DWG NO 4884-2-D10/33
FILE NO 0281550-C12D-2
DATE 20 March 1984
SHEET 10 OF 43 SHEETS

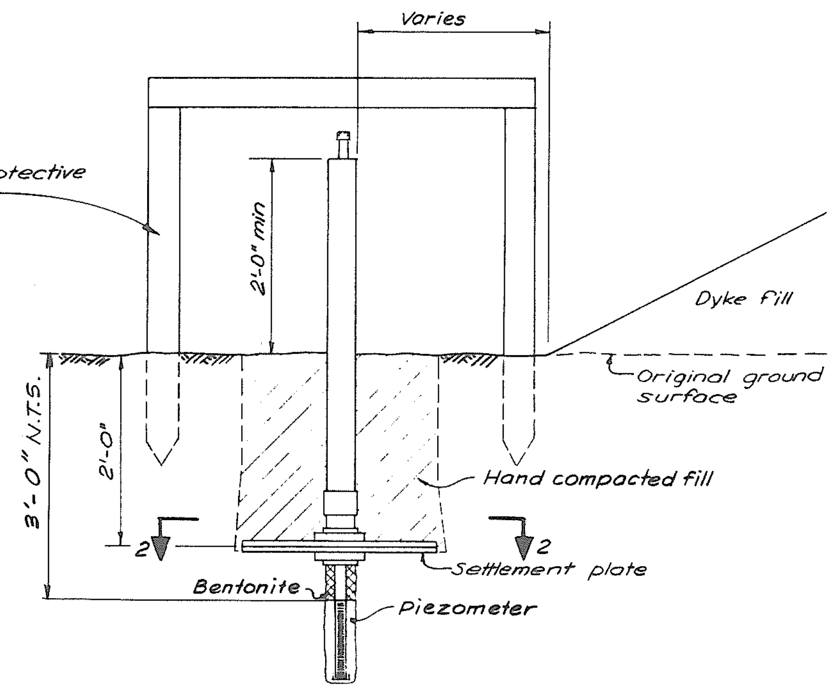
280093



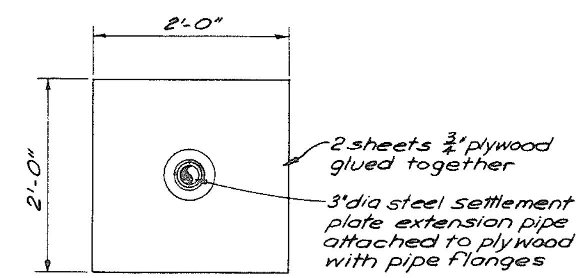
INSTALLATION AT DYKE ℄
PIEZOMETER TIP, TYPICAL



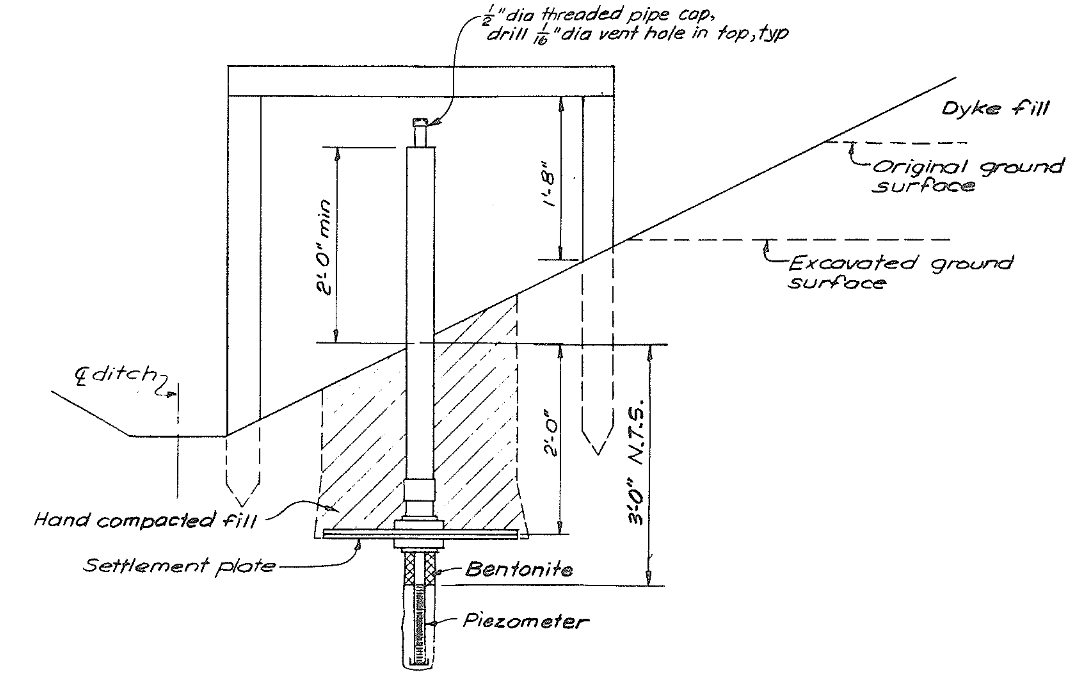
PLAN 1



INSTALLATION OUTSIDE FILL



PLAN 2
TYPICAL SETTLEMENT PLATE



INSTALLATION NEAR DITCH

NOTES

1. Surface settlement plate to be installed at approx 2'-0" depth below ground level.
2. Protective fence to be installed prior to any fill placement & raised as fill surface rises.
3. Locations of piezometer - settlement plate units are shown on Dwg 4884-2-D3, D4 & D6, and 4884-3-D26
4. All extension pipes to be clearly identified.
5. "R.S. Technical" type piezometer with 3/8" holes and filter cloth, typ.

NOTE ON DESIGN

Design adapted from Dwg 4884-1-D3
By : FL
Checked : [signature]
Original designed by M.A.M. checked by R.C.D, 29 Aug 1978

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD Herbert Nussbaum
PROJECT ENGINEER M A Merlo
CHIEF ENGINEER [signature]

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing APPROVED FOR CONSTRUCTION	MM	[signature]		12-11-85
1.	Prepared for Tender (Combined contracts)	RB	[signature]	MM	5-6-84

REVISIONS

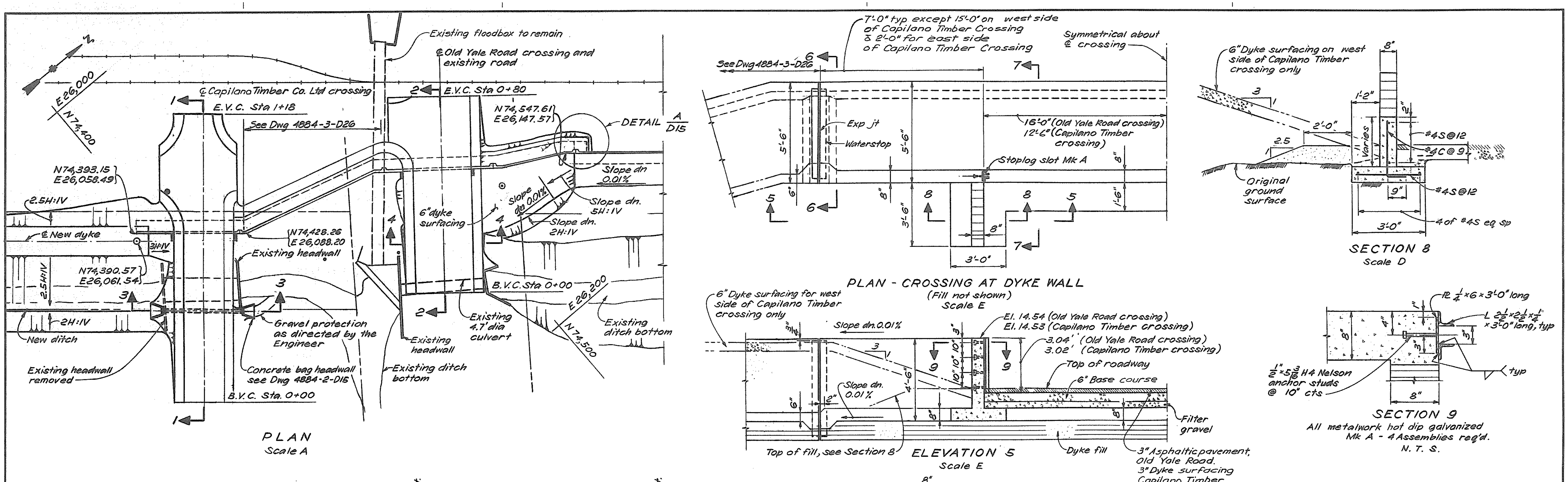
RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984
APPROVED [signature] DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

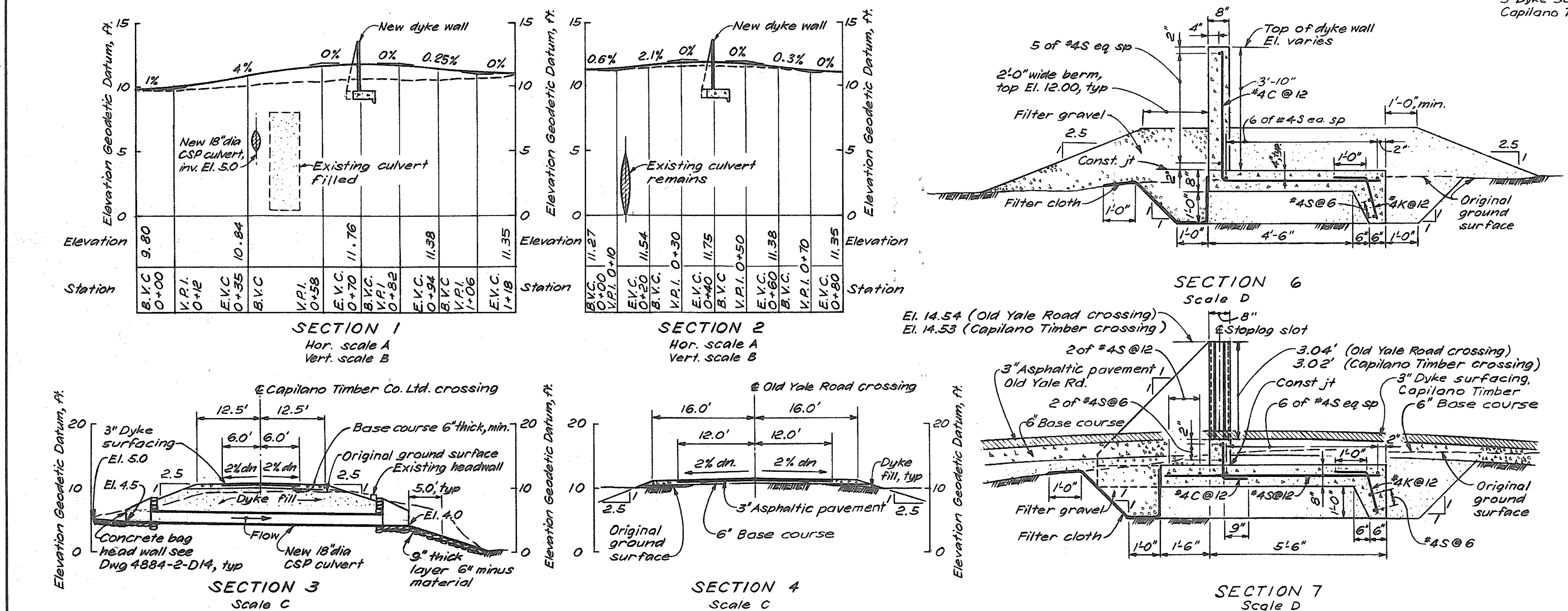
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
SETTLEMENT PLATE &
PIEZOMETER DETAILS

DESIGNED See Note
DRAWN [signature]
CHECKED See Note
SCALE Not to scale
DWG. NO. 4884-2-D11/R2
SURVEYED
DATE
FILE NO. 0281550-C12D-2
DATE 9 Jan 1979
SHEET 11 OF 43

280093



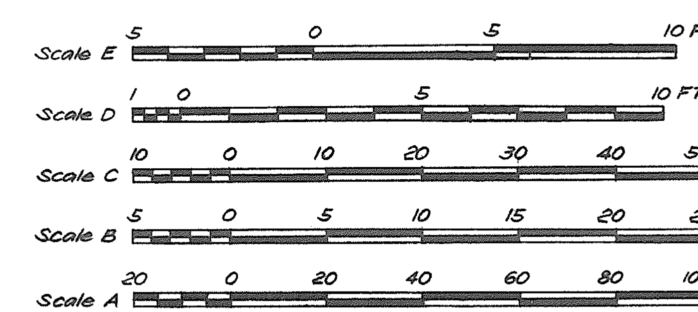


NOTES

1. For general notes and legend see Dwg 4884-2-D3.
2. For typical reinforcement bends see Dwg 4884-2-D16.
3. For notes on concrete & reinforcement see Dwg 4884-3-D15.
4. Mk letter to be prefixed D12 and clearly painted on embedded metalwork.
5. For detail of expansion joint see Dwg 4884-2-D15.
6. For structural fill & excavation payment line see Dwg 4884-2-D13.

NOTE ON DESIGN

Design adapted from Dwgs 4884-1-D15, D2, D18 & D9
By FL & M.A.M.
Checked: [signature]
Original designed by C.Ma checked by S.S, 29 Aug 1978



PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD [signature]
PROJECT ENGINEER [signature]
CHIEF ENGINEER [signature]

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2	Record Drawing	MAM			10-9-85
	APPROVED FOR CONSTRUCTION JUL 25 '84				
1	Prepared for Tender (Combined Contracts)	FRB			5-6-84

REVISIONS

RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984
APPROVED [signature] DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

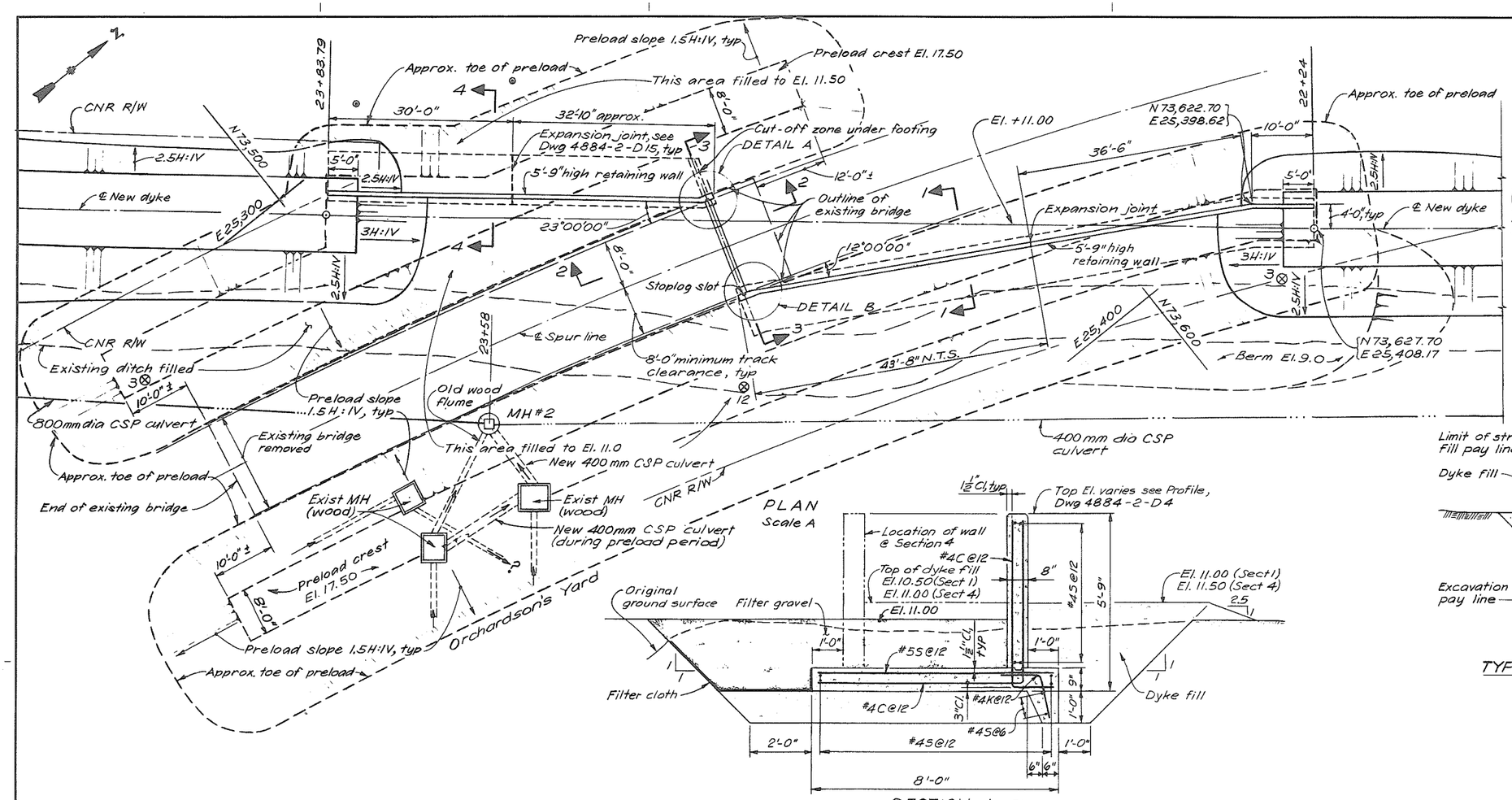
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
CAPILANO TIMBER & OLD YALE ROAD
ROAD CROSSINGS & STOPLOG WALLS

DESIGNED See Note
DRAWN FL
CHECKED See Note
SCALE As shown
DWG. NO. 4884-2-D12/R2

SURVEYED
DATE
FILE NO. 0281550-C12D-2
DATE 9 Jan 1979
SHEET 12 OF 43 SHEETS

280095



NOTES:

1. For general notes and legend see Dwg 4884-2-D3.
2. For typical reinforcement bends see Dwg 4884-2-D16
3. For notes on concrete & reinforcement see Dwg 4884-2-D15.
4. For note on design see Dwg 4884-2-D12

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MILLER

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO	DESCRIPTION	BY	CHD	APPR	DATE
3.	Record Drawing	MH			11-9-85
2.	East wall slab revised to clear rail line. Section 4 added, Section 3 revised. APPROVED FOR CONSTRUCTION JUL 25 '84	MP	jm		6-5-85
1.	Prepared for Tender (Combined Contracts)	RRB	MM	MM	5-6-84

REVISIONS

RECOMMENDED ____ PROJECT MANAGER
DATE June 6 1984

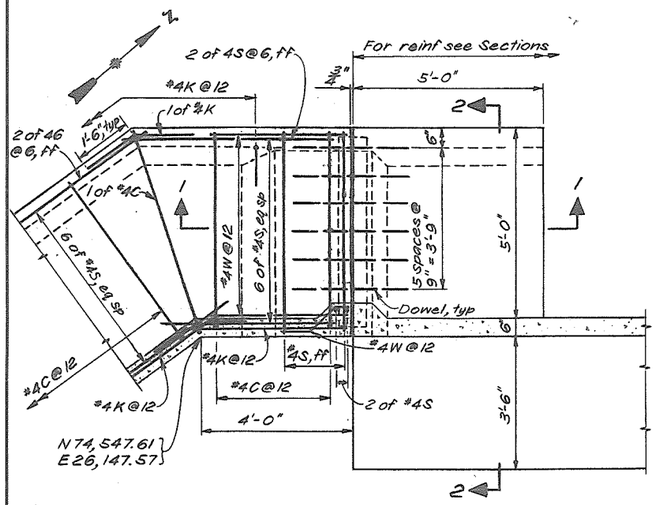
APPROVED ____ DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
C.N.R. TRACK & DYKE CROSSING STA. 23+15
PLAN, SECTIONS & DETAILS

DESIGNED See Note 8	SURVEYED
DRAWN FL	DATE
CHECKED See Note 8	FILE NO. 0281550-CI2D-2
SCALE As shown	DATE 9 Jan 1979
DWG. NO 4884-2-DI3/R3	SHEET 13 OF 43 SHEETS

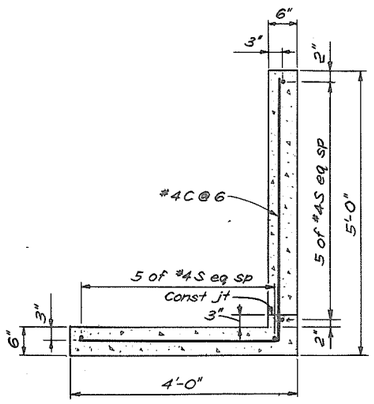
280096



DETAIL $\frac{A}{D12}$

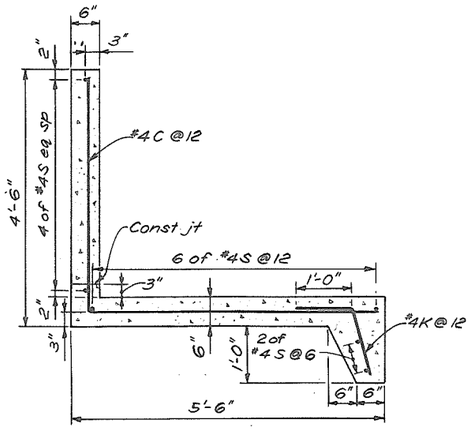
Excavation & fill not shown

Scale A

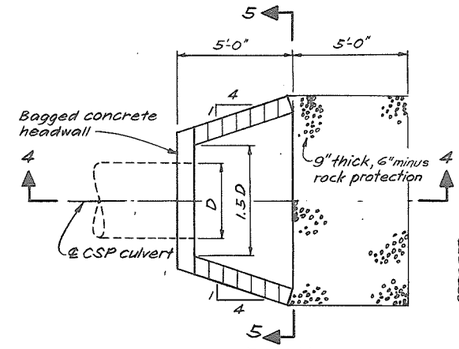


SECTION 5'-0" HIGH DYKE WALL

Scale B



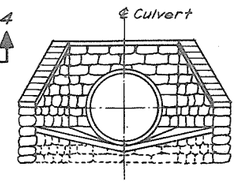
SECTION 4'-6" HIGH DYKE WALL



PLAN

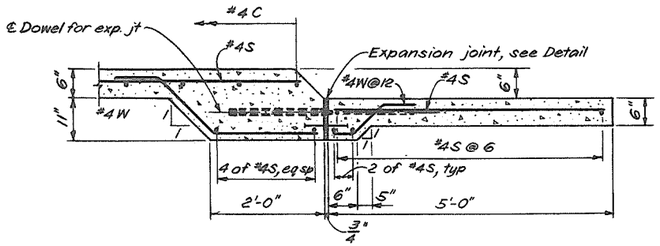
BAGGED CONCRETE HEADWALL

N. T. S.



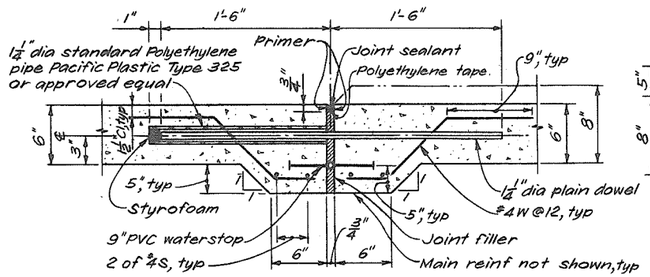
ELEVATION 5

N. T. S.



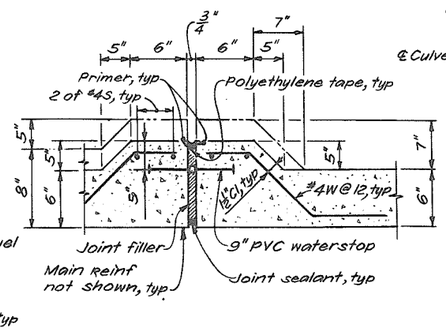
SECTION 1

Scale B



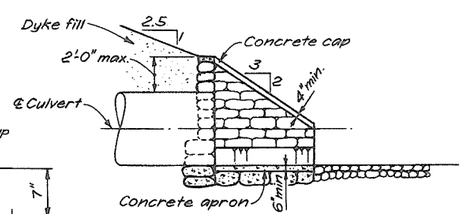
DYKE WALL FOOTING

Typical for 6" to 6" & 6" to 8" thick footings



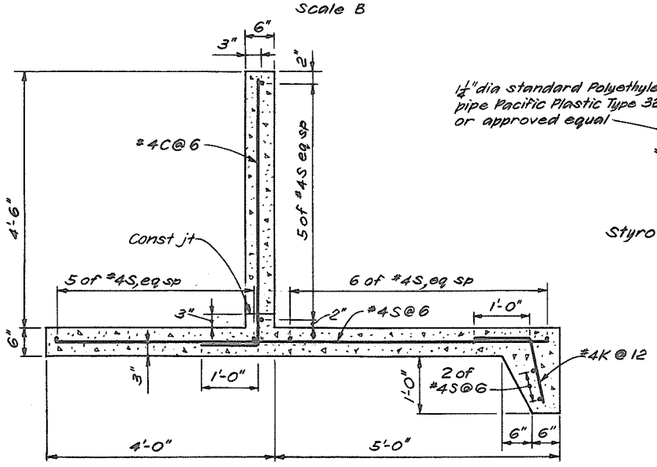
DYKE WALL

Typical for 6" to 6" & 6" to 8" thick walls



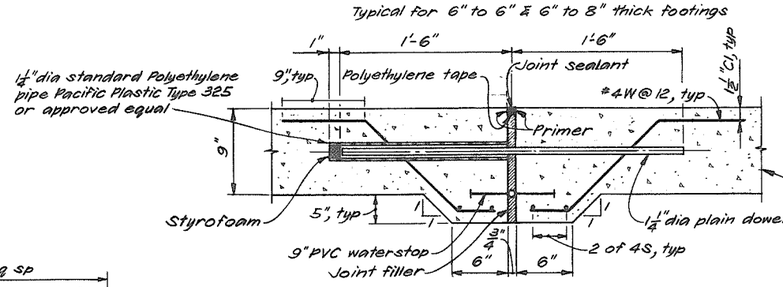
SECTION 4

N. T. S.

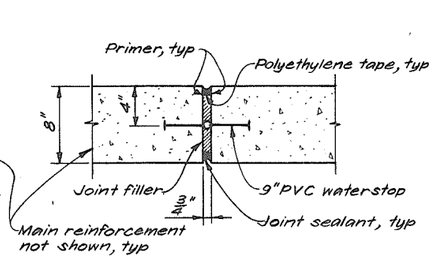


SECTION 2

Scale B



RETAINING WALL FOOTING



RETAINING WALL

TYPICAL EXPANSION JOINT DETAILS

N. T. S.

NOTES

1. For general notes and legend see Dwg 4884-2-D3.
2. For typical reinforcement bends see Dwg 4884-2-D16.
3. Dimensions to reinforcement are to ℄ bars unless otherwise shown.
4. Concrete shall be Class II except as noted.
5. Concrete cover to reinforcement to be 3" unless otherwise shown.
6. For typical footing dowel details see Dwg 4884-2-D16.
7. For note on design see Dwg 4884-2-D12.

Scale B 1 0 1 2 3 4 5 6 7FT.

Scale A 1 0 1 2 3 4 5 6 7 8 9 10FT.

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2	Record Drawing APPROVED FOR CONSTRUCTION	MAW	jm		10-9-85
1	Prepared for tender (Combined Contracts)	FRB	MAW	MAW	5-6-84

REVISIONS

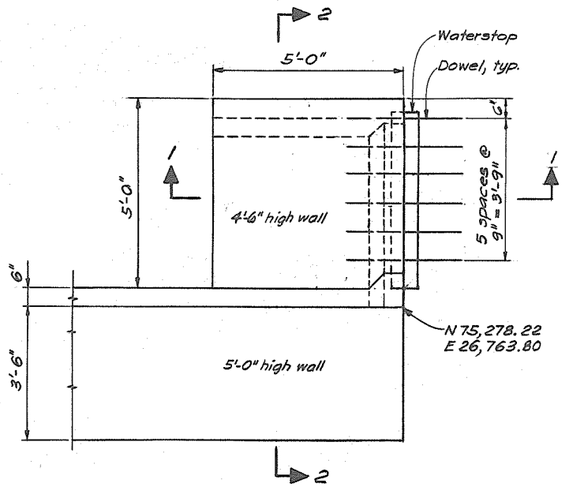
RECOMMENDED PROJECT MANAGER
DATE June 6 1984.
APPROVED DIRECTOR, WATER INVESTIGATIONS
DATE Jun 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
DYKE WALL & CULVERT HEADWALL
CONCRETE OUTLINE & REINFORCEMENT

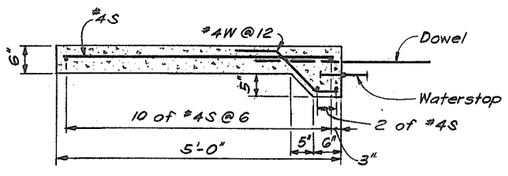
DESIGNED See Note 7	SURVEYED
DRAWN FL	DATE
CHECKED See Note 7	FILE NO. 0281550-C12D-2
SCALE As shown	DATE 9 Jan 1979
DWG. NO. 4884-2-D15/R2	SHEET 14 OF 43 SHEETS

280097

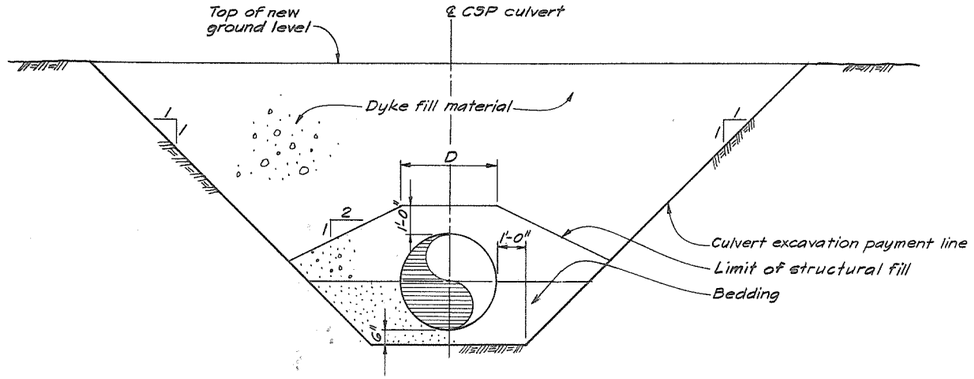


DETAIL $\frac{B}{D2}$

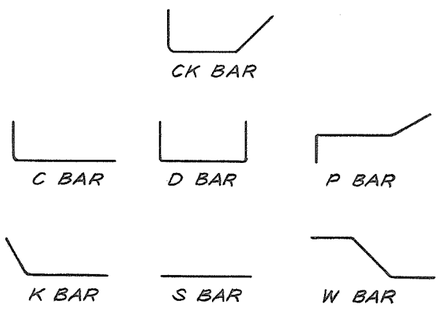
Excavation, fill & reinforcement not shown
Scale A



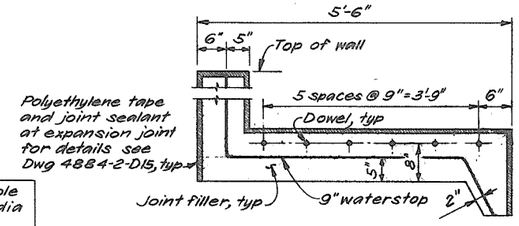
SECTION 1
Scale B



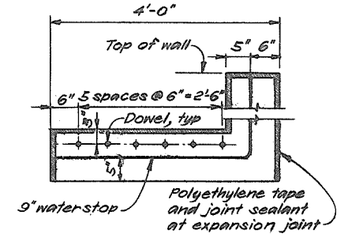
CULVERT EXCAVATION AND FILL PAYMENT LINES - SECTION
Scale N.T.S.



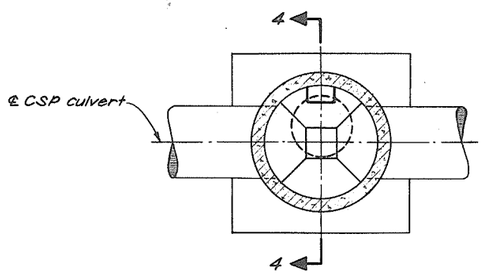
TYPICAL REINFORCEMENT BENDS



4'-6" HIGH DYKE WALL
Scale B

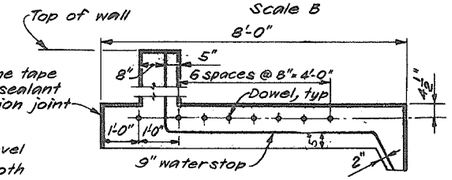


5'-0" HIGH DYKE WALL
Scale B

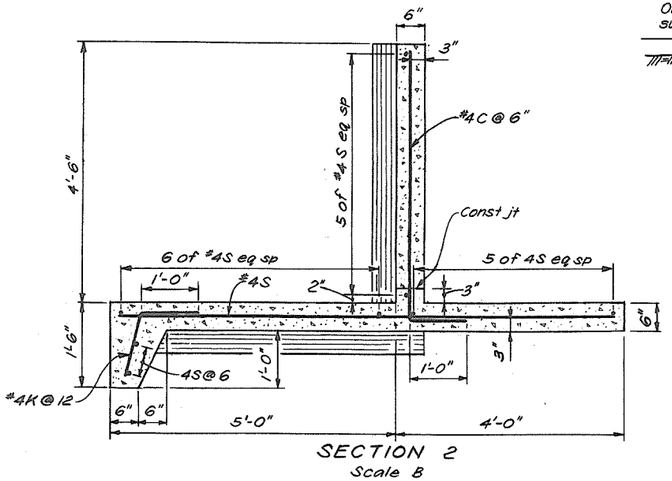


PLAN

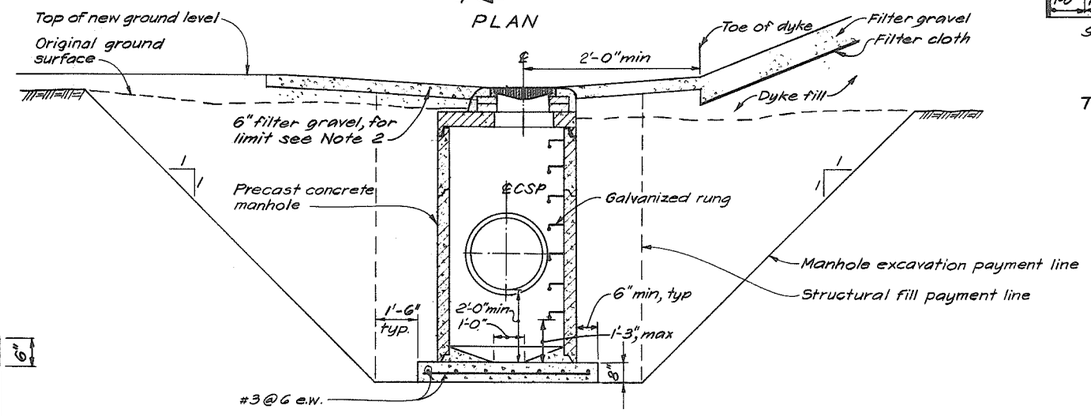
CSP Inside dia "d"	Manhole Inside dia "D"
18"	3'-6"
30"	4'-6"



RETAINING WALL
Scale A



SECTION 2
Scale B



SECTION 4

TYPICAL MANHOLE AND CATCH BASIN
Scale N.T.S.

TYPICAL DETAILS - FOOTING DOWELS AT EXPANSION JOINTS
(Showing sections of joints)

NOTES

1. For notes of reinforcement and concrete see Dwg 4884-2-D15.
2. Filter gravel around manhole to extend up to dyke toe and 10.0' at the other 3 sides.
3. For note on design see Dwg 4884-2-D12.

Scale C 1 0 1 2 3FT.

Scale B 1 0 1 2 3 4 5 6 7FT.

Scale A 1 0 5 10 FT.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MEHLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing APPROVED FOR CONSTRUCTION JUL 20 '84	MP	JM		25-9-85
1.	Prepared for Tender. (Combined Contracts)	FRB		HM	5-6-84

REVISIONS

RECOMMENDED PROJECT MANAGER
DATE June 6 1984

APPROVED DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA - BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

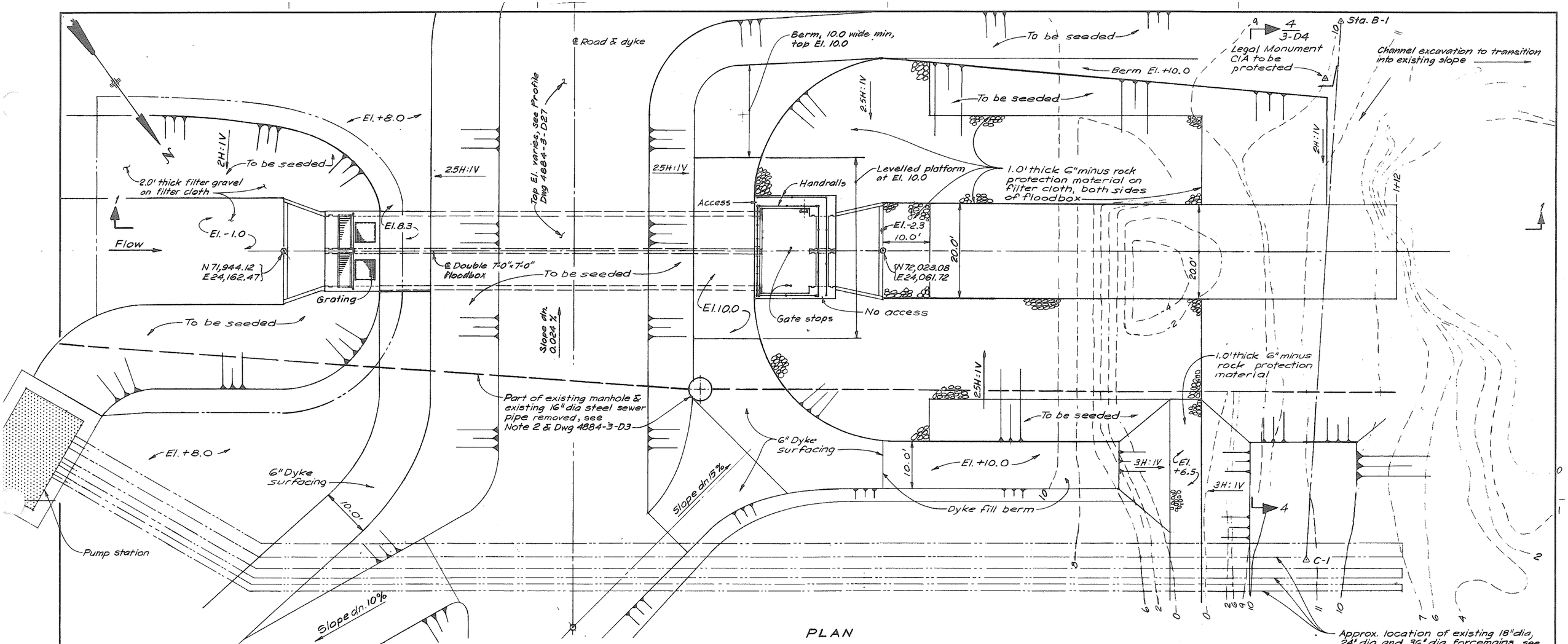
PROJECT 10.4 CONTRACT NO. 2

SOUTH WESTMINSTER FLOOD CONTROL WORKS
DYKE WALL - CONCRETE OUTLINE, REINFORCEMENT AND DETAILS

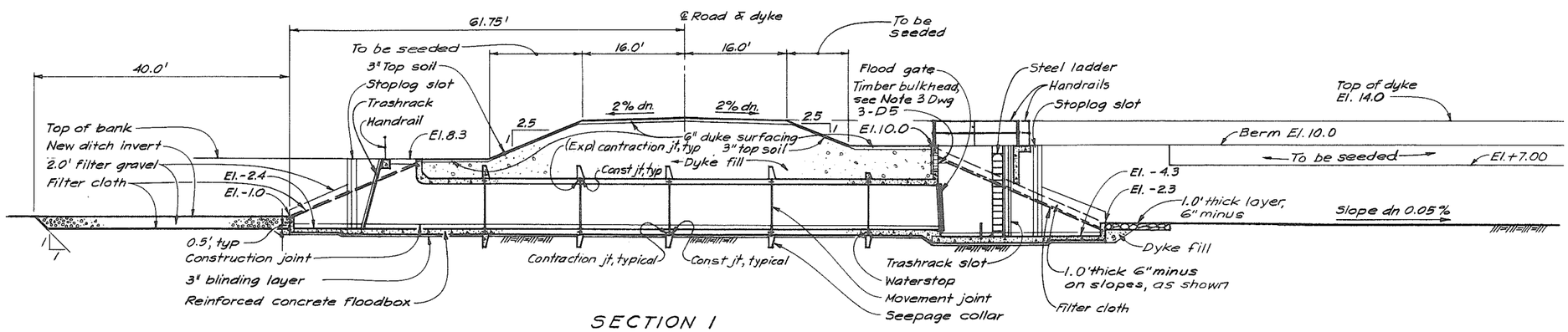
DESIGNED See Note 3	SURVEYED
DRAWN FL	DATE
CHECKED See Note 3	FILE NO. 0281550-C12D-2
SCALE As shown	DATE 9 Jan 1979
DWG. NO. 4884-2-D16/R2	SHEET 15 OF 43 SHEETS

280098

MANSON RD.



