

Cranberry Marsh Enhancement Project

Final Report to Fish and Wildlife Compensation Program

Ducks Unlimited Canada

March 31, 2008

Funding generously contributed by



North American
Wetlands
Conservation Act



EXECUTIVE SUMMARY

Cranberry Marsh is a large, productive wetland situated just south of Valemount, BC. In the early 1980's, at the request of the Province of BC, Ducks Unlimited Canada (DUC) enhanced the marsh by installing two dykes with control structures and a number of nesting islands for waterfowl. The 110.4-hectare McKirdy compartment of Cranberry Marsh now provides good breeding habitat for a large variety of waterfowl, including Canada geese, mallard, teal, wigeon, scaup and ring-necked ducks. A large variety of other wildlife, including moose, beaver, otter, hawks and shorebirds, reside in or regularly visit the marsh.

In recent years, DUC inspections of the control structure on the McKirdy Compartment have revealed it to be rusted and degraded to the point that it is not functioning adequately. As secure water levels are important for breeding waterfowl and other marsh residents, the failing control represented a significant risk that habitat values at the site would degrade if the control was not replaced.

To protect the McKirdy Compartment from the threat of drainage and ensure that stable water levels are maintained, in summer 2007 the failing water control structure at the outlet of Cranberry Marsh was replaced by a new concrete drop structure with a polyethylene culvert section. The new water control structure has an expected lifespan of up to 100 years. The control replacement was completed as planned and within budget, and no problems were encountered.

ACKNOWLEDGEMENTS

Ducks Unlimited Canada gratefully acknowledges our funding partners on this project:

- Columbia Basin Trust / Columbia-Kootenay Fisheries Renewal Partnership
- Ducks Unlimited Inc.
- Fish and Wildlife Compensation Plan
- Habitat Conservation Trust Fund
- North American Waterfowl Conservation Act (NAWCA)

INTRODUCTION

Ducks Unlimited Canada (DUC) is the nation's leading wetland conservation organization. DUC conserves, restores and manages wetlands and associated habitats for North America's waterfowl. These habitats also benefit other wildlife and people. Active in the province of British Columbia for nearly 40 years, DUC has completed more than 500 on-the-ground wetland conservation projects in BC and has vast experience in planning and undertaking the installation, maintenance and replacement of water control structures on wetland projects.

Cranberry Marsh is a 345-hectare remnant of a flat bottom lake located in the Rocky Mountain Trench just south of Valemount, BC (Figure 1). In 1969, a large portion of the marsh (approximately 200 hectares) was deeded to the Province of British Columbia by Mrs. Robert Starratt for use as a wildlife sanctuary in memory of her husband. Ducks Unlimited Canada (DUC) was subsequently requested by the Fish and Wildlife Branch to investigate the possibilities for enhancing the wetland for waterfowl and other wildlife.

Cranberry Marsh was first enhanced by Ducks Unlimited Canada (DUC) in the early 1980's to reverse the effects of progressive drainage activities that had degraded the marsh over the past several decades. At that time, DUC constructed two dykes and installed two water control structures to maintain water at a level suitable for waterfowl and other wetland-dependent wildlife. The 110.4-hectare McKirdy compartment of Cranberry Marsh (Figure 2) now provides good breeding habitat for a large variety of waterfowl, including Canada geese, mallard, teal, wigeon, scaup and ring-necked ducks. The marsh is also home to moose, beaver, otter, hawks, shorebirds and a variety of other wildlife. A fundamental component of the R.W. Starratt Wildlife Sanctuary, Cranberry Marsh boasts a 7-km loop trail, two viewing platforms, and interpretive signage. The sanctuary is gaining popularity among birding enthusiasts and is regularly promoted as a key attraction of the Valemount area.

The controls on Cranberry Marsh are inspected regularly as part of DUC's ongoing project operation and maintenance program. In the mid-2000's, inspections revealed that the existing half-round corrugated steel pipe (CSP) control structure on the McKirdy Compartment had rusted and degraded to the point that it was not functioning adequately, putting the security of water levels in the marsh at risk.

The purpose of this project is to conserve over 110 hectares of wetland habitat for waterfowl and other wetland-dependent wildlife by replacing the ageing water control structure at the McKirdy compartment of Cranberry Marsh.

STUDY AREA

The project took place at the existing Ducks Unlimited Canada project on Cranberry Marsh, located in the R.W. Starratt Wildlife Sanctuary, approximately 1.6 km south of the village of Valemount, BC (Figures 1 & 2).



METHODS

To protect Cranberry Marsh from the threat of drainage and ensure that stable water levels are maintained, the failing water control structure at the outlet of Cranberry Marsh was replaced by a new concrete drop structure with a polyethylene culvert section. The new water control structure has an expected lifespan of up to 100 years. The project was conducted in the following manner:

- Landowner approval for the project was obtained (project is situated on Provincial Crown land).
- Engineering surveys were conducted and design drawings created.
- Environmental permits and approvals were obtained.
- A coffer dam was installed to temporarily eliminate flow through wetland outlet. (Work was conducted during late summer low flow period).
- The existing control structure was removed using an excavator.
- The site was prepared for installation of the new structure (soils compacted, etc.)
- The new control structure and HDPE exit pipe were installed.
- The coffer dam was removed to re-establish flows through the new control structure.
- A beaver grate was (will be?) installed at the outlet to prevent beaver damage.
- Disturbed banks will be seeded in early spring 2008 to promote the re-establishment of riparian vegetation and to discourage weeds.
- Signage recognizing partner contributions and the wetland's importance to waterfowl and other wildlife will be manufactured and installed in spring 2008.

RESULTS

A project budget and summary of expenditures is provided as Appendix A. Construction photos are provided in Appendix B, and as-built drawings are attached as Appendix C.

DISCUSSION

The water control structure was replaced as planned, resulting in conservation of over 110 hectares of wetland habitat for waterfowl and other wetland-dependent wildlife. Seeding of disturbed areas and installation of signage will take place in Spring 2008.

It is not possible after just a few winter months following construction to assess the long-term success of this project; however, given the successful replacement of the control structure, there is every reason to believe that water will be maintained in the wetland at a level suitable for waterfowl production throughout the functional life of the control structure, up to 100 years.

As a result of this project, it is expected that:

- Cranberry Marsh will be protected from the threat of drainage, and stable water levels will be maintained.
- Wetland vegetation in and around the marsh will continue to thrive.
- Waterfowl and other wildlife will continue to inhabit the marsh.
- Schools, community groups, and visitors to the area will continue to use the marsh to become educated about wetland ecology.

