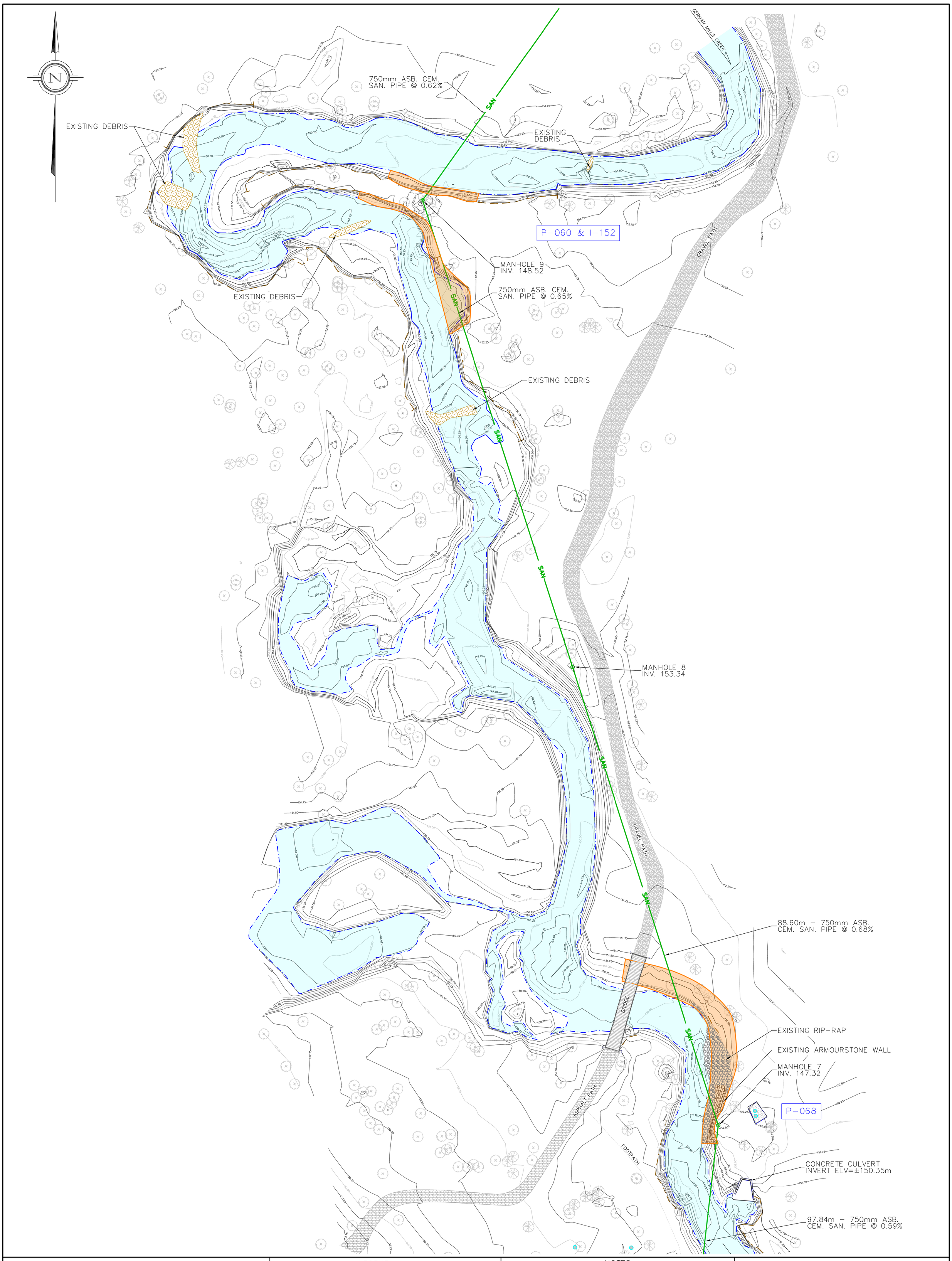


GERMAN MILLS SETTLERS PARK

CONCEPTUAL DESIGN OF SANITARY PROTECTION WORKS P-060 & I-152/SITE 2 AND P-068/SITE 3

CONCEPT 1 - PROTECT IN PLACE

DATE:	DESIGN BY	DWG. BY	APPD. BY
APRIL 2018	B.G. & D.M.	P.G.	B.G.