PLAN



SECTION 1

NOTES

1. For general notes, legend and adjacent dyke arrangement see Dwg 4884-3-D27.
2. Existing manhole removed above the top of existing 16" dia steel sewer inlet pipe. Both the excavation for the existing manhole and the existing pipe were backfilled with dyke fill.

10 0 10 20 30 40 50 FT.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD C.R. Bland
PROJECT ENGINEER M.A. Merlo
CHIEF ENGINEER John S. Watson

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing	MP	jm		8-11-85
1.	Prepared for Tender (Combined Contracts)	FRB	MAM	MAM	5-6-84

REVISIONS

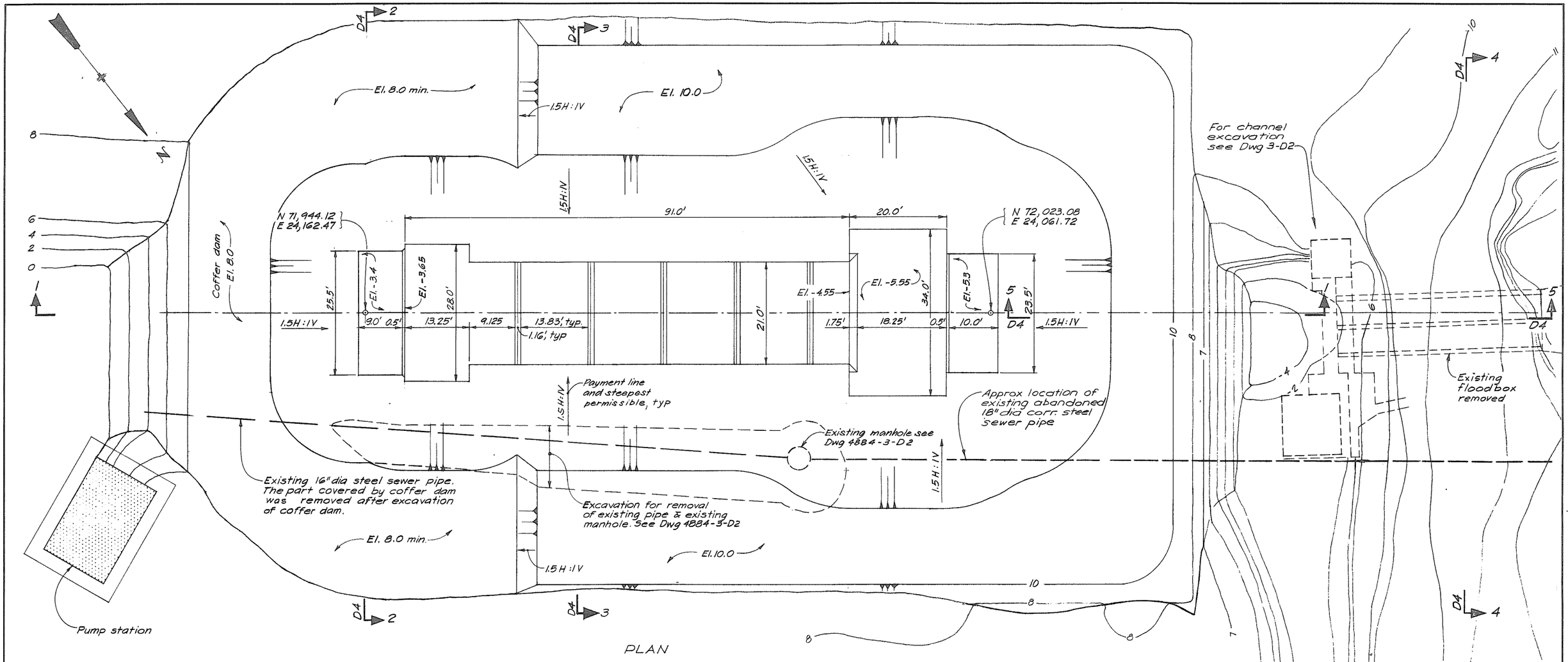
RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984.
APPROVED [signature] DIRECTOR, WATER INVESTIGATIONS
DATE Jun 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT NO. 4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
MANSON ROAD FLOODBOX
GENERAL ARRANGEMENT

DESIGNED NMC	SURVEYED E.S.
DRAWN H.N.C., L.S.	DATE Nov, 1974.
CHECKED R.A.D., L.V.S	FILE NO. 0281550-C12D-3
SCALE As shown	DATE 14 Feb, 1979.
DWG. NO. 4884-3-D2R2	SHEET 16 OF 43 SHEETS

280099



PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD R. Bland.
PROJECT ENGINEER M. A. Merlo
CHIEF ENGINEER J. M. B. [illegible]

NO	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing APPROVED FOR CONSTRUCTION JUL 25 84	MP			86-9-85
1.	Prepared for Tender (Combined Contracts).	PRB	[illegible]		5-6-84

REVISIONS

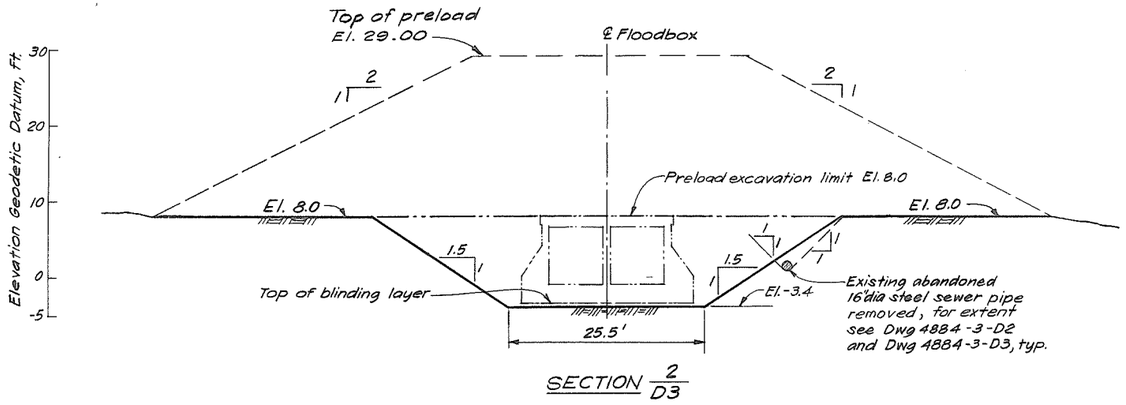
RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984.
APPROVED [signature] DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

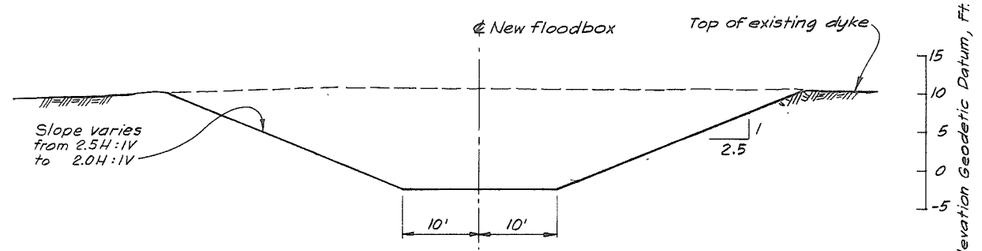
PROJECT ID.4 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
MANSON ROAD FLOODBOX
EXCAVATION & BACKFILL - SHEET 1 OF 2

DESIGNED	NAE	SURVEYED	E. S.
DRAWN	L.B.	DATE	Nov, 1974.
CHECKED	R.B., L.V.S	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979
DWG. NO.	4884-3-D3R2	SHEET	17 OF 43 SHEETS

280100

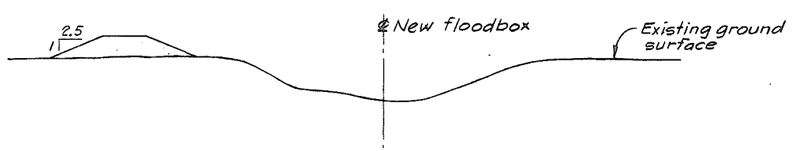


SECTION 2/D3

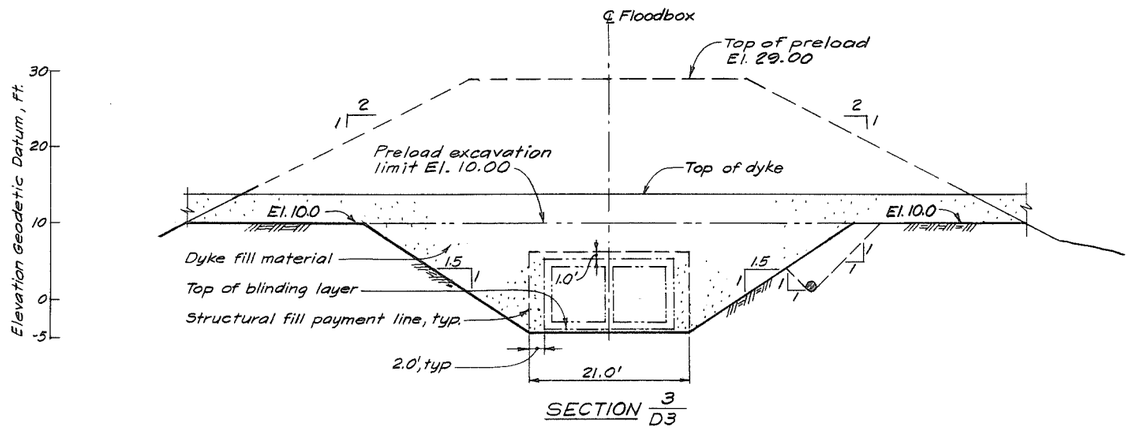


SECTION 4/D2, D3
CHANNEL EXCAVATION

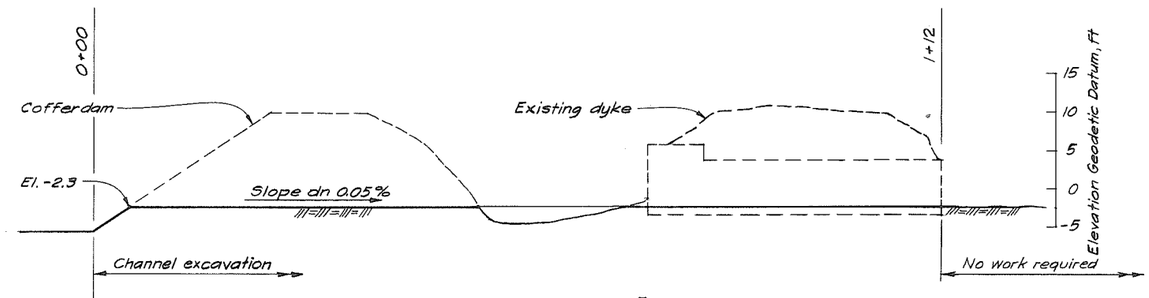
Transition area



STA 3+10
Note: No work required



SECTION 3/D3



SECTION 5/D3
CHANNEL EXCAVATION

10 0 10 20 30 40FT

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD C.R. Bland
PROJECT ENGINEER M.A. Merlo
CHIEF ENGINEER John G. Hilton

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing. APPROVED FOR CONSTRUCTION	MP	jr		26-9-85
1.	Prepared for Tender (Combined Contracts)	PRB	MAM	MM	5-6-84

REVISIONS

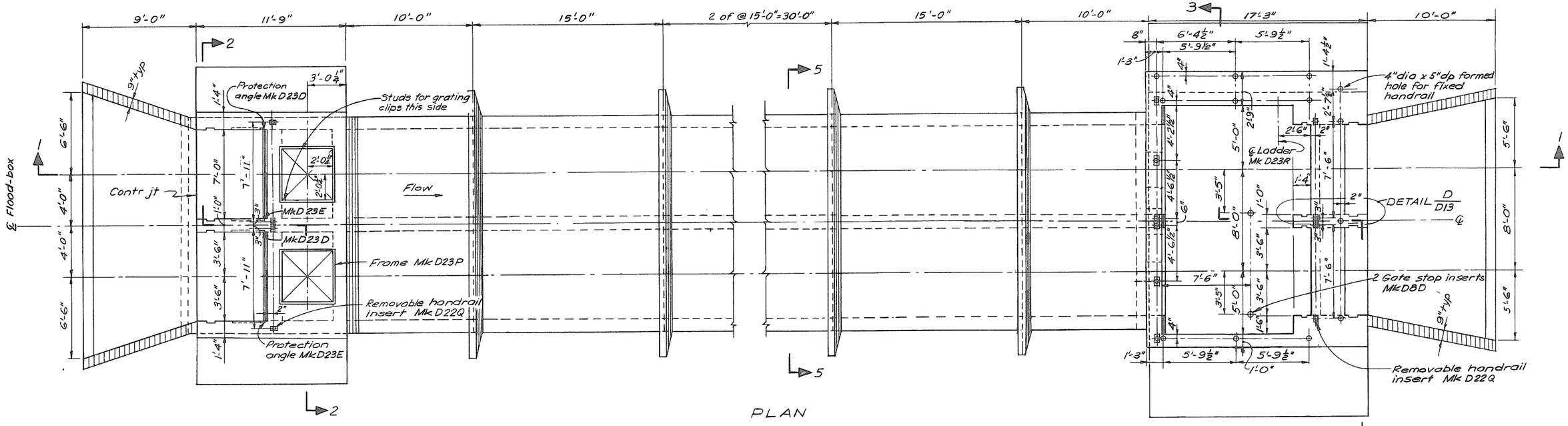
RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984.
APPROVED [signature] DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

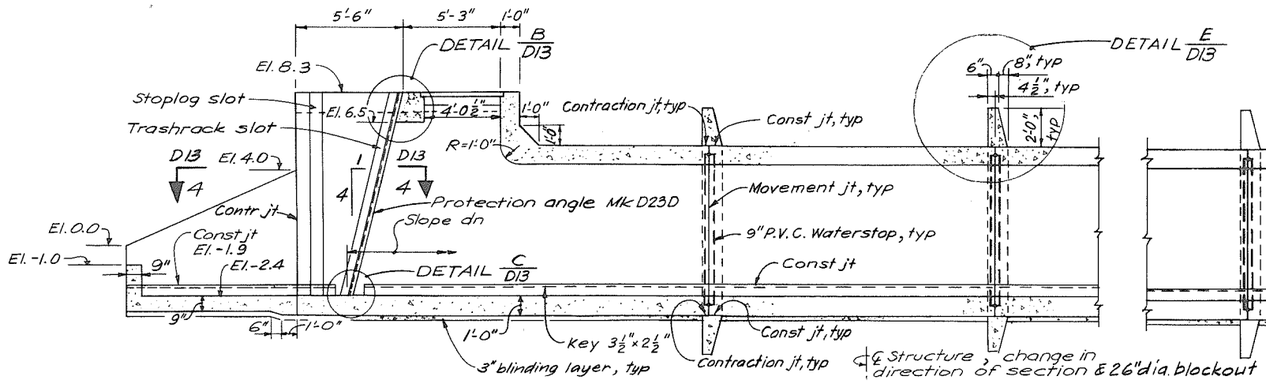
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

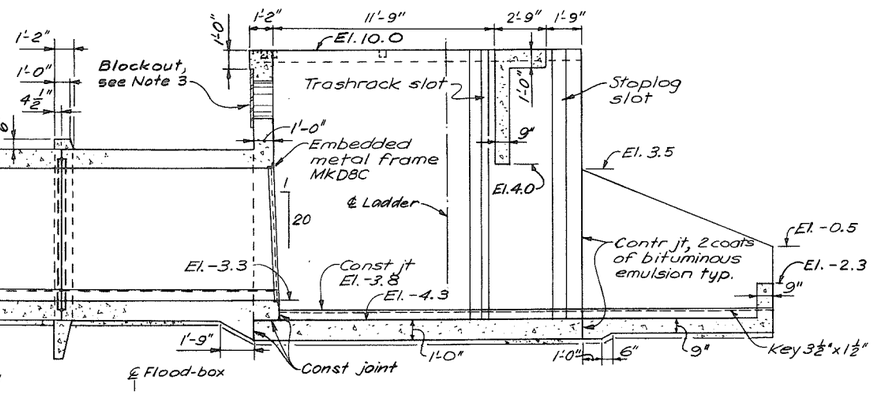
PROJECT 10.4 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
MANSON ROAD FLOODBOX
EXCAVATION & BACKFILL - SHEET 2 OF 2

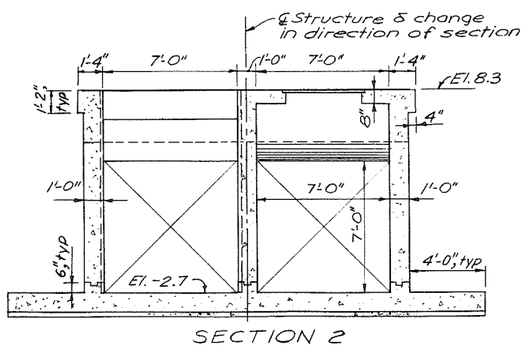
DESIGNED NAE	SURVEYED
DRAWN HNC	DATE
CHECKED R.S.D., LVS	FILE NO. 0281550-C12D-3
SCALE As shown	DATE 14 Feb, 1979.
DWG. NO. 4884-3-D4R2	SHEET 18 OF 43 SHEETS

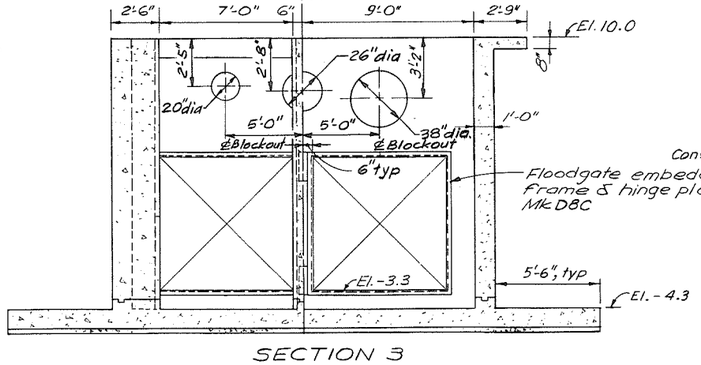
280101

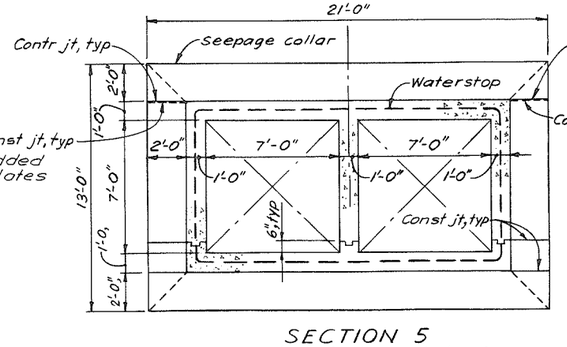












NOTES

1. For reinf. details see Dwgs 4884-3-D6 & D7.
2. Concrete :
   3" Blinding layer : Class III
   Inlet, Outlet & Conduit : Class I.
3. Blockout covered by nominal 2" thick temporary timber bulkheads

5 0 5 10 15 20FT

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD C.R. Bland
PROJECT ENGINEER M.A. Merlo
CHIEF ENGINEER John S. Turner

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing. APPROVED FOR CONSTRUCTION	MP	jm		26-9-85
1.	Prepared for Tender (Combined Contracts).	PRB			5-6-84

REVISIONS

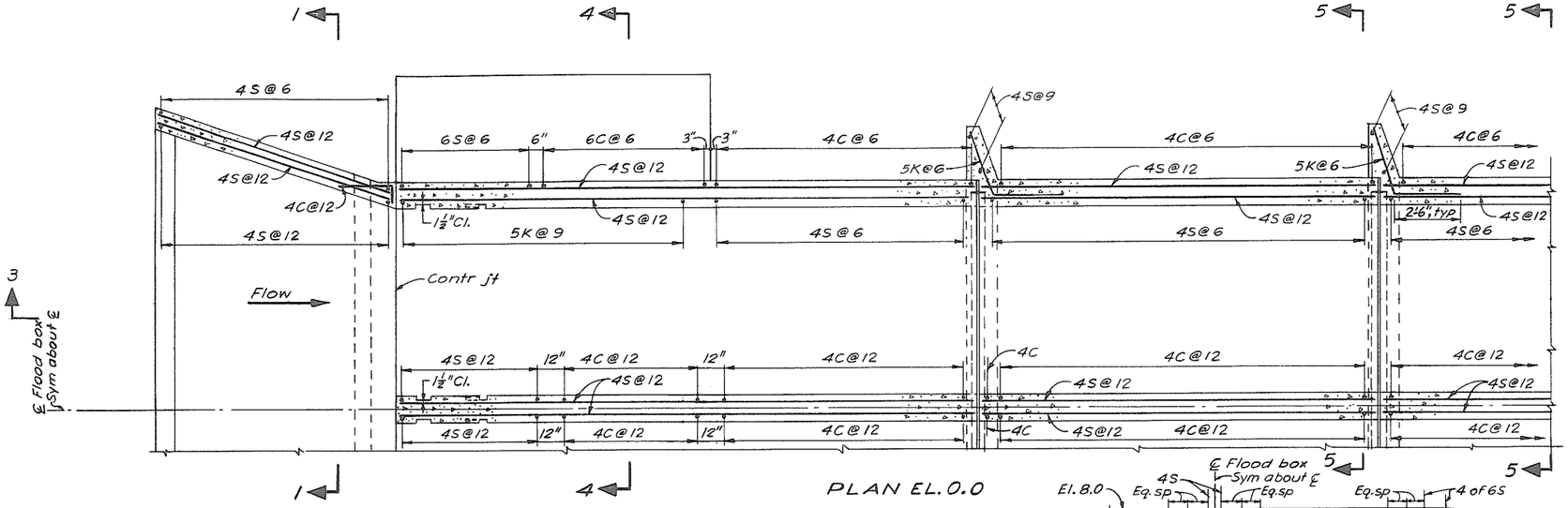
RECOMMENDED C.R. Bland PROJECT MANAGER
DATE June 6 1984.
APPROVED G.G. Miller A/ DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
MANSON ROAD FLOODBOX
CONCRETE OUTLINE

DESIGNED	NAE	SURVEYED	
DRAWN	[illegible]	DATE	
CHECKED	RSS	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D5R2	SHEET	19 OF 43 SHEETS

280102



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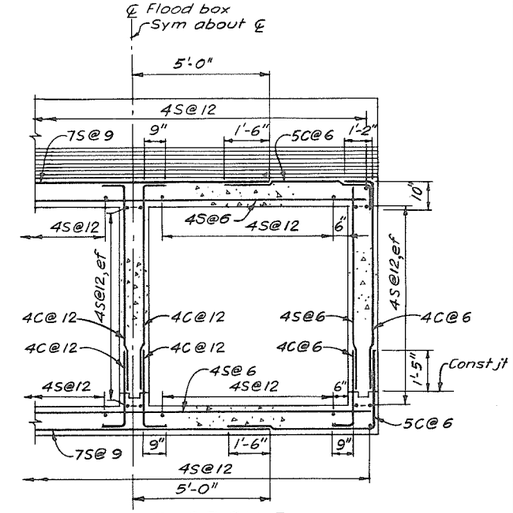
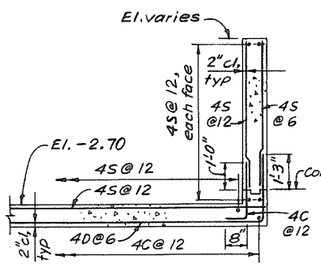
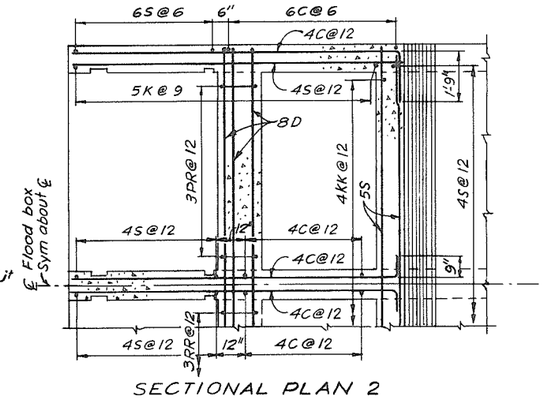


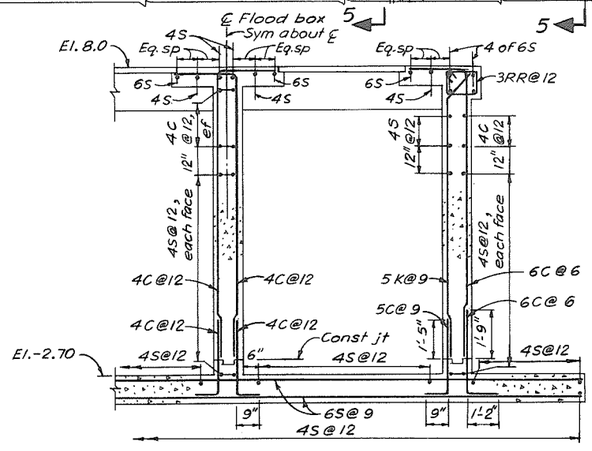
SECTION 5



SECTION 1



SECTIONAL PLAN 2



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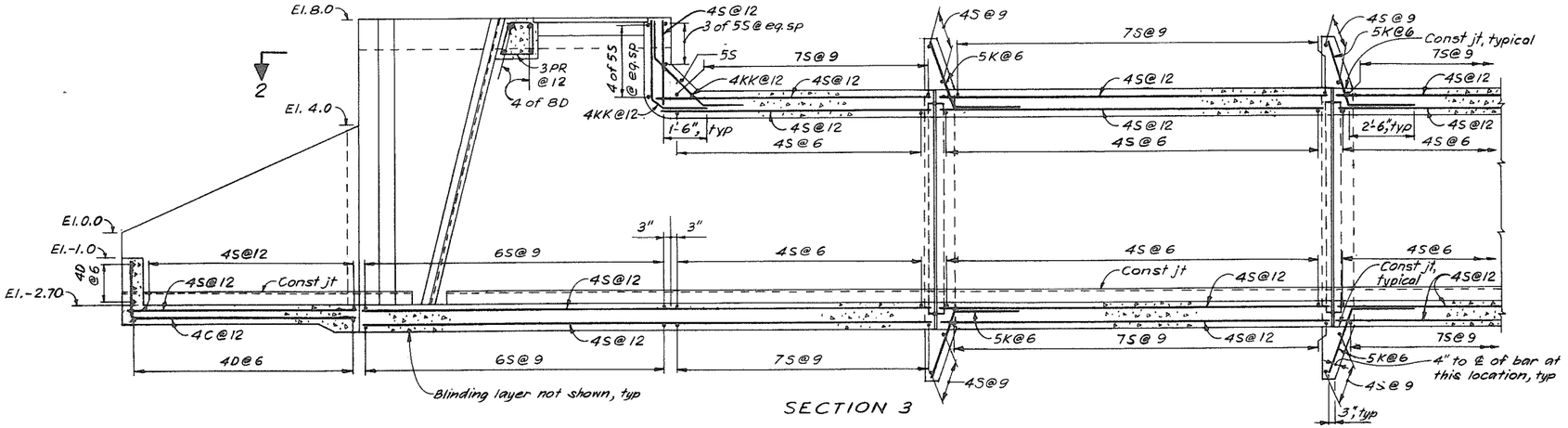

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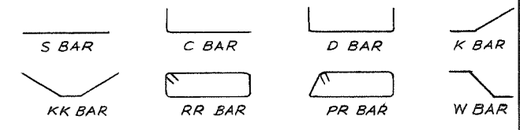


TYPICAL REINFORCEMENT BENDS

LEGEND

6S@9 — Spacing in inches; Bar size; Bend type

nf = near face, ff = far face, ef = each face, Cl. = clear, eq. sp. = equal spacing.

NOTES

1. For concrete outline see Dwg D5.
2. Dimensions to reinforcement are to ℄ of bars unless otherwise shown.
3. Concrete cover to reinforcement to be 2" in top slab and 3" elsewhere unless otherwise shown.

5 0 5 10 FT

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD
PROJECT ENGINEER M. A. Merlo
CHIEF ENGINEER John. C. Miller

NO	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing. APPROVED FOR CONSTRUCTION JUL 25 '84	MP	jm		30-9-85
1.	Prepared for Tender (Combined Contracts).	FRS			5-6-84

REVISIONS

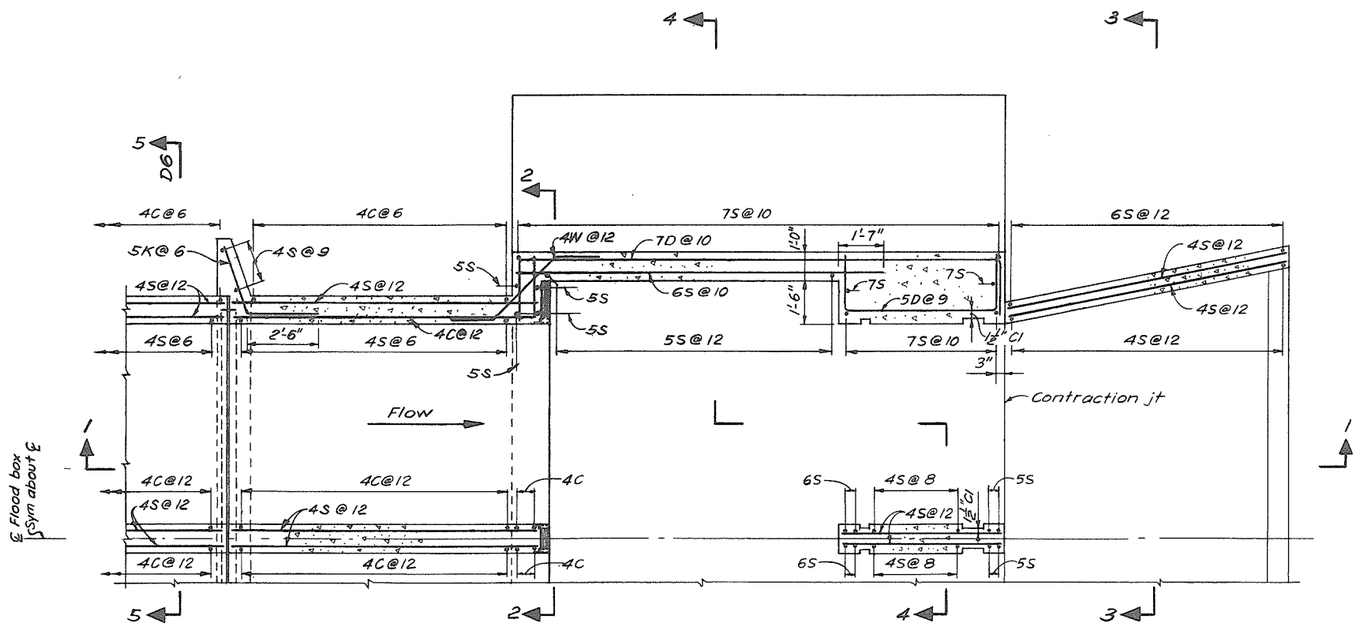
RECOMMENDED PROJECT MANAGER
DATE June 6 1984.
APPROVED DIRECTOR, WATER INVESTIGATIONS
DATE Jun 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

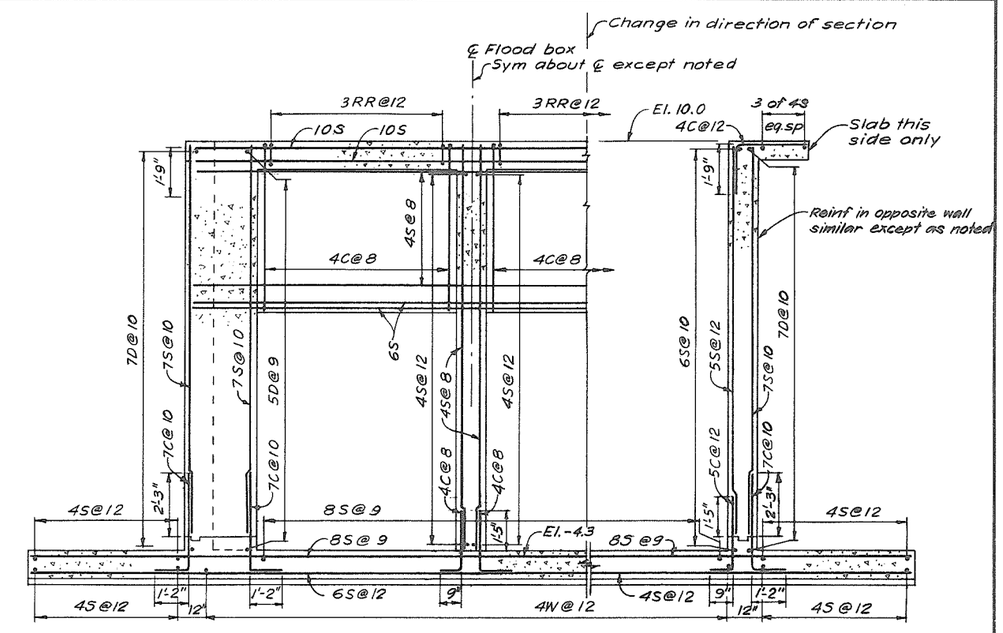
PROJECT 10.4 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
MANSON ROAD FLOODBOX
INLET - REINFORCEMENT

DESIGNED		SURVEYED	
DRAWN	S.K.C.	DATE	
CHECKED	RSS	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D6 R2	SHEET	20 OF 43 SHEETS

280103



PLAN EL. 0.0



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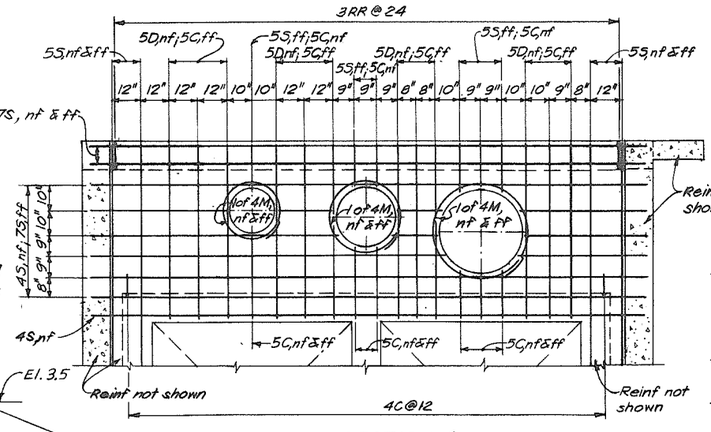
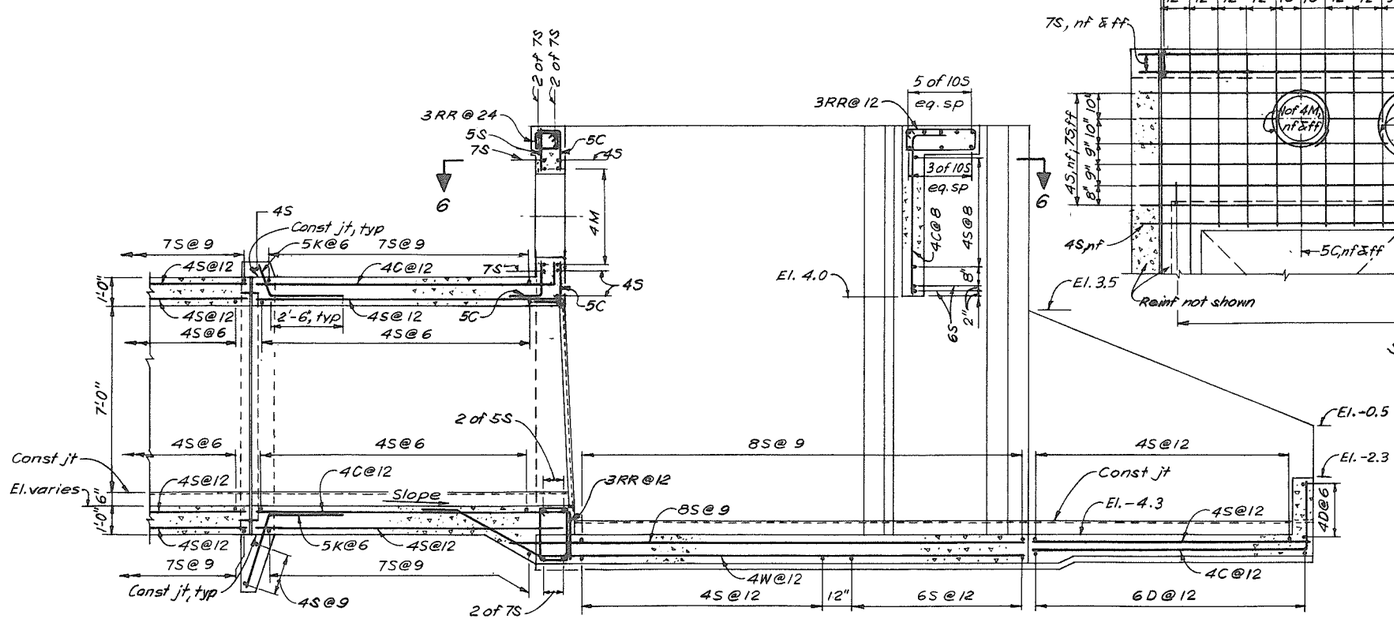


SECTION 2



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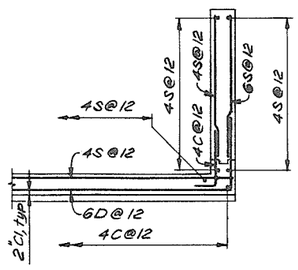

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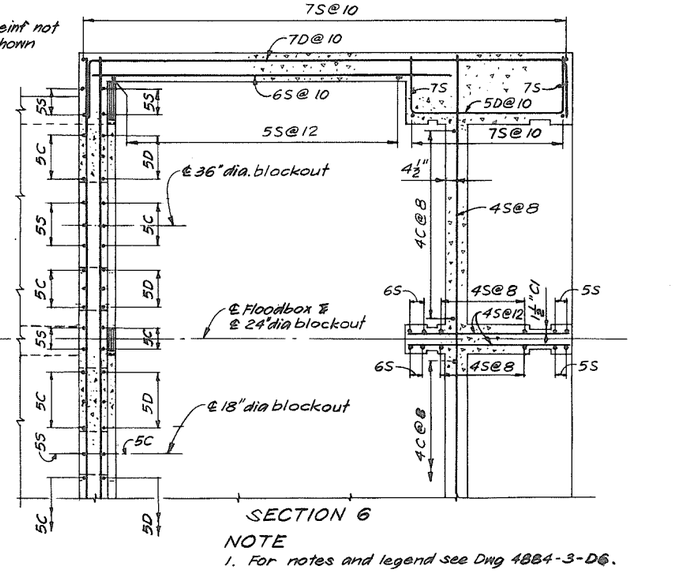


SECTION 6

NOTE
1. For notes and legend see Dwg 4884-3-D6.