The project leaves a legacy to the community of Valemount in allowing the continuation of excellent wildlife viewing and ecotourism opportunities at Cranberry Marsh, which is frequented by hikers, birders and other tourists. Through the benefits of improved water quality, reduced storm flows, increased minimum flows and habitat for wildlife, society as a whole will benefit for many years from this wetland enhancement project.

MANAGEMENT IMPLICATIONS

Cranberry Marsh will continue to be operated, maintained and managed for the benefit of waterfowl and other wildlife for the next century. The water level in the McKirdy Compartment of the marsh will be assessed by DUC engineering support staff during regular engineering inspections (every 1-2 years). The value of habitat for waterfowl will be assessed by DUC biological staff during regular biological inspections (every 5 years). Annual maintenance costs of \$2,000 are anticipated. Ongoing maintenance costs will be funded by Ducks Unlimited Canada, with support from the BC Habitat Conservation Trust Fund.

APPENDIX A: PROJECT BUDGET AND EXPENDITURES

DIRECT EXPENDITURES		AMOUNT	
		Budget	Actual
Contracted Services			
• Engineering supervisor: \$400/day x 7.5 days		\$3,000	\$1,937.15
• GIS and mapping		-	\$111.30
• Mileage		\$500	\$342.96
• Accommodations		\$500	\$309.72
• Meals		-	\$212.00
	SUB TOTAL (Contracted Services)	\$4,000	\$2,913.13
Materials and Supplies			
• Pre-cast concrete drop-structure control		\$5,500	\$4,558.00
• HDPE exit pipe		\$3,000	\$2,327.98
• Beaver gates		-	\$226.00
• Miscellaneous construction supplies		\$1,500	\$927.02
• Signage kiosk supplies and installation		-	\$5,157.00
	SUB TOTAL (Materials and Supplies)	\$10,000	\$13,196.00
Equipment Rental			
• Excavator rental: \$1,325/day x 7 days		\$9,275	\$2,214.87
• Compaction equipment: \$575/day x 3 days		\$1,725	\$180.80
• Transport of heavy equipment and materials		-	\$1,621.80
	SUB TOTAL (Equipment Rental)	\$11,000	\$4,017.52
	TOTAL EXPENDITURES	\$25,000	\$20,126.60
PROJECT FUNDING (CASH)			
• Fish and Wildlife Compensation Program		\$10,000	\$10,000.00
• Columbia Basin Trust		-	\$10,000.00
• Ducks Unlimited Inc.		\$7,500	\$63.30
• North American Waterfowl Conservation Act		\$7,500	\$63.30
	TOTAL PROJECT FUNDING	\$25,000	\$20,126.60
IN-KIND CONTRIBUTIONS (DUCKS UNLIMITED CANADA)			
• DUC administration /overhead / office expenses		\$1,000	\$1,715.00
• DUC professional staff – project management		\$1,000	\$980.00
• DUC press release to local media & follow-up interviews		-	\$735.00
• Highlight project in DUC provincial member publication		-	Undetermined
• Highlight project in DUC provincial volunteer publication		-	Undetermined
	SUB TOTAL (In-kind Contributions)	\$2,000	\$3,430.00
	TOTAL VALUE OF PROJECT	\$27,000	\$23,556.60

APPENDIX B: CONSTRUCTION PHOTOS



Figure 1. Cranberry Marsh
Prior to construction (March 2006).



Figure 2. Old control structure on
McKirdy Compartment, prior to
construction (June 2005).

Photos this page courtesy of Ducks Unlimited Canada.



Figure 3. New control structure to be installed (September 2007).



Figure 4. New exit pipe and plywood seepage collars to be installed (September 2007).

Photos this page courtesy of John Renner.

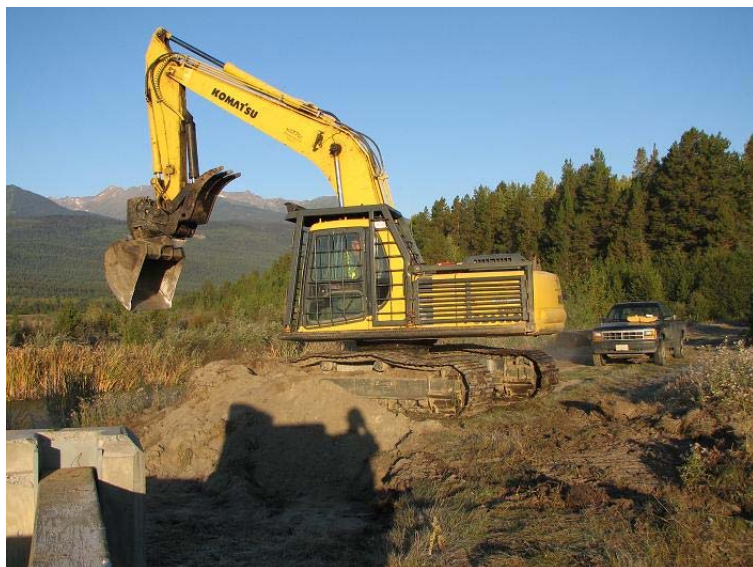


Figure 5. Excavator used on site
(September 2007).



Figure 6. Exposing old control structure
(September 2007).

Photos this page courtesy of John Renner.



Figure 7. Work in progress. Compactor shown and controls in background. Exit pipe in foreground (September 2007).