SCALE:
1:300

10m 0m 10m

LEGEND

- WATERLINE AT TIME OF SURVEY
- SAN — EXISTING SANITARY MAIN
- EXISTING SANITARY MANHOLE
- EXISTING STORM MANHOLE
- EXISTING ARMOURSTONE
- EXISTING EROSION SCAR
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EXISTING DEBRIS
- EXISTING RIPRAP
- EXISTING GRAVEL PATH
- EXISTING ASPHALT PATH
- PROPOSED BANK REVETMENT

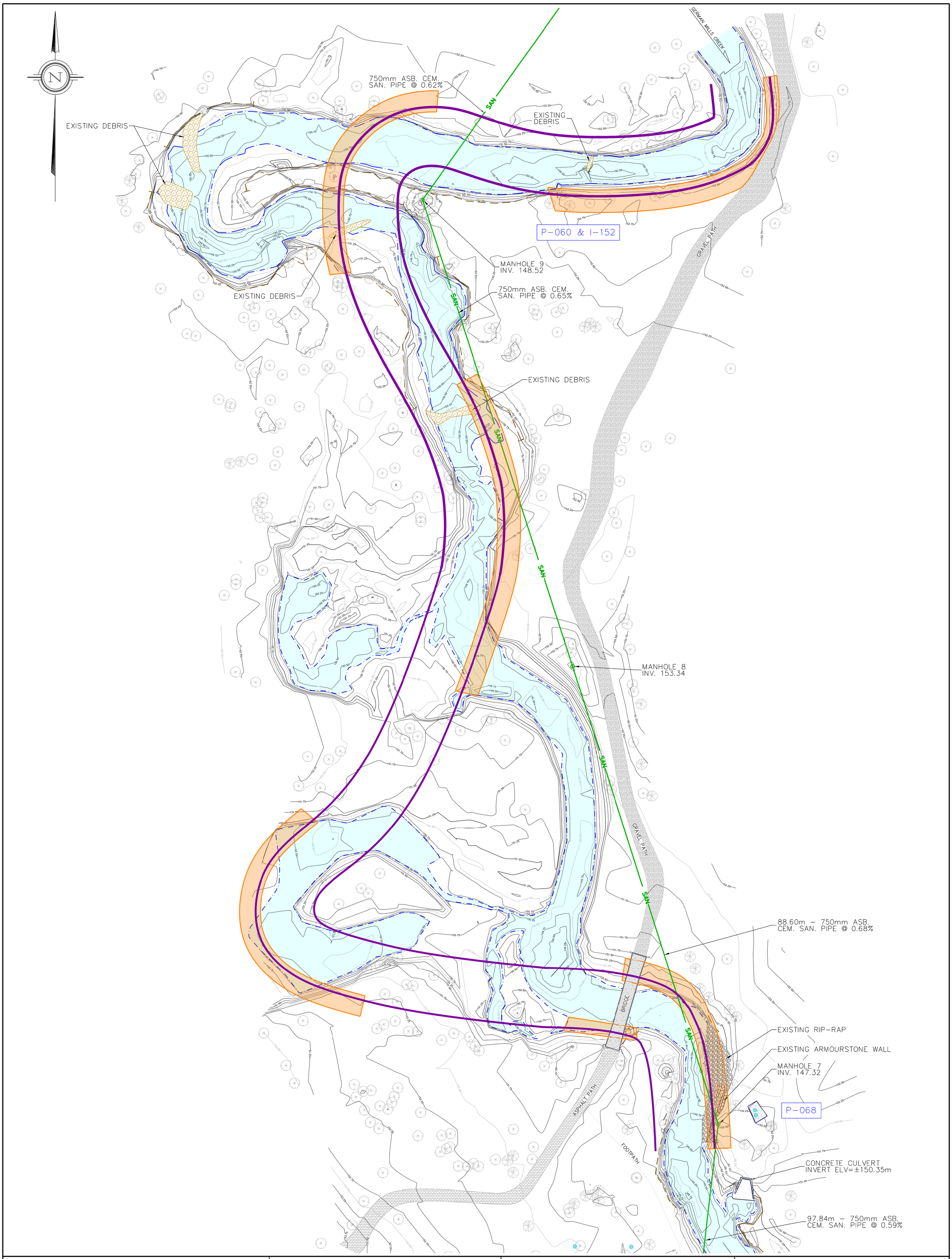
NOTES

1. VERTICAL CONTROL IS IN METERS (GSC). ELEVATIONS HAVE BEEN DERIVED FROM CITY OF TORONTO BENCH MARK No.12020060017–ELEVATION=150.133m.
   HORIZONTAL CONTROL IS IN 6° UTM (NAD27). APPROXIMATE COORDINATES HAVE BEEN DERIVED FROM CITY OF TORONTO HCM No.'s 0201974004, AND 02019670445.
2. SURVEY PERFORMED BY TRCA STAFF ON SEPTEMBER 29 AND 30, 2014, NOVEMBER 4 AND 5, 2015 AND FEB 23, 24 AND 27, 2017.
3. CONTOUR INTERVAL IS 0.25 METERS.