5 0 5 10FT

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing. APPROVED FOR CONSTRUCTION JUL 25 '85	MP	JM		30-9-85
1.	Prepared for Tender (Combined Contracts).	PRB			5-6-84

REVISIONS

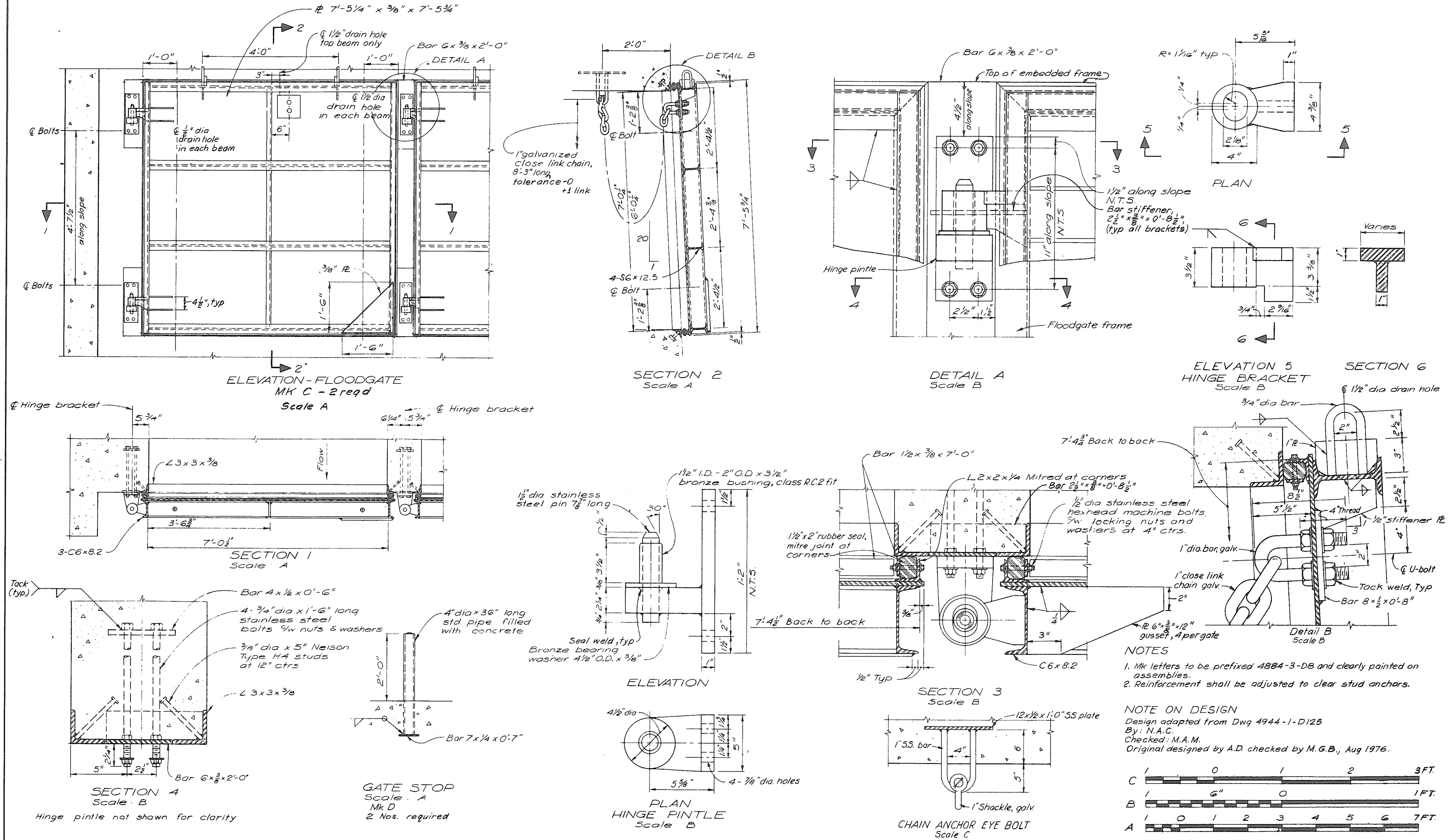
RECOMMENDED PROJECT MANAGER
DATE June 6 1984.
APPROVED DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
MANSON ROAD FLOODBOX
OUTLET - REINFORCEMENT

DESIGNED		SURVEYED	
DRAWN	S.K.C	DATE	
CHECKED	RSS	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D7R2	SHEET	21 OF 43 SHEETS

280104



NOTES

1. Mk letters to be prefixed 4884-3-D8 and clearly painted on assemblies.
2. Reinforcement shall be adjusted to clear stud anchors.

NOTE ON DESIGN

Design adapted from Dwg 4944-1-D125
By: N.A.C.
Checked: M.A.M.
Original designed by A.D. checked by M.G.B., Aug 1976.

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD	C. R. Bland
PROJECT ENGINEER	M A Merlo
CHIEF ENGINEER	John B Tinker

REVISIONS

NO	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing	NP			2-10-85
	APPROVED FOR CONSTRUCTION				
1.	Prepared for Tender (Combined Contracts).	PRB		MA	5-6-84

RECOMMENDED — PROJECT MANAGER
DATE June 6 1984.
APPROVED — DIRECTOR, WATER INVESTIGATIONS
DATE Jun 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA - BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
MANSON ROAD FLOODBOX
FLOODGATES

DESIGNED	See Note On Design	SURVEYED	
DRAWN		DATE	
CHECKED		FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D8 R2	SHEET	22 of 43 SHEETS

280105

Relocated power pole
Traverse to YI
Existing culvert extended as shown
6" thick dyke surfacing on 1.0' thick filter gravel on access road and as shown in section placed prior to cofferdam removal
Access road see Note 3, Dwg 4884-3-D26
℄CN-ML & Burlington R.R.
El. 7.00
Approx location of existing 8" dia watermain
Flexible couplings
Slope dn 10%
2H:IV
10H:IV
To be seeded
Intake structure, see Dwg 4884-3-D12
40'-0"
El. 8.0
8H:IV
Existing pumphouse removed
For extension of wing wall see Dwg 3-D34
N 75,288.69
E 26,827.7
Flow
6" Minus
New pumphouse (Existing) to remain
2.0' thick filter gravel on bottom of ditch
2" Filter gravel
Approx outline of filter gravel and filter cloth. Actual placement as determined in field by the Engineer and placed prior to cofferdam removal.
℄ 72" dia precast reinforced concrete pipe culverts
℄ Intake & Outlet structures
Existing 24" dia forcemain
3H:IV
4'-6" high dyke wall, see Dwg 4884-3-D26
2.0' wide berm, top El. 12.0
Existing (2 no.) 18" dia forcemains
Existing floodbox filled
Existing valve chamber
Burlington signal cable duct
P-1, 15
10 x 1
PLAN
30°00'00"
El. 10.0
11.0'
Access
10.0'
10.29'
EL. 10.0'
100'
N 75,366.36
E 26,717.96
El. -4.07
Dn 5H:IV
El. 0.0
Flow
No Exit
New 18" (2 no.) & 1-24" dia forcemains
Outlet structure see Dwg 4884-3-D12
6.0' wide ditch lined with 6" minus rock
6" minus rock protection material 12" thick on top of filter cloth on slopes only (Typ.)
To be seeded
Approximate clearing and grubbing boundaries extent as determined in the field by the Engineer
Slope to transition into existing drainage channel, typ
To Fraser River
FRASER RIVER
Flow
10'

℄ New channel
Existing bank
New bank
SECTION 2

4'-6" high dyke wall, top El. varies
Filter gravel, 1.0' min
Filter cloth
Berm
End of ties
3.0'
℄ CN-ML
Approximate location of existing Canadian National Telecommunication cable
6" thick dyke surfacing (10.0' wide) on 12" thick filter gravel
To be seeded
1.0' min.
14.0' min
14.0' min
24" dia Armco flap gate
Handrail
El. 10.0
10.0' wide 6" Dyke surfacing
Removable handrail
El. 8.0
4.0'
1.5'
2.5'
1.25' min, typ
Stoplog slot
Max permissible excavation line
Steel ladder
Stoplog slot
Filter cloth
6" minimum rock protection (12" thick) on slopes
El. 0.0
Top of stub wall El. -2.2
El. -3.0
2.0', typ
El. -2.70
El. -4.07
Exc. Channel Invert
Filter gravel
Filter cloth
El. -5.7
El. -9.7
3.0'
12.0'
8.0'
Payment line & steepest permissible slope
Approx location of existing 8" dia watermain
1.0' min Fill
3" blinding layer for outlet structure only
El. -3.0
40'-0"
Filter cloth
27'-2" Class V (Trench installed)
49.0' Class V jacked pipe East of ℄ Floodbox, see Note 2
49.0' Class V trench placed West of Floodbox
10'-4" Class V (Trench installed) on East side
8'-2" Class V " " } on West side
2'-2" Class V " " } on West side
2 concrete seepage collars, see Dwg 4884-3-D13
SECTION 1

NOTES
1. Elevations are to Geodetic Datum in ft.
2. Exact length of jacked pipe culverts as designated in field. by the Engineer.

10 0 10 20 30 40 50 FT

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405
DEPARTMENT HEAD C.R. Blair
PROJECT ENGINEER M.A. Merlo
CHIEF ENGINEER John E. Turton

NO	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing	MP			21-10-85
	APPROVED FOR CONSTRUCTION				
1.	Prepared for Tender (Combined Contracts)	FRB			5-6-84

REVISIONS

RECOMMENDED _____ PROJECT MANAGER
DATE June 6 1984

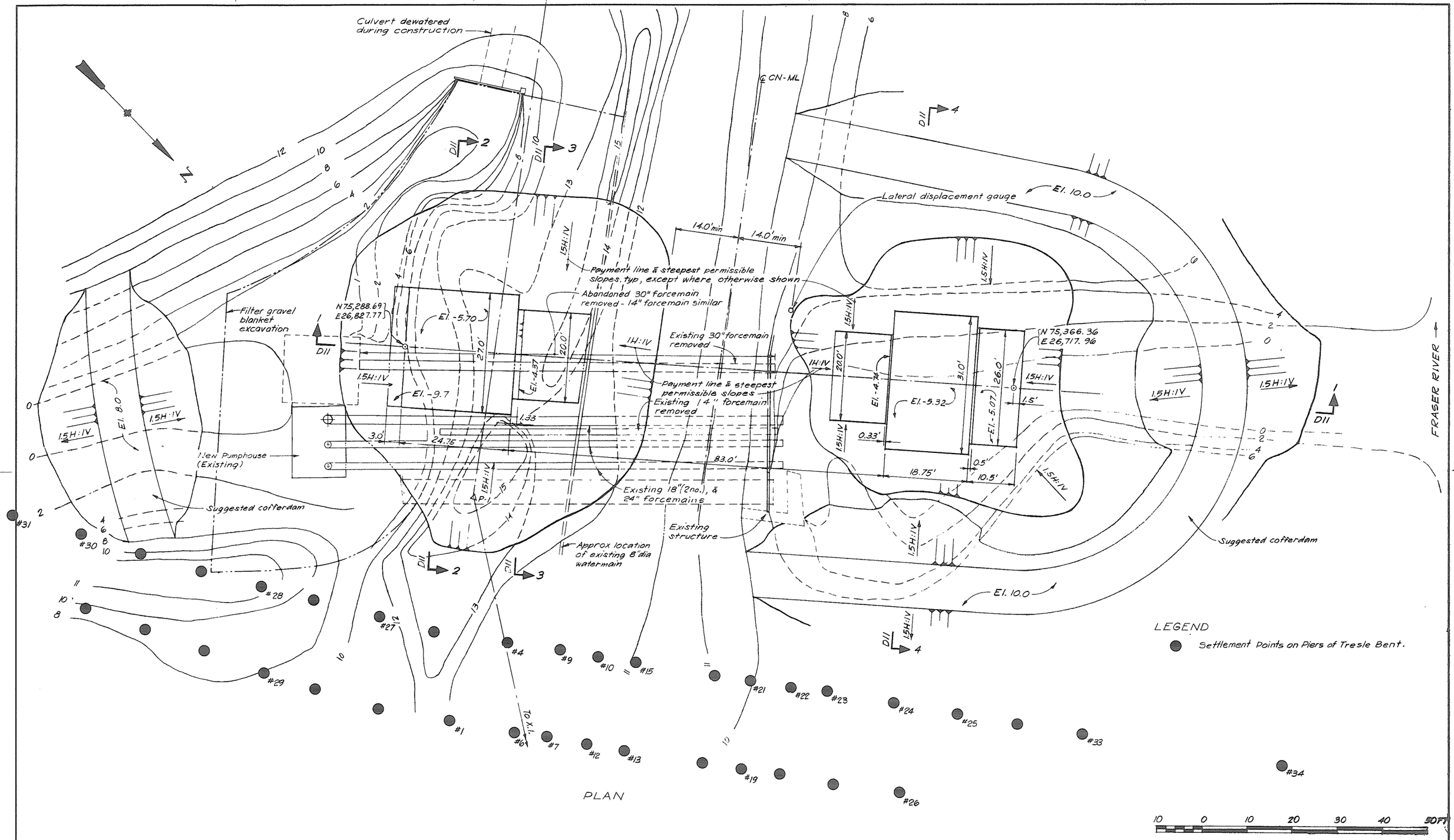
APPROVED _____ DIRECTOR, WATER INVESTIGATIONS
DATE _____

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
PATTULLO FLOODBOX
GENERAL ARRANGEMENT

DESIGNED	NAE	SURVEYED	E. S. & W.S.
DRAWN	HNG, MP	DATE	Nov, 1974 & May, 1978.
CHECKED	E.L.Q., LVS	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D9R2	SHEET	23 OF 43 SHEETS

280106



PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO 10405
DEPARTMENT HEAD C.R. Bland
PROJECT ENGINEER M.A. Merlo
CHIEF ENGINEER John [illegible]

NO	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing. APPROVED FOR CONSTRUCTION	MP			1-10-85
1.	Prepared for Tender (Combined Contracts)	FRB	[illegible]	[illegible]	5-6-84

REVISIONS

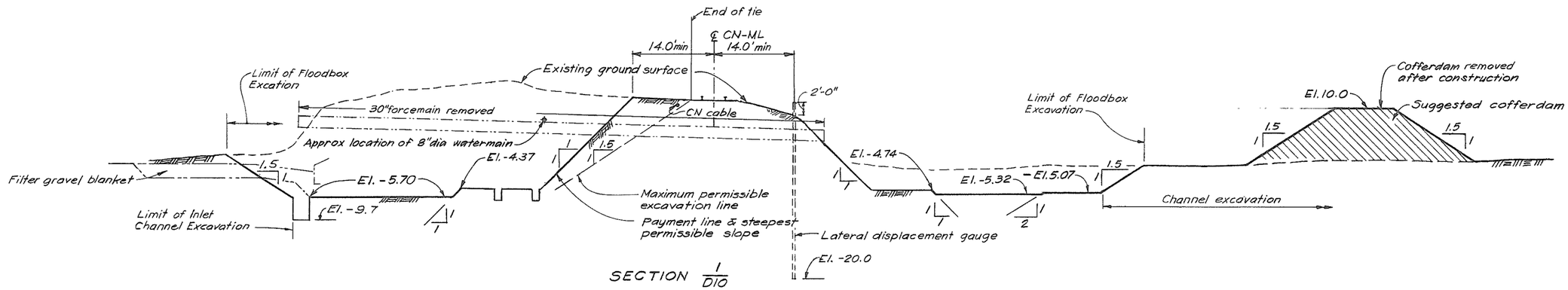
RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984.
APPROVED [signature] DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

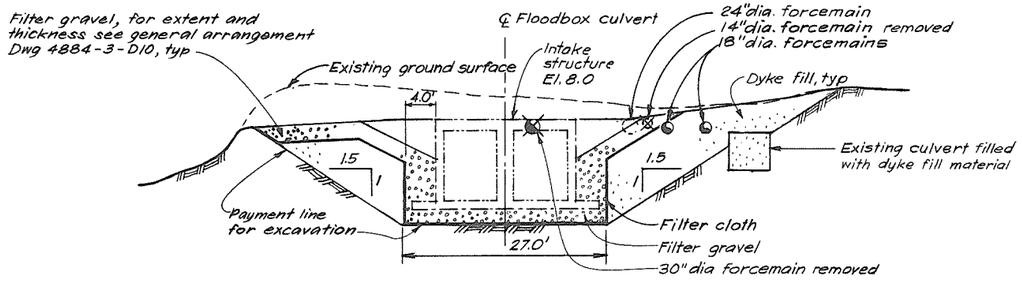
PROJECT 104 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
PATTULLO FLOODBOX
EXCAVATION & BACKFILL - SHEET 1 OF 2

DESIGNED NAC	SURVEYED E.S. & W.S.
DRAWN HNC	DATE Nov, 1974 & May, 1978
CHECKED R.D., LVS	FILE NO. 0281550-C12D-3
SCALE As shown	DATE 14 Feb, 1979.
DWG. NO. 4884-3-D10R2	SHEET 24 OF 43 drawings

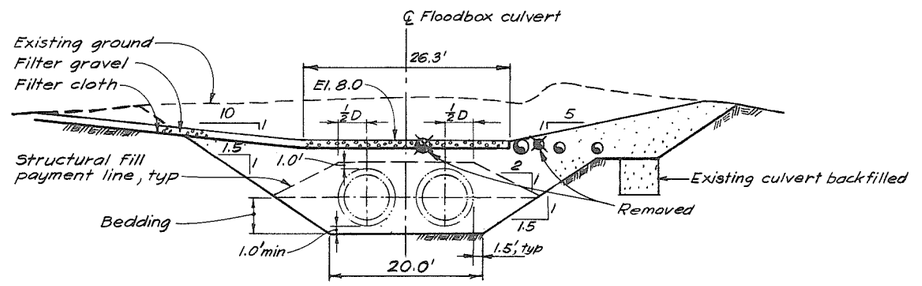
280107



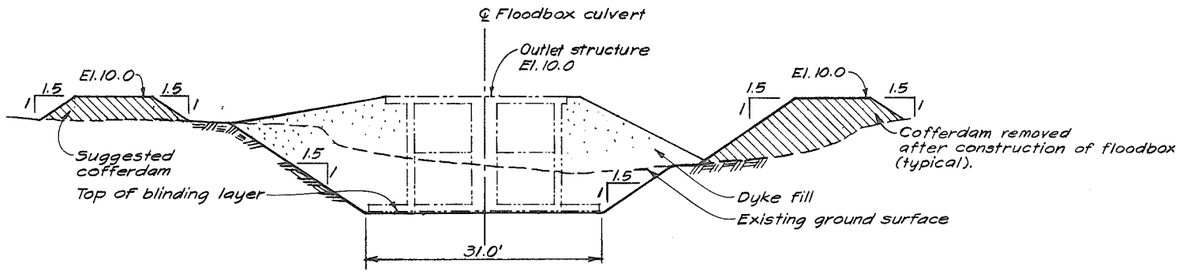
SECTION 1/D10



SECTION 2/D10



SECTION 3/D10



SECTION 4/D10

10 0 10 20 30 40 50FT

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD C.R. Blair
PROJECT ENGINEER M.A. Merlo
CHIEF ENGINEER John B. Milne

NO	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing APPROVED FOR CONSTRUCTION	MP	JM		1-10-85
1.	Prepared for Tender (Combined Contracts).	PRB	[illegible]	HH	5-6-84

REVISIONS

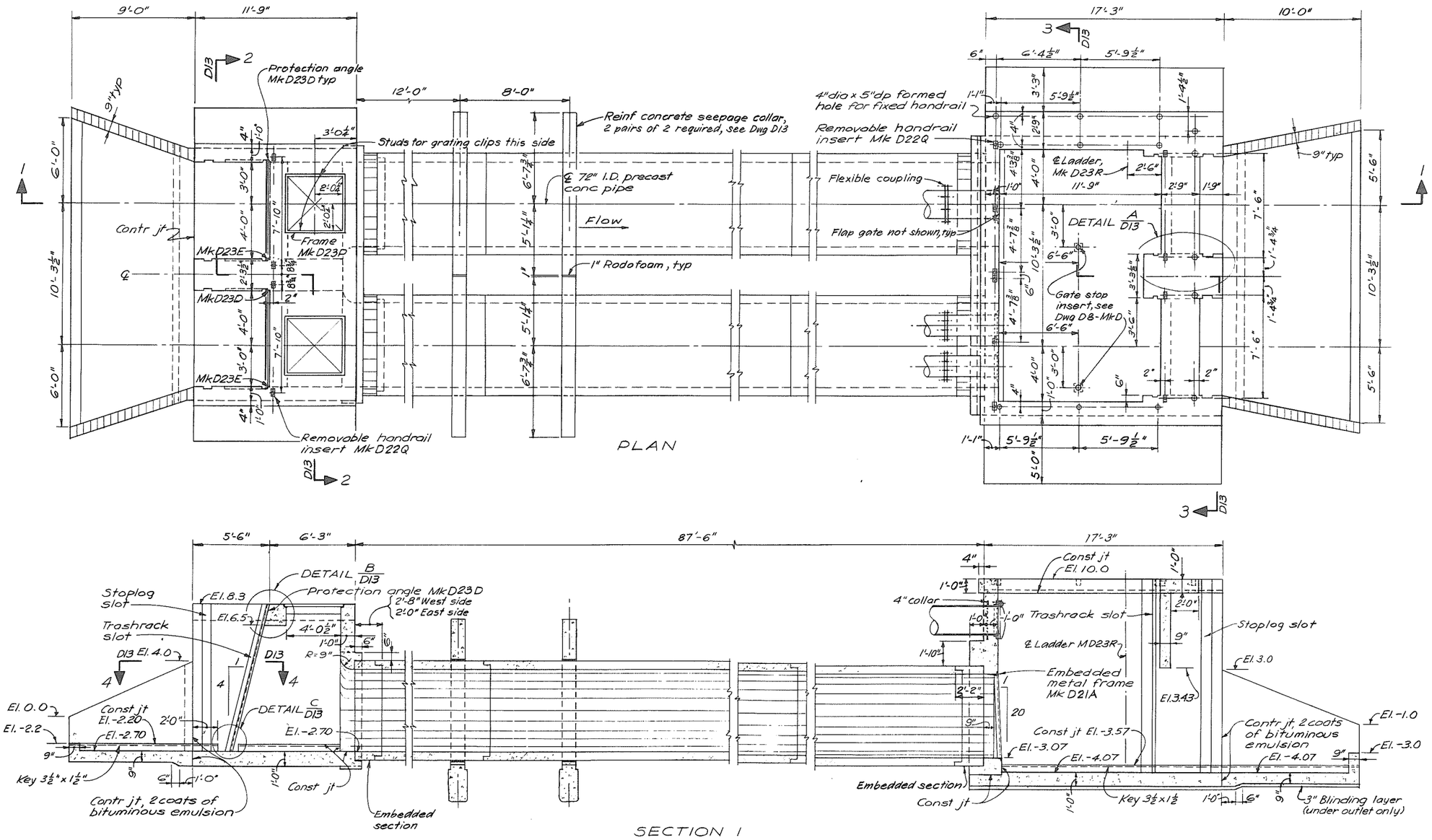
RECOMMENDED Ben Boden PROJECT MANAGER
DATE June 6 1984.
APPROVED Gibb Fuller DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
PATTULLO FLOODBOX
EXCAVATION & BACKFILL- SHEET 2 OF 2

DESIGNED NAC	SURVEYED		
DRAWN HNC	DATE		
CHECKED R.L.D., LVS	FILE NO. 0281550-C12D-3		
SCALE As shown	DATE 14 Feb, 1979.		
DWG. NO 4884-3-D11 R2	SHEET 25 OF 43 SHEETS		

280108



NOTES

1. For reinforcement see Dwgs D14 & D15.
2. Concrete:
   Precast concrete culvert pipe see Dwg D9
   3" Blinding layer: Class III
   Inlet & outlet: Class I
   Seepage collar: Class I

5 0 5 10 15 20 FT

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD C.R. Bland
PROJECT ENGINEER M.A. Merlo
CHIEF ENGINEER John C. Crippen

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing APPROVED FOR CONSTRUCTION	MP	jm		1-10-85
1.	Prepared for Tender (Combined Contracts)	FRE	MAM	MM	5-6-84

REVISIONS

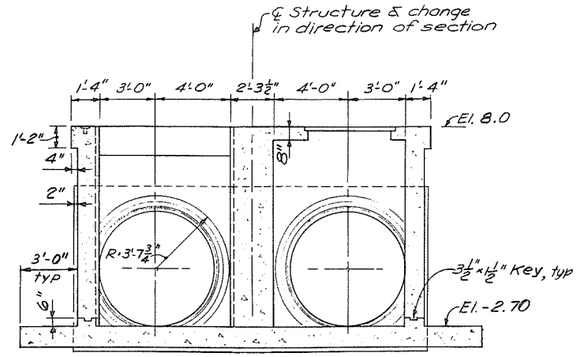
RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984.
APPROVED [signature] DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
PATTULLO FLOODBOX
CONCRETE OUTLINE - PLAN AND SECTION

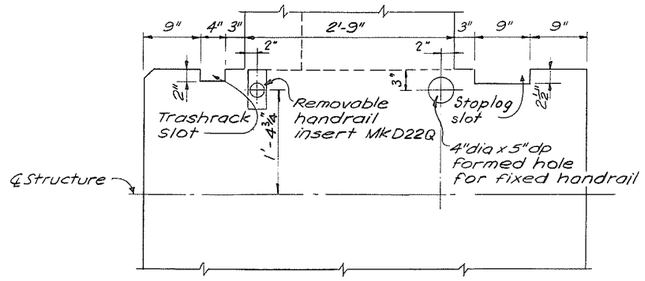
DESIGNED	NAC	SURVEYED	
DRAWN	MAM	DATE	
CHECKED	RSS	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D12R2	SHEET	26 OF 43 SHEETS

280109



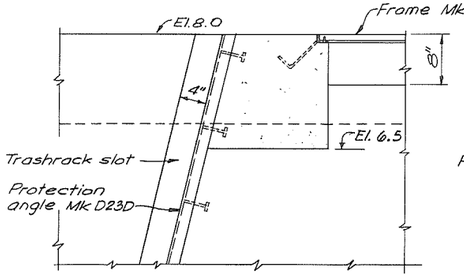
SECTION 2/D12

Scale A



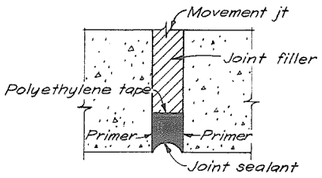
DETAIL A/D12 Shown

DETAIL D/D5 Similar, except for pier width & handrail holes & inserts



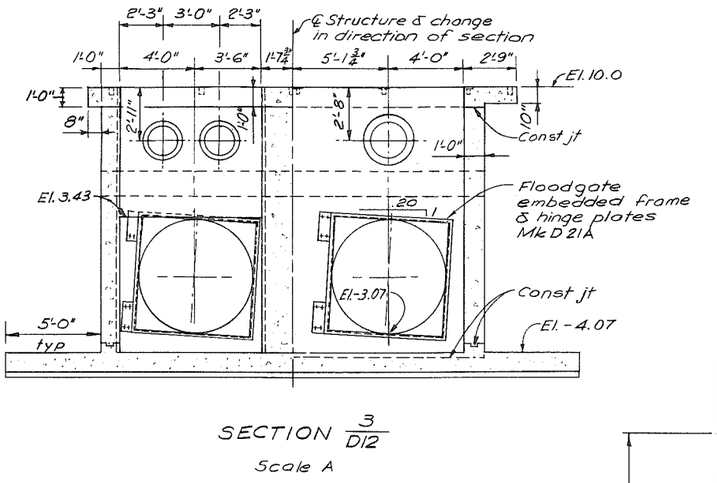
DETAIL B/D5, D12

Scale B



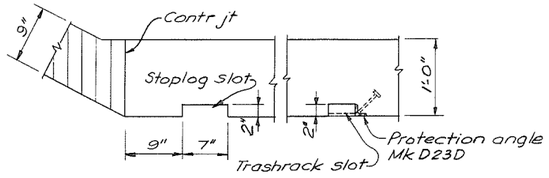
DETAIL F

NTS



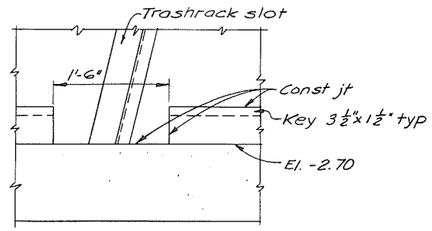
SECTION 3/D12

Scale A



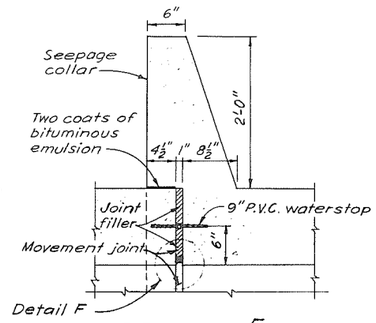
SECTION 4/D5, D12

Scale B



DETAIL C/D5, D12

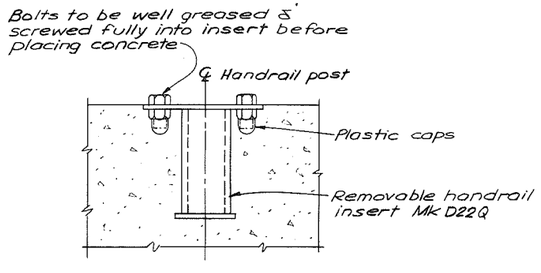
Scale B



DETAIL E/D5

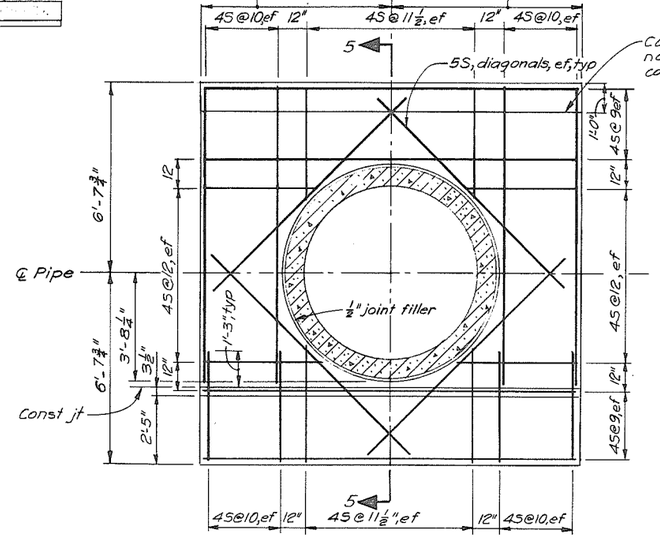
Typical for joints all round

Scale B



INSERT FOR REMOVABLE HANDRAIL

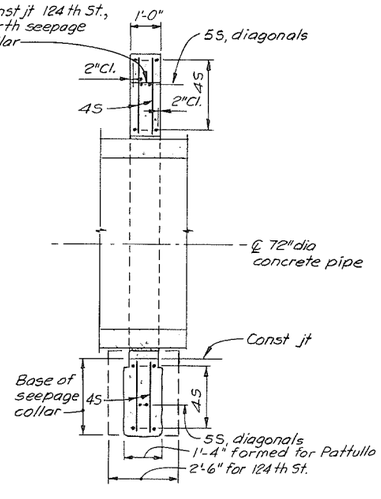
N.T.S.



FLOODBOX SEEPAGE COLLAR

ef denotes each face; Cl. denotes clearance

Scale C



SECTION 5

Scale C

NOTE

1. For general notes see Dwg D12.

Scale C 4 0 4 8 12 FT

Scale B 1 0 1 2 3 4 5 FT

Scale A 5 0 5 10 15 20 FT

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD C R Blair
PROJECT ENGINEER M A Merlo
CHIEF ENGINEER J.K. [illegible]

NO	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing	MP	jm		3-9-85
	APPROVED FOR CONSTRUCTION JULES M				
1.	Prepared for Tender (Combined Contracts).	PRB			5-6-84

REVISIONS

RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984

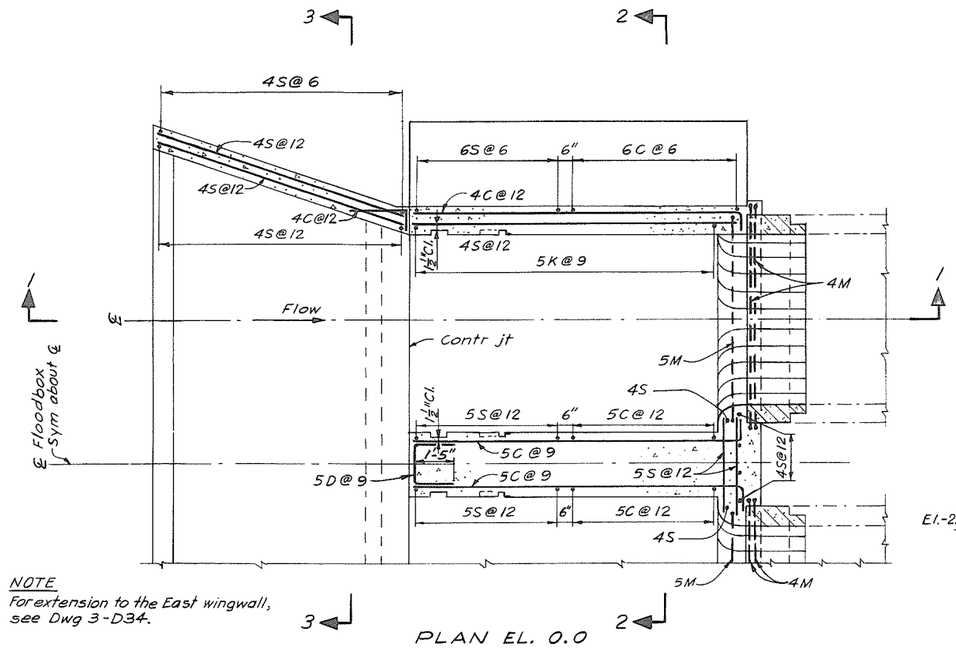
APPROVED [signature] A/DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

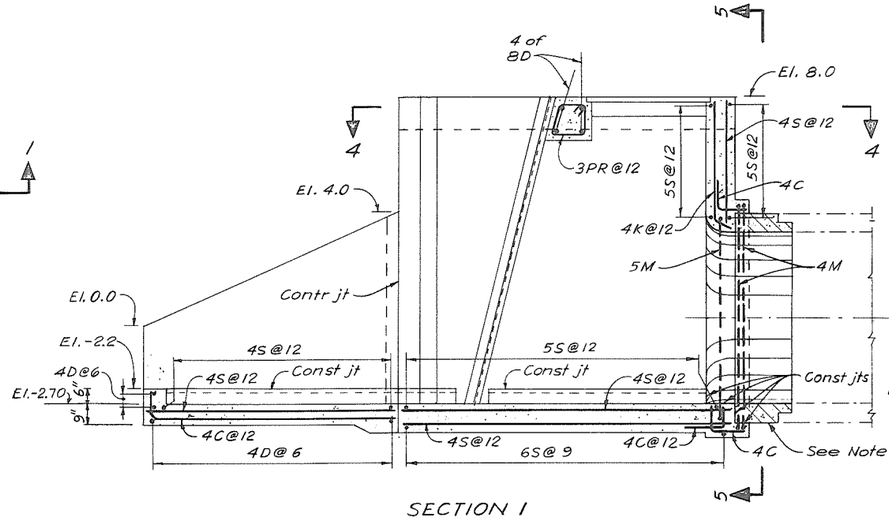
PROJECT 10.4 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
PATTULLO FLOODBOX
CONCRETE OUTLINE - SECTIONS & DETAILS

DESIGNED	NAC	SURVEYED	
DRAWN	MP	DATE	
CHECKED	RSS	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D13R2	SHEET	27 OF 43 SHEETS

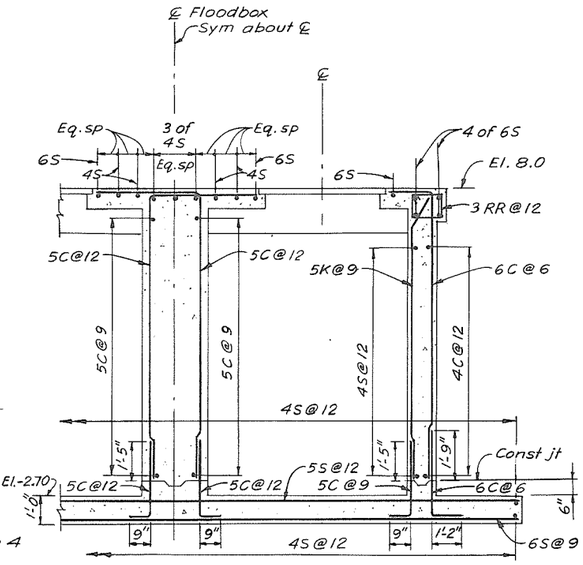
280110



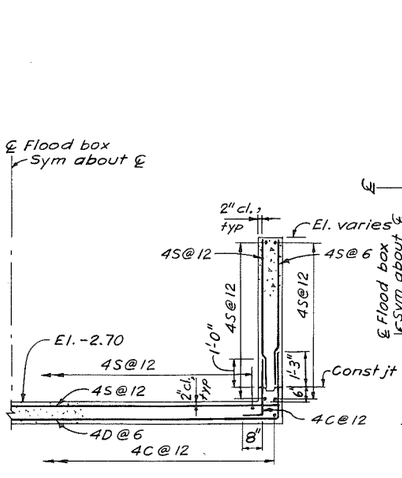
PLAN EL. 0.0



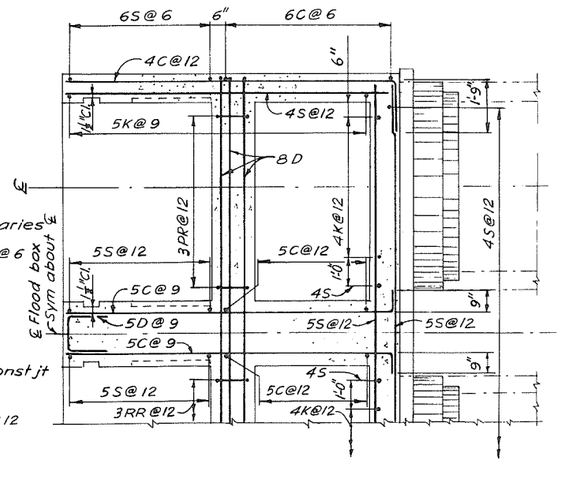
SECTION 1



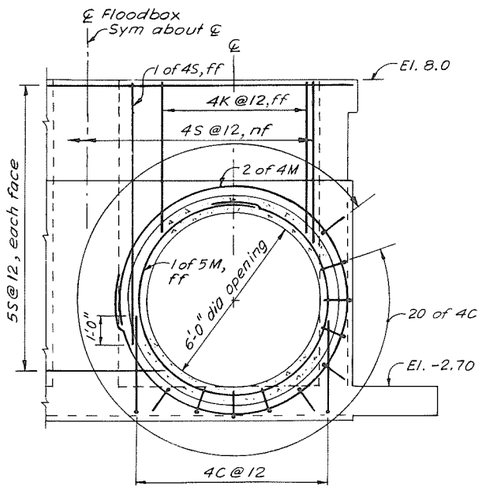
SECTION 2



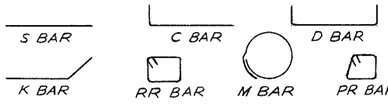
SECTION 3



SECTIONAL PLAN 4



SECTION 5



TYPICAL REINFORCEMENT BENDS

LEGEND

6 S @ 9 — Spacing in inches; Bar size; Bend type

Abbreviations:
nf = near face
ff = far face
ef = each face
Cl = clear
eq.sp. = equal spacing

NOTES
1. Reinforcement shown in sections to be symmetrical about ℄ unless otherwise shown.
2. For concrete outline see Dwgs D12 & D13.
3. Concrete cover to reinforcement to be 2" in top slab and 3" elsewhere unless otherwise shown.
4. Precast concrete 72" internal diameter culvert sections with exposed reinforcement to be embedded in in-situ inlet and outlet as shown.