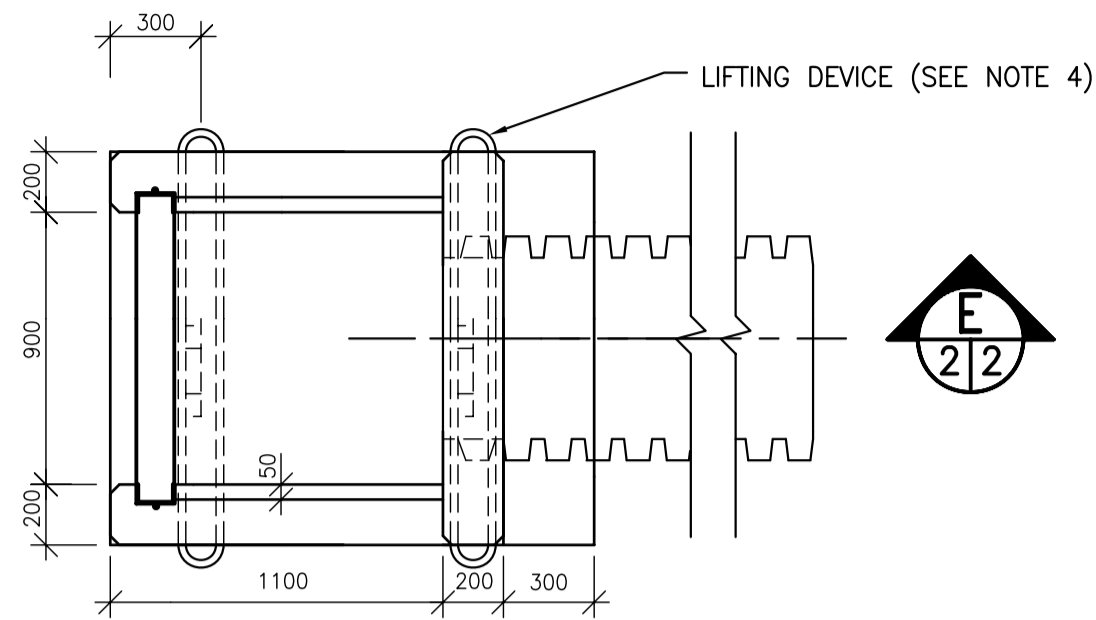


Figure 8. New control and exit pipe installed. Control visible at left side of dyke; outlet pipe visible at right side. Seeding still required (September 2007).

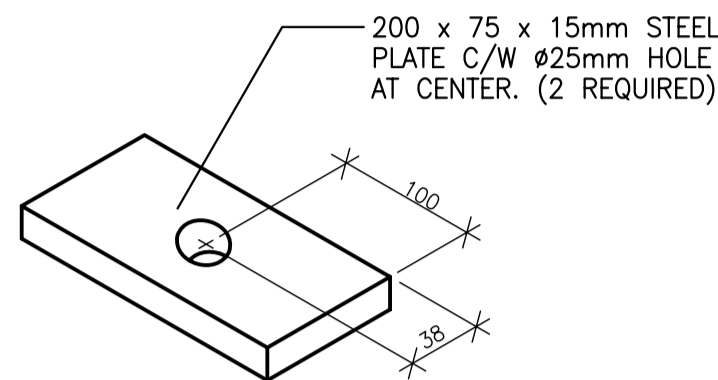
Photos this page courtesy of John Renner.

APPENDIX C: AS-BUILT DRAWINGS

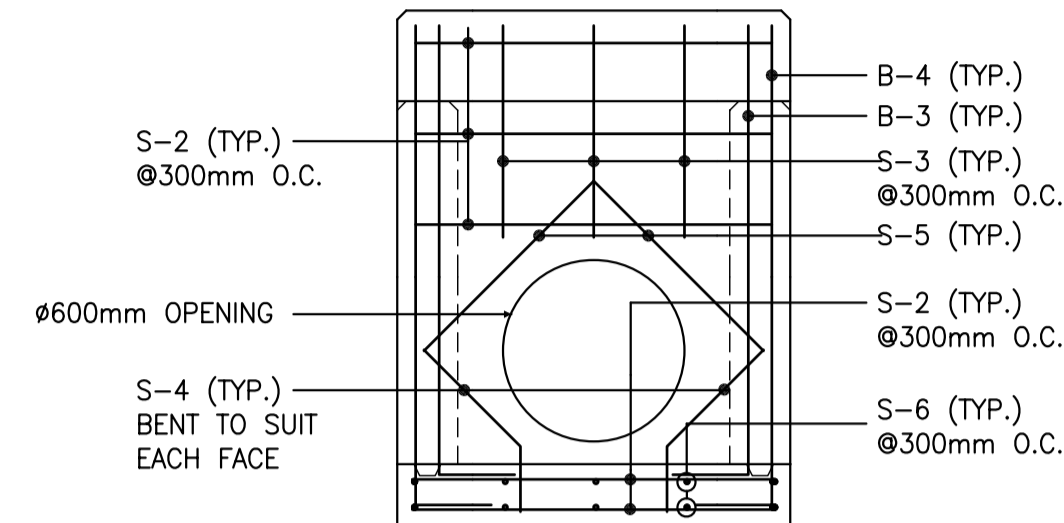
- Cranberry Marsh Concrete Drop Inlet, 2007/10/16
- Cranberry Marsh Control Structure Details, 2007/10/16



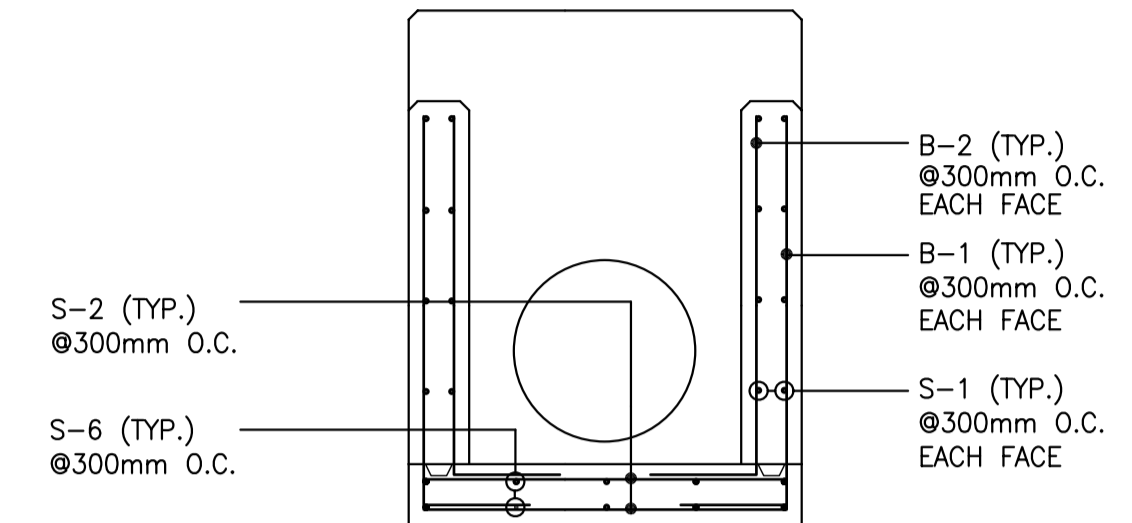
CONCRETE DROP INLET
PLAN VIEW
SCALE : 1 = 25