4. SANITARY MANHOLE AND PIPE INFORMATION DERIVED FROM YORK ENGINEERING CONSULTANTS LIMITED DRAWINGS FOR THE TOWNSHIP OF MARKHAM ENGINEERING DEPARTMENT – LESLIE EAST AREA AND DONMILLS INDUSTRIAL PARK SANITARY TRUNK SEWER, DATED JUNE 22, 1967.

Greck
5770 Highway 7, Unit 3, Woodbridge, Ontario, L4L 1T8

PALMER ENVIRONMENTAL CONSULTING GROUP INC.
74 Berkeley Street, Toronto, ON M5A 2W7

Toronto and Region Conservation for The Living City.



GERMAN MILLS SETTLERS PARK

CONCEPTUAL DESIGN OF SANITARY PROTECTION WORKS P-060 & I-152/SITE 2 AND P-068/SITE 3

CONCEPT 2 - CHANNEL REALIGNMENT WITH BANK PROTECTION

DATE:	DESIGN BY	DWG. BY	APPD. BY
APRIL 2018	B.G. & D.M.	P.G.	B.G.

SCALE:
1:300

10m 0m 10m

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- EXISTING ASPHALT PATH
- PROPOSED BANK REVETMENT
- PROPOSED CHANNEL ALIGNMENT

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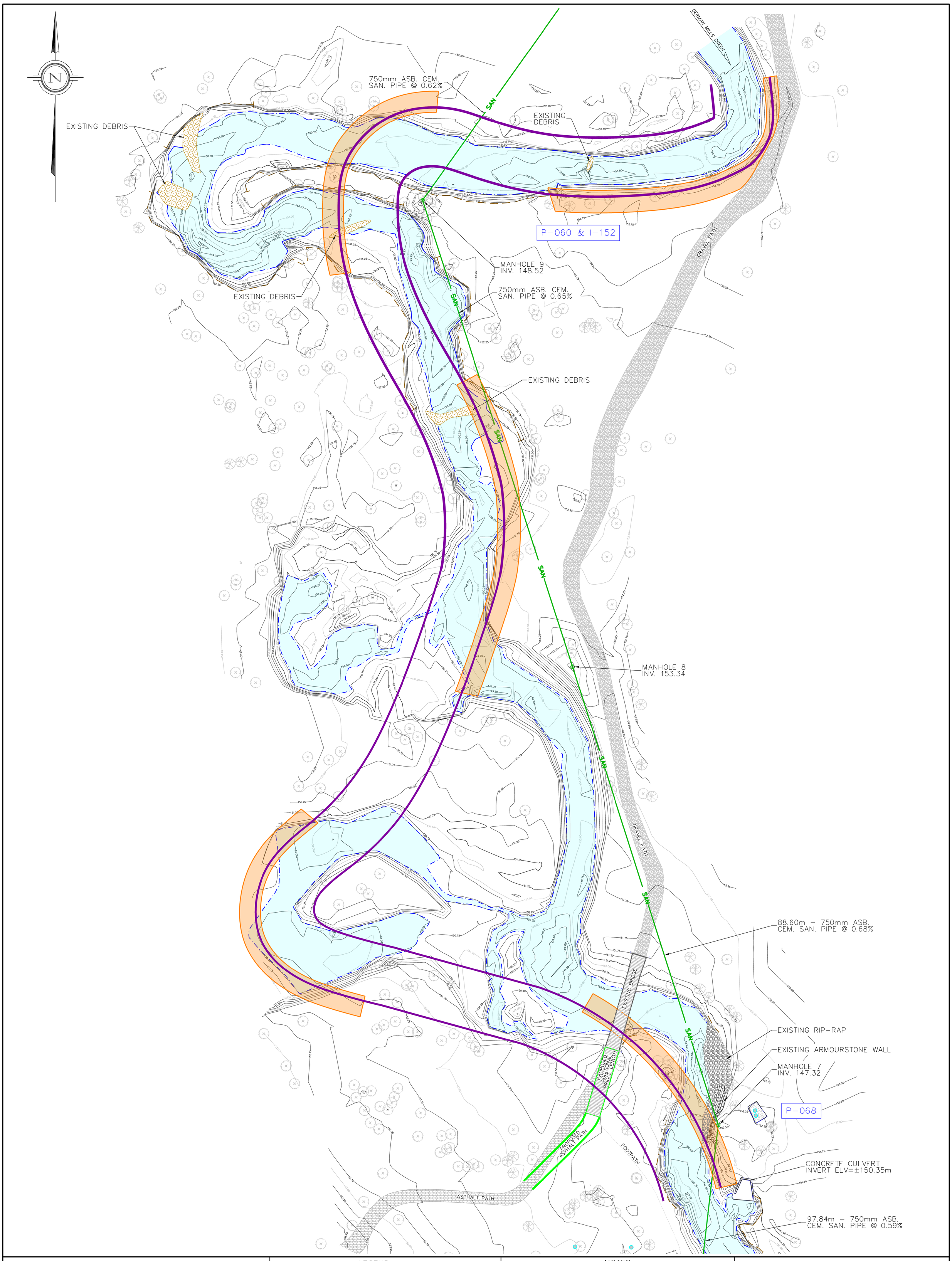