5 0 5 10 FT

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing. APPROVED FOR CONSTRUCTION JUL 25 84	MP	jm		3-10-85
1.	Prepared for Tender (Combined Contracts).	PRB			5-6-84

REVISIONS

RECOMMENDED — PROJECT MANAGER
DATE June 6 1984

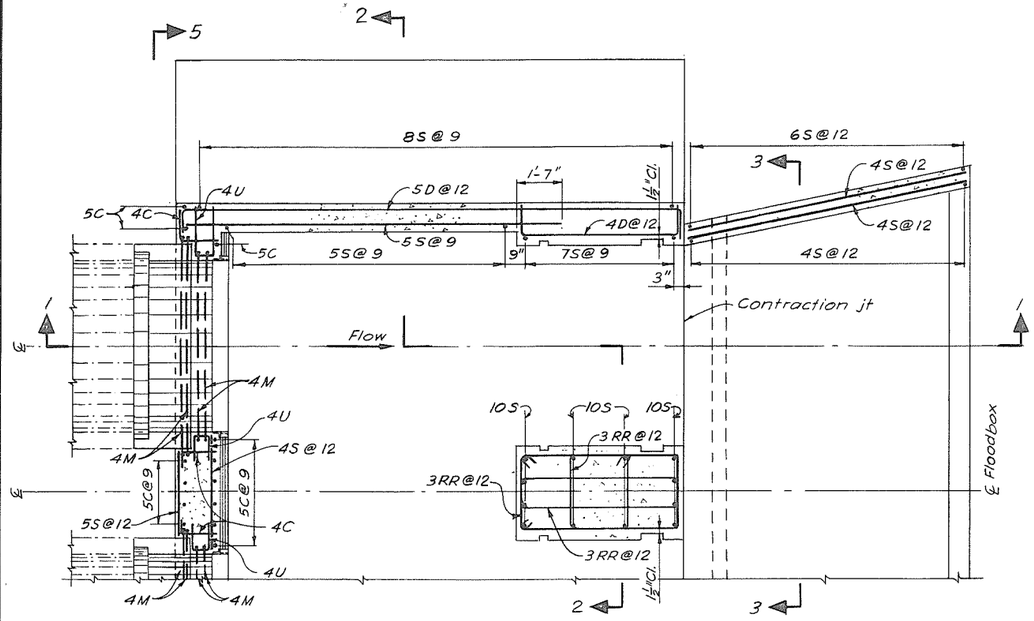
APPROVED — DIRECTOR, WATER INVESTIGATIONS
DATE Jun 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

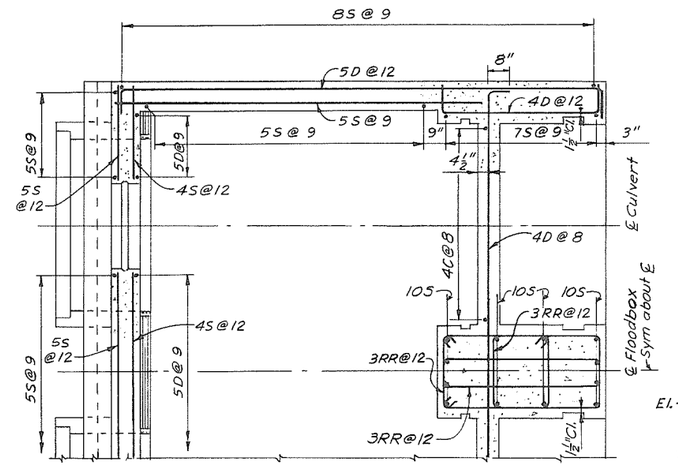
PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
PATTULLO FLOODBOX
INLET REINFORCEMENT

DESIGNED		SURVEYED	
DRAWN	S.K.C.	DATE	
CHECKED	RSS	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D14R2	SHEET	28 OF 43 SHEETS

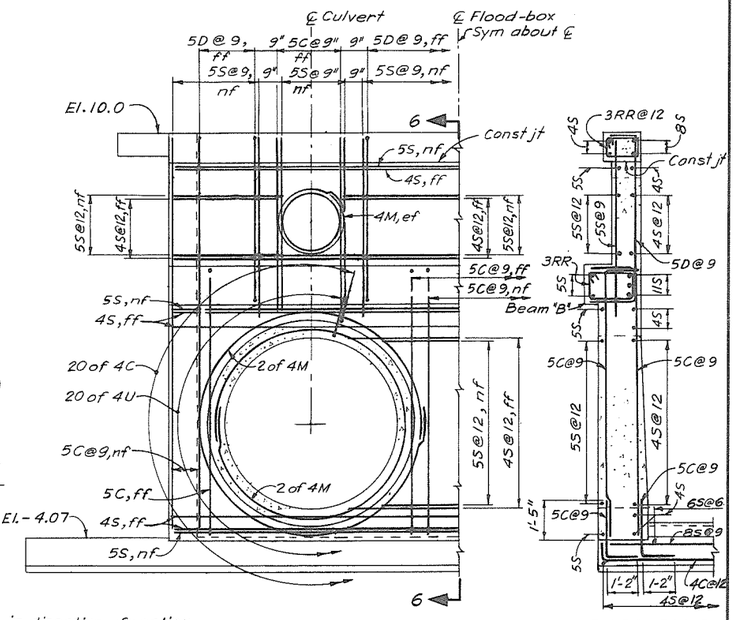
28D 111



PLAN EL. -1.0



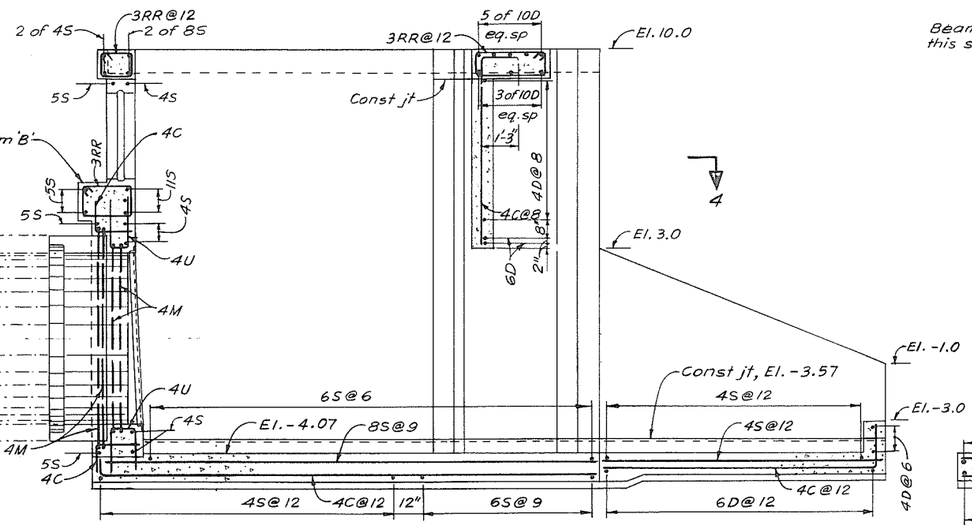
SECTION 4



SECTION 5

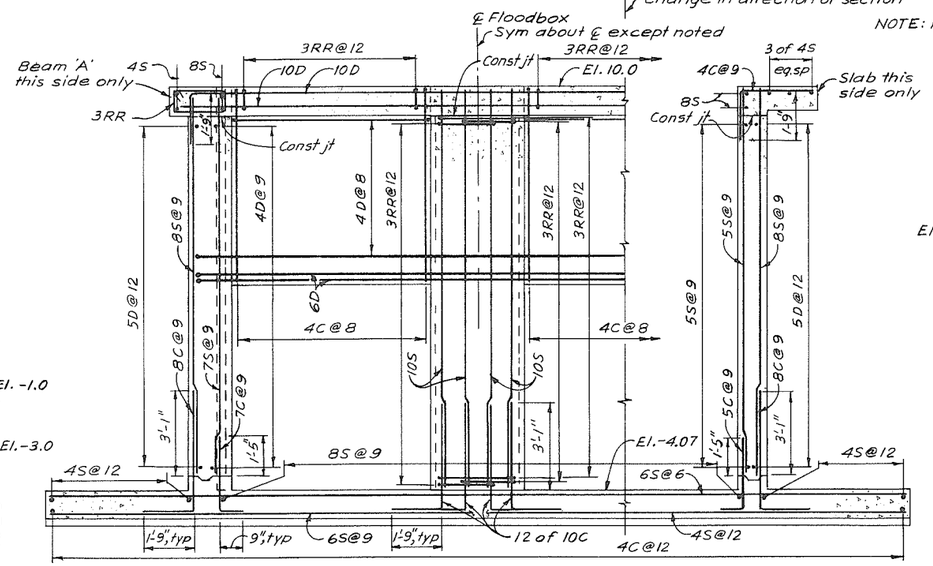
NOTE: Reinforcement in beams not shown.

SECTION 6

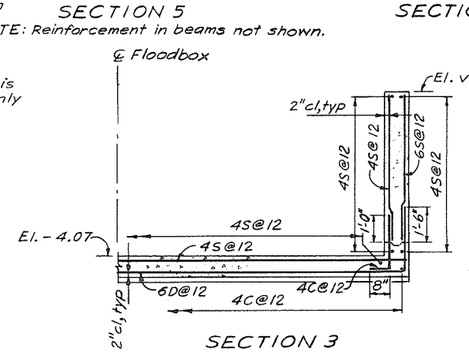


SECTION 1

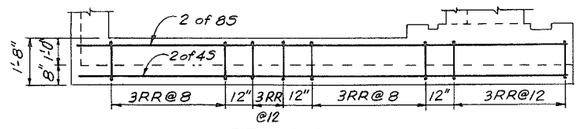
Change in direction of section



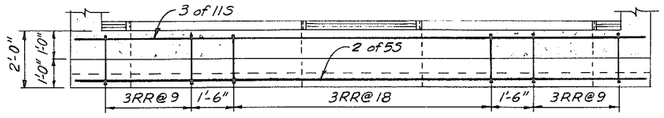
SECTION 2



SECTION 3



BEAM A



BEAM B

NOTES

1. For general notes see Dwg D14.
2. For concrete outline see Dwg. D12 & D13.

5 0 5 10 FT

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER John S. Hutton

NO	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing APPROVED FOR CONSTRUCTION JUL 25 84	MP	JM		3-10-85
1.	Prepared for Tender (Combined Contracts)	FRB			5-6-84

REVISIONS

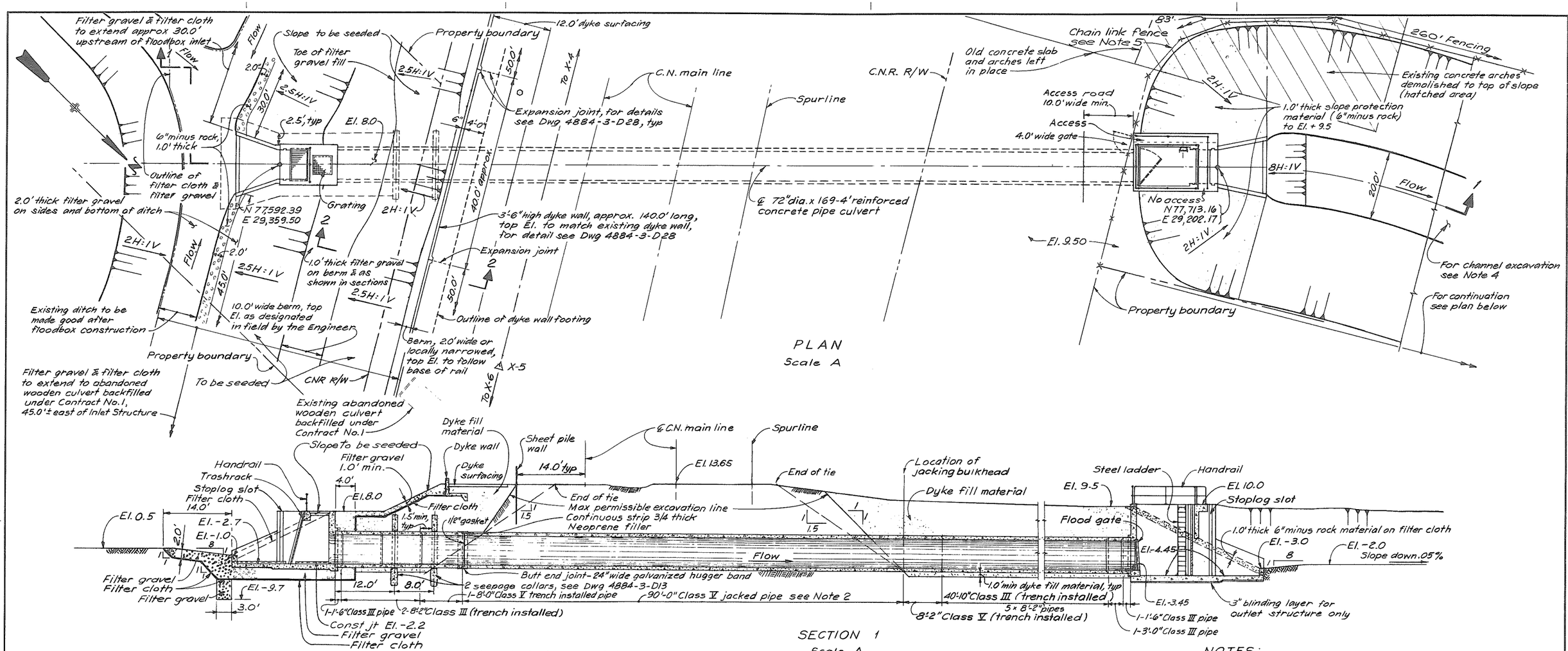
RECOMMENDED PROJECT MANAGER
DATE June 6 1984.
APPROVED DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
PATTULLO FLOODBOX
OUTLET REINFORCEMENT

DESIGNED		SURVEYED	
DRAWN	S.K.C.	DATE	
CHECKED	RSS	FILE NO.	0281550-CI2D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D15 R2	SHEET	29 OF 43 SHEETS

280112



NOTES:

1. Elevations are to Geodetic Datum in feet.
2. Exact length of jacked pipe designated in the field by the Engineer
3. Waterstop protection removed and dowels inserted into existing wall prior to new dyke wall construction.
4. Outlet channel extended at slope shown to meet Fraser River, approx. 340 ft.
5. Frost Steel & Wire Co. Ltd. standard chain link security fence, height 6'-6" (2.0 m) topped with three strands of barbed wire, with gate.

Scale B 50 0 50 100 150 200 250 FT.

Scale A 10 0 10 20 30 40 50 FT.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD C.R. Black
PROJECT ENGINEER M.A. Merlo
CHIEF ENGINEER John S. Hickman

NO	DESCRIPTION	BY	CHD	APPR	DATE
3.	Record Drawing APPROVED FOR CONSTRUCTION	MP	jm		22-11-85
2.	Chain link fence added.	MAW			13-7-84
1.	Prepared for Tender (Combined Contracts).	PRB	MAW	HH	5-6-84

REVISIONS

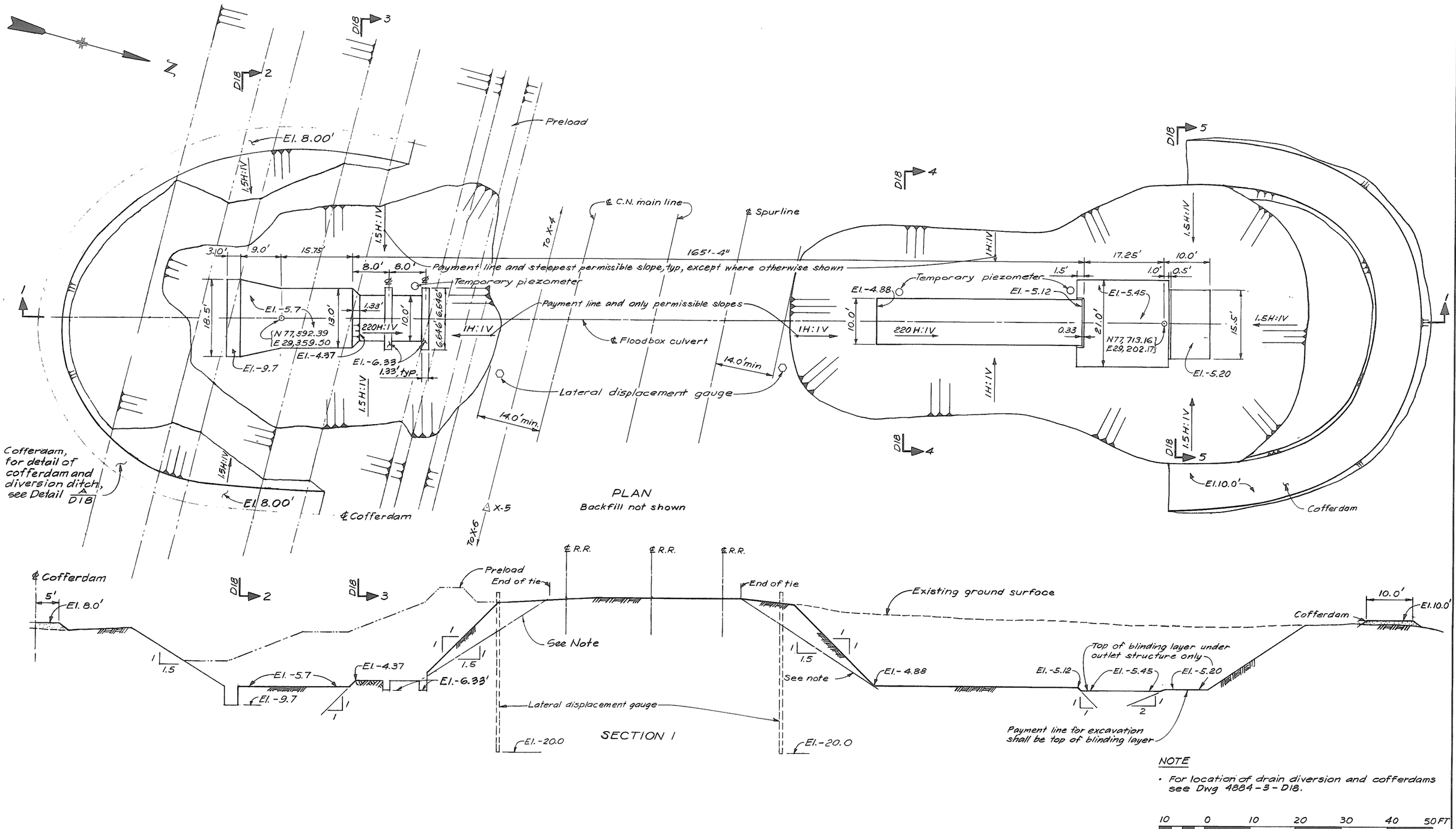
RECOMMENDED E.W. Beale PROJECT MANAGER
DATE June 6 1984.
APPROVED C.H. Keller for DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
124 TH STREET FLOODBOX
GENERAL ARRANGEMENT

DESIGNED	N.A. Connell	SURVEYED	W.S. & M.R.
DRAWN	H.N.C.	DATE	May, 1978
CHECKED	R.L.D., LVS	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D16R3	SHEET	30 OF 43 SHEETS

280113



PLAN
Backfill not shown

SECTION 1

NOTE

- For location of drain diversion and cofferdams see Dwg 4884-3-D18.

10 0 10 20 30 40 50 FT

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD C.R. Blank
PROJECT ENGINEER
CHIEF ENGINEER John S. Hilen

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing APPROVED FOR CONSTRUCTION JUL 25 84				7-11-85
1.	Prepared for Tender (Combined Contracts)				5-6-84

REVISIONS

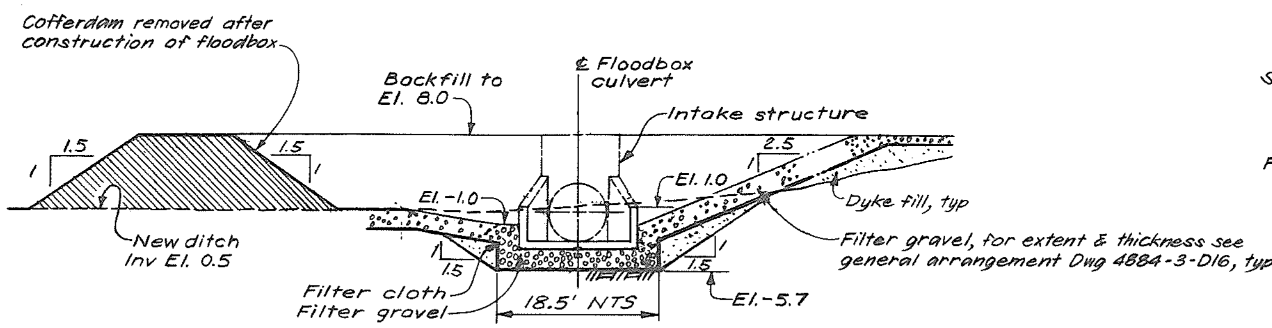
RECOMMENDED PROJECT MANAGER
DATE June 6 1984.
APPROVED DIRECTOR, WATER INVESTIGATIONS
DATE Jun 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
124 TH STREET FLOODBOX
EXCAVATION & BACKFILL - SHEET 1 OF 2

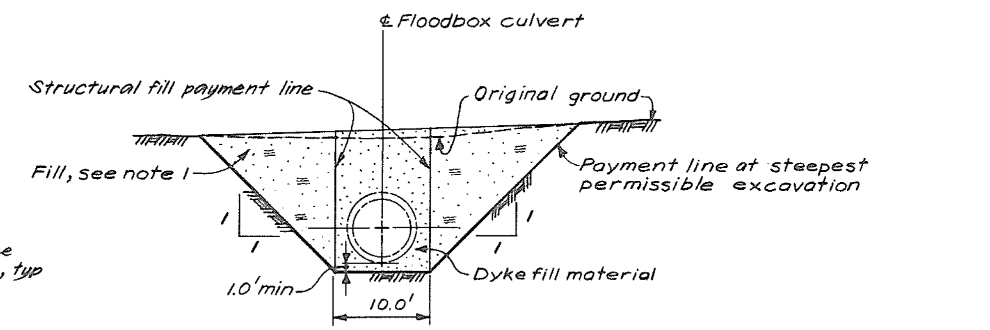
DESIGNED NAE	SURVEYED W.S & M.R.
DRAWN SK	DATE May, 1978.
CHECKED R.A.D. LVS	FILE NO. 0281550-C12D-3
SCALE As shown	DATE 14 Feb, 1979.
DWG. NO. 4884-3-D17 R2	SHEET 31 OF 43 SHEETS

280114



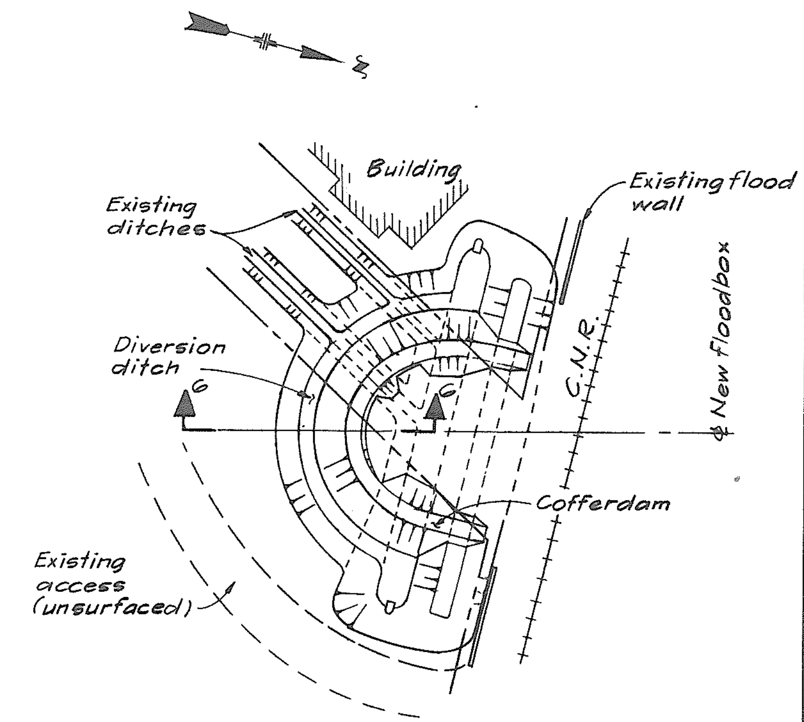
SECTION $\frac{2}{D17}$

Scale A



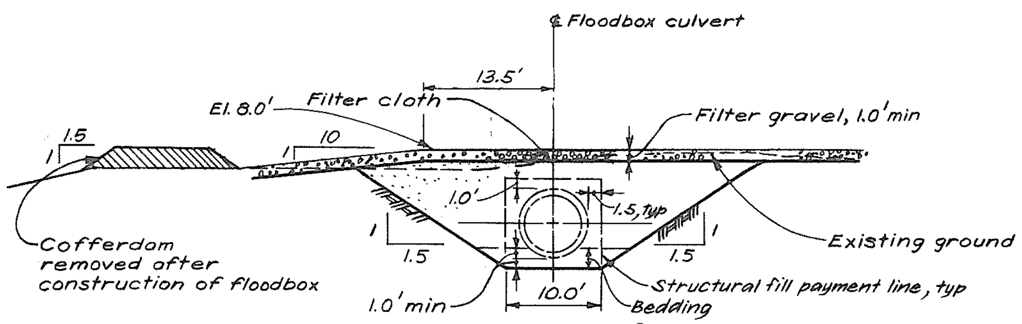
SECTION $\frac{4}{D17}$

Scale A



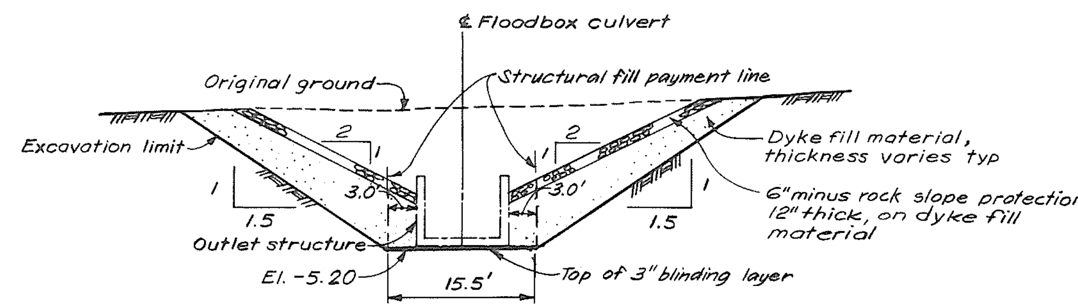
DETAIL $\frac{A}{D17}$

Scale B



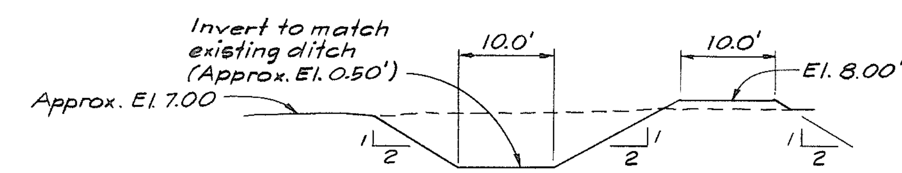
SECTION $\frac{3}{D17}$

Scale A



SECTION $\frac{5}{D17}$

Scale A



SECTION 6

Scale A

NOTE

1. North of the CNR right of way the culvert was backfilled with dyke fill material in the 10.0' wide prism shown in Section 4; backfill either side of this prism was material originally excavated.

Scale B: 50 0 50 100 150 200 FT.

Scale A: 10 0 10 20 30 40 50 FT

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD: C. R. Bland
PROJECT ENGINEER: M A Merlo
CHIEF ENGINEER: John B. [signature]

NO	DESCRIPTION	BY	CHD	APPR	DATE
2	Record Drawing APPROVED FOR CONSTRUCTION	MAM	JM		5-11-85
1	Prepared for Tender (Combined Contracts)	RB	MAM	MM	5-4-84

REVISIONS

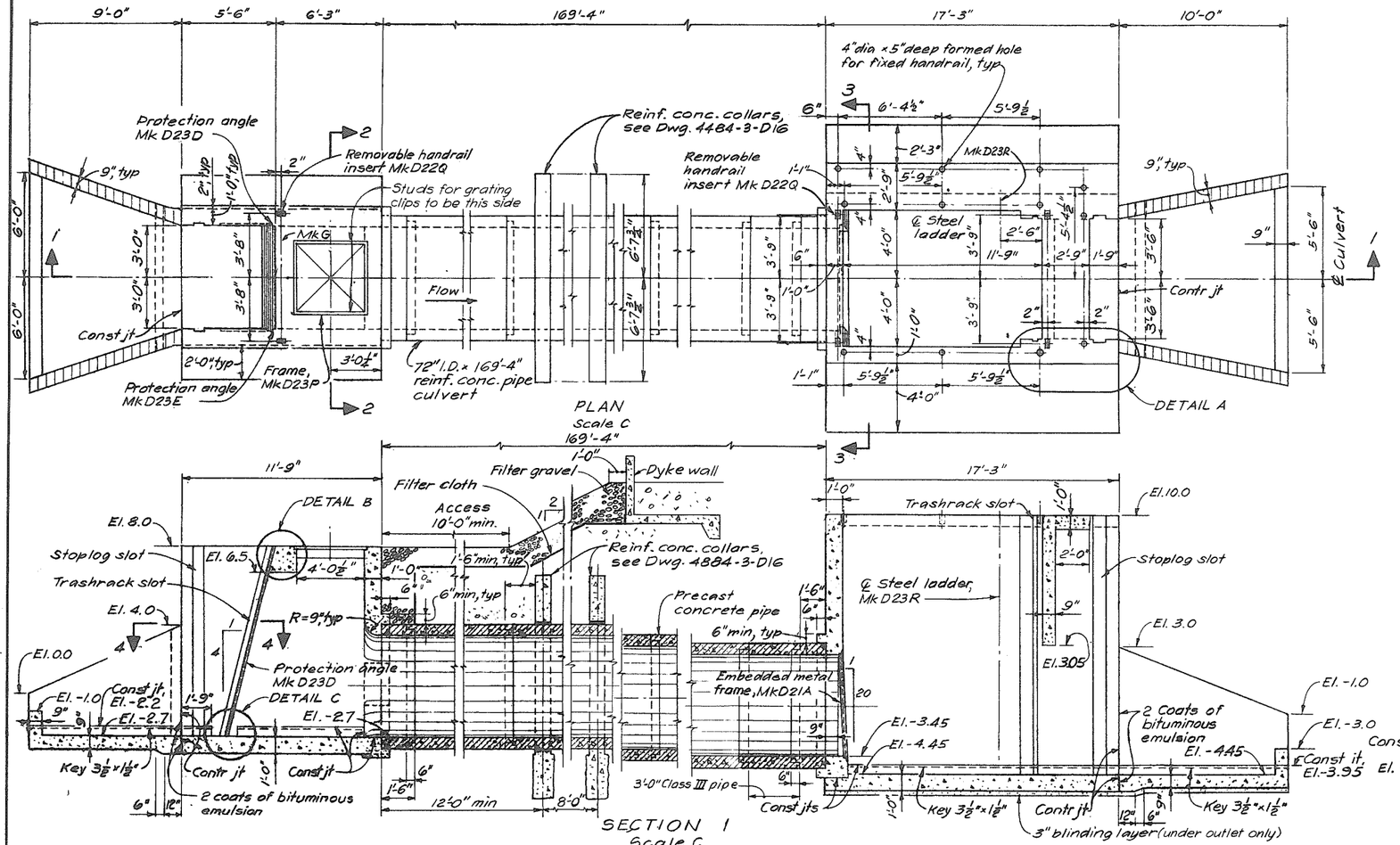
RECOMMENDED: [signature] PROJECT MANAGER
DATE: June 6 1984.
APPROVED: [signature] A/ DIRECTOR, WATER INVESTIGATIONS
DATE: Jun 6/84

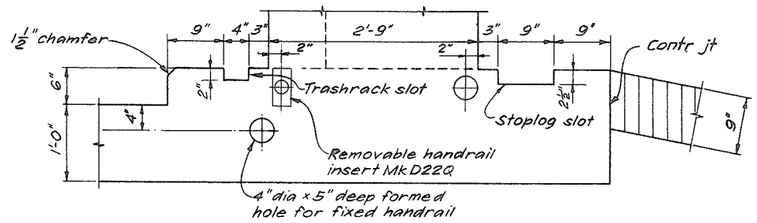
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
124 TH STREET FLOODBOX
EXCAVATION & BACKFILL - SHEET 2 OF 2

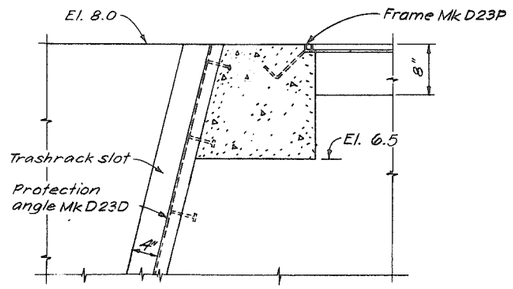
DESIGNED: NAC
DRAWN: S K
CHECKED: R.D., LVS
SCALE: As shown
DWG. NO. 4884-3-D18 R2
SURVEYED:
DATE:
FILE NO. 0281550-C12D-3
DATE 14 Feb, 1979.
SHEET 32 OF 43 SHEETS

280115

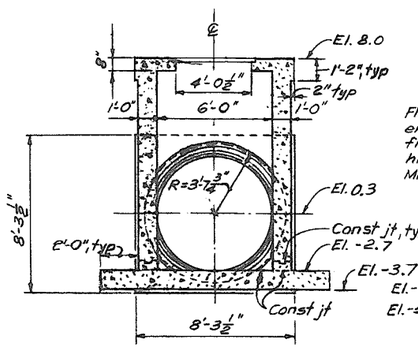




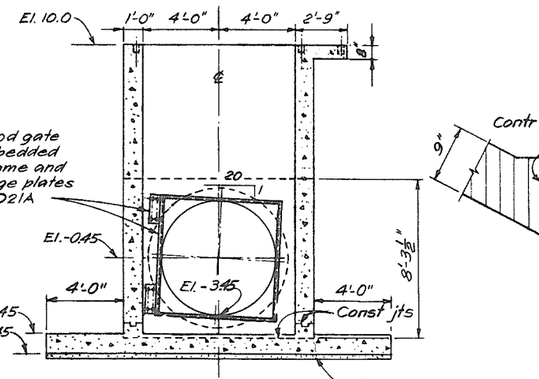
DETAIL A
Scale B



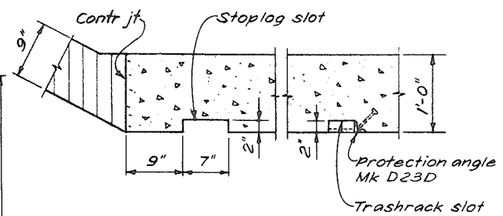
DETAIL B
Scale B



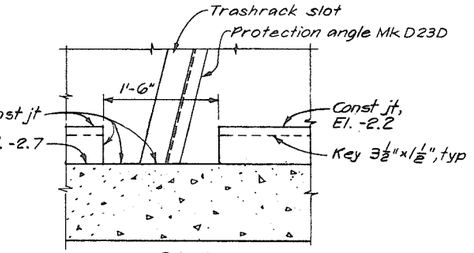
SECTION 2
Scale C



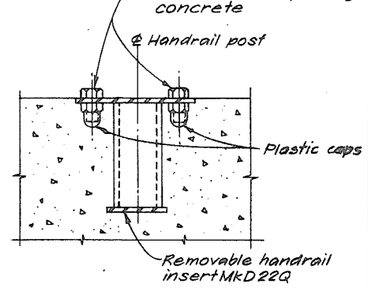
SECTION 3
Scale C



SECTION 4
Scale B



DETAIL C
Scale B



INSERT FOR REMOVABLE HANDRAIL
Scale A

NOTE ON DESIGN

Design adapted from 4884-1-D13
By NAC
Checked M A M
Original design by C.M., checked by ZBS
June 1978

NOTES

1. For reinforcement see Dwg D20
2. Concrete shall be Class 1.
3. Precast concrete 72" internal diameter culvert sections with exposed reinforcement was embedded in in-situ inlet and outlet as shown.

