



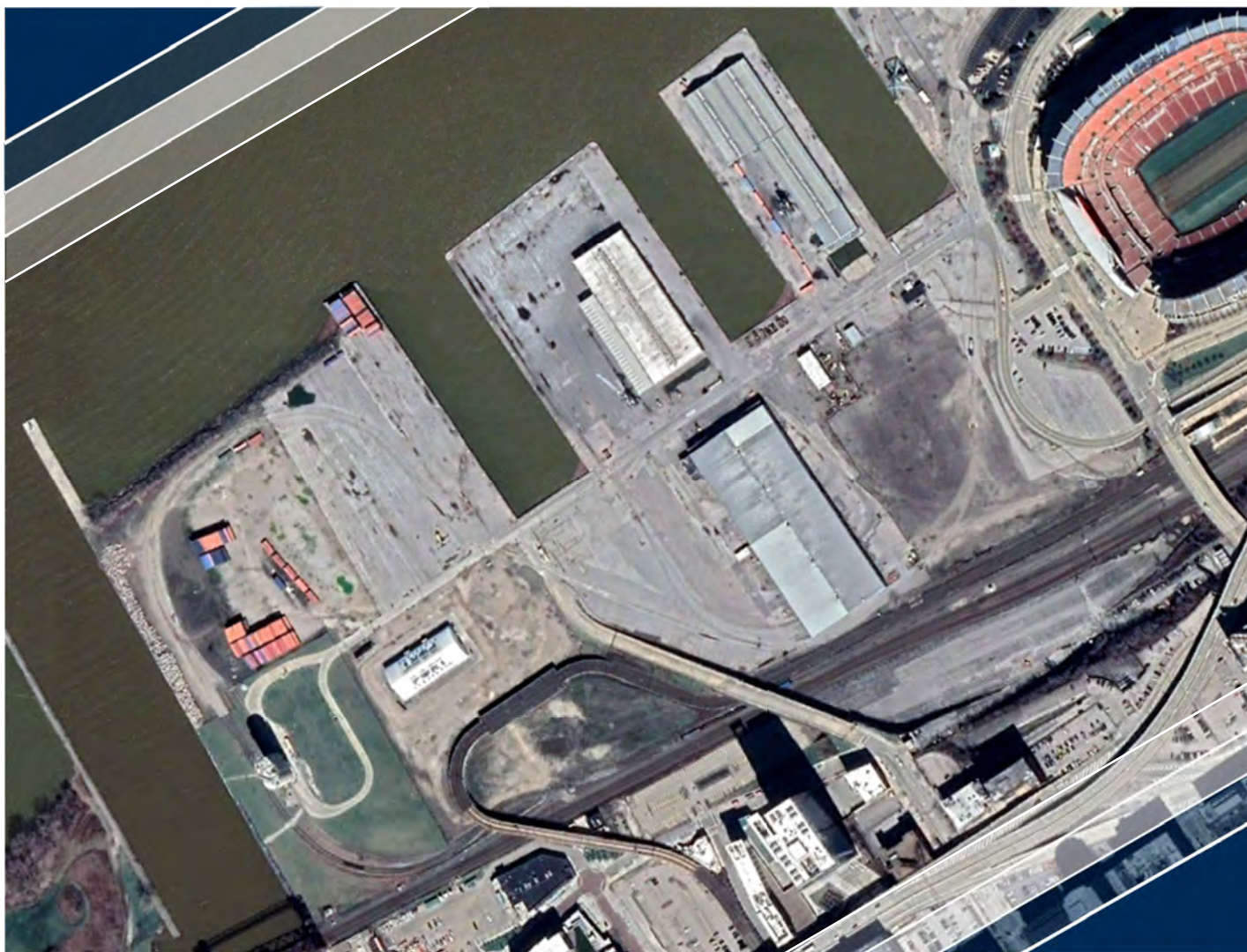
PORT OF CLEVELAND WATER QUALITY MASTER PLAN SUMMARY

Port Rehabilitation Project

Project # 19-00265

Submitted to:

Cleveland-Cuyahoga County Port Authority



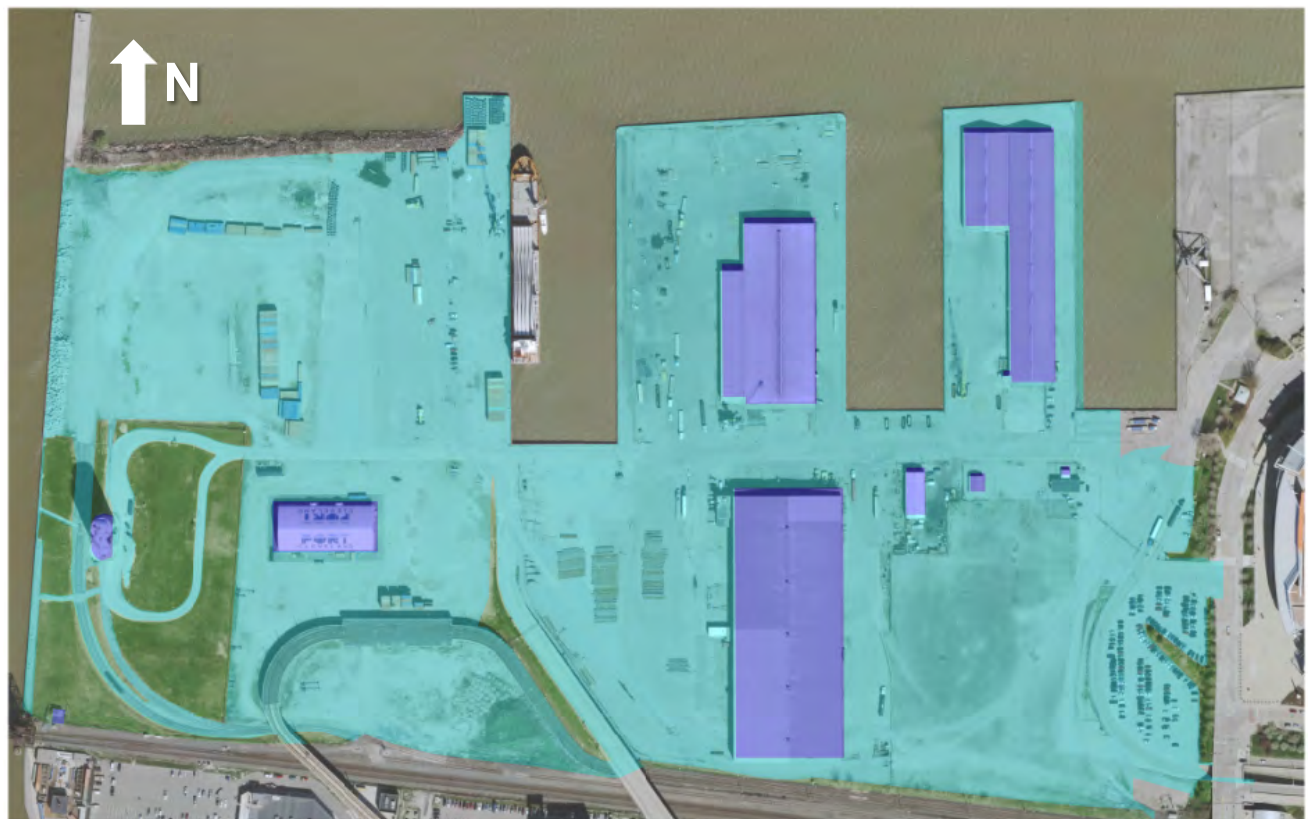
INTRODUCTION

JMT has been tasked with the development of the Port of Cleveland's Water Quality Master Plan using similar techniques employed for Dock 24 and Dock 26 rehabilitations. The Port of Cleveland sits on the edge of Lake Erie in Cleveland, Ohio. The site's stormwater runoff outfalls directly to Lake Erie. The Port is committed to the care and preservation of Lake Erie and is working to reduce the overall impact of stormwater runoff from its facilities. The goal of this Master Plan is to help the Port of Cleveland reach their pollutant load reduction requirements of their industrial discharge permit.




The plan includes discussion of existing conditions, pollution sources, existing stormwater controls, improvement recommendations, and an implementation plan.