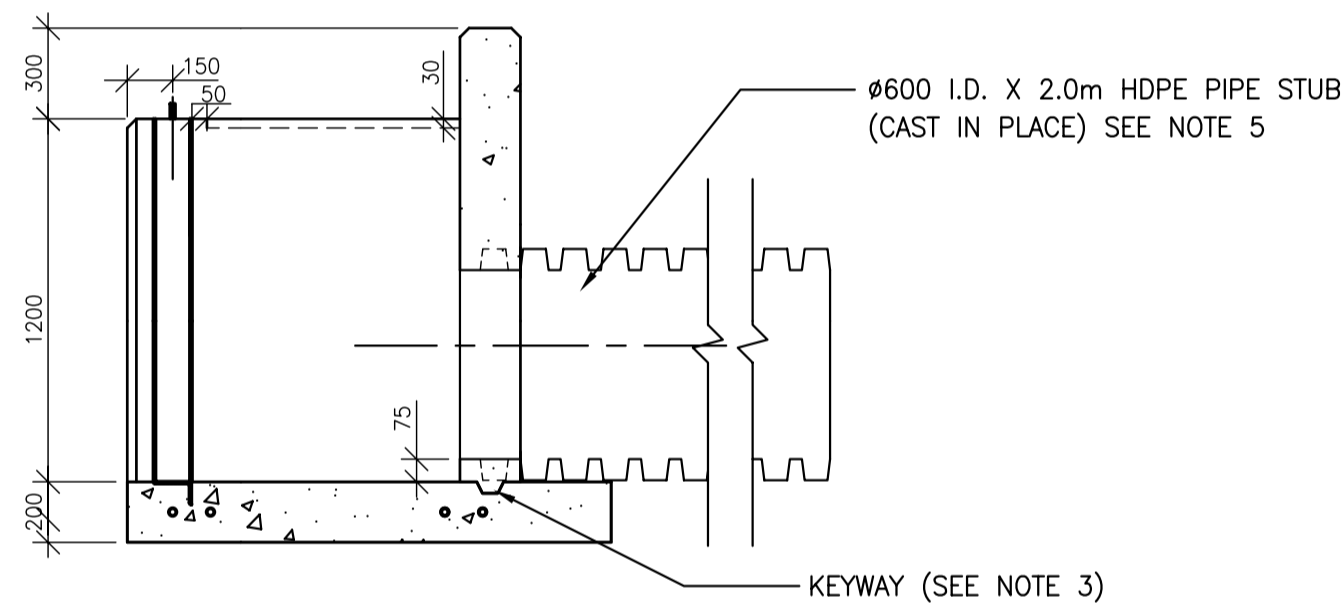
STOPLOG HOLDOWN PLATE
(2 REQUIRED)
N.T.S.



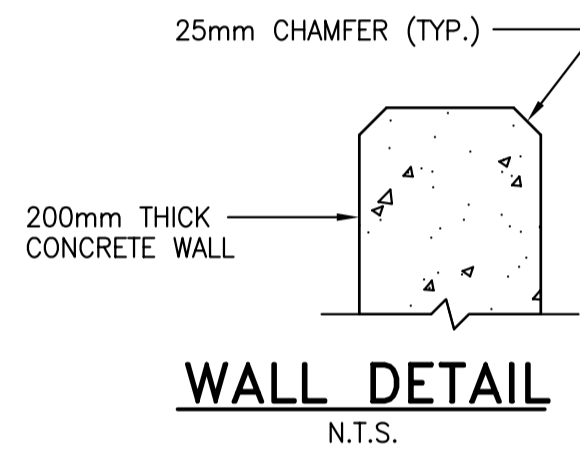
DROP INLET-REINFORCEMENT
BACK WALL
SCALE : 1 = 25



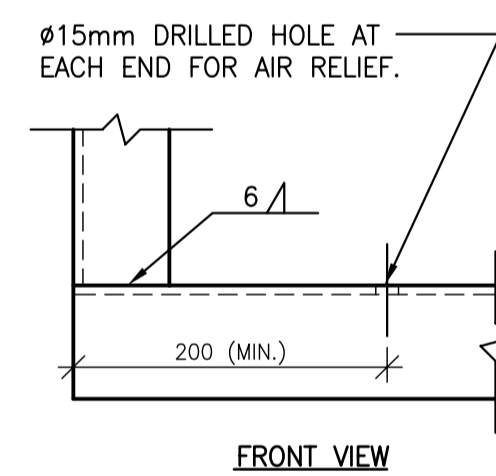
DROP INLET-REINFORCEMENT
FRONT VIEW
SCALE : 1 = 25