Scale C 5 0 5 10 15 20FT.
Scale B 1 0 1 2 3 4 5FT.
Scale A 1 6" 0 1FT.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD C.R. Bland
PROJECT ENGINEER
CHIEF ENGINEER John B Hilen

REVISIONS

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing Approved for Construction	MP	jm		25-7-84
1.	Prepared for Tender (Combined Contracts)	FRB	MM	MM	5-6-84

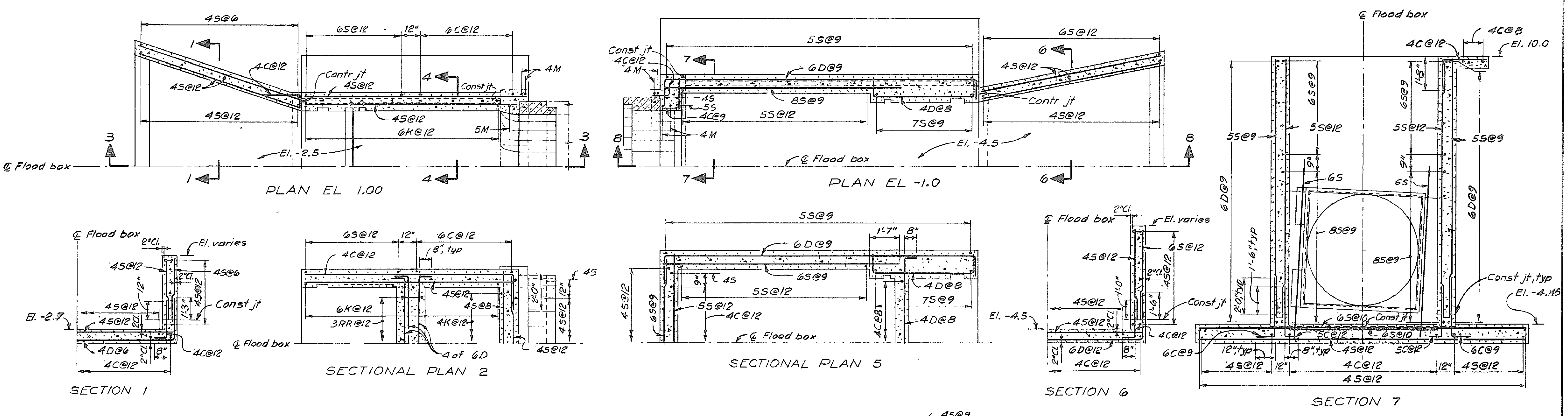
RECOMMENDED PROJECT MANAGER
DATE June 6 1984.
APPROVED DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

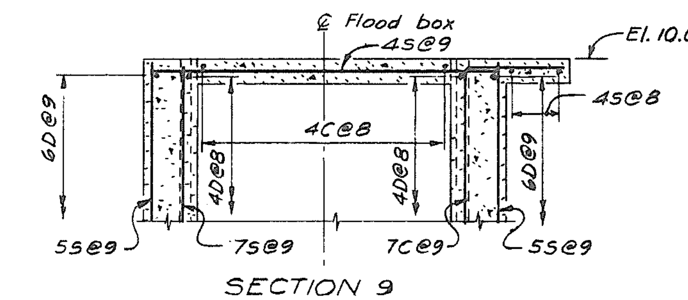
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

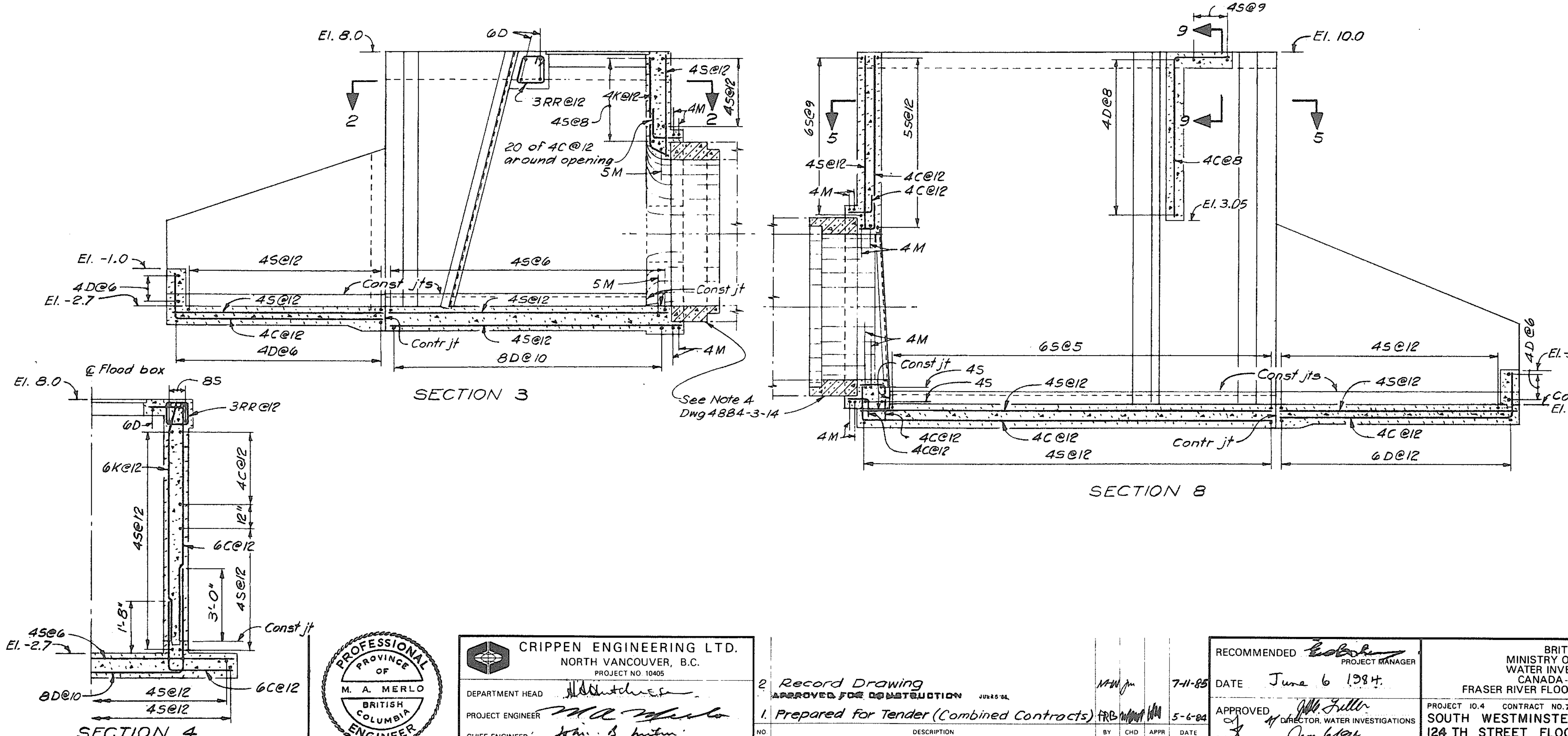
PROJECT NO. 4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
124TH STREET FLOODBOX
CONCRETE OUTLINE

DESIGNED	See Note On Design	SURVEYED	
DRAWN	FL M.N.C.	DATE	
CHECKED	See note	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D19 R2	SHEET	33 OF 43 SHEETS

280116







NOTES

1. Reinforcement shown in sections to be symmetrical about ℄ unless shown otherwise.
2. For concrete outline, see Dwg D19.
3. Concrete cover to reinforcement to be 3", except as otherwise shown.
4. Concrete to be Class I.

NOTE ON DESIGN
Design adapted from Dwg. 4884-1-D14
By: N.A.C.
Checked: M.A.M.
Original designed by C.M. checked by Z.B.S. Aug. 29 '78.

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO 10405

DEPARTMENT HEAD [signature]
PROJECT ENGINEER [signature]
CHIEF ENGINEER [signature]

NO	DESCRIPTION	BY	CHD	APPR	DATE
2	Record Drawing / APPROVED FOR CONSTRUCTION JUNE 6 '84				7-11-85
1	Prepared for Tender (Combined Contracts)	FRB			5-6-84

REVISIONS

RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984
APPROVED [signature] DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

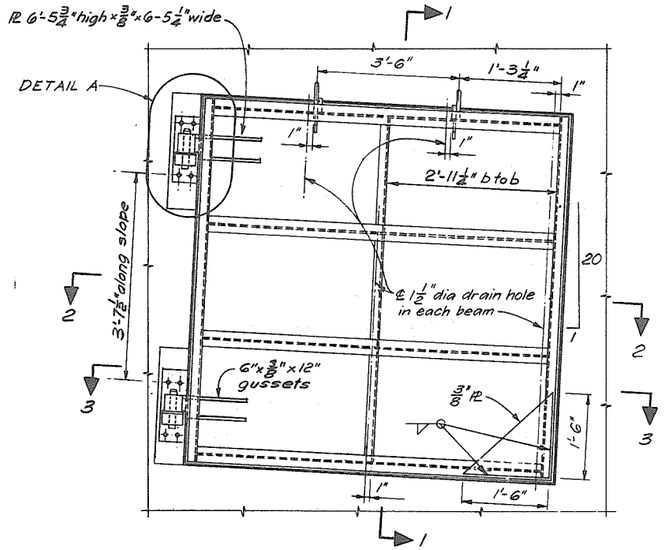
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
124 TH STREET FLOODBOX
REINFORCEMENT

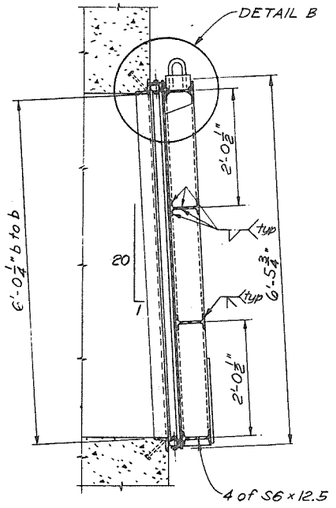
DESIGNED See Note On Design
DRAWN MP
CHECKED —
SCALE As shown
DWG. NO. 4884-3-D20 R2

SURVEYED
DATE
FILE NO. 0281550-C12D-3
DATE 14 Feb, 1979.
SHEET 34 OF 43 SHEETS

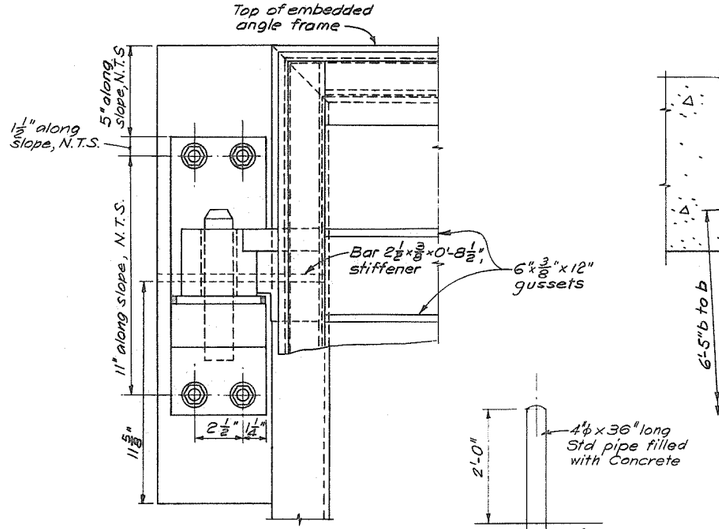
280117



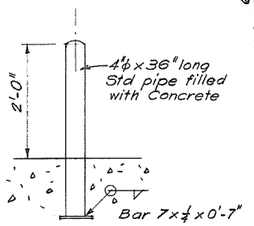
ELEVATION - FLOODGATE
Mk A - 3 required
Scale A



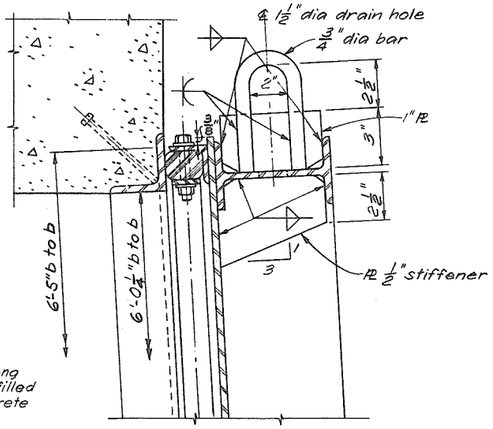
SECTION 1
Scale A



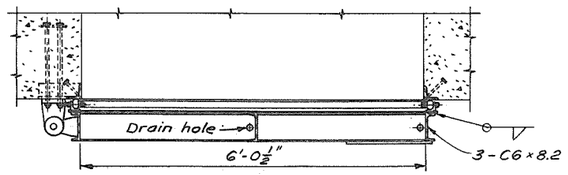
DETAIL A
Scale B



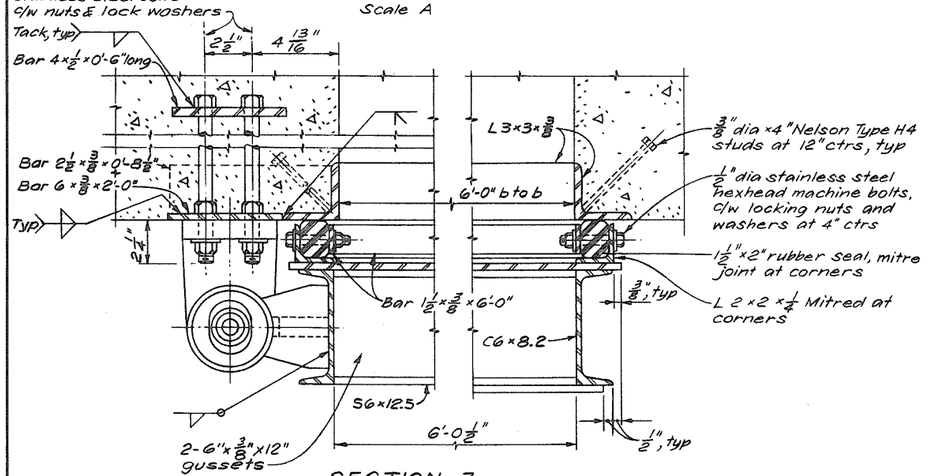
GATE STOP
Scale A
Mark B, 2 req'd for Pattullo Floodbox only



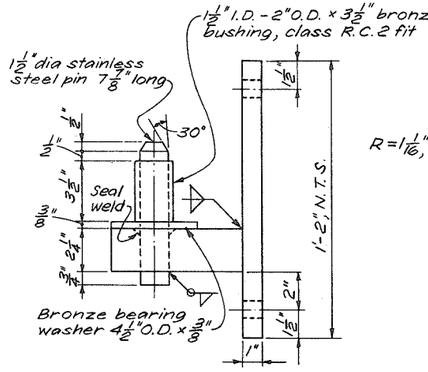
DETAIL B
Scale B



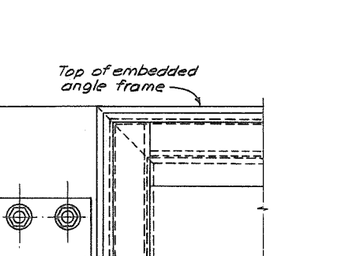
SECTION 2
Scale A



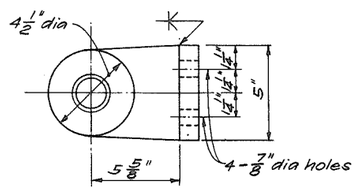
SECTION 3
Scale B



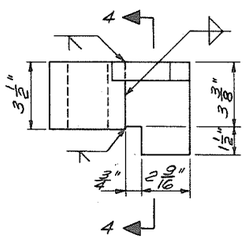
ELEVATION



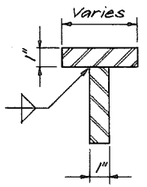
PLAN



PLAN
HINGE PINTLE
Scale B



ELEVATION
HINGE BRACKET
Scale B



SECTION 4
Scale B

NOTES

1. Mk letters to be prefixed D21 and clearly painted on assemblies.
2. Reinforcement shall be adjusted to clear stud anchors.
3. Floodgate Elevation, Section 2 & 3 and Detail A shown for 124th street Floodbox, the adjacent gate is not shown for Pattullo Floodbox.

NOTE ON DESIGN

Design adapted from Dwg 4944-1-D125
By: M A M
Checked: N.A.C.
Original designed by A.D. checked by M.G.B., 6 Aug 1976.

Scale B: 1 6" 0 1FT.

Scale A: 1 0 1 2 3 4 5 6 7FT.

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405
DEPARTMENT HEAD C.R. Bland
PROJECT ENGINEER M.A. Merlo
CHIEF ENGINEER John B. Smith

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2	Record Drawing APPROVED FOR CONSTRUCTION JUL 20 '84	MAM	jm		7-11-85
1	Prepared for Tender (Combined contracts)	FL	MAM	MM	5-6-84

REVISIONS

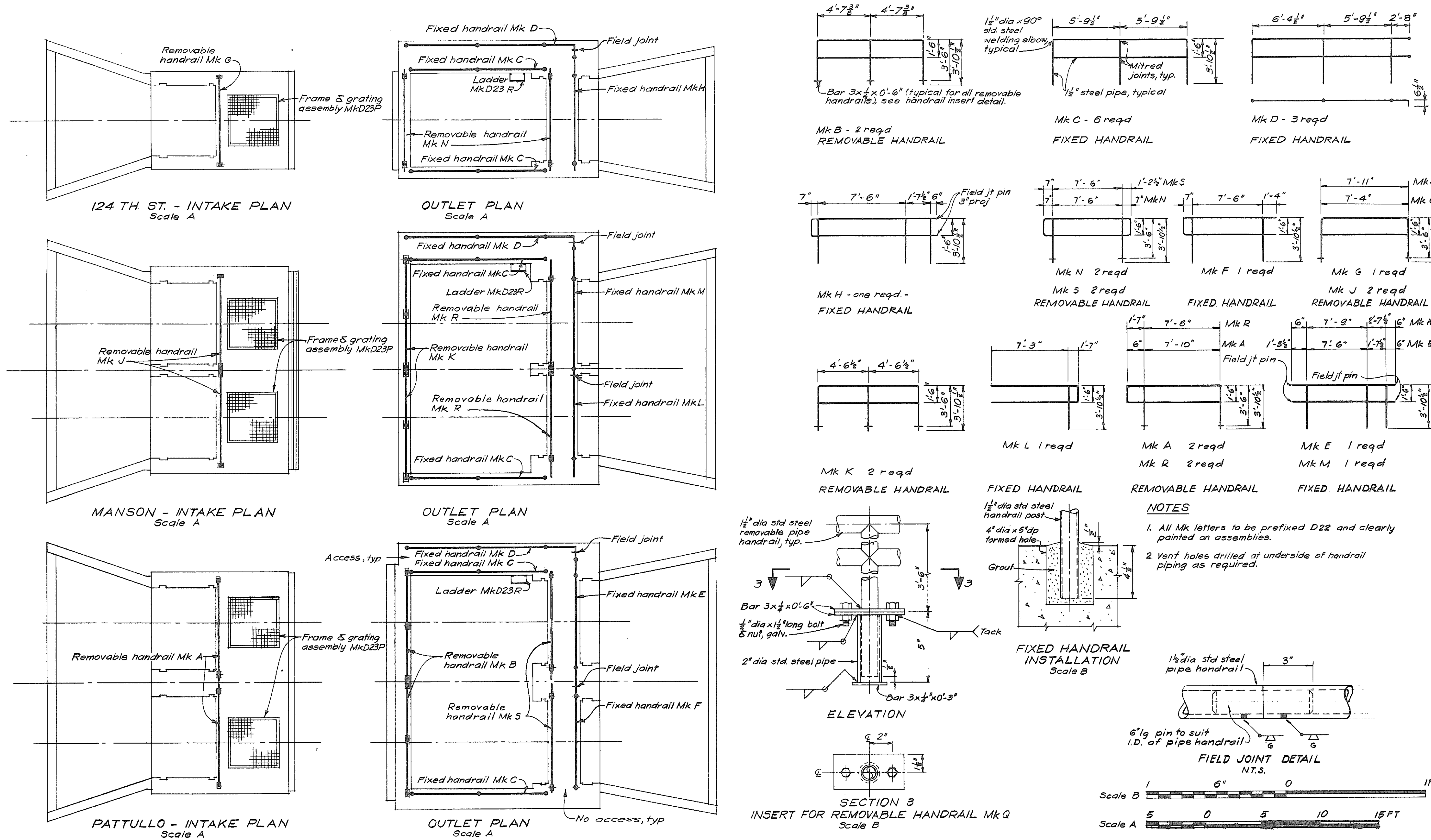
RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984.
APPROVED [signature] DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT NO. 4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
124 TH STREET AND PATTULLO FLOODBOXES
FLOODGATES

DESIGNED See Note On Design	SURVEYED
DRAWN FL	DATE
CHECKED See Note	FILE NO. 0281550-C12D-3
SCALE As shown	DATE 14 Feb, 1979.
DWG. NO. 4884-3-D212	SHEET 35 OF 43 SHEETS

280118



NOTES

1. All Mk letters to be prefixed D22 and clearly painted on assemblies.
2. Vent holes drilled at underside of handrail piping as required.

NOTE ON DESIGN

Design adapted from Dwgs 4944-1-D126 & D127 by M.A.M. & M.H.W.
Checked by: RSS.
Original designed by M.H.W., W.K.C & N.vdG, checked by M.P. & M.G.B.

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD: C. R. Bland
PROJECT ENGINEER: M A Merlo
CHIEF ENGINEER: John E. Walton

NO	DESCRIPTION	BY	CHD	APPR	DATE
2	Record Drawing	MH	JM		7-11-85
	APPROVED FOR CONSTRUCTION				
1.	Prepared for Tender (Combined contracts)	RB			5-6-84

REVISIONS

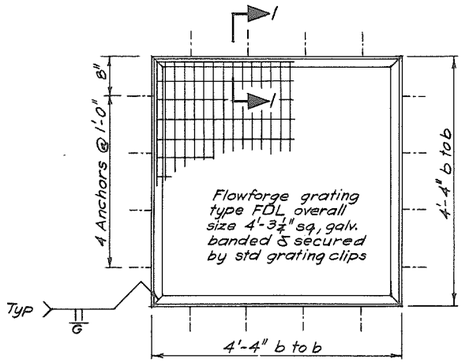
RECOMMENDED: [signature] PROJECT MANAGER
DATE: June 6 1984
APPROVED: [signature] DIRECTOR, WATER INVESTIGATIONS
DATE: June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA - BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

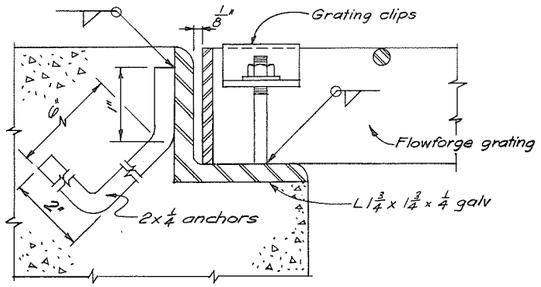
PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
124 TH ST., MANSON & PATTULLO FLOODBOXES
HANDRAILS

DESIGNED: See Note On Design
SURVEYED:
DRAWN: L.S.
CHECKED: See Note On Design
FILE NO. 0281550-C12D-3
SCALE: As shown
DATE: 14 Feb, 1979.
DWG. NO. 4884-3-D22 R2
SHEET 36 OF 43 SHEETS

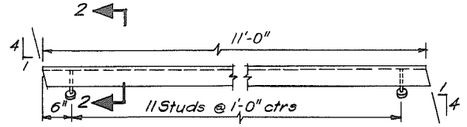
280119



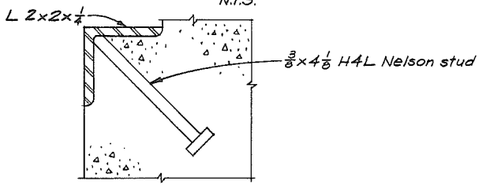
FRAME & GRATING ASSEMBLY
Mk P - 5 reqd
Scale D



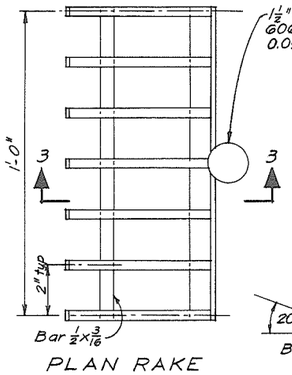
SECTION 1
Scale C



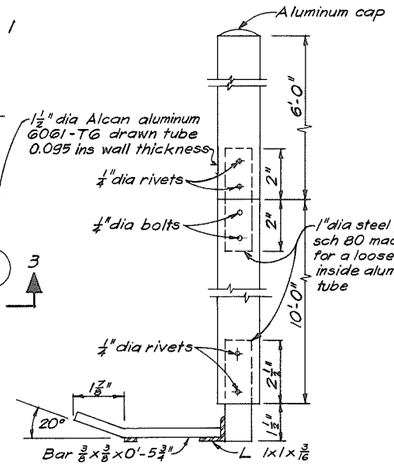
INTAKE TRASHRACK SLOT PROTECTION ANGLE
Mk D - 5 reqd
Mk E - Similar opp. hand - 5 reqd
N.T.S.



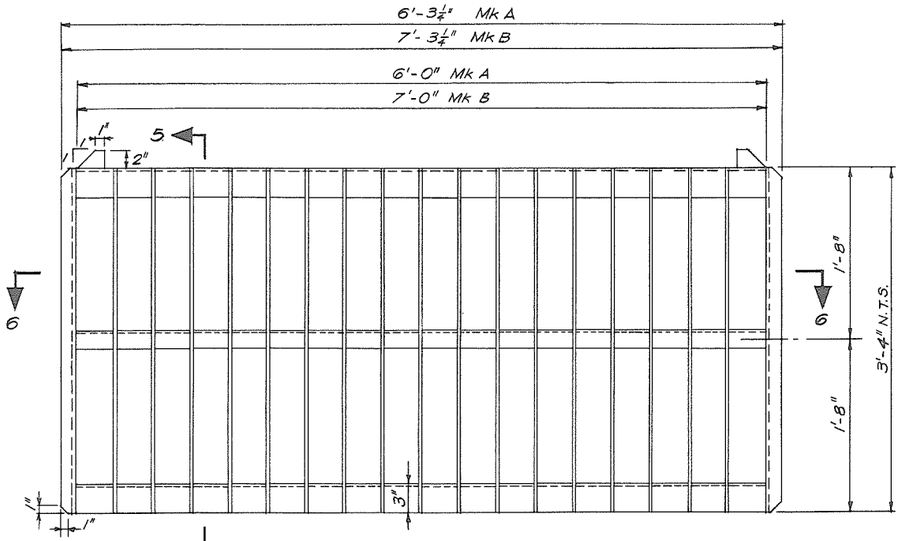
SECTION 2
N.T.S.



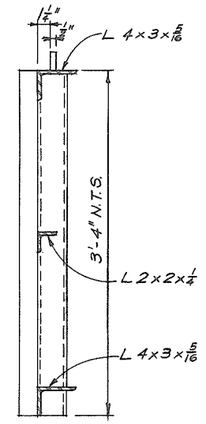
PLAN RAKE
3 reqd
Scale B



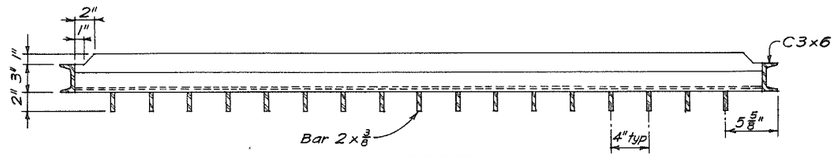
SECTION 3
Scale B



ELEVATION - INTAKE TRASHRACK
Mks A & B
Scale A



SECTION 5
Scale A

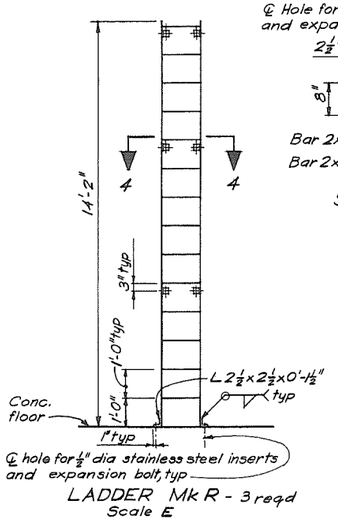


SECTION 6
Scale A

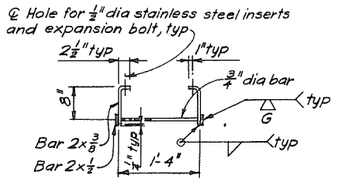
NOTES ON TRASHRACK DESIGN
Design adapted from Dwg 4944-1-D125
By: N.A.C.
Checked: M.A.M.
Original designed by A.D.
Checked by M.G.B., 6 Aug. 1976

TRASHRACK SCHEDULE				
Location	Intake		Outlet	Rake
	Mk A	Mk B	Mk C	
Manson	–	6	6	1
Pattullo	–	6	6	1
124 Th Street	3	–	3	1
Total	3	12	15	3

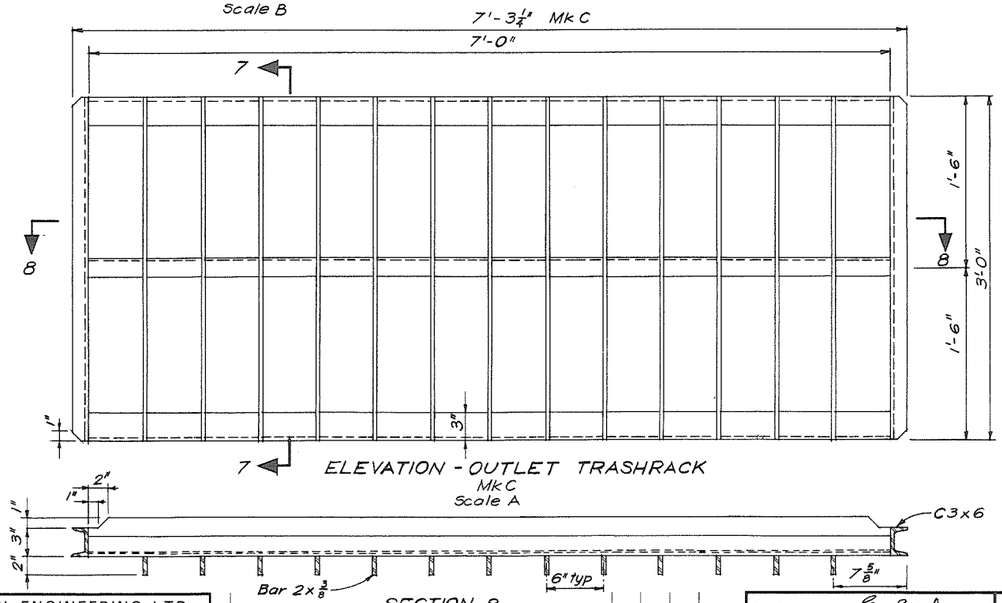
NOTE
- All Mk letters to be prefixed D23 and clearly painted as assemblies.



LADDER Mk R - 3 reqd
Scale E

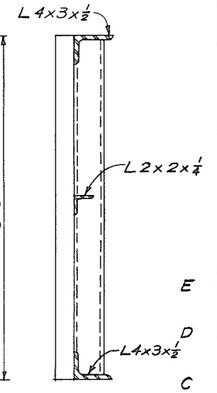


SECTION 4
Scale D

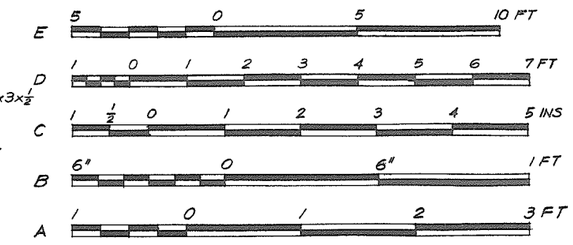


ELEVATION - OUTLET TRASHRACK
Mk C
Scale A

SECTION 8



SECTION 7



PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10409

DEPARTMENT HEAD C.R. Bland
PROJECT ENGINEER M.A. Merlo
CHIEF ENGINEER John B. Wilson

NO	DESCRIPTION	BY	CHD	APPR	DATE
2	Record Drawing APPROVED FOR CONSTRUCTION JUL 25 '85	MAM	JM		7-11-85
1	Prepared for Tender (Combined contracts)	RBB	MAM	MAM	5-6-84

REVISIONS

RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984

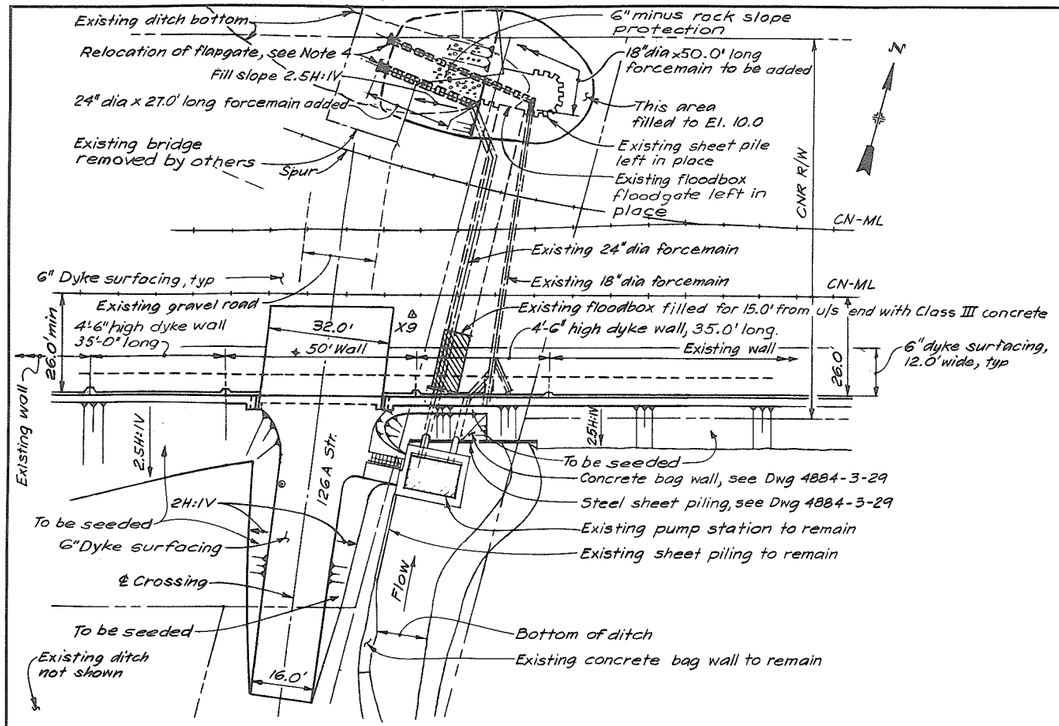
APPROVED [signature] for DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA - BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

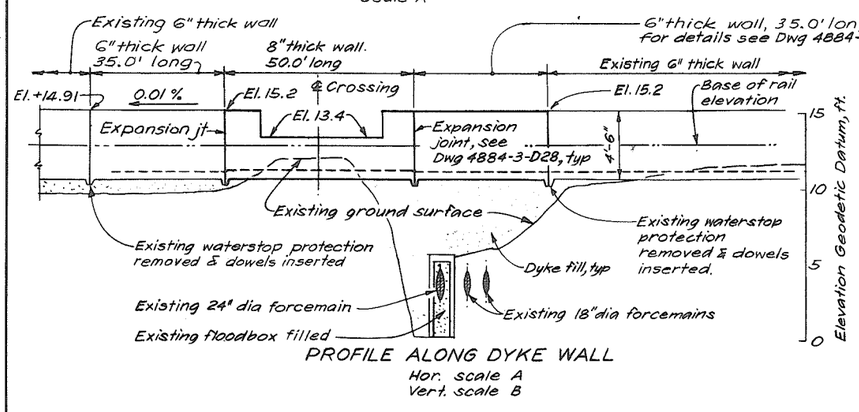
PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
124TH ST, MANSON & PATTULLO FLOODBOXES
TRASHRACKS & MISCELLANEOUS METALWORK

DESIGNED See Note On Design	SURVEYED
DRAWN L.S.	DATE
CHECKED	FILE NO. 0281550-C12D-3
SCALE As shown	DATE 14 Feb, 1979.
DWG. NO. 4884-3-D23R2	SHEET 37 OF 43 SHEETS

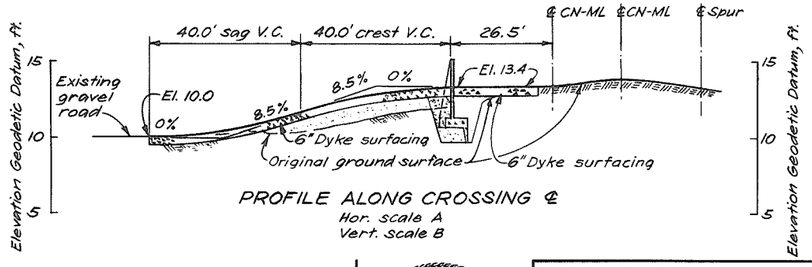
280120



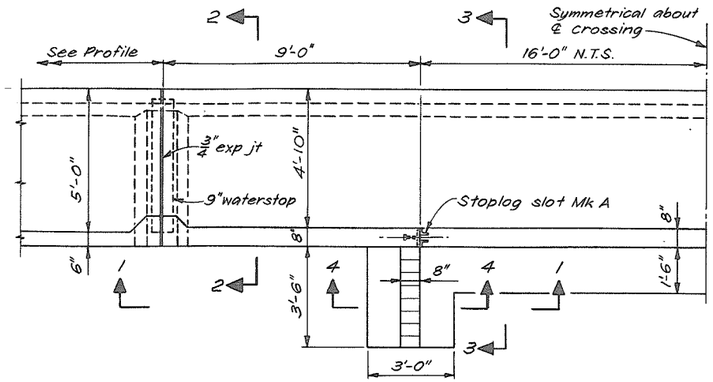
PLAN-126 A STREET DYKE
Scale A



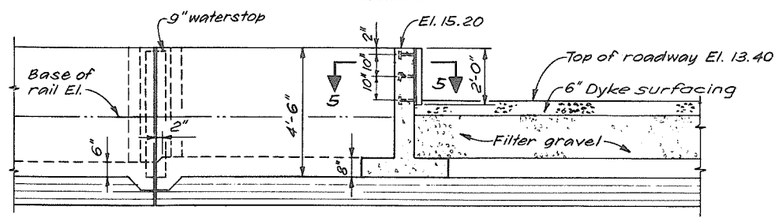
PROFILE ALONG DYKE WALL
Hor. scale A
Vert. scale B



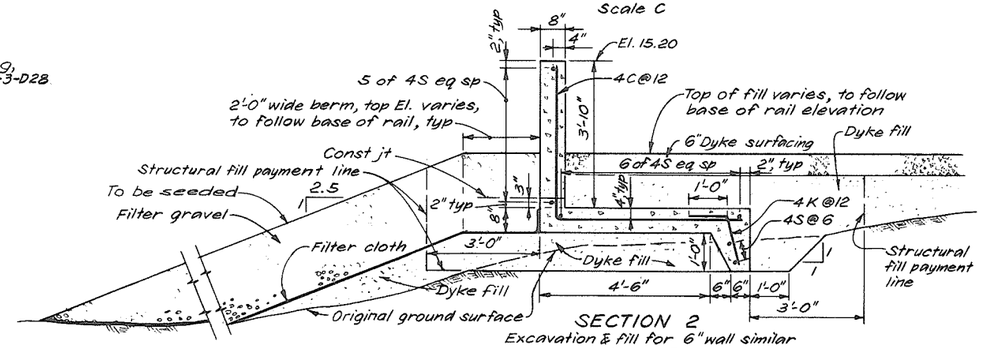
PROFILE ALONG CROSSING ℄
Hor. scale A
Vert. scale B



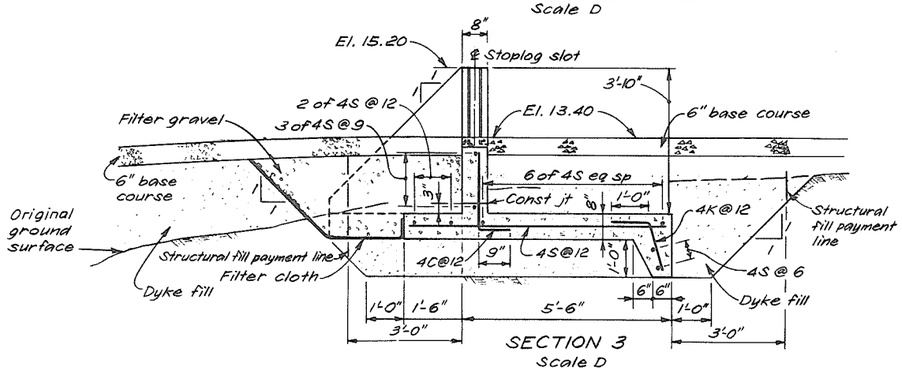
PLAN - CROSSING AT DYKE WALL
(Fill not shown)
Scale C



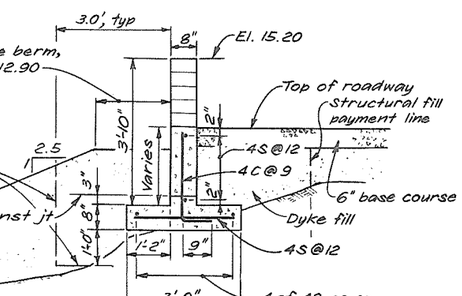
ELEVATION 1
Scale C



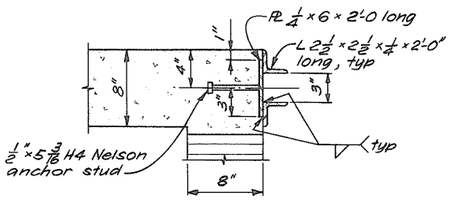
SECTION 2
Excavation & fill for 6" wall similar
Scale D



SECTION 3
Scale D



SECTION 4
Scale D



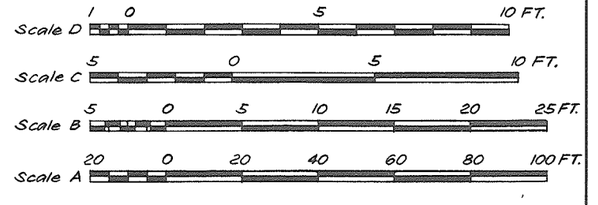
SECTION 5
All metalwork to be hot dip galvanized
Mk A - 2 assemblies req'd.
N. T. S.