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CONCEPTUAL DESIGN OF SANITARY PROTECTION WORKS P-060 & I-152/SITE 2 AND P-068/SITE 3

CONCEPT 3 - CHANNEL REALIGNMENT WITH BANK PROTECTION AND BRIDGE ENLARGEMENT

DATE:	DESIGN BY	DWG. BY	APPD. BY
APRIL 2018	B.G. & D.M.	P.G.	B.G.

SCALE:
1:300

10m 0m 10m

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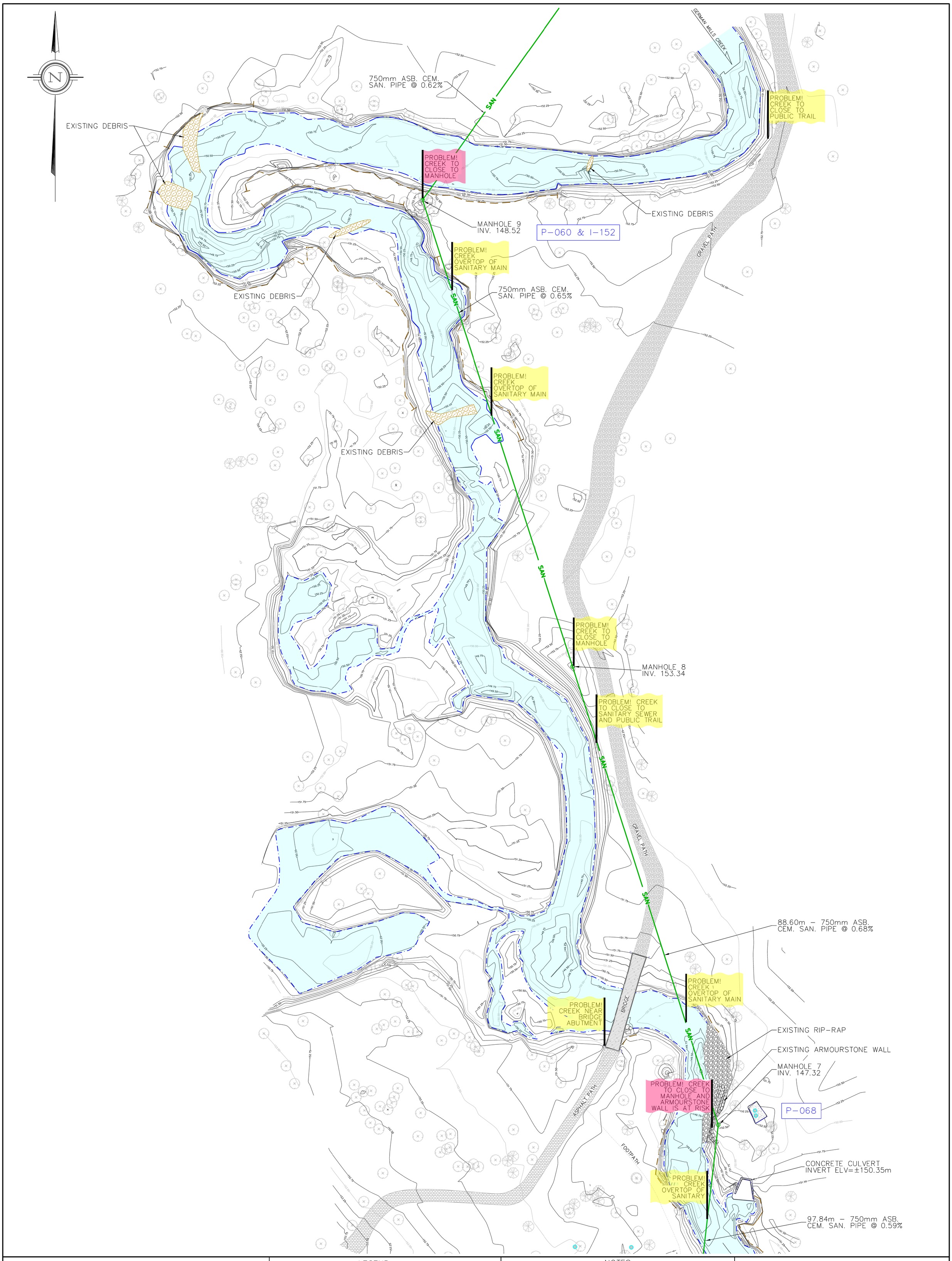