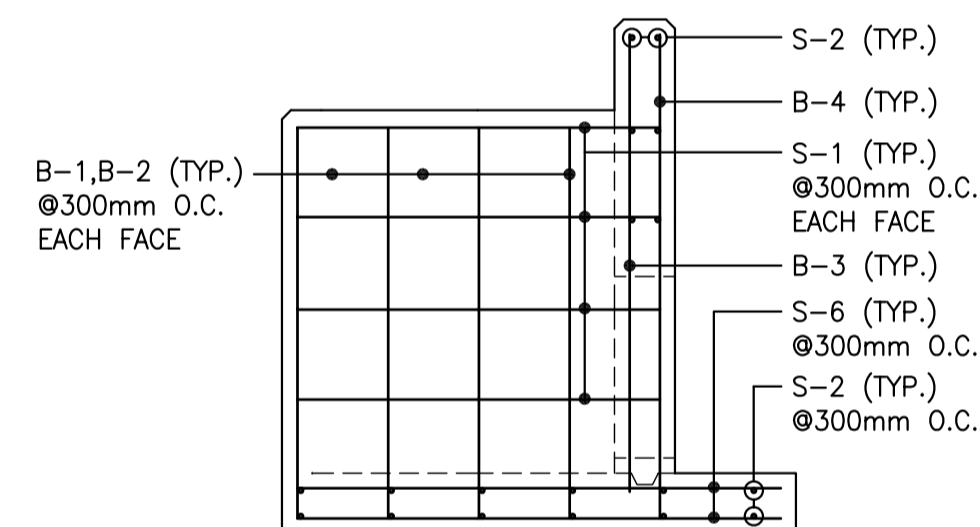
CONCRETE DROP INLET
SCALE : 1 = 25



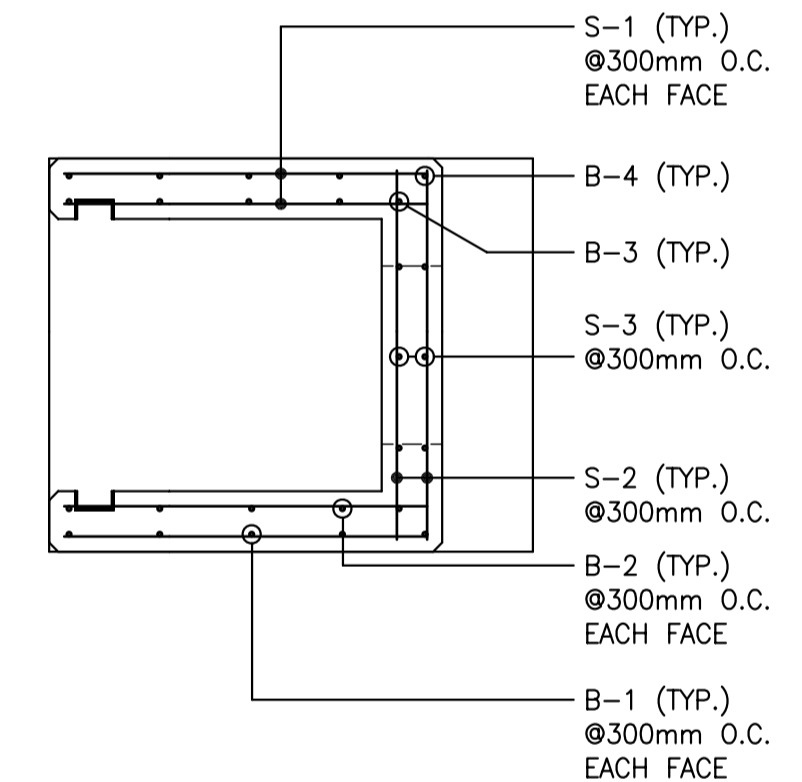
WALL DETAIL
N.T.S.



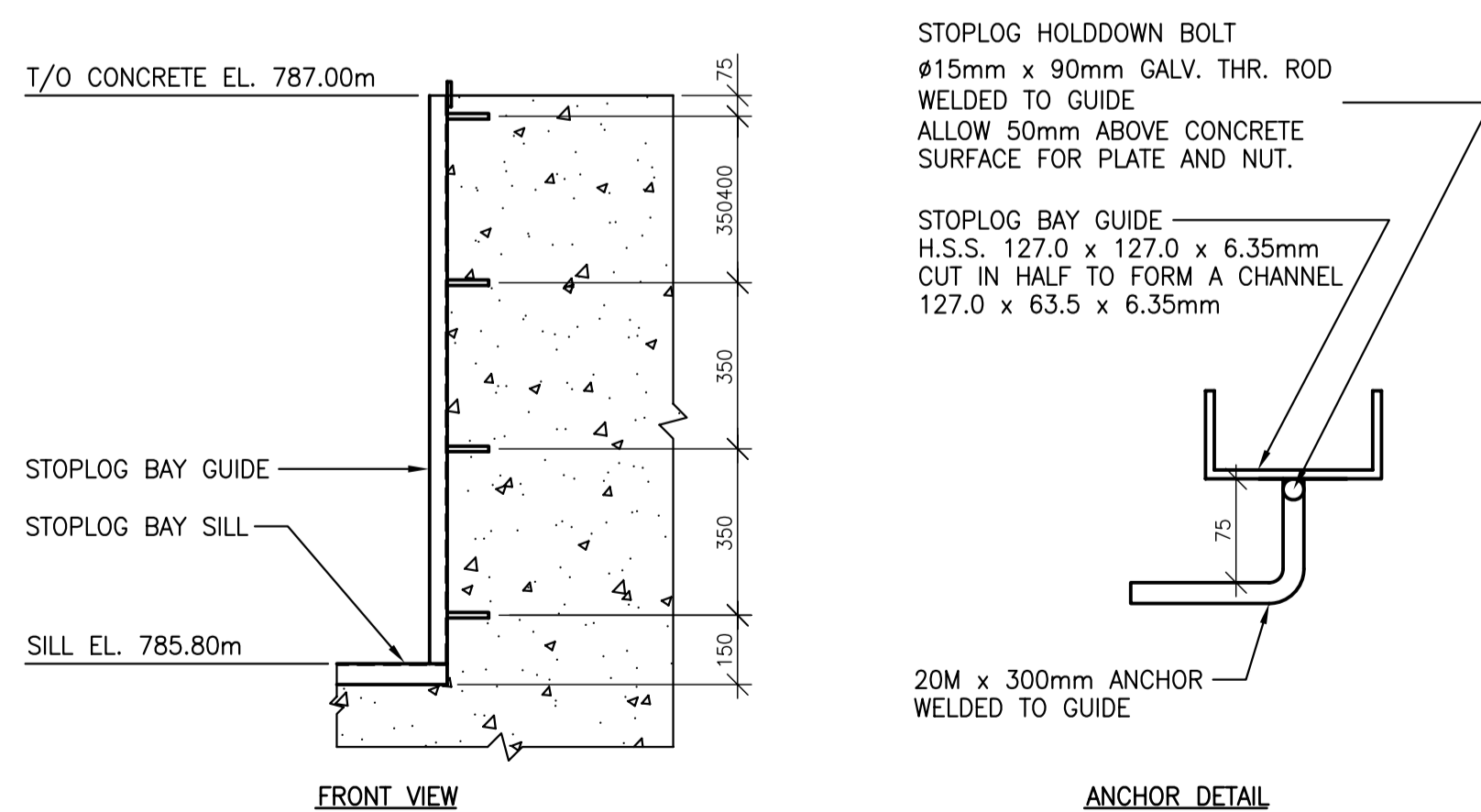
FRONT VIEW



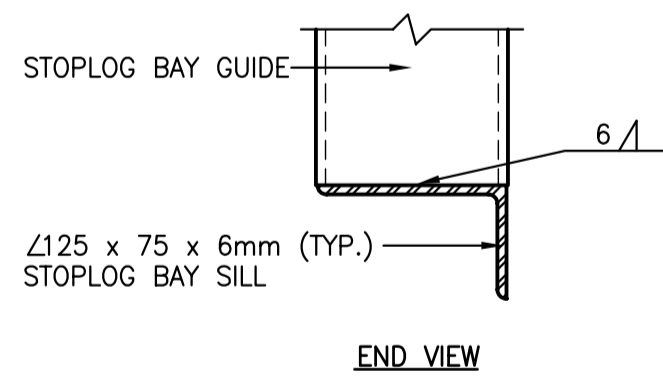
DROP INLET-REINFORCEMENT
SIDE VIEW
SCALE : 1 = 25



DROP INLET-REINFORCEMENT
PLAN VIEW
SCALE : 1 = 25



STOPLOG BAY GUIDE-ANCHOR DETAIL
N.T.S.