NOTE ON DESIGN

Design adapted from Dwg 4884-1-D15, D2, D18 & D9 by M.A.M & FL.
Checked by: MAM
Original design by C. Ma checked by ZBS & NAC.

NOTES

1. For general notes and legend see Dwg 4884-3-D27.
2. For notes of concrete & reinforcement see Dwg 4884-3-D28.
3. Mk letters to be prefixed D25 and clearly painted on embedded metalwork.
4. Exact location of extension to existing 24" dia and 18" dia forcemain determined on site by the Engineer. Existing flapgates for the forcemains were relocated onto the end of the pipes as shown.



PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO	DESCRIPTION	BY	CHD	APPR	DATE
2	Record Drawing	MAM	JM		8-11-85
	APPROVED FOR CONSTRUCTION JUL 25 '85				
1.	Prepared for Tender (Combined contracts)	PRD	MAM	MM	5-6-84

REVISIONS

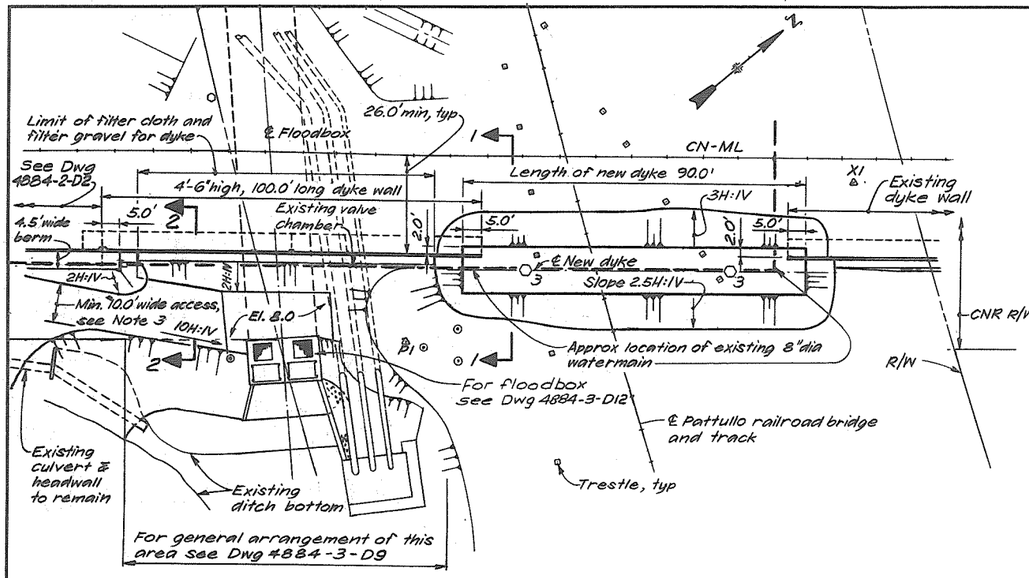
RECOMMENDED — PROJECT MANAGER
DATE June 6 1984
APPROVED — A/ DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

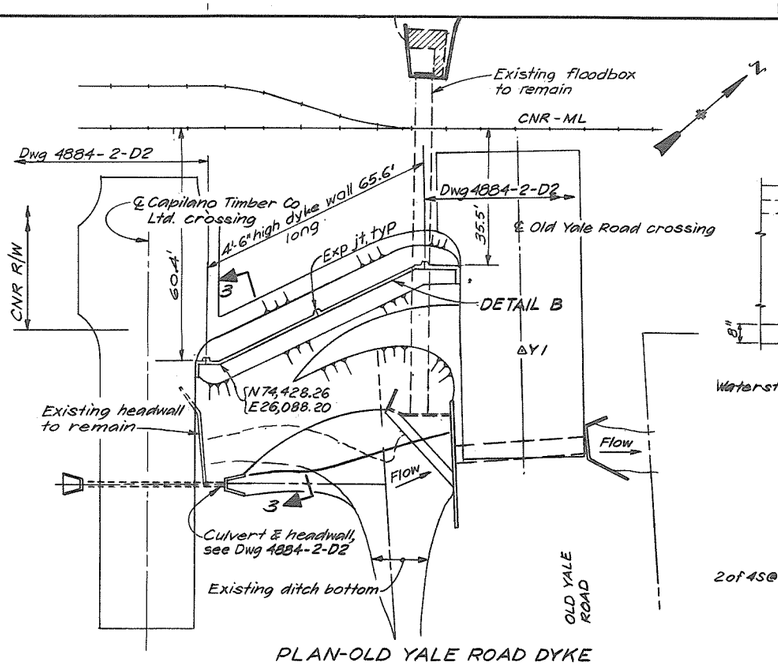
PROJECT 10.4 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
126 A STREET DYKE
PLAN, PROFILE AND SECTIONS

DESIGNED See Note on Design	SURVEYED
DRAWN FL	DATE -
CHECKED See Note On Design	FILE NO. 0281550-C12D-3
SCALE As shown	DATE 14 Feb, 1979.
DWG. NO. 4884-3-D25R2	SHEET 38 OF 43 SHEETS

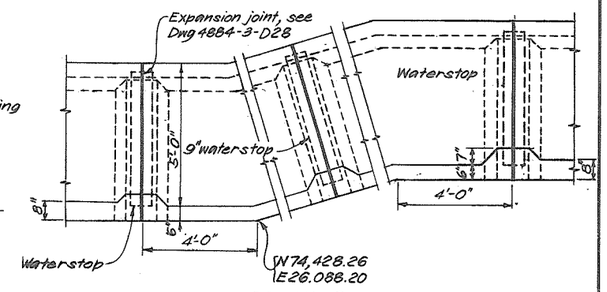
280121



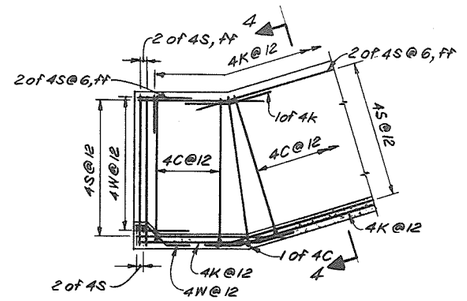
PLAN-PATTULLO DYKE
Scale A



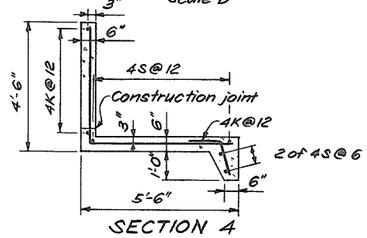
PLAN-OLD YALE ROAD DYKE
Scale A



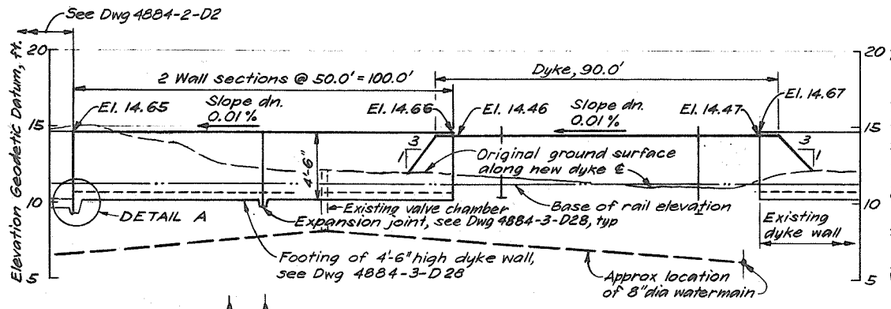
DETAIL B
Showing concrete outline of dyke wall
Scale D



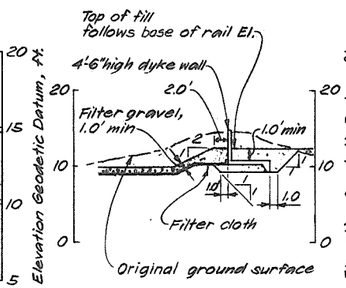
DETAIL B
Showing reinforcement of dyke wall
Scale D



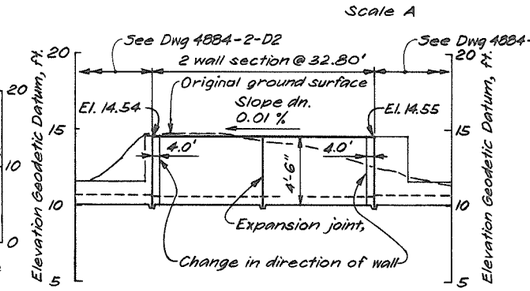
SECTION 4
Scale D



PROFILE-PATTULLO DYKE
Hor. scale A
Vert. scale B

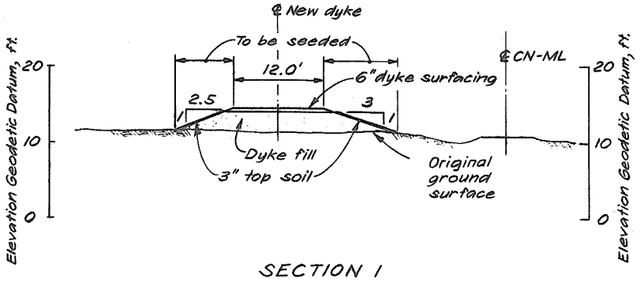


SECTION 2
Scale C

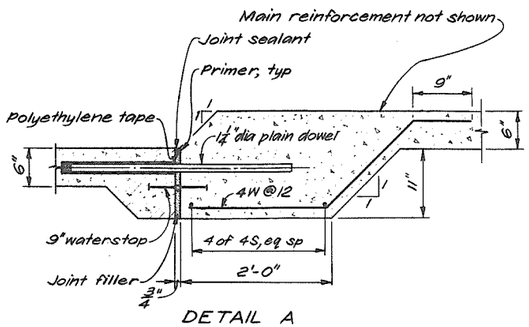


PROFILE-OLD YALE ROAD DYKE
Hor. scale A
Vert. scale B

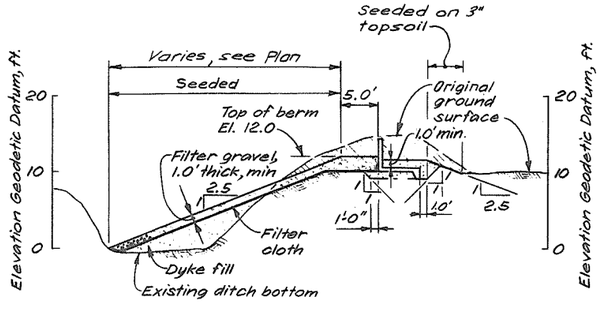
72" dia culverts



SECTION 1
Scale C



DETAIL A
N.T.S.



SECTION 3
Scale C

NOTES

1. For general notes and legend see Dwg 4884-3-D27.
2. For notes of concrete and reinforcement see Dwg 4884-3-D28.
3. Dyke surfacing, minimum 10.0' wide and minimum 6" thick on access road adjacent to Pattullo Floodbox, was extended to match existing dyke and road accesses.
4. For structural fill & excavation payment lines see Dwg 4884-3-D13

Scale D: 5 0 5 10 FT.

Scale C: 10 0 10 20 30 40 50 FT.

Scale B: 5 0 5 10 15 20 25 FT.

Scale A: 20 0 20 40 60 80 100 FT.

NOTE ON DESIGN

Design adapted from Dwgs 4884-1-D4, D2, D18 & D9 by M.A.M & FL
Check by: [signature]
Original design by M.A.M & C.Ma, checked by R.C.D, Z.B.S. & NAC

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD [signature]
PROJECT ENGINEER [signature]
CHIEF ENGINEER [signature]

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing APPROVED FOR CONSTRUCTION JUL 25 84	MW	jm		12-11-85
1.	Prepared for Tender (Combined contracts)	FRR	[illegible]	MW	5-6-84

REVISIONS

RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984

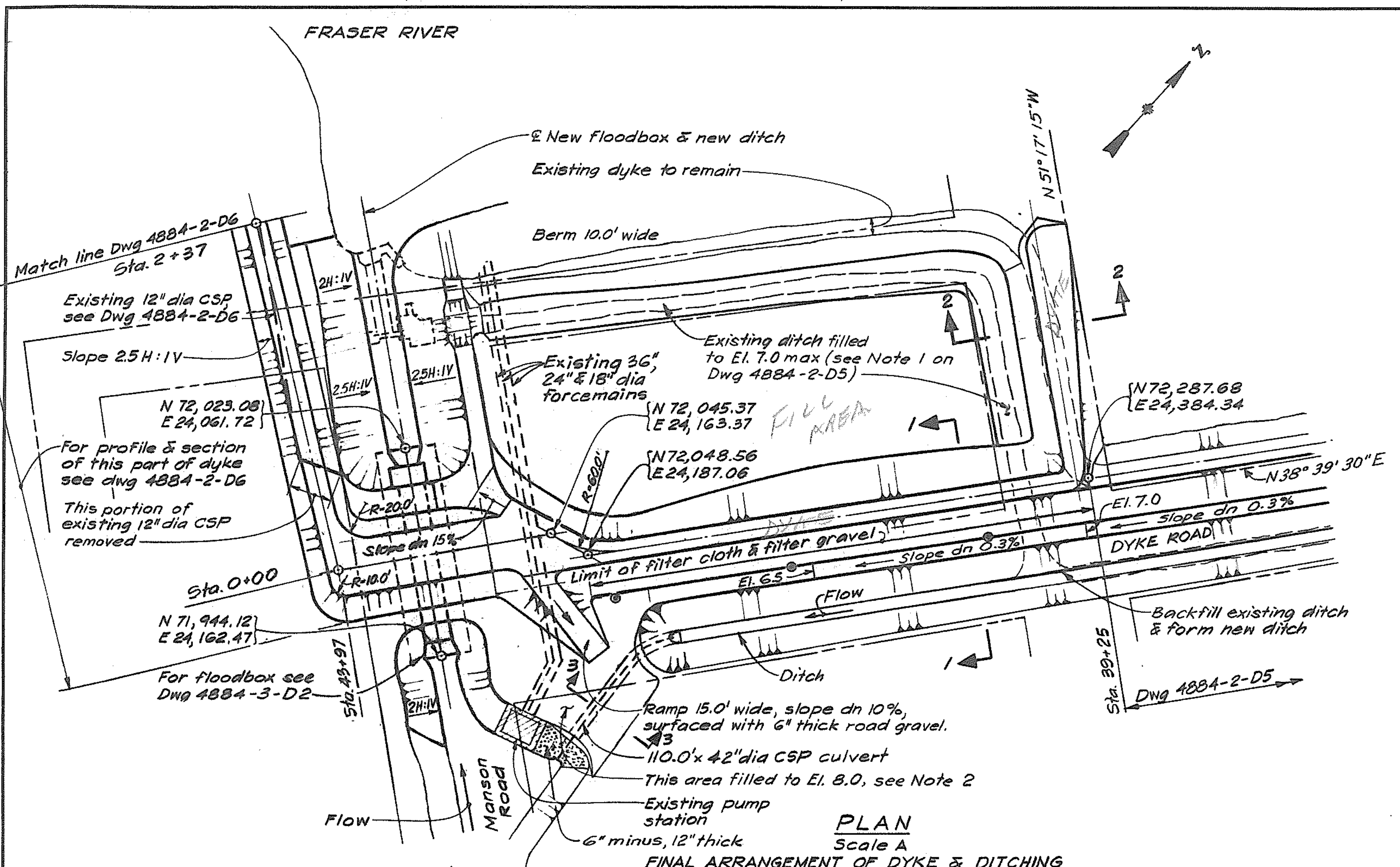
APPROVED [signature] for DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
PATTULLO & OLD YALE ROAD DYKES
PLAN, PROFILE AND SECTIONS

DESIGNED See Note On Design	SURVEYED
DRAWN FL	DATE
CHECKED See Note On Design	FILE NO. 0281550-C12D-3
SCALE As shown	DATE 14 Feb, 1979.
DWG. NO. 4884-3-D26R2	SHEET 39 OF 43 SHEETS

280122

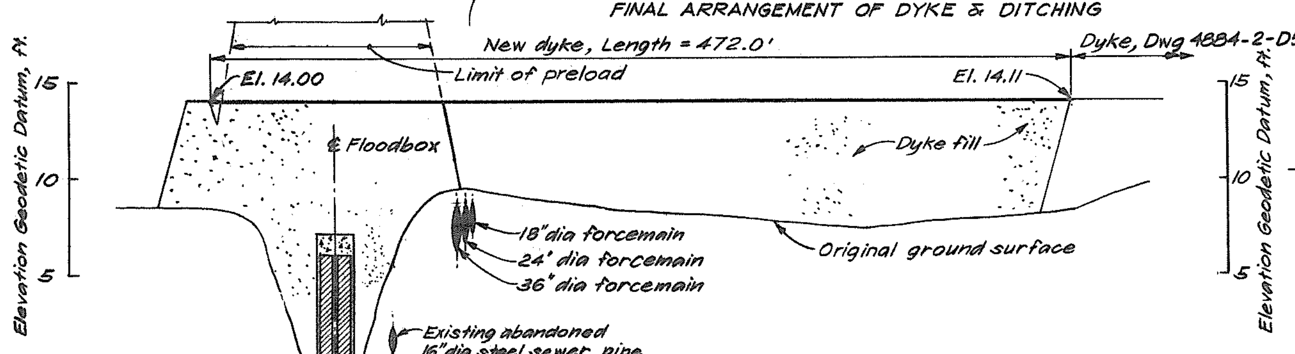


LEGEND

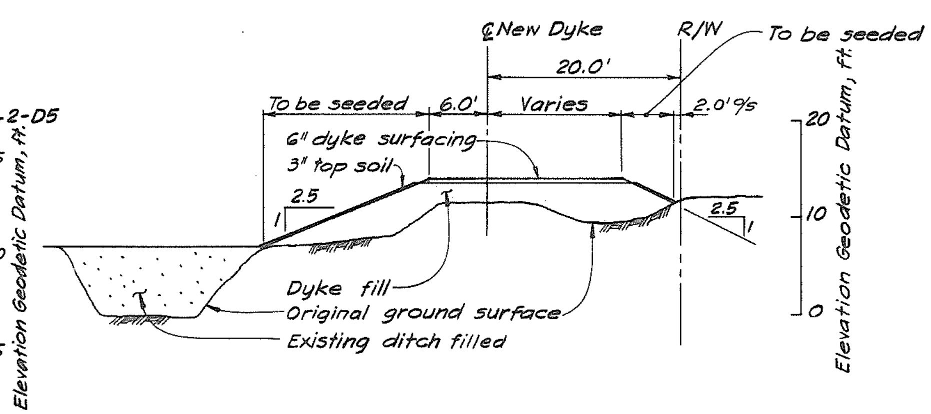
R/W	Right of way
CNR	Canadian National Railroad
CN-ML	CN-Main line
(symbol)	Railroad
(symbol)	Asphaltic concrete pavement
(symbol)	Legal boundary
(symbol)	Base of rail
(symbol)	New ditch invert
(symbol)	Power pole
(symbol)	Dyke coordinate
(symbol)	Excavation
(symbol)	Fill
(symbol)	Lateral movement gauge location (Slope indicator on Plan)
El.-20.0	Lateral movement gauge in section (Slope indicator casing in section) Bottom El. of casing
(symbol)	Telephone pole
(symbol)	Dyke traverse control monument

GENERAL NOTES

1. Dyke station measured along land side edge of dyke wall or ℄ of new dyke.
2. All sections taken normal to dyke wall centreline or new dyke centreline.
3. Dyke outline shown in cross-section is final dyke section. Additional settlement allowance not shown.
4. Dyke & dyke wall alignment have been set by coordinate points and for the dyke section adjacent to CNR tracks by offsets measured at right angles to and from centreline of south railroad track. Exact layout of dyke shall be determined by the Engineer and shall comply with the minimum clearances specified.
5. Limit of clearing and grubbing as shown on sections are typical for areas as indicated on plans and are maximum limits. Actual limits determined in field by the Engineer.



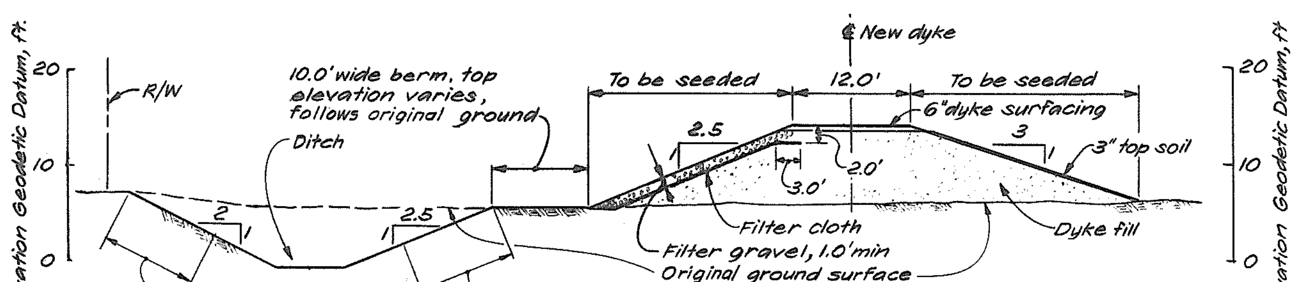
PROFILE ALONG DYKE ℄
Hor. Scale A
Vert. scale B



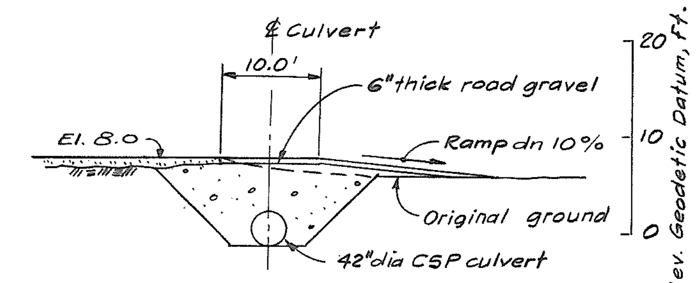
SECTION 2
Scale C

NOTES

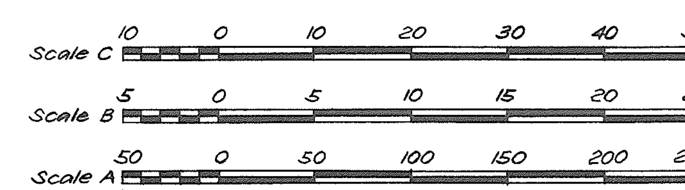
1. For general arrangement of Manson Road floodbox see Dwg 4884-3-D2.
2. Gravel surfacing on dyke side of ramp over culvert removed before placing fill over.



SECTION 1
Scale C



SECTION 3
Scale C



PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD C.R. Black
PROJECT ENGINEER M.A. Merlo
CHIEF ENGINEER John B. ...

NO	DESCRIPTION	BY	CHD	APPR	DATE
2	Record Drawing — APPROVED FOR CONSTRUCTION JUL 25 84	MH	JM		22-11-85
1	Prepared for Tender (Combined contracts)	PRB		MM	5-6-84

REVISIONS

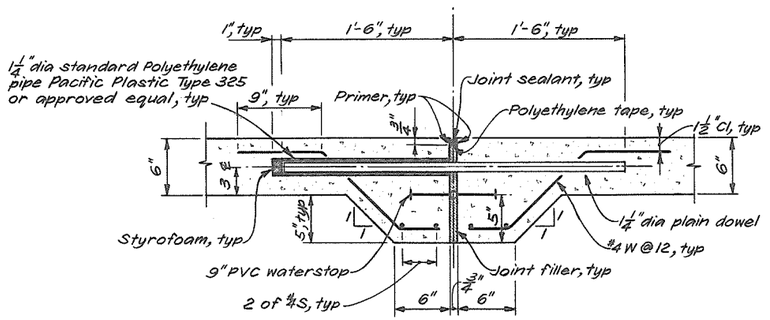
RECOMMENDED (signature) PROJECT MANAGER
DATE June 6 1984
APPROVED (signature) DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA - BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

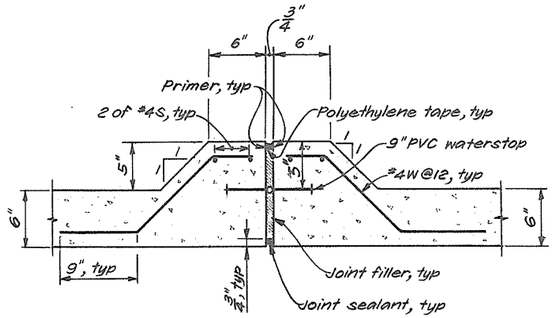
PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
DYKE ROAD DYKE
PLAN, PROFILE AND SECTION

DESIGNED		SURVEYED	E. S.
DRAWN	FL	DATE	Nov, 1974.
CHECKED	R.L.D., LVS	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	14 Feb, 1979.
DWG. NO.	4884-3-D27R2	SHEET	40 OF 43 SHEETS

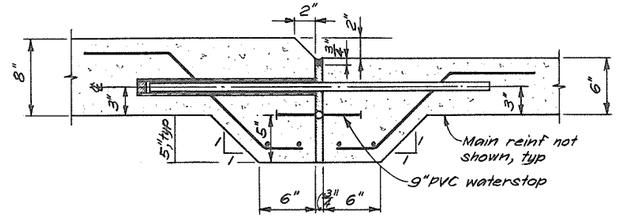
280123



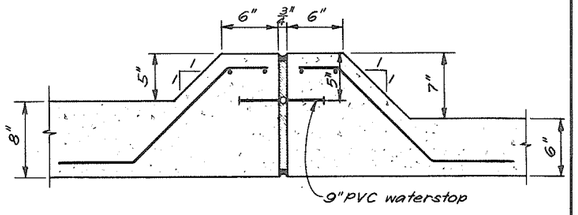
EXPANSION JOINT AT DYKE WALL FOOTING
Typical for 6" to 6" thick footings
Scale B



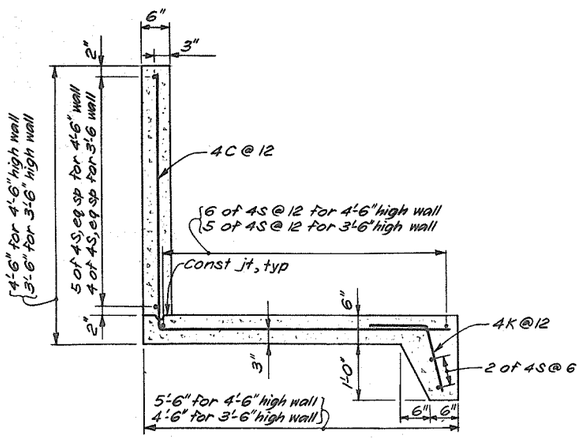
EXPANSION JOINT AT DYKE WALL
Typical for 6" to 6" thick walls
Scale B



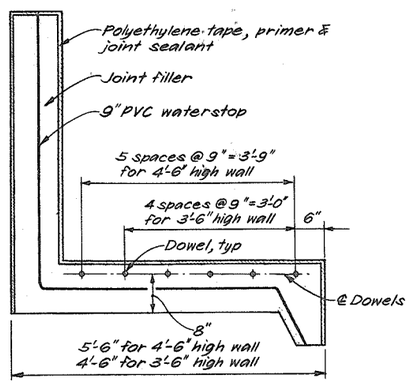
EXPANSION JOINT AT DYKE WALL FOOTING
ADJACENT TO CROSSING
Typical for 6" to 8" thick footings
Scale B



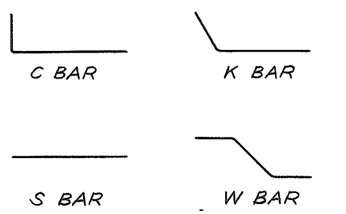
EXPANSION JOINT AT DYKE WALL
ADJACENT TO CROSSING
Typical for 6" to 8" thick walls
Scale B



TYPICAL CONCRETE OUTLINE
AND REINFORCEMENT FOR DYKE WALLS
4'-6" high wall shown, 3'-6" high wall similar, except as noted
Scale A



TYPICAL DYKE WALL FOOTING
DOWELS AT EXPANSION JOINT
4'-6" high wall shown, 3'-6 high wall similar, except as noted
Scale A



TYPICAL REINFORCEMENT BENDS

NOTES

1. For general notes and legend see Dwg 4884-3-D27.
2. Dimensions to reinforcement are to ℄ bar unless otherwise shown.
3. Concrete for the walls shall be Class II.
4. Cover to reinforcement shall be 3" unless otherwise shown.

Scale B 1 0 1 2 3FT.

Scale A 1 0 1 2 3 4 5 6 7FT.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO.	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing. APPROVED FOR CONSTRUCTION JUL 23 84	MP	jm		31-10-85
1.	Prepared for Tender (Combined contracts)				5-6-84

REVISIONS

RECOMMENDED PROJECT MANAGER
DATE June 6 1984.
APPROVED DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

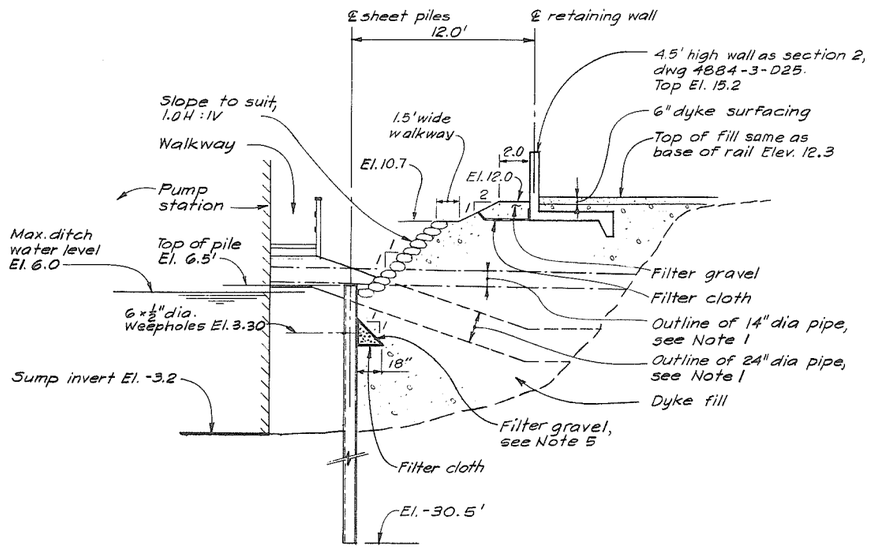
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS

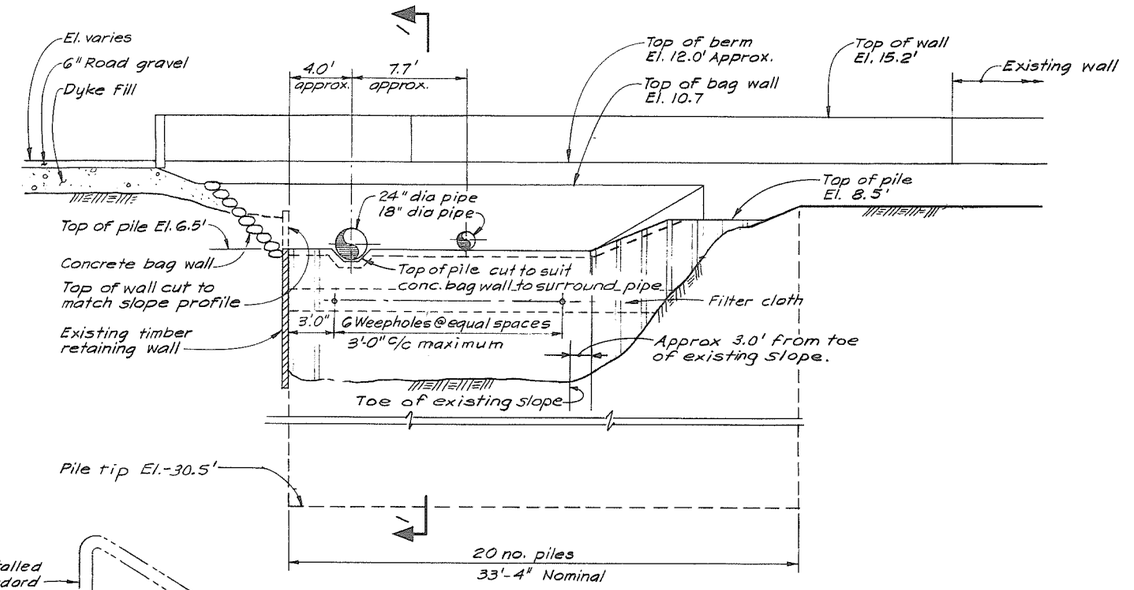
MISCELLANEOUS CONCRETE DETAILS

DESIGNED	NAE	SURVEYED	
DRAWN	FL	DATE	
CHECKED	Cm	FILE NO.	0281550-C12D-3
SCALE	As shown	DATE	10 Feb, 1978.
DWG. NO.	4884-3-D28R2	SHEET	41 OF 43 SHEETS

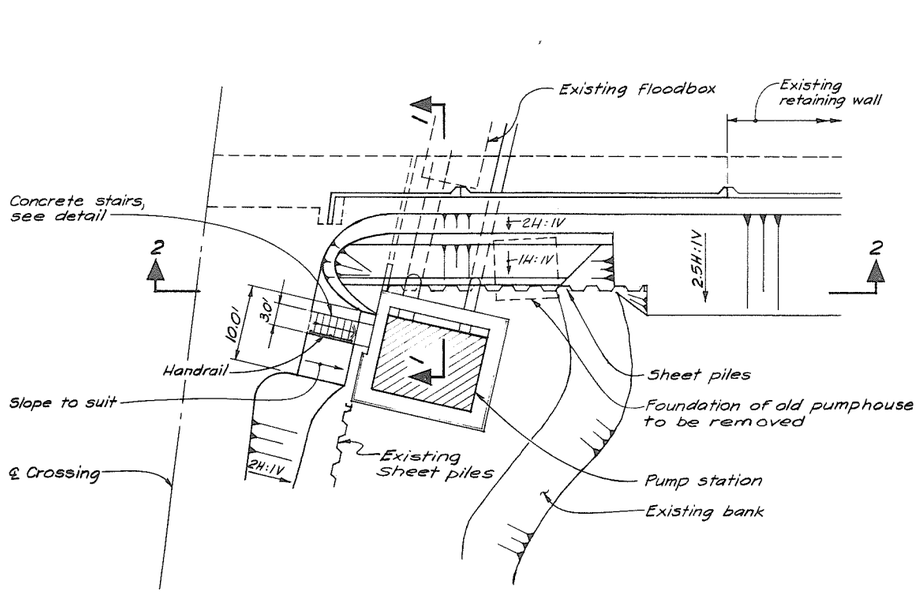
280124



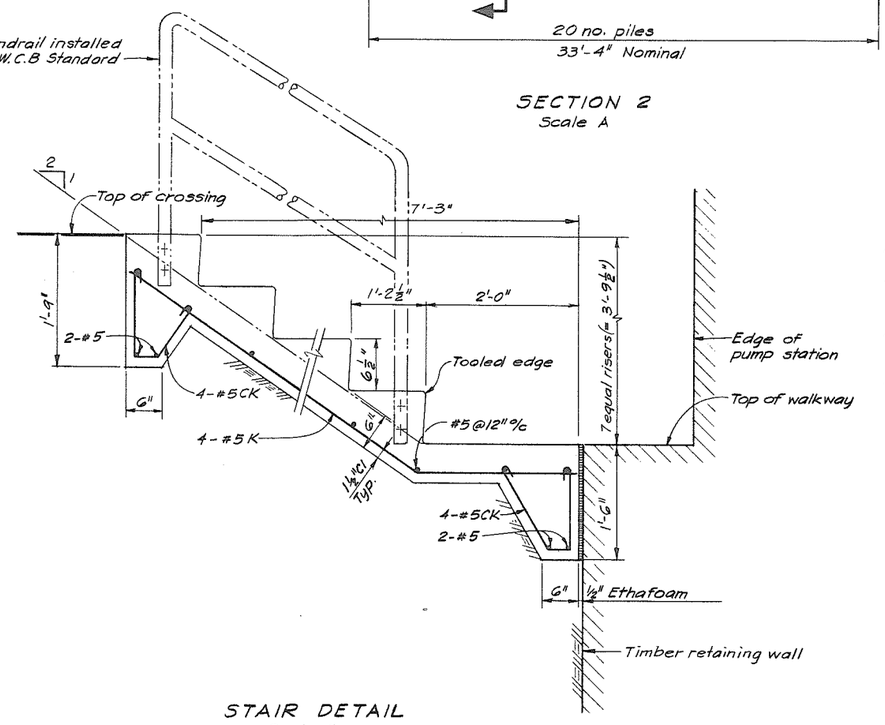
SECTION 1
Scale A



SECTION 2
Scale A



PLAN
For location plan see Dwg 3-D25
Scale B



STAIR DETAIL
Scale C

NOTE

1. Section of discharge pipes temporarily removed for pile driving and replaced.
2. Concrete for the stairs shall be class II.
3. For typical reinforcement bends see Dwg 4884-2-D16.
4. Piles to be Arbed BZ 12.
5. Filter gravel behind weepholes extended continuosly along sheet pile weepholes.