GERMAN MILLS SETTLERS PARK

CONCEPTUAL DESIGN OF SANITARY PROTECTION WORKS P-060 & I-152/SITE 2 AND P-068/SITE 3

EXISTING CONDITIONS

DATE:	DESIGN BY	DWG. BY	APPD. BY
APRIL 2018	B.G. & D.M.	P.G.	B.G.

SCALE: 1:300

10m 0m 10m

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Toronto and Region Conservation for The Living City.

TRCA German Mills Settlers Park Channel Stabilization and Erosion Control - Sites 2 and 3 Evaluation Matrix

Objectives	Criteria	Comments	Do Nothing	Option 1	Option 2	Option 3	Comments
Physical and Natural Environment	Flooding	Impact on surface drainage, flooding; meet legislated criteria for flooding and water	\	\	\	\	Regulatory flood hazard elevations are not expected to change significantly. No changes to flood flow conveyance or flood storage. Minor changes expected for more frequent flow event (2 and 5 year storms).
	Erosion	Impacts on soils, geology, rate of erosion	- -	+	++	+++	Doing nothing will allow continued, unnatural rates of erosion. For Option 1 erosion rates will be reduced at localized areas of treatment. Options 2 is a holistic channel restoration approach that will increase channel length (i.e. reduce slope/tractive forces), reduce reach scale erosion, and increase the radius of curvature near the manhole (Site 2) and bridge (Site 3). Option 3 provides for a more natural planform for the low flow and bankfull flow channel. It also reduces the direction of water to the outer meander bank caused by flows against the abutment. As such the larger bridge provides less potential for downstream erosion by providing a better alignment for all critical flow conditions.
	Terrestrial Habitat	Impact on connectivity, diversity and sustainability	-	+	-	-	Doing nothing will allow continued, uncontrolled erosion, which leads to loss of vegetation and riparian habitats. Option 1 provides some benefits by limiting further loss of vegetation in the riparian zone. Options 2 and 3 improves riparian stability, reduces loss of vegetation, and creates wetland habitat in the newly formed oxbow. Options 2 and 3 will require the removal of numerous trees and will cause significant riparian habitat disturbance as part of the construction of the proposed channel re-alignment. These removals will be minimized as much as feasibly possible by utilizing former abandon channel segments.
	Aquatic Habitat	Impact on connectivity, spawning and sustainability	-	+	++	+++	Doing nothing will lead to continued uncontrolled erosion, which introduces fine sediment into channel and reduces habitat complexity (e.g. pools and riffles). Options 1 will reduce fine sediment input and incorporate pool and riffles. Options 2 and 3 will take on a holistic approach to channel restoration and allow for improved fish habitat (e.g. pool-riffle sequences), larger riparian area, and reduced fine sediment input within the project area. Option 3 provides a small flood plain area prior to flows coming in contact with the bridge abutments. As such, a more natural riparian zone consisting of native stone, sediment and wood debris can be accommodated under the bridge to improve aquatic habitat.
	Valley Slope Stability	Impact to slope erosion due to loss of vegetation, cutting of slopes, agitation of soils etc..	N/A	N/A	N/A	N/A	No existing or projected risks associated with contact with the valley slopes.
Social/Cultural Environment	Aesthetic Value	Impact on existing and proposed development aesthetic value	N/A	N/A	N/A	N/A	
	Benefit to Community	Access to trails, enjoyment of valley	-	\	+	+	Options 2-3 increases the distance between the walking path and the channel providing increased public safety. Doing nothing will increase the risk due to uncontrolled erosion.
	Archaeological Features	Impacts on existing archaeological features	N/A	N/A	N/A	N/A	
	First Nations	Concern to first nations	N/A	N/A	N/A	N/A	
	Private/Public Land	Loss of public and private land	N/A	N/A	N/A	N/A	
Technical Criteria	Regulatory Agency Acceptance	Satisfies TRCA, DFO and MNRF mandates	-	+	+	++	Option 2 and 3 allows for greater natural channel form and function.