END VIEW

STOPLOG BAY-SILL DETAIL
N.T.S.

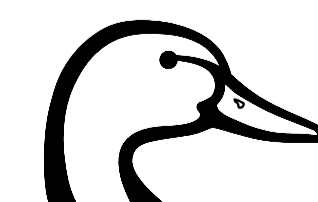
REINFORCEMENT DATA						
REBAR No.	No. REQ'D	SIZE	LENGTH (mm)	DIMENSION (mm)		REBAR TYPE
				a	b	
B-1	8	15M	1600	300	1300	TYPE B
B-2	8	15M	1500	300	1200	
B-3	2	15M	1800	300	1500	
B-4	2	15M	1900	300	1600	
S-1	16	15M	1200			TYPE S
S-2	18	15M	1200			
S-3	6	15M	700			
S-4	4	15M	660			
S-5	4	15M	800			
S-6	10	15M	1500			

NOTES:

- STRUCTURAL CONCRETE IN ACCORDANCE WITH DUCKS UNLIMITED CANADA SPECIFICATION DU514-R1:
 - STRENGTH: 25 MPA TYPE 50 CEMENT
 - ENTRAINED AIR: 4-6%
 - MINIMUM COVER ON REBAR: 50mm.
 - TYPICAL REBAR SPACING 300mm (APPROX.)
- MISCELLANEOUS STEEL TREATED WITH RUST PROHIBITING PAINT AS APPROVED BY DUCKS UNLIMITED.
- KEYWAY REQUIRED ONLY IF STRUCTURE DONE AS TWO POURS.
- 25mm STEEL CABLE LIFTING DEVICE CAST-IN-PLACE EXTENDING ACROSS STRUCTURE BASE TO SIDE WALLS - OR APPROVED EQUAL SYSTEM.
- HDPE PIPE CAST IN PLACE. TOP EDGE OF CORRIGATION OPENED TO ALLOW ENTRY OF CONCRETE FOR POSITIVE LOCK WITH CONCRETE WALL. - 6 CUTOUTS - 100mm x 50mm EQUALLY SPACED.

SHEET 2 of 2

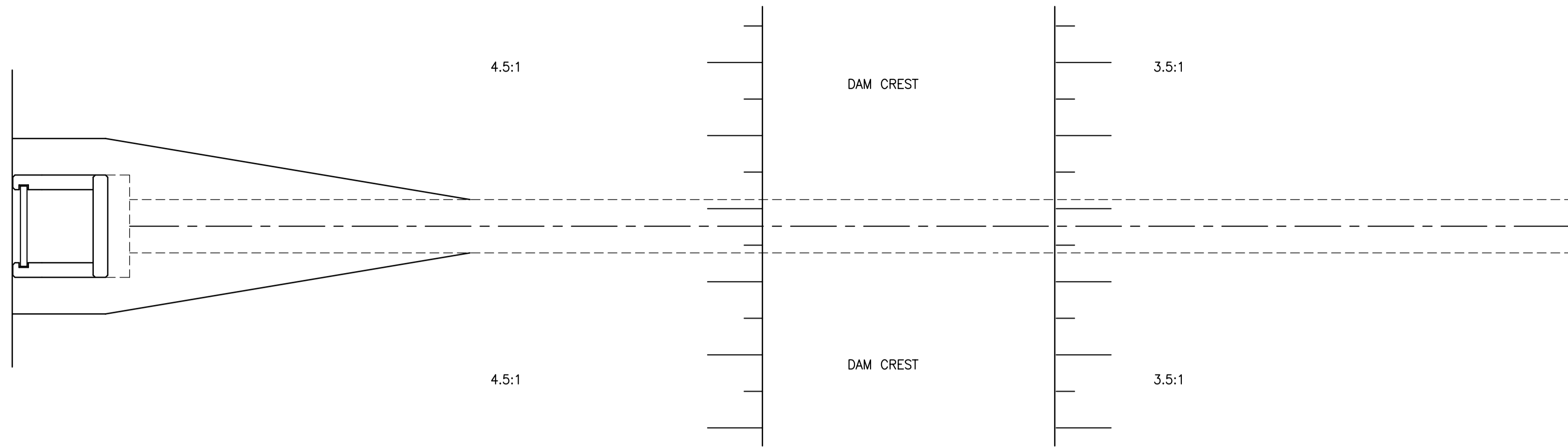
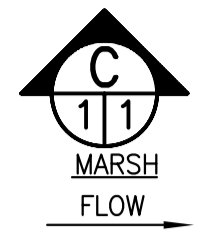
DATE	REV.	DESCRIPTION	APPR'D	SURVEYED BY
20070321	A	REPLACEMENT CONTROL		
20070916	B	AS BUILT		
	C			
	D			
	E			



Ducks Unlimited Canada

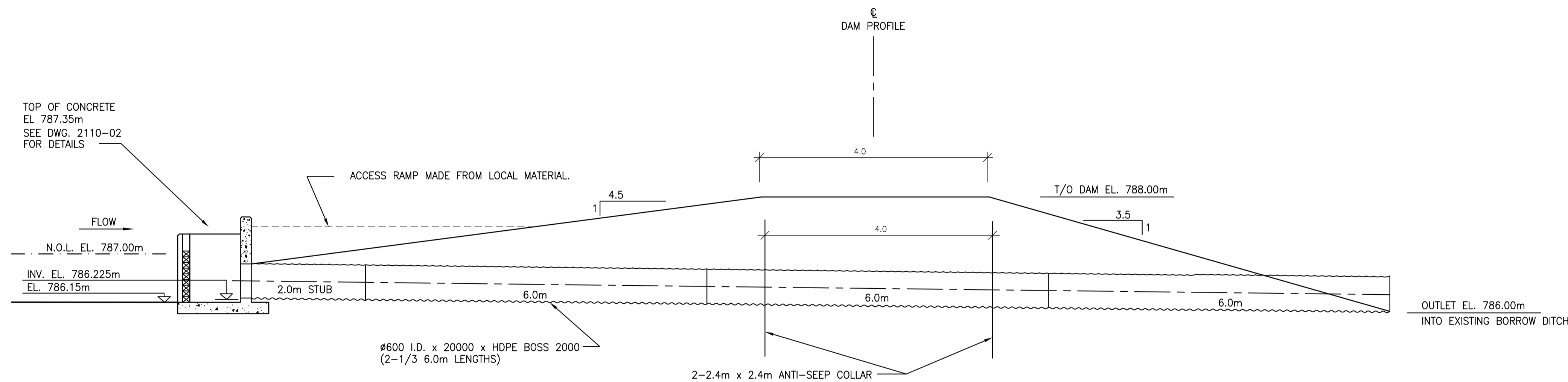
CRANBERRY MARSH
CONC. DROP INLET
REINF. DETAILS