Scale C 1 0 1 2 3 4 Ft
Scale B 10 0 10 20 30 40 Ft
Scale A 5 0 5 10 15 20 Ft

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10407

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO.	DESCRIPTION	BY	CHD	APPR	DATE
3	Record Drawing.	MP	jm		20-11-85
2	Pile tip elevation revised	MAM	CTL	MM	10-8-84
1	Prepared for Tender (Combined Contracts) APPROVED FOR CONSTRUCTION JUL 20 '84		MM	MM	5-6-84

REVISIONS

RECOMMENDED — PROJECT MANAGER
DATE June 6 1984
APPROVED — DIRECTOR, WATER INVESTIGATIONS
DATE Jun 6/84

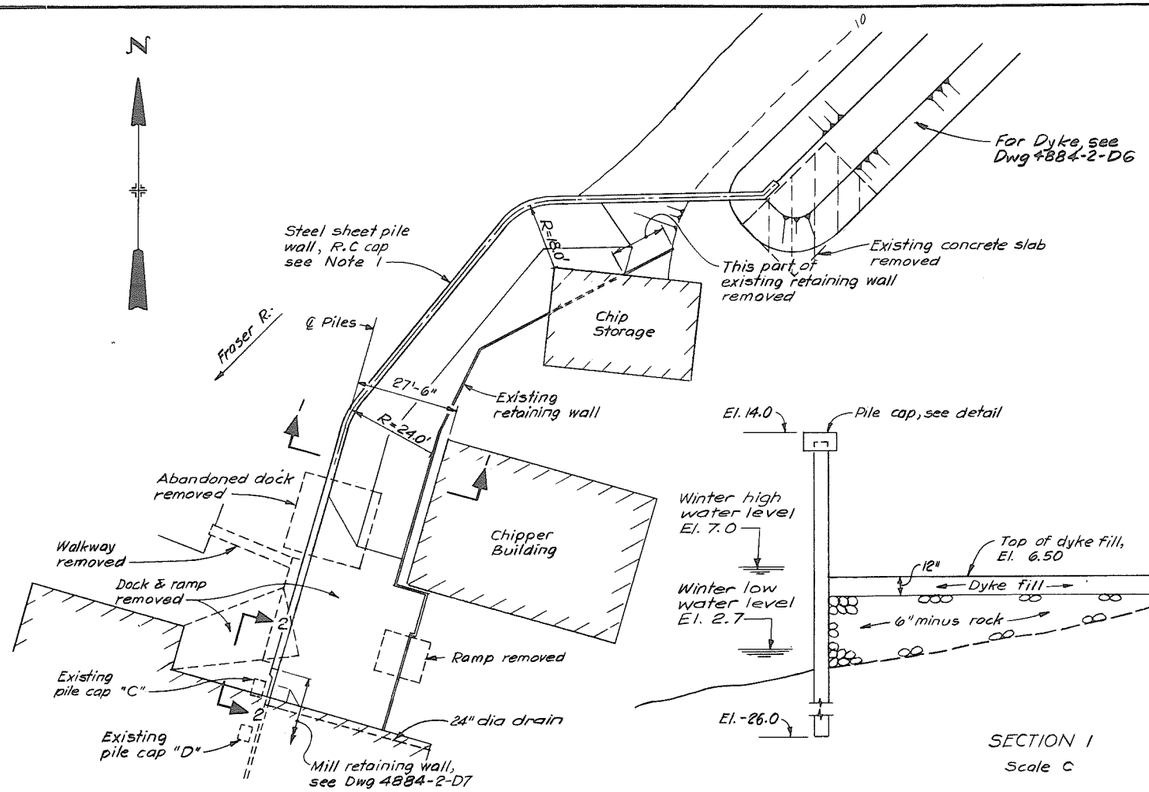
BRITISH COLUMBIA
MINISTRY OF ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO.2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
126A STREET DYKE - SHEET PILE WALL
PLAN, SECTIONS AND DETAIL

DESIGNED DRB	SURVEYED
DRAWN L.S.	DATE
CHECKED CR	FILE NO. 0281550-C12D-3
SCALE As shown	DATE 29 Feb. 1984
DWG. NO. 4884-3-D29 R3	SHEET 42 OF 43 SHEETS

280125

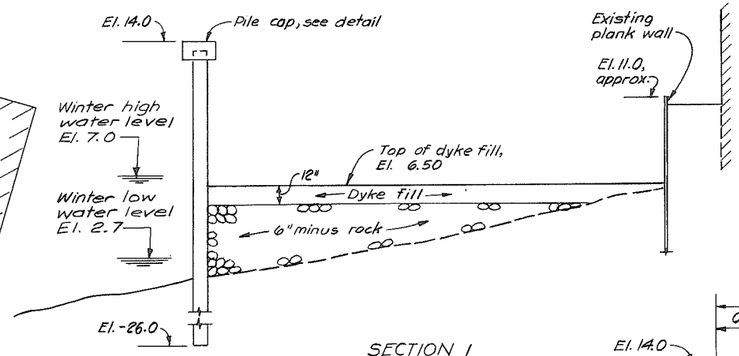
E. WELDWOOD SHEETPILE WALL



PLAN

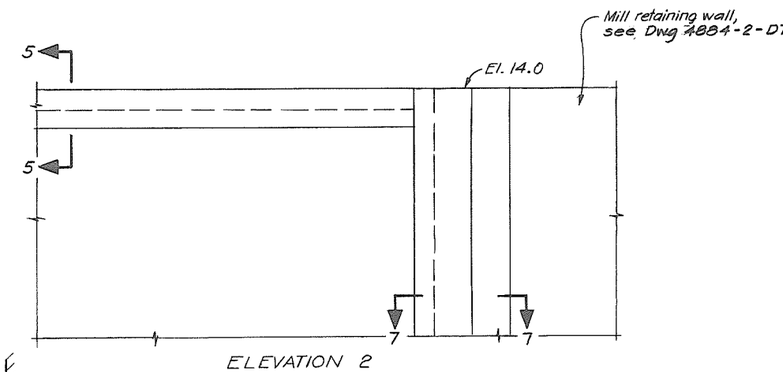
Continuation from Dwg 4884-2-D7

Scale E



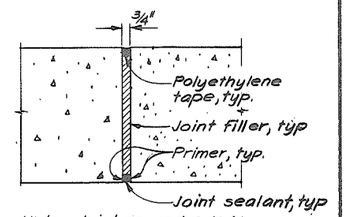
SECTION 1

Scale C



ELEVATION 2

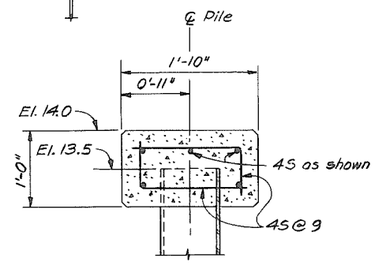
Scale B



Note: Joint spaced @ 10.0' intervals.

DETAIL OF PILE CAP JOINT

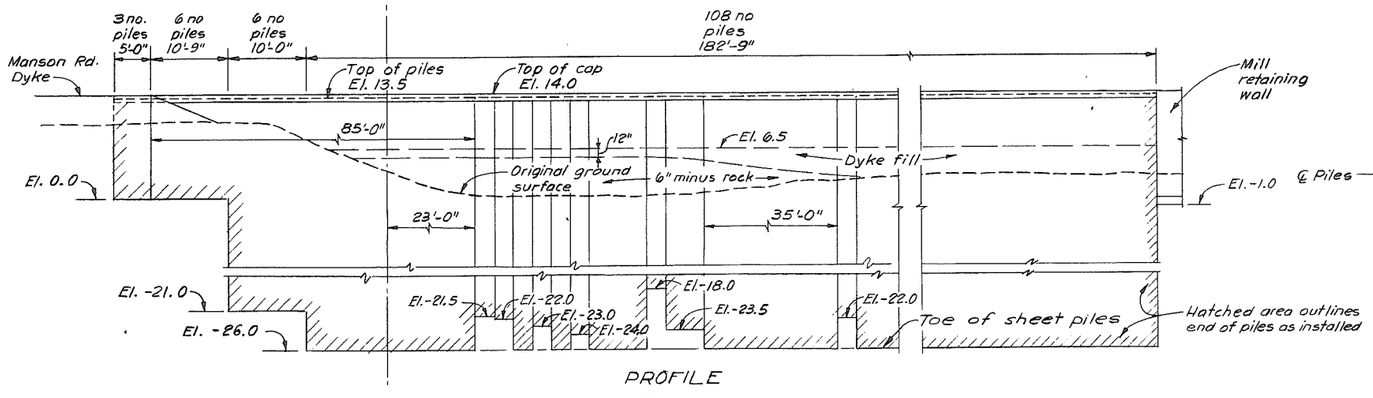
Scale A



SECTION 5

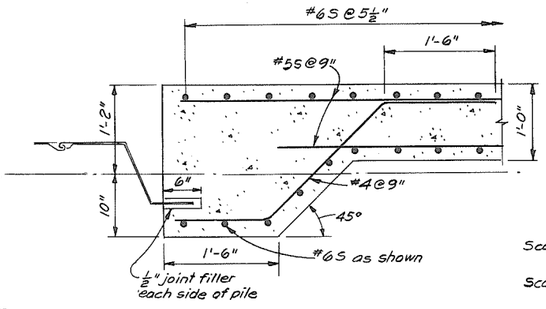
Typical section of pile cap

Scale A



PROFILE

Scale D



SECTION 7

Detail of joint at Mill retaining wall / Sheet pile wall

Scale A

NOTES

1 Piles to be Arbed BZ 12 or equivalent.

Scale E 20 0 20 40 60 80 100 FT.

Scale D 10 0 10 20 30 40 50 FT.

Scale C 5 0 5 10 15 20 FT.

Scale B 1 0 1 2 3 4 5 6 7 8 9 10 FT.

Scale A 1 0 1 2 3 4 5 FT.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. MERLO

CRIPPEN ENGINEERING LTD.
NORTH. VANCOUVER, B.C.
PROJECT NO. 10407

DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

REVISIONS

NO	DESCRIPTION	BY	CHD	APPR	DATE
4.	Record Drawing	MP			30-9-85
3.	Mill retaining wall extended & 2 piles deleted.	MP	FRB	Jm	12-10-84
2.	Pile tip elevations revised	MP	CRL		10-8-84
1.	Prepared for Tender (Combined Contracts)				5-6-84

APPROVED FOR CONSTRUCTION

RECOMMENDED PROJECT MANAGER
DATE June 6 1984

APPROVED DIRECTOR, WATER INVESTIGATIONS
DATE Jun 6/84

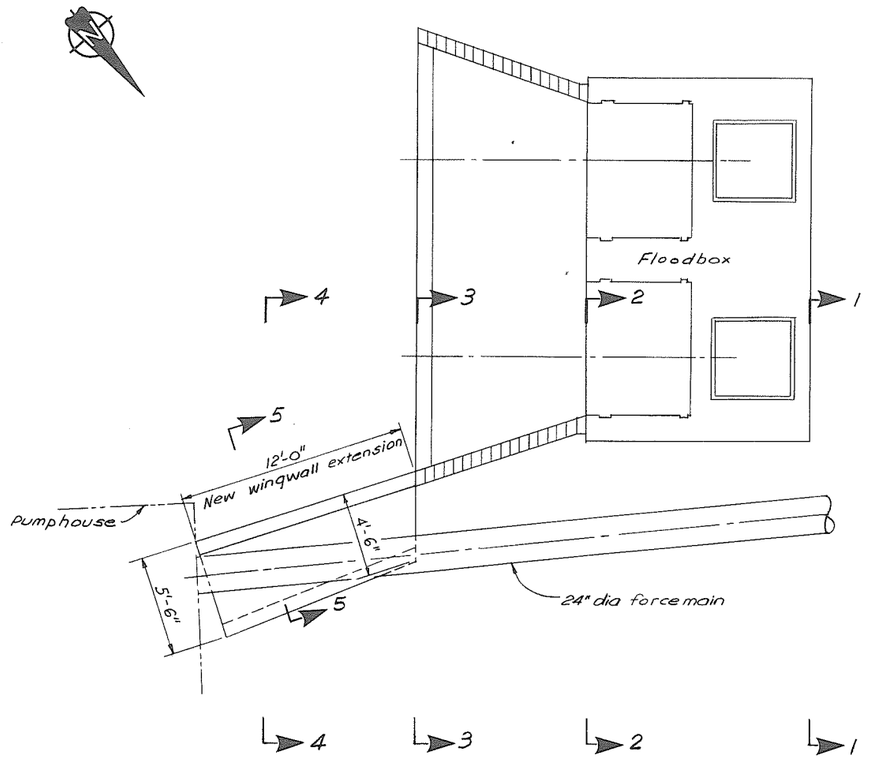
BRITISH COLUMBIA
MINISTRY OF ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2

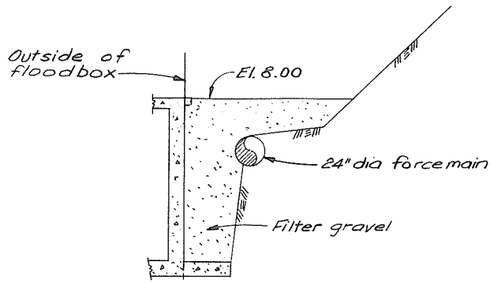
SOUTH WESTMINSTER FLOOD CONTROL WORKS
WELDWOOD SHEET PILE WALL
GENERAL ARRANGEMENT AND DETAILS

DESIGNED	FRB	SURVEYED	
DRAWN	M.P.	DATE	
CHECKED	CRL	FILE NO.	0281550-C12D-2
SCALE	As shown	DATE	29 Feb. 1984
DWG. NO.	4884-3-D30R4	SHEET	43 OF 43 SHEETS

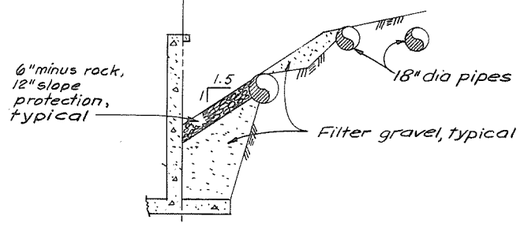
280126



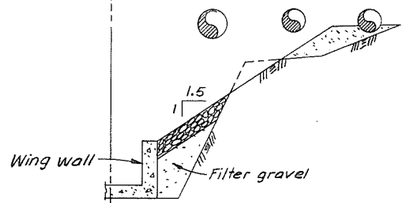
PLAN
Scale: $\frac{1}{4}$"=1'-0"
Backfill not shown



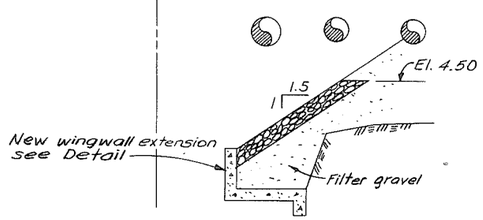
SECTION 1



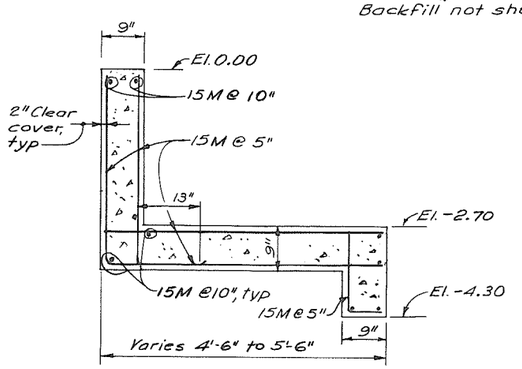
SECTION 2



SECTION 3



SECTION 4
Scale 1"=5'-0"



SECTION 5
Scale $\frac{3}{4}$"=1'-0"

NOTE

1. Reference Drawings Nos. 4884-3-D9 to D14.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA J. B. MILL ENG. NEW

CRIPPEN ENGINEERING LTD.
PROJECT NO. 1040
DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER pp John S. Mill...

NO.	DESCRIPTION	BY	CHD	APPR	DATE
1	Record Drawing	MHW	jm		28-11-85

REVISIONS

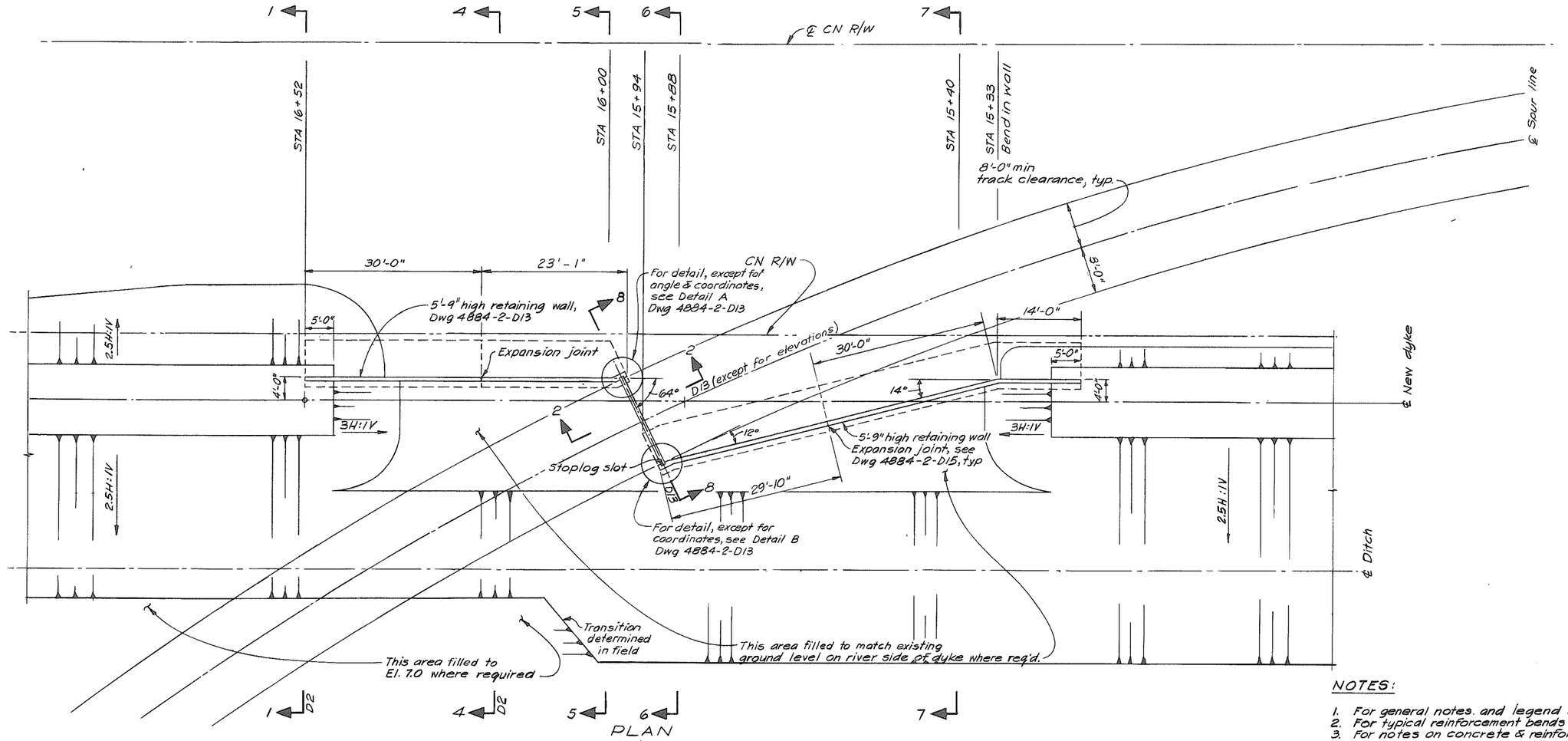
RECOMMENDED John S. Mill... PROJECT MANAGER
DATE 12 August 1985
APPROVED for DIRECTOR, WATER INVESTIGATIONS
DATE 15 August 1985

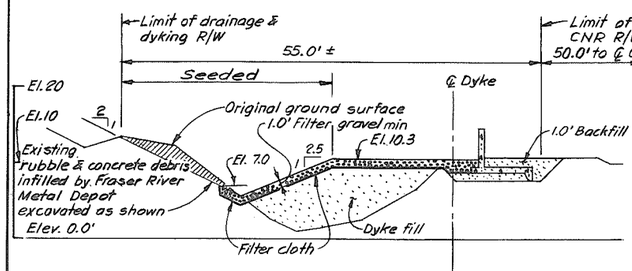
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
PATTULLO FLOODBOX
WINGWALL EXTENSION

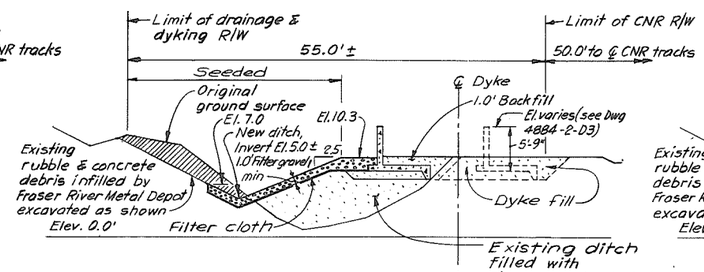
DESIGNED	J.B.M.	SURVEYED	
DRAWN	M.H.W.	DATE	
CHECKED	CTL/AGC	FILE NO.	
SCALE	As shown	DATE	
DWG. NO.	4884-2-D34 R1	SHEET ... OF ... SHEETS	

280084

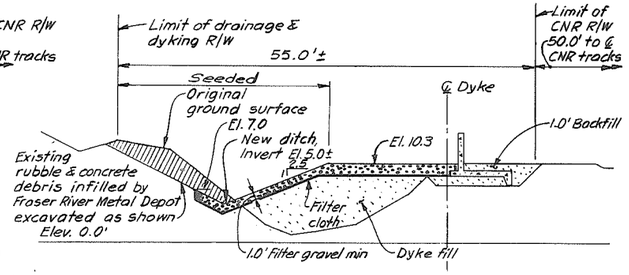




SECTION 5
STA 16+00
Scale 1"=10'



SECTION 6
STA 15+88
Scale 1"=10'



SECTION 7
STA 15+40
Scale 1"=10'

NOTES:

1. For general notes and legend see Dwg 4884-2-D3.
2. For typical reinforcement bends see Dwg 4884-2-D16.
3. For notes on concrete & reinforcement see Dwg 4884-2-D15.
4. For note on design see Dwg 4884-2-D12.
5. For typical detail of dyke wall excavation and structural Fill payment lines see Dwg 4884-2-D12.
6. For concrete wall elevations and connections to dyke see Dwg 2-D3.

CRIPPEN ENGINEERING LTD.
PROJECT NO. 1040
DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

NO	DESCRIPTION	BY	CHD	APPR	DATE
1	Record Drawing	MHW			28-11-85

REVISIONS

RECOMMENDED John B. Linton PROJECT MANAGER
DATE 4 April 1985
APPROVED for DIRECTOR, WATER INVESTIGATIONS
DATE 12 April 1985

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
OPENING FOR C.N.R. SPUR LINE TO
FRASER RIVER METALS DEPOT

DESIGNED P.R.B.	SURVEYED
DRAWN L.S., MP	DATE
CHECKED CTL, RSS	FILE NO. 0281550-C12D-2
SCALE As shown	DATE
DWG. NO. 4884-2-D33R1	SHEET OF SHEETS

280083

APPENDIX I

CONCRETE TEST RESULTS

CONCRETE TEST RESULTS
For Class II - 21 MPa Concrete
In Concrete Dyke Walls

Test No.	Date Cast	Location	Air	Slump	7 day Strength	28 day Strength	Remarks
			%	mm	MPa	MPa	
3	24 Oct 84	Dyke footings (2+80 to 3+30) (3+80 to 4+30), (4+80 to 5+30), (5+80 to 6+30), (6+80 to 7+30), (7+80 to 8+30), (8+80 to 9+20) and (9+60 to 10+00) (Between Pattullo Floodbox and Old Yale Road Crossing)	5.0	70	21.5	28.8	
4	25 Oct 84	Dyke wall footing between Pattullo Floodbox and Old Yale Road Crossing (2+30 to 2+80), (3+30 to 3+80), (4+30 to 4+80), (5+30 to 5+80), (6+30 to 6+80), (7+30 to 7+80), (8+30 to 8+80) and (9+20 to 9+60)	4.0	75	21.5	30.1	
6	2 Nov 84	Dyke wall between Pattullo and Old Yale Road Crossing Wall sections (5+80 to 6+30), (6+80 to 7+30), (7+80 to 8+30), (8+80 to 9+20) and (9+60 to 10+00)	5.0	75	21.8	28.4	
7	8 Nov 84	Dyke wall between Pattullo Floodbox and Old Yale Road Crossing Wall sections (2+80 to 3+30), (3+80 to 4+30), (4+80 to 5+30), (7+30 to 7+80), (8+30 to 8+80) and (9+20 to 9+60)	5.1	100	20.8	27.5	
9	16 Nov 84	Dyke wall between Pattullo and Old Yale Road Crossing	-	130	-	-	Concrete rejected (see test 9A)

CONCRETE TEST RESULTS

Concrete Dyke Walls - (Cont'd)

Test No.	Date Cast	Location	Air	Slump	7 day Strength	28 day Strength	Remarks
			%	mm	MPa	MPa	
9A	16 Nov 84	Dyke wall between Pattullo Floodbox and Old Yale Road Crossing Wall Sections (2+30 to 2+80), (3+30 to 3+80), (4+30 to 4+80), (5+30 to 5+80) and (6+30 to 6+80)	-	65	20.7	26.95	
12	29 Jan 85	Manson Road Dyke Footings sections	4.9	80	23.2	32.15	
13	14 Feb 85	Manson Road Dyke Wall sections	4.8	90	20.0	25.4	
14	20 Feb 85	124th Street Dyke Wall section	4.0	60	22.1	27.0	
15	14 May 85	126A Street Dyke Footing sections 2 x 35' long	6.0	60	-	24.8	2 cylinders damaged by vandals
16	16 May 85	126A Steet Dyke Walls sections 2 x 35' long	5.7	70	17.6	23.85	
17	17 May 85	126A street Crossing Footing	5.5	70	17.3	24.35	
18	24 May 85	Dyke wall between Pattullo Floodbox and Old Yale Road Crossing Footing Station 10+00 to 10+31.79	4.5	50	21.0	26.55	

CONCRETE TEST RESULTS

Concrete Dyke Walls - (Cont'd)

Test No.	Date Cast	Location	Air	Slump	7 day Strength	28 day Strength	Remarks
			%	mm	MPa	MPa	
19	28 May 85	Retaining wall for proposed CNR Spurline into Fraser River Metals Depot Wall section (15+19 to 15+63) and (16+22 to 16+52) retaining wall footing at CNR Spurline between Station 22+24 and 23+83.8 Station 23+21 to 23+53.8	3.7	50	22.0	29.85	
20	29 May 85	5'9" high retaining walls at spurlines Wall section (15+98.9 to 16+22) footing sections (22+70.5 to 23+14.1)	3.9	100	17.8	24.55	
21	31 May 85	Retaining wall footing sections at (22+24 to 22+70.5) and (23+53.8 to 23+83.8) Wall sections (15+98.9 to 16+22) and (22+70.5 to 23+14.1)	5.8	60	18.1	26.2	
22	3 June 85	Old Yale Road Crossing footing	5.5	80	16.9	23.7	
23	5 June 85	Capilano Timber Crossing footing Wall 10+00 to 10+31.79	5.5	50	22.6	29.25	

CONCRETE TEST RESULTS

Concrete Dyke Walls - (Cont'd)

Test No.	Date Cast	Location	Air	Slump	7 day Strength	28 day Strength	Remarks
			%	mm	MPa	MPa	
24	6 June 85	Old Yale Road Crossing Walls	5.7	70	18.3	25.05	
25	10 June 85	Capilano Timber Crossing Walls	6.1	40	20.7	28.4	
26	13 June 85	Dyke between Pattullo Floodbox and Old Yale Road Footing section (1+80 to 2+30)	-	-	17.2	23.35	Slump & Air not tested
30	12 July 85	Dyke between Pattullo Floodbox and Old Yale Road Wall section (1+80 to 2+30)	5.5	50	23.9	30.75	Class 1 28 MPa concrete placed
31	24 July 85	Dyke wall between Old Yale Road and Capilano Timber Crossing - Footing section close to Old Yale Road	5.5	85	22.7	29.65	Class 1 28 MPa concrete placed
38	28 Aug 85	Retaining wall through Weldwood Mill Footing El -2.0' to -1.0'	-	45	25.1	32.15	Air not tested
41	4 Sept 85	Retaining wall through Weldwood Mill Wall section from El -1.0' to +7.3'	3.5	65	25.1	34.55	
42	17 Sept 85	Retaining wall through Weldwood Mill Wall section from El +7.3' to +14.0' Footing dyke wall either side of Other Ramp west of Weldwood Mill	3.3	40	20.6	32.05	

CONCRETE TEST RESULTS

Concrete Dyke Walls - (Cont'd)

Test No.	Date Cast	Location	Air	Slump	7 day Strength	28 day Strength	Remarks
			%	mm	MPa	MPa	
43	20 Sept 85	Dyke wall west of Weldwood Mill Footing west of Railway Ramp Walls either side of Wharf Ramp	5.0	30	24.6	31.95	
44	20 Sept 85	Dyke wall west of Pattullo Floodbox footing 0+80 to 1+30 Dyke wall east of Pattullo Floodbox (0+20 to 0+30)	4.5	40	23.9	32.75	
45	8 Oct 85	Retaining wall through Weldwood Mill Footing at west end from elevation -2.0' to -1.0'	-	85	24.3	31.9	Air not tested
46	8 Oct 85	Dyke wall west of Pattulo Floodbox Footing (0+30 to 0+80)	-	65	21.6	30.75	Air not tested
47	11 Oct 85	Retaining wall through Weldwood Mill Wall section at west end from El -1.0' to El +7.3' Wall dyke wall west of Railway Ramp	-	80	21.1	29.7	Air not tested
48	11 Oct 85	Dyke wall west of Pattullo Floodbox Wall section (0+30 to 0+80)	-	75	23.7	32.3	Air not tested
49	29 Oct 85	Dyke wall west of Weldwood Mill Footing west of Mill Wall east of Railway Ramp	-	65	25.1	37.15	Air not tested

CONCRETE TEST RESULTS

Concrete Dyke Walls - (Cont'd)

Test No.	Date Cast	Location	Air	Slump	7 day Strength	28 day Strength	Remarks
			%	mm	MPa	MPa	
50	31 Oct 85	Dyke wall west of Weldwood Mill Wall west of Mill El +8.83 to +14.0'	5.9	90	20.5	30.3	

CONCRETE TEST RESULTS

For Class 1 - 28 MPa Concrete

In 124th Street Floodbox

Test No.	Date Cast	Location	Air	Slump	7 day Strength	28 day Strength	Remarks
			%	mm	MPa	MPa	
5	2 Nov 85	Base slab for Outlet Structure	5.2	60	25.6	33.7	
8	9 Nov 85	Base slab for Inlet Structure and apron slab.	-	85	14.8	28.55	Air not tested
10	22 Nov 85	Inlet Structure walls	3.0	80	22.9	31.45	
11	22 Nov 85	Outlet Structure walls	3.5	65	23.7	31.15	

CONCRETE TEST RESULTS

For Class 1 - 28 MPa Concrete

In Pattullo Floodbox

Test No.	Date Cast	Location	Air	Slump	7 day Strength	28 day Strength	Remarks
			%	mm	MPa	MPa	
27	21 June 85	Base slab for Outlet Structure and apron slab at outlet	5.0	100	22.4	27.75	
28	11 July 85	Walls for Outlet Structure	4.3	75	24.5	31.6	
29	11 July 85	Base slab for Inlet Structure and apron slab at Inlet	4.5	70	22.8	32.1	
31	24 July 85	Walls for Inlet Structure	5.5	85	22.7	29.65	

CONCRETE TEST RESULTS

For Class 1 - 28 MPa Concrete

In Manson Floodbox

Test No.	Date Cast	Location	Air	Slump	7 day Strength	28 day Strength	Remarks
			%	mm	MPa	MPa	
32	6 Aug 85	Base slab for Outlet Structure and alternate base slabs for conduit sections. Also inlet apron slab.	4.9	60	24.6	31.35	
33	6 Aug 85	Base slab for Outlet Structure and alternate base slabs for conduit sections. Also inlet apron slab.	4.8	65	24.8	30.6	
34	8 Aug 85	Base slab for Inlet Structure and alternate base slabs for conduit sections. Also outlet apron slab.	4.7	60	26.3	32.85	
35	8 Aug 85	Base slab for Inlet Structure and alternate base slabs for conduit sections. Also outlet apron slab.	5.1	70	25.9	35.75	
36	21 Aug 85	Walls and suspended roof slab for Inlet Structure and alternate conduit sections.	6.0	70	27.2	31.6	
37	21 Aug 85	Walls and suspended roof slab for Inlet Structure and alternate conduit sections.	5.9	65	29.3	34.35	
39	3 Sept 85	Walls and suspended roof slab for Outlet Structure and alternate conduit sections	5.5	60	27.6	33.3	

CONCRETE TEST RESULTS

Manson Floodbox - (Cont'd)

Test No.	Date Cast	Location	Air	Slump	7 day Strength	28 day Strength	Remarks
			%	mm	MPa	MPa	
40	3 Sept 85	Walls and suspended roof slab for Outlet Structure and alternate conduit sections	5.3	40	24.6	30.7	