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (sanitary sewer, maintenance hole and foot bridge)	- -	+	++	++++	Option 1 places a manhole in a lower erosion risk area (point bar) and provides a better fit of the channel through the footbridge. Options 2 will move the channel from a potentially future erosion hazard at Manhole 8. Option 2 also reduce the erosive forces at the meander downstream of the footbridge. Option 3 allows for a greater and more natural meander radius. This reduces risks associated with outer meander bend erosion on revetment works and to the storm sewer outfall. It also reduces the distance the channel lies overtop of the sanitary sewer.
	Access to Existing Infrastructure	Access to manhole from same side of river as neighbouring manholes	\	\	\	\	
	Maintenance Requirements	Requirement for regular, irregular or no maintenance activities, such as structural maintenance or vegetation maintenance	- -	+	+	++	By doing nothing, the channel will continue to erode uncontrollably and future maintenance will be required. Options 2 and 3 remove the need to re-access the site for maintenance works at Manhole 8. Option 2 will require more maintenance to maintain erosion control structures at Manhole 9 downstream of the undersized bridge, and will incur additional costs to remobilize for channel realignment once the footbridge is replaced.
Financial Criteria	Capital Costs	Rough Order Magnitude (ROM) capital costs for the detailed design, permitting and installing proposed concept	\	-	- -	- - -	As the project area of Options 2 and 3 will be larger, the cost associated with them will be larger. Option 3 will have the greatest up front capital cost because of the footbridge.
	Maintenance Costs	ROM costs to maintain the proposed structure	-	+	+	++	For the Do Nothing and Option 1 scenarios cost will be incurred to address future erosion risks to the trail, sanitary sewer and exisitng footbridge. For Option 2 maintenance costs remain high within the lifespan of the project as the exisitng footbridge will require replacement and the creek will have to be realigned to take advantage of a large bridge. Option 3 has the least maintence cost for the life of the project.
Constructability	Complexity of Treatment	Requirement for specialized services to design or install unique or proprietary specification that must be completed by a certified contractor/consultant	N/A	\	\	\	Works at all site will utilize similar equipment and construction methodologies.
	Erosion and Sediment Control	Consideration for amount of earth to be cut and/or filled, as well as difficulty of controlling/managing the sediment	N/A	-	- -	- -	Doing nothing will not have any sediment or erosion problems associated with construction activities. All options will require cut and fill operations, and sediment control applications to minimize sediment release into the channel. Options 2 and 3 have the potential to release more sediment than other approaches due to the greater length of channel reach to be reconstructed.
	Water Management	Consideration for the effects that project works and final concepts will have on the quality of water	N/A	-	-	-	All options are expected to have the same minor and temporary impact on water quality during construction
	Site Access Constraints and Impacts	Suitable entry location for project works equipment and future land access requirements with least disruption to natural features	N/A	-	- -	- -	All options will use the gravel path for site access. Options 2 and 3 have a larger area of work, therefore disrupting more land.
Public Safety	Potential Risks to Trail and Park Users	Impact on public safety and requirement for safety features (e.g. safety fences)	-	+	++	++	While all options will reduce the risk to public safety, Option 2 and 3 will divert the channel further from the path reducing the risk to pedestrians.
Overall			Least Preferred	Moderately Preferred	Moderately Preferred	Most Preferred	

Option 1 - Repair in Place
Option 2 - Channel Realignment
Option 3 - Channel realignment with Bridge Extension

+ = Benefits
\ = No Impact
- = Detriment

** note that negative values within concept designs can be minimized and compensated for during construction