DWG. No. 2110-02



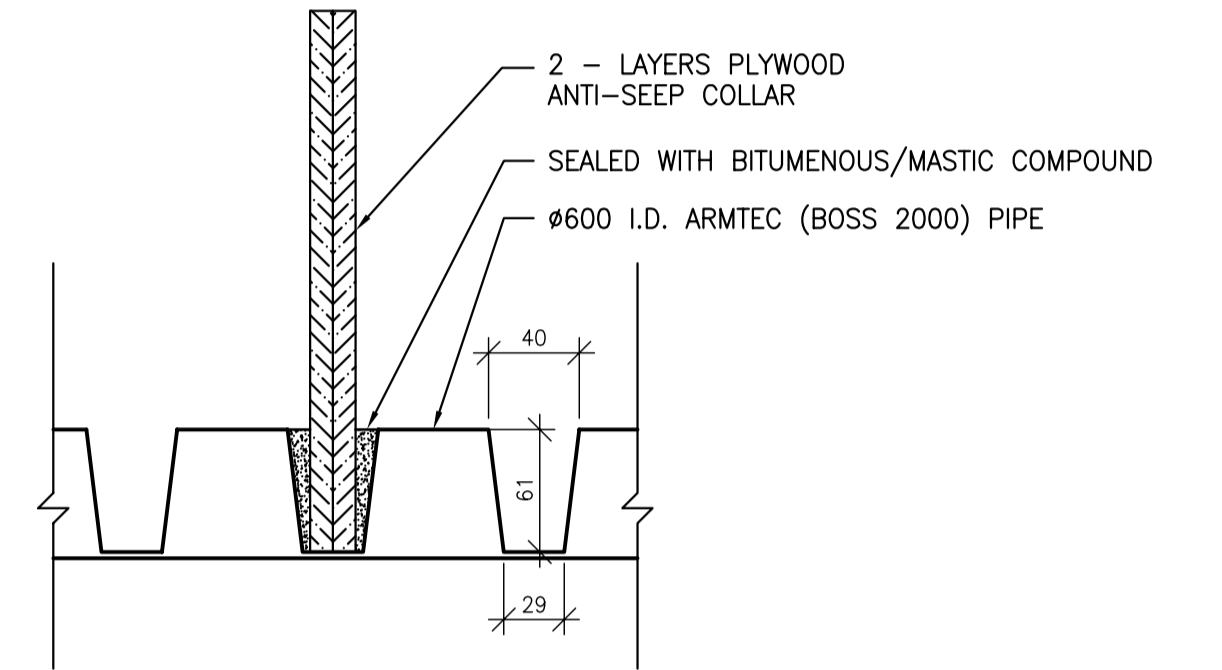
CONTROL INSTALLATION DETAIL PLAN VIEW

SCALE : 1 = 50



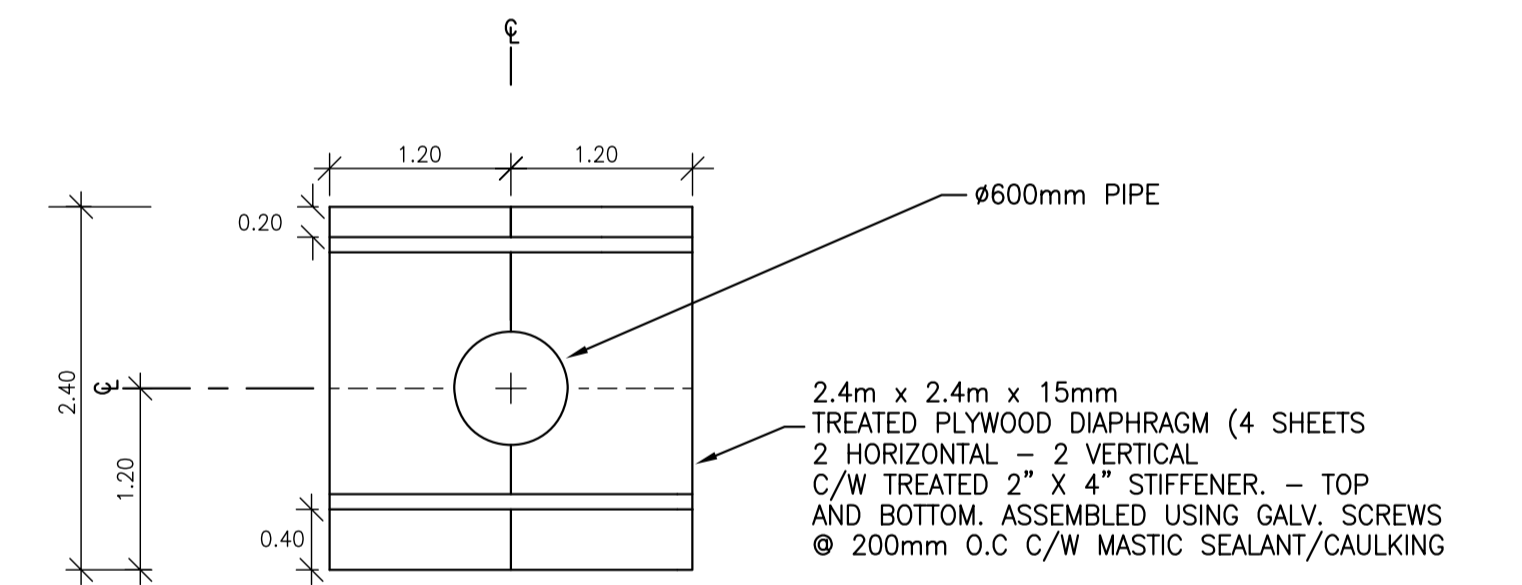
C 111 CONTROL INSTALLATION DETAIL

SCALE : 1 = 50



CONNECTION DETAIL

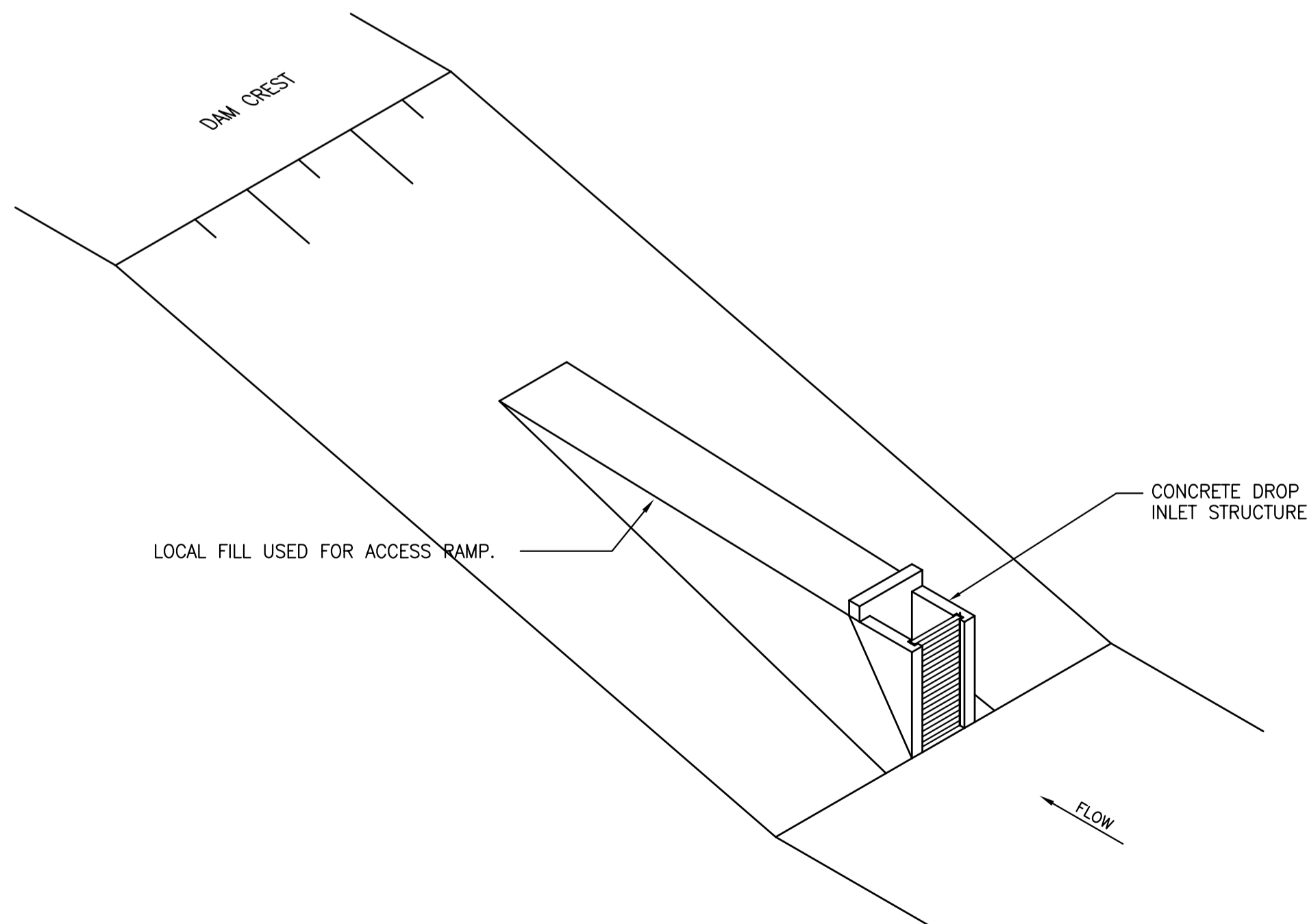
NTS



END VIEW

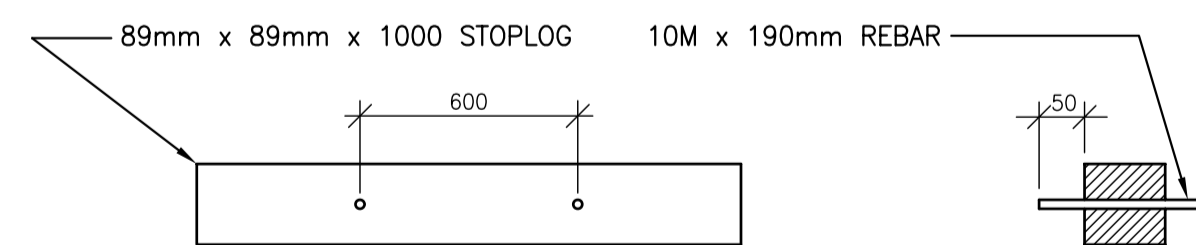
ANTI-SEEPAGE COLLAR DETAIL

NTS



CONCRETE DROP INLET ISOMETRIC VIEW

N.T.S.



STOPLOG DETAIL

N.T.S.

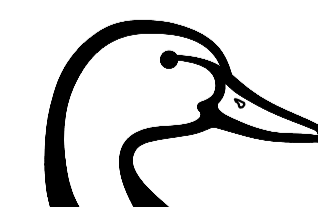
NOTES:

1. STOPLOGS 89mm x 89mm CONSTRUCTION GRADE SPRUCE S4S. LENGTH EQUAL TO OPENING SIZE LESS 30mm (CUT IN FIELD).
2. DIAPHRAGM SECTIONS JOINED BY WAY OF GALVANIZED SCREWS @ 200mm O.C. INCLUDING SEALANT.
4. NEW CONTROL INSTALLED 2 METERS SOUTH OF THE ORIGINAL. NEW STRUCTURES WERE FIT TO THE EXISTING SHAPE OF THE DYKE USING LOCAL ON SITE MATERIALS.

Plot Scale: 1=50
Last Plot: 20071016
Last Revision: 20071016

DATE	REV.	DESCRIPTION	APPR'D
20070322	A	CONTROL REPAIR	
20070916	B	AS BUILT	
	C		
	D		
	E		

SURVEYED BY _____
DATE SURVEYED _____
DESIGNED BY JR
DRAFTED BY JR
DATE 20070322



Ducks Unlimited Canada

CRANBERRY MARSH CONTROL STRUCTURE DETAILS

DWG. No. 2110-01