APPENDIX 2

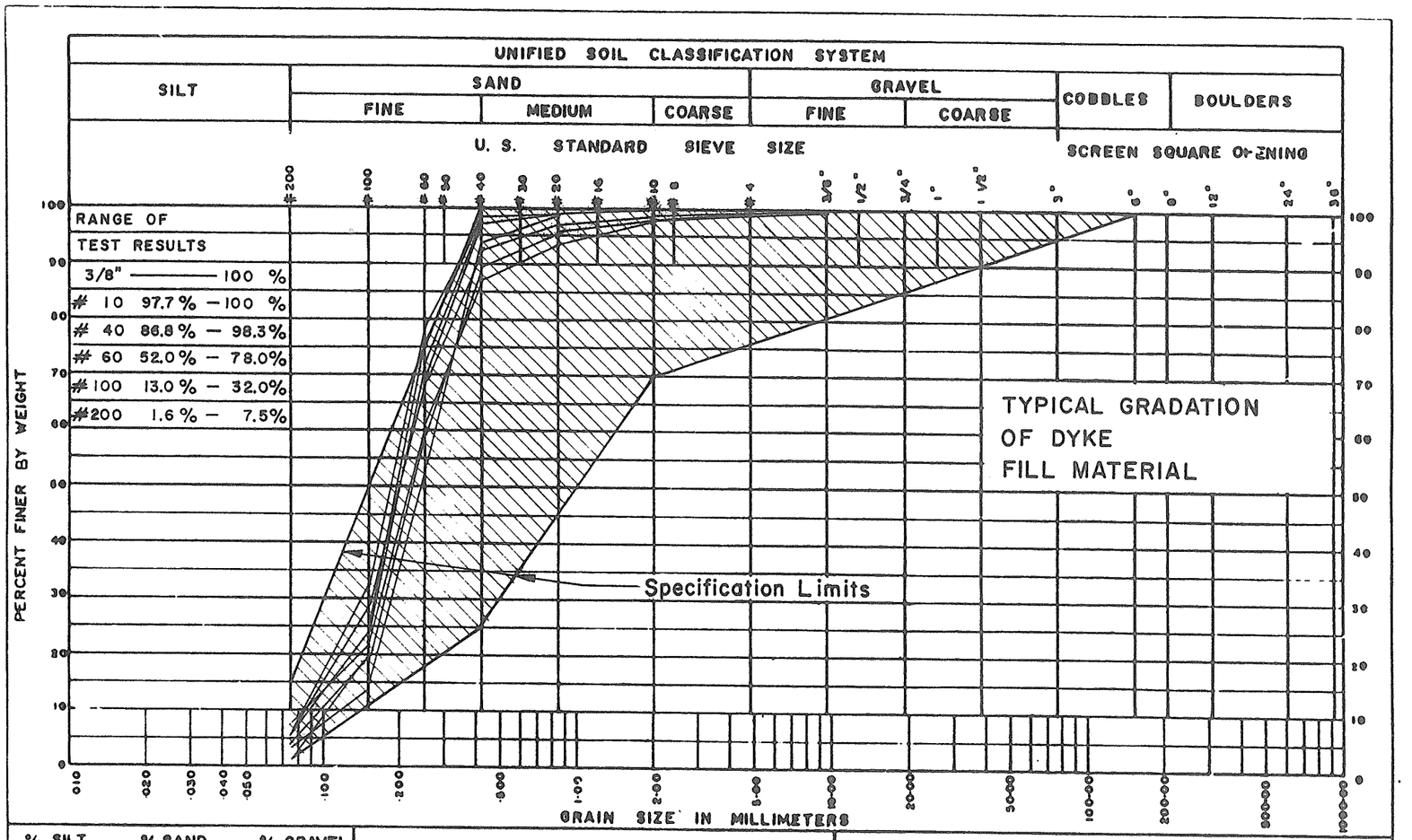
DYKE MATERIALS

APPENDIX 2

DYKE MATERIALS

APPENDIX 2

DYKE MATERIALS - CONTRACT NO. 2



% SILT % SAND % GRAVEL

% COBBLES % BOULDERS

REMARKS

CRIPPEN CONSULTANTS

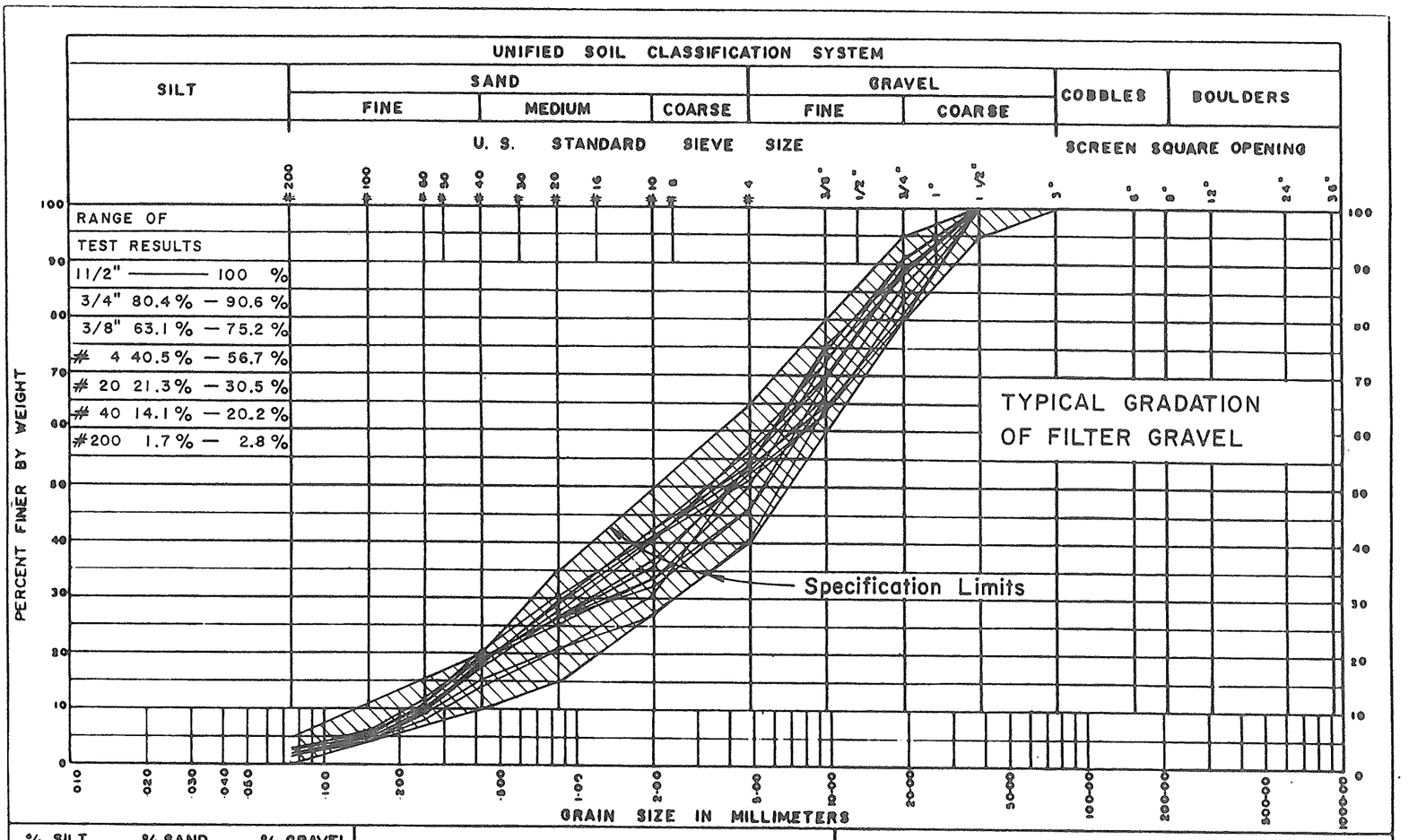
GRAIN SIZE DISTRIBUTION

PROJECT SOUTH WESTMINSTER DYKE AND FLOODBOX CONSTRUCTION CONTRACT NO. 2

MATERIAL DYKE FILL

TESTED BY A.S./R.H. DATE Aug 1984 / Nov 1985

FIG 21



% SILT ____ % SAND ____ % GRAVEL ____

% COBBLES ____ % BOULDERS ____

REMARKS ____

CRIPPEN CONSULTANTS

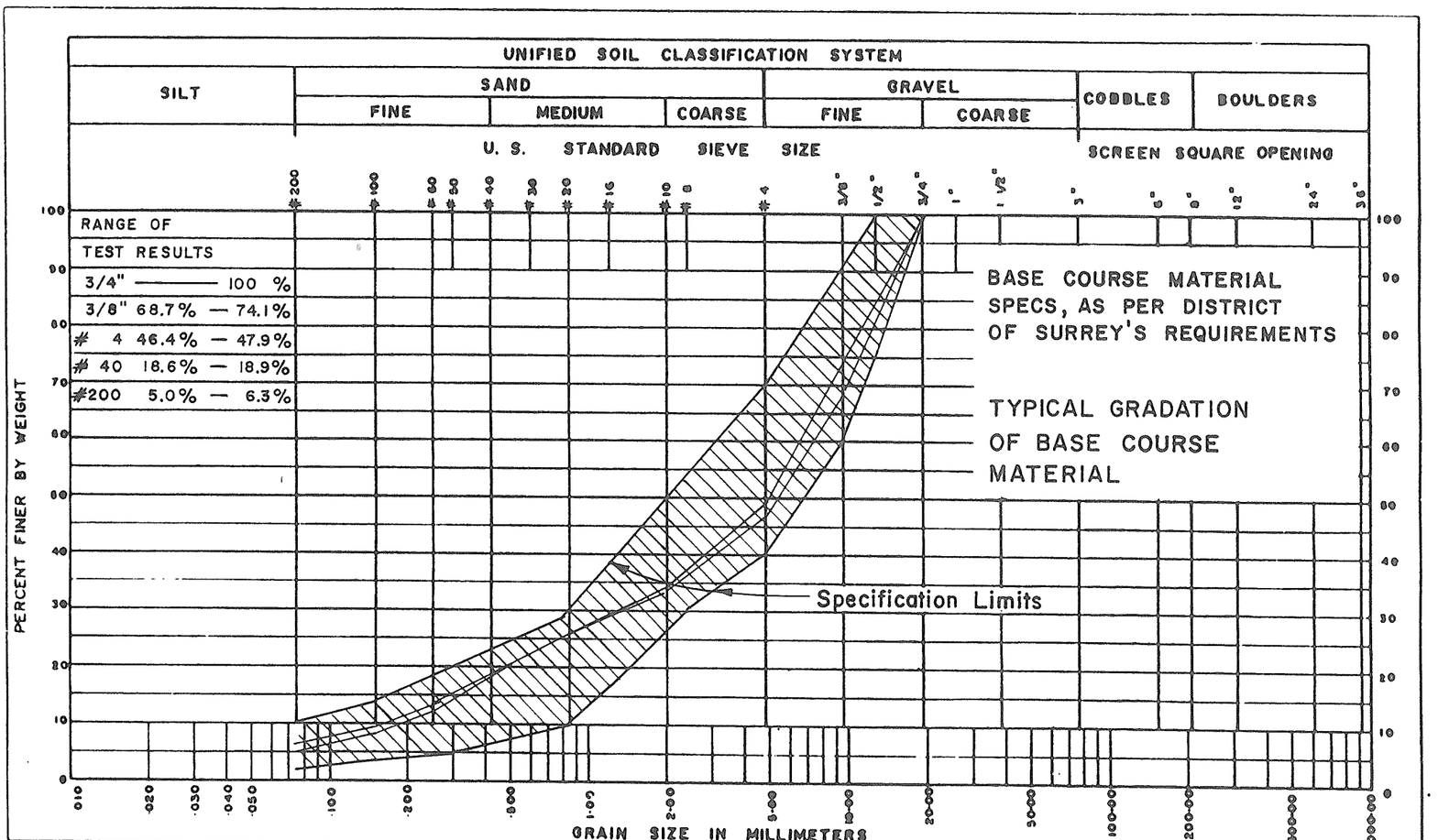
GRAIN SIZE DISTRIBUTION

PROJECT SOUTH WESTMINSTER DYKE AND FLOODBOX CONSTRUCTION CONTRACT NO. 2

MATERIAL FILTER GRAVEL

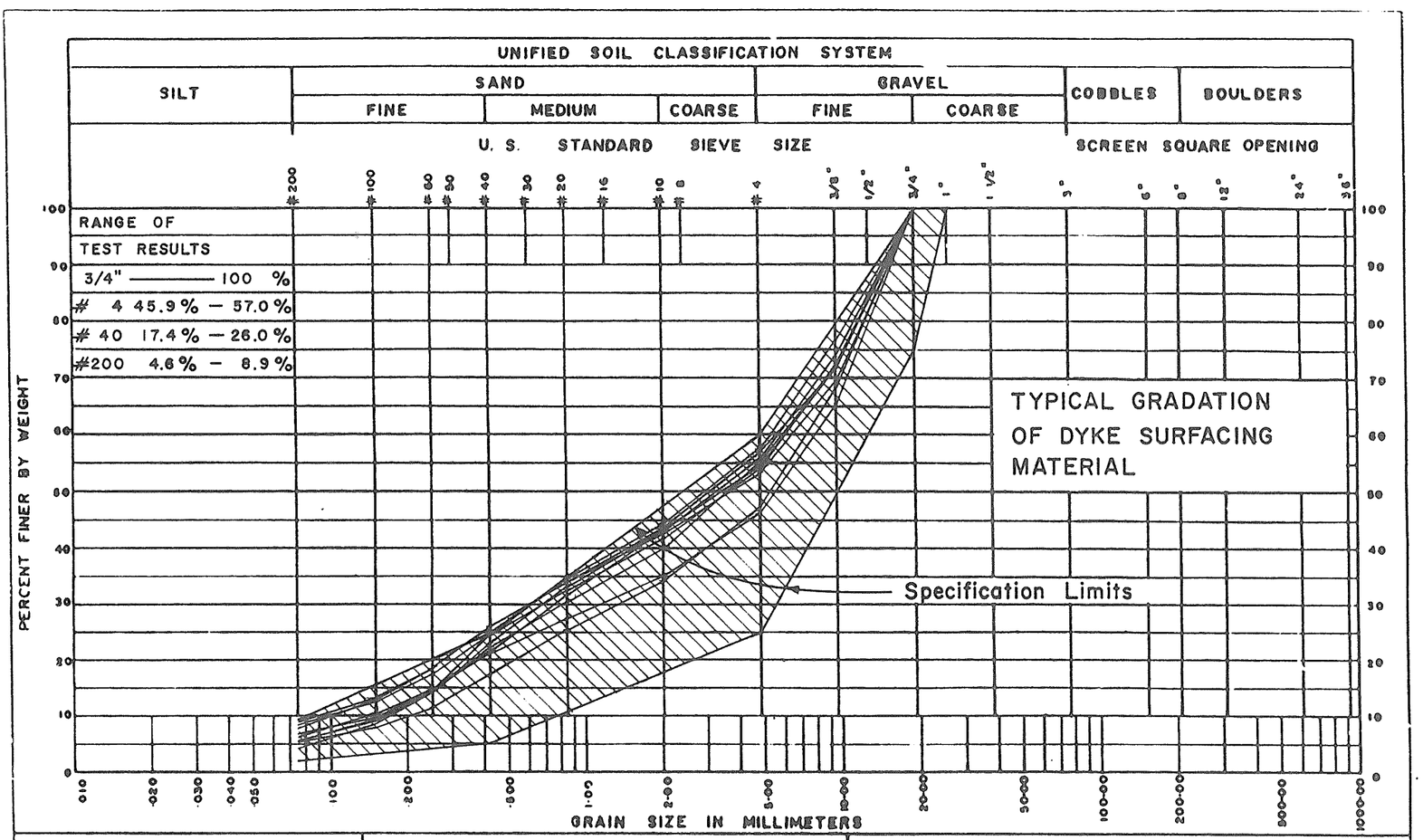
TESTED BY A.S./R.H. DATE Aug 1984 / Nov 1985

FIG. 2.2



% SILT ____ % SAND ____ % GRAVEL ____ % COBBLES ____ % BOULDERS ____ REMARKS ____	CRIPPEN CONSULTANTS GRAIN SIZE DISTRIBUTION	PROJECT SOUTH WESTMINSTER DYKE AND FLOODBOX CONSTRUCTION CONTRACT NO. 2 MATERIAL BASE COURSE TESTED BY R.H. DATE June 1985

FIG. 2.3



% SILT % SAND % GRAVEL

% COBBLES % BOULDERS

REMARKS

CRIPPEN CONSULTANTS

GRAIN SIZE DISTRIBUTION

PROJECT SOUTH WESTMINSTER DYKE AND FLOODBOX CONSTRUCTION CONTRACT NO. 2

MATERIAL DYKE SURFACING

TESTED BY R.H. DATE Nov 1984/Nov 1985

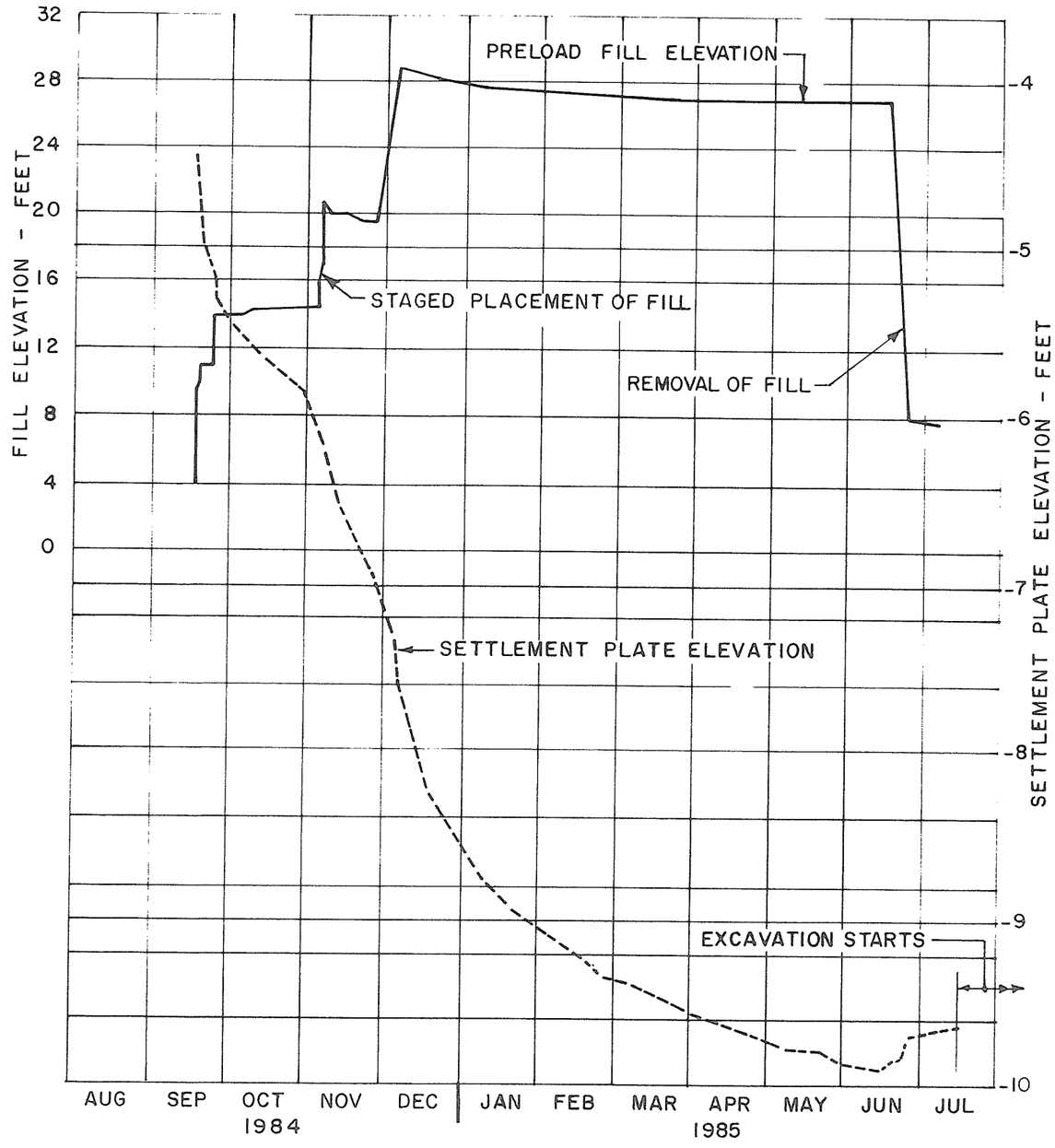
FIG. 2.4

APPENDIX 3

INSTRUMENTATION

APPENDIX 3

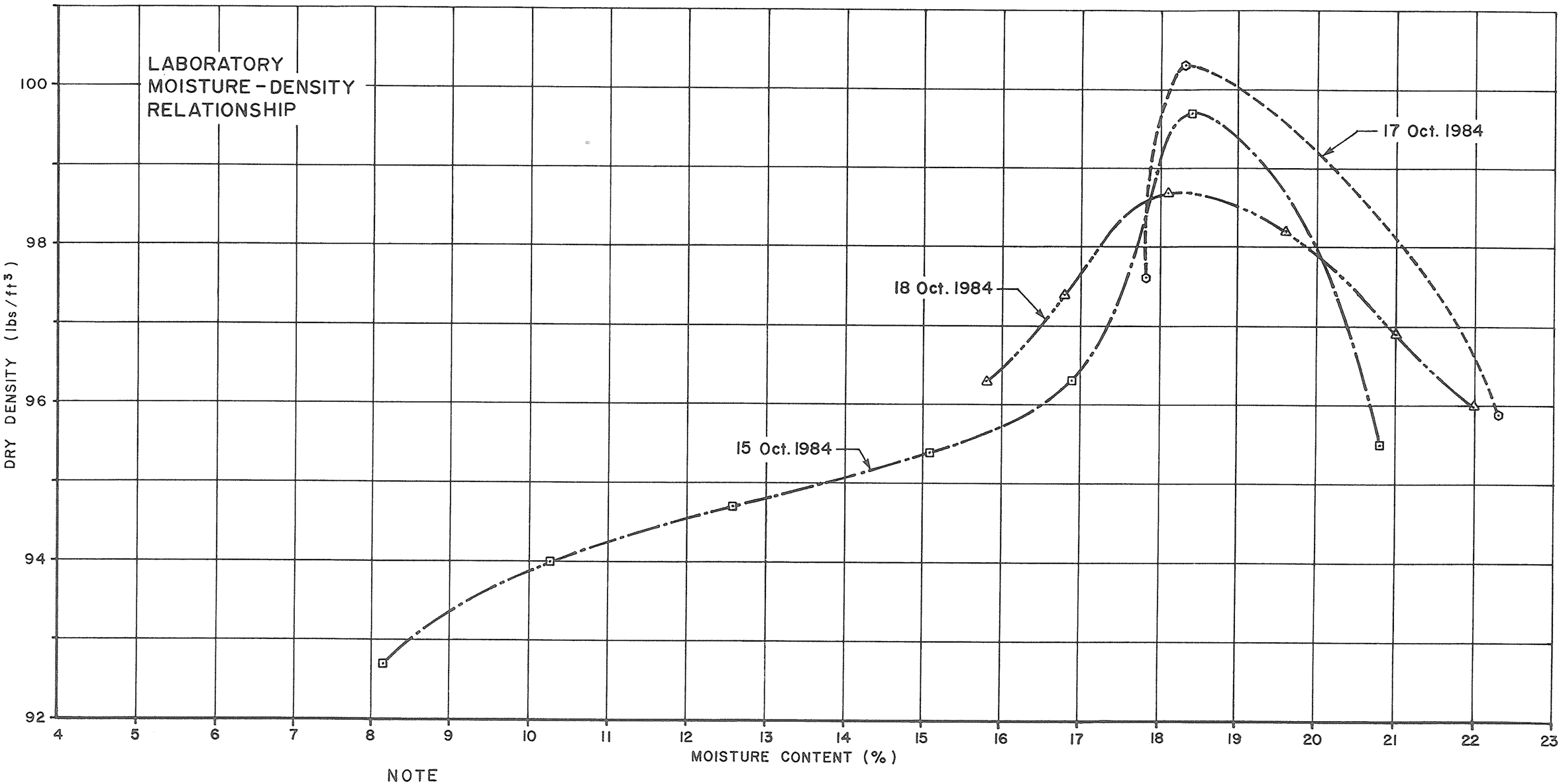
INSTRUMENTATION - CONTRACT NO. 2



SETTLEMENT PLATE NO.6 - Typical

MANSON ROAD
PRELOAD FILL-SETTLEMENT
FIG. 3.1

DYKE FILL MATERIAL - CONTRACT 2

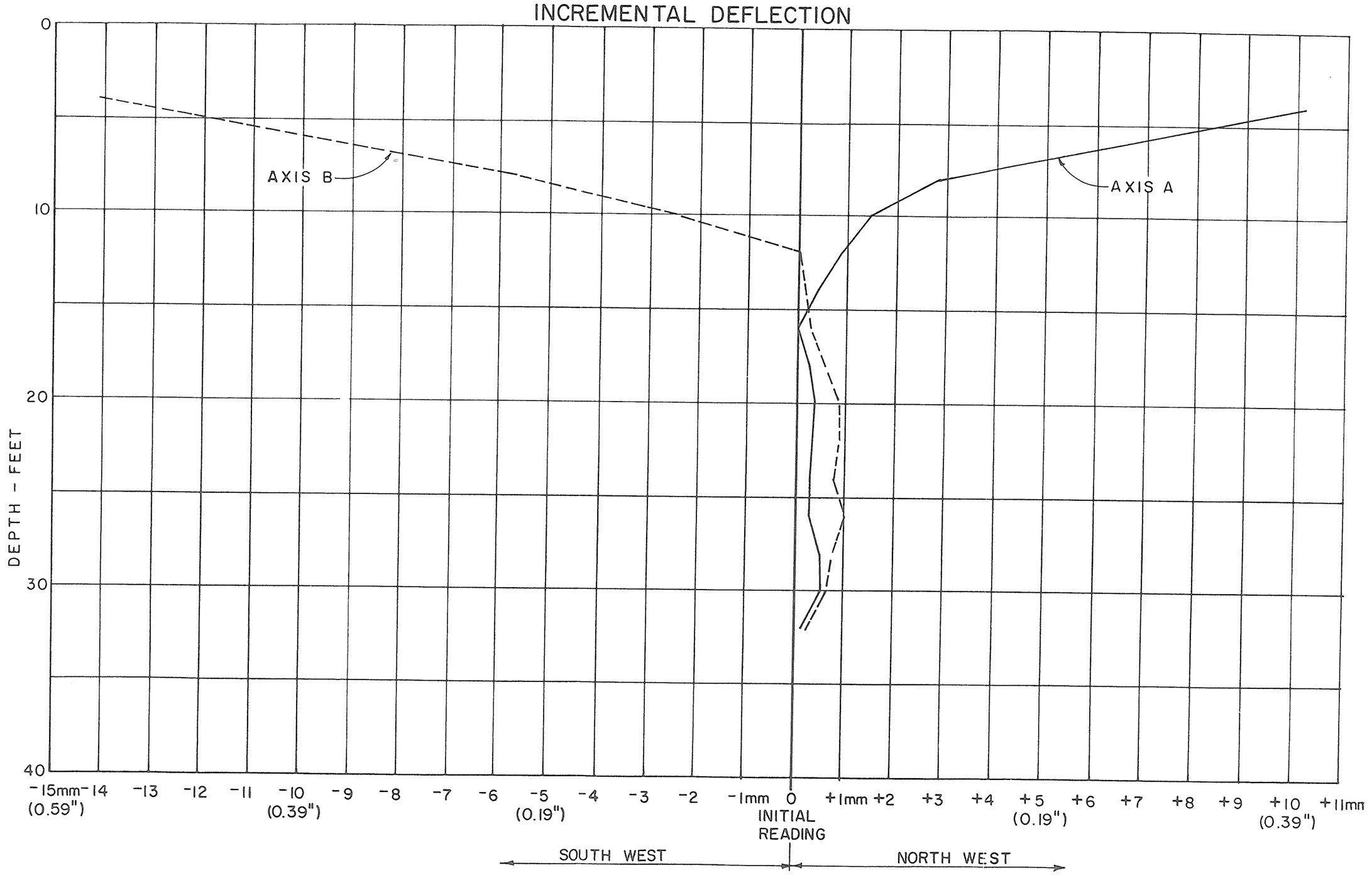


NOTE

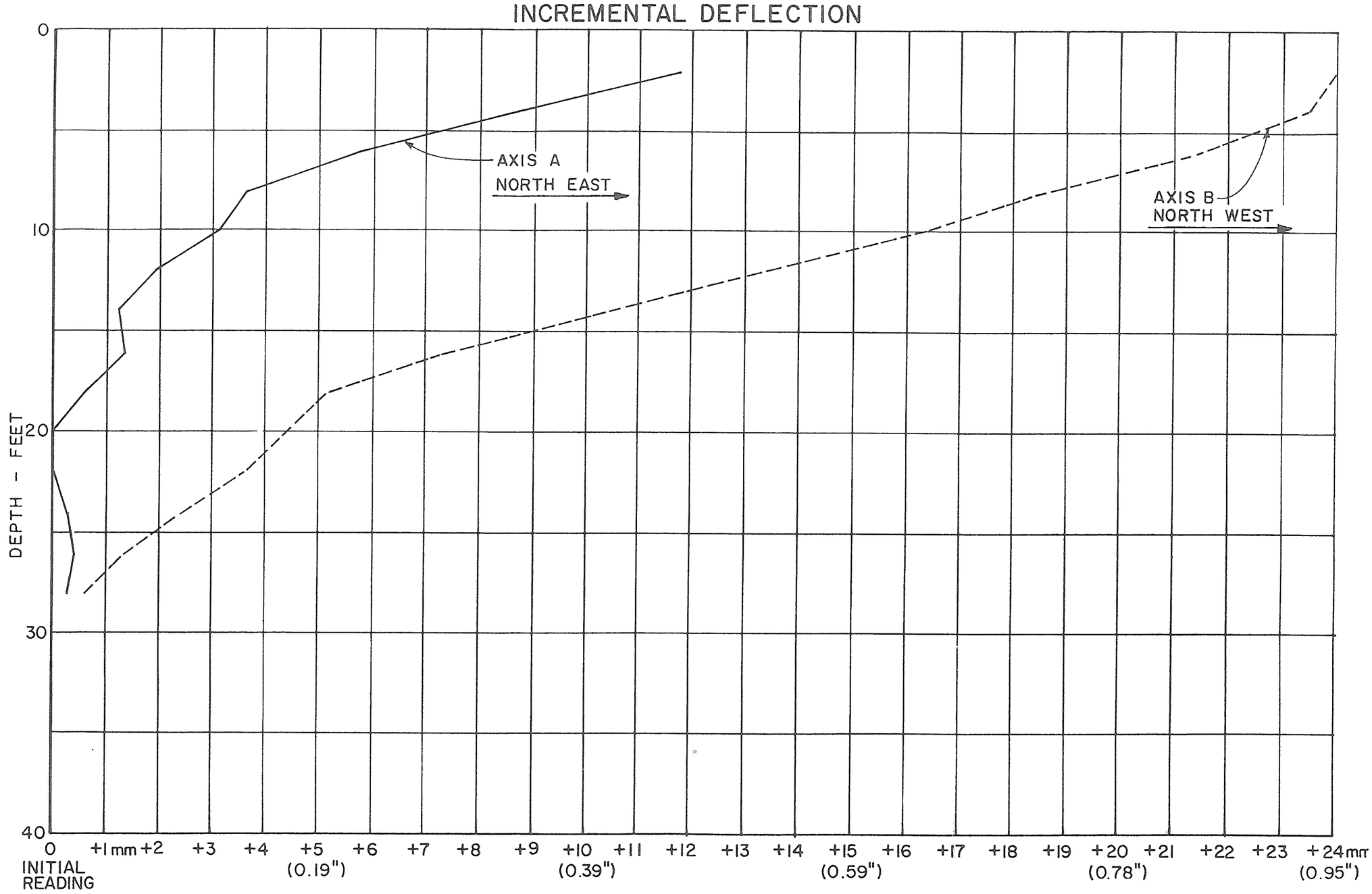
LABORATORY TEST RESULTS UNRELIABLE AT HIGHER MOISTURE CONTENTS DUE TO LEAKAGE OF WATER FROM SAMPLE.

MAXIMUM DRY DENSITY ESTIMATED FROM LOWER PORTION OF CURVES AND FROM FIELD COMPARISON TESTS OF COMPACTION VS NUMBER OF ROLLER PASSES.

FIG. 3.2



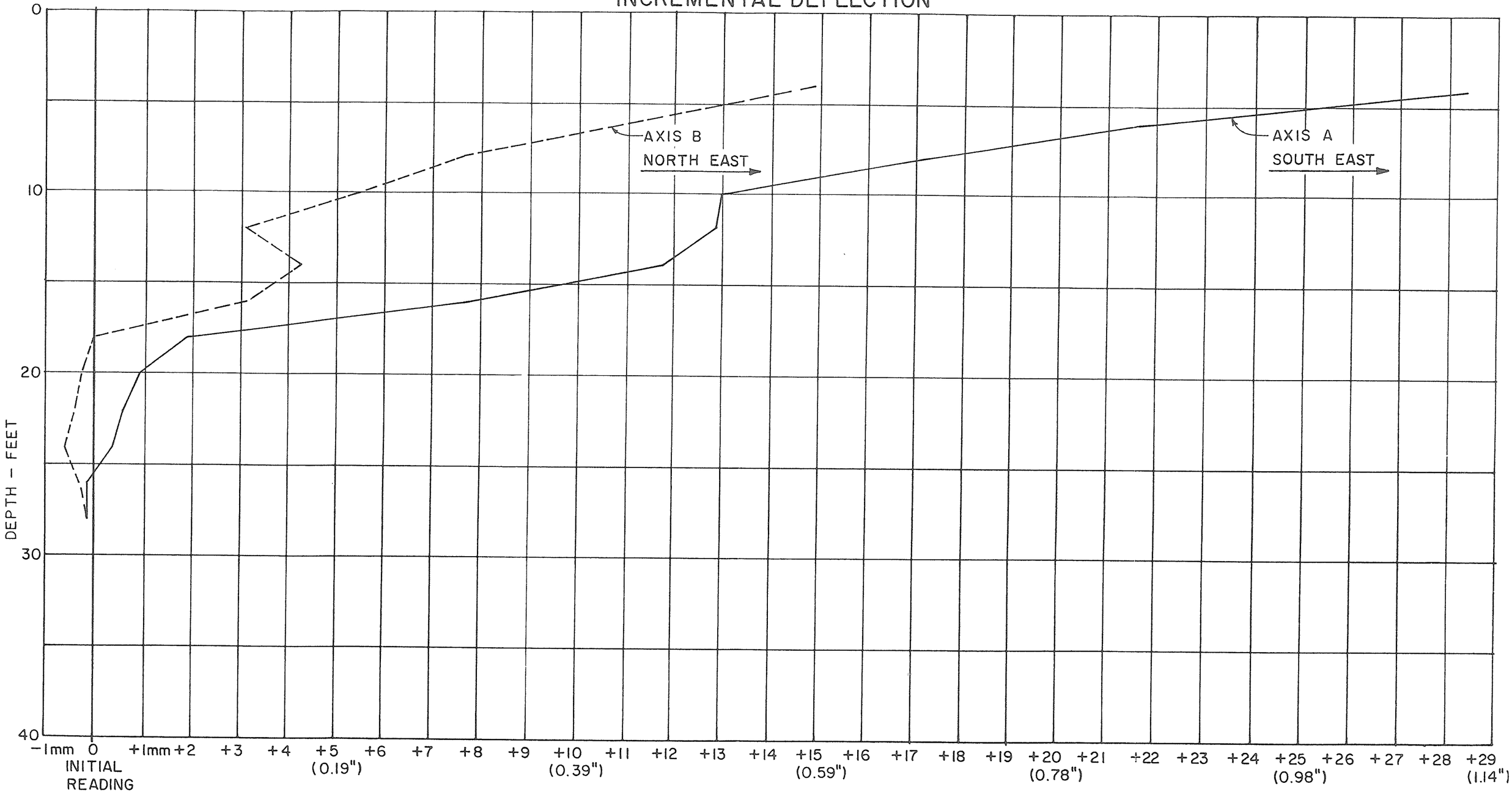
FINAL READINGS LATERAL MOVEMENT GAUGE S1



FINAL READINGS
LATERAL MOVEMENT GAUGE S3

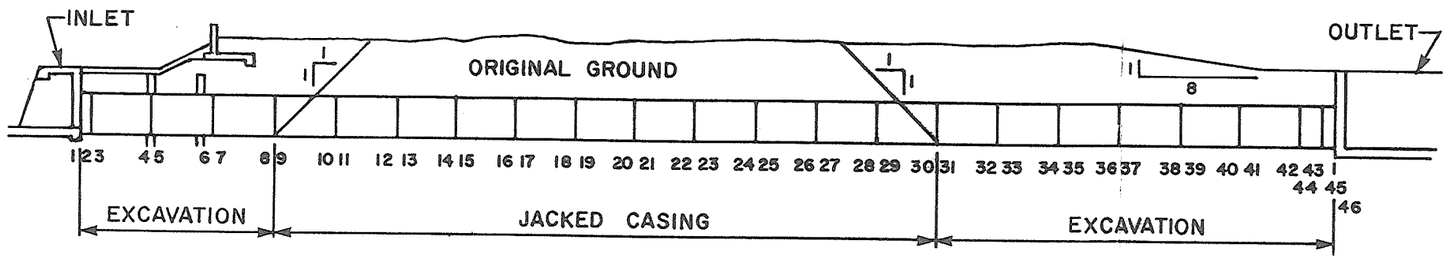
FIG. 3.4

INCREMENTAL DEFLECTION



FINAL READINGS
LATERAL MOVEMENT GAUGE S4
FIG. 3.5

INVERT PROFILE OF 72" Ø PIPE AT 124TH ST. OUTLET WORKS



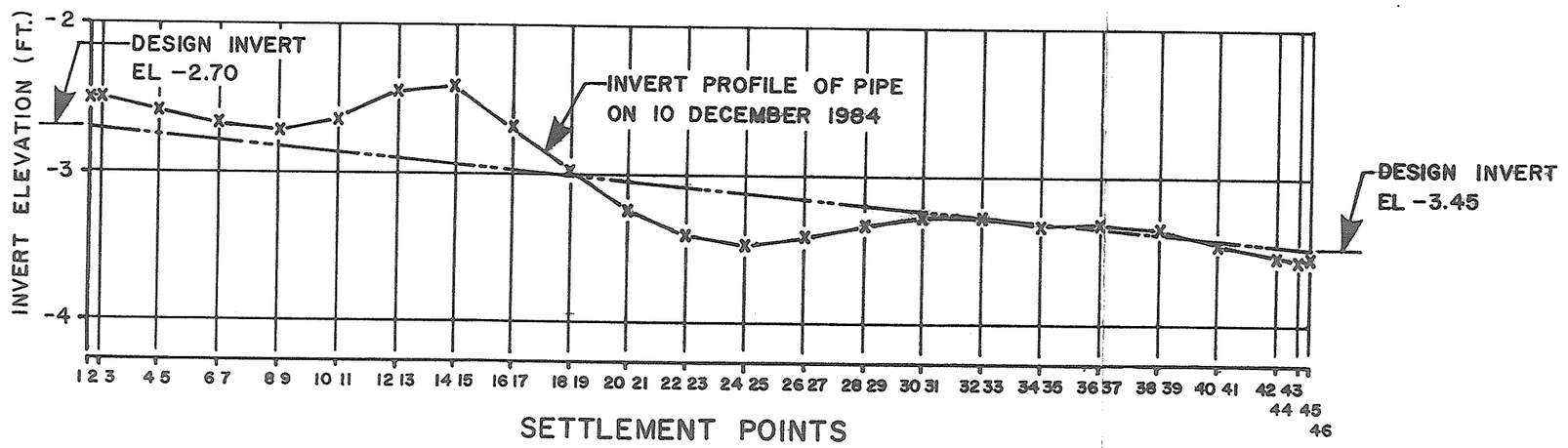


FIG. 3.6

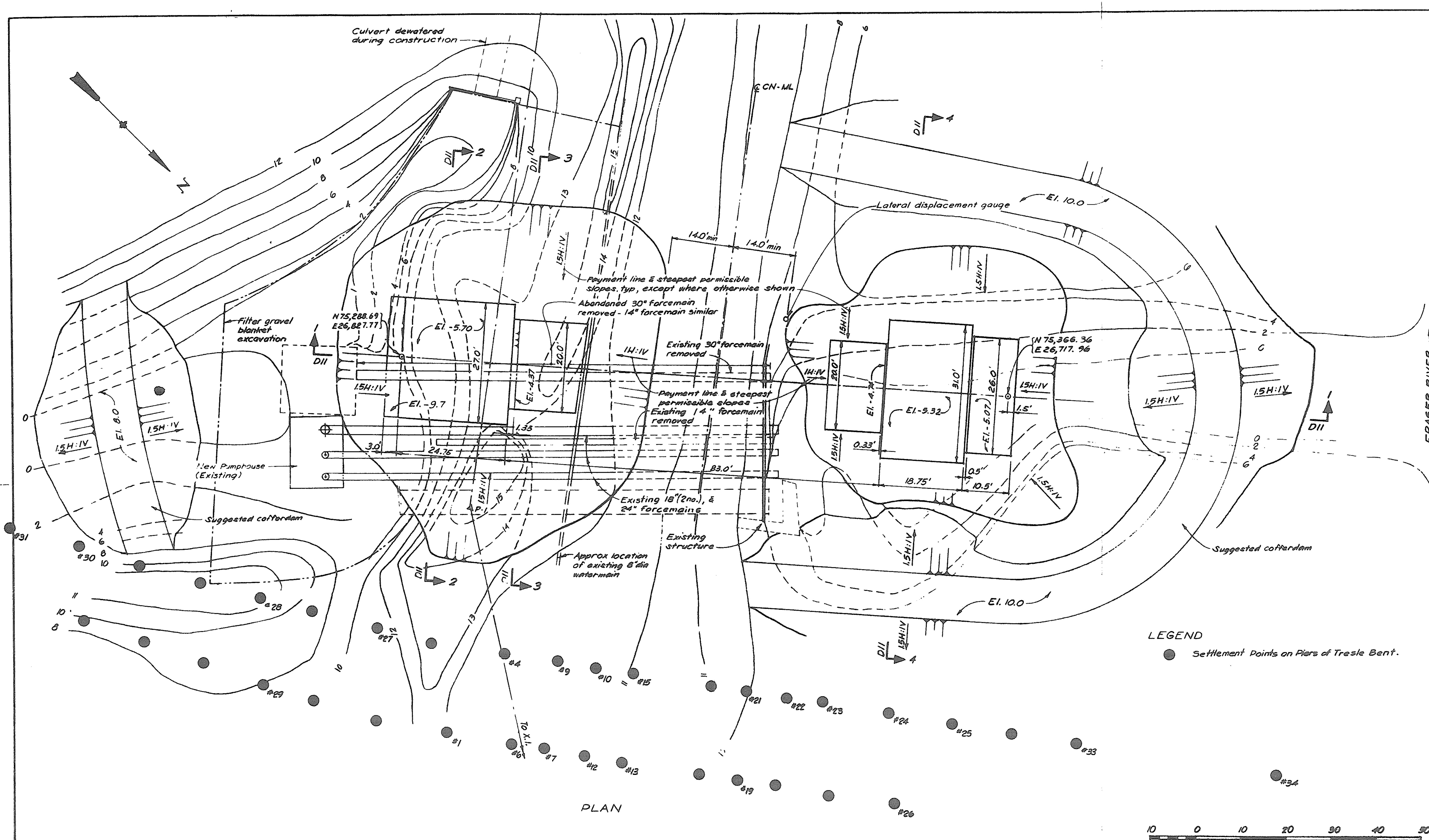
PUBLIC WORKS CANADA - RAIL TRESTLE - PATULLO BRIDGE

MONITORING FOR POSSIBLE SETTLEMENT

DUE TO CONSTRUCTION OF FLOODBOX

Point No.	Initial Elevation	Final Elevation
1	11.47	11.48
2	14.13	discontinued
3	14.09	discontinued
4	13.26	13.31
5	13.50	discontinued
6	12.43	12.44
7	13.67	13.68
8	12.99	discontinued
9	14.01	14.03
10	12.87	12.88
11	14.15	discontinued
12	12.46	12.47
13	12.55	12.55
14	13.12	discontinued
15	12.66	12.67
16	12.85	discontinued
17	13.34	discontinued
18	12.70	discontinued
19	16.44	damaged
20	15.19	discontinued
21	12.15	12.15
22	10.94	10.96
23	10.66	10.67
24	10.24	10.26
25	9.51	9.52
26	12.09	12.08
27	13.54	13.56
28	9.88	9.90
29	11.36	11.38
30	7.78	7.79
31	8.47	8.47
32	7.93	7.94
33	9.52	9.53
34	8.68	8.69

Fig. 3.7



CRIPPEN ENGINEERING LTD. NORTH VANCOUVER, B.C. PROJECT NO 10405	
DEPARTMENT HEAD	C.R. Eland
PROJECT ENGINEER	M.A. Merlo
CHIEF ENGINEER	[illegible]

NO	DESCRIPTION	BY	CHD	APPR	DATE
2.	Record Drawing.	MP			1-10-85
1.	Prepared for Tender (Combined Contracts)	FRB			5-6-84

REVISIONS

RECOMMENDED [signature] PROJECT MANAGER
DATE June 6 1984
APPROVED [signature] A/ DIRECTOR, WATER INVESTIGATIONS
DATE June 6/84

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 2
SOUTH WESTMINSTER FLOOD CONTROL WORKS
PATTULLO FLOODBOX
CNR / PWC TRESTLE SETTLEMENT POINTS

DESIGNED NAC
DRAWN HHC
CHECKED R.D., LVS
SCALE As shown

SURVEYED E.S. & W.S.
DATE Nov, 1974 & May, 1978
FILE NO. 0281650-C12D-3
DATE 14 Feb, 1979.

FIG. 3.8