EXISTING CONDITIONS

The primary land cover on the facility is impervious, comprised of pavement, buildings, and gravel. Open paved spaces are the most predominant land cover on site. Permanent warehouse buildings are the second largest land cover type by percentage on this site. See below of the existing land cover exhibit.



LEGEND

 BUILDINGS (8.1 AC)	 TURF (6.8 AC)
 CONCRETE (60.6 AC)	

Presently, runoff from the docks enters directly into Lake Erie via sheet flow or from concentrated discharges of gravity stormwater pipes. This runoff is currently treated on only one dock: Dock 20. There are multiple other discharge locations that range from smaller metallic downspout outfall pipes to larger reinforced concrete pipes within the Port property.

POLLUTION SOURCES

The Port of Cleveland is permitted through the Ohio Environmental Protection Agency under the NPDES permit. Although the Port's stormwater discharge is authorized under this permit, it requires quarterly testing. Samples are tested for color, odor, clarity, floating solids, settled solids, suspended solids, foam, and oil, as well as industrial classified heavy metal pollutants aluminum, lead, and zinc. The sources of the industrial pollution include metal roof surfaces, loading docks and parking areas, truck tire tread, outdoor storage of product materials and equipment, and motor oil. The most recent testing results are tabulated below (2019 and 2020). The data highlighted in red shows the discharge concentrations of aluminum (Al) and zinc (Zn) often exceeding the permitted discharge concentrations at the outfall locations.

STORMWATER OUTFALL SAMPLE HISTORY													
OUTFALL	Q1 2018 (NO SAMPLE)			Q2 2019 (4/15/2019)			Q3 2019			Q4 2019			
	Al	Pb	Zn	Al	Pb	Zn	Al	Pb	Zn	Al	Pb	Zn	
OU-1	NO QUALIFYING DISCHARGE EVENTS (FROZEN/DRY CONDITIONS)			-	-	-	NO QUALIFYING DISCHARGE EVENTS WHERE SAMPLES TAKEN				-	-	-
OU-2				-	-	-					-	-	-
OU-3				1.110	0.021	0.190					1.850	0.027	0.251
OU-4				-	-	-					-	-	-
OU-5 (PRE FILTER)				-	-	-					1.560	0.013	0.242
OU-5 (POST FILTER)				-	-	-					-	-	-
OU-6				1.260	0.011	0.175					-	-	-
OU-7				2.730	0.022	0.366					0.416	0.084	0.093
OU-8				3.780	0.023	0.463					13.200	0.068	2.400
OU-9				-	-	-					-	-	-
OU-10				4.930	0.042	0.362					3.210	0.026	0.242
OU-11				-	-	-					-	-	-
OU-12				-	-	-					-	-	-
OU-13				7.830	0.237	0.720					1.650	0.017	0.206
OU-14	-	-	-	-	-	-							
CONTROL	-	-	-	-	-	-							
AVERAGE DISCHARGE CONCENTRATION (mg/L)	n/a	n/a	n/a	3.607	0.059	0.379	n/a	n/a	n/a	3.648	0.039	0.572	
PERMITTED DISCHARGE CONCENTRATION (mg/L)	0.750	-	-	0.750	0.227	0.180	0.750	-	-	0.75	0.227	0.180	

STORMWATER OUTFALL SAMPLE HISTORY												
OUTFALL	Q1 2020 (NO SAMPLE)			Q2 2020 (NO SAMPLE)			Q3 2020 (9/28/2020)			Q4 2020		
	Al	Pb	Zn	Al	Pb	Zn	Al	Pb	Zn	Al	Pb	Zn
OU-1	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE	-	-	-			
OU-2							-	-	-			
OU-3							0.549	0.008	0.066			
OU-4							2.530	0.043	0.402			
OU-5 (PRE FILTER)							-	-	-			
OU-5 (POST FILTER)							-	-	-			
OU-6							1.450	0.018	0.252			
OU-7							3.010	0.036	0.588			
OU-8							1.770	0.015	0.656			
OU-9							-	-	-			
OU-10							2.860	0.043	0.808			
OU-11							-	-	-			
OU-12							-	-	-			
OU-13							10.300	0.389	0.677			
OU-14							-	-	-			
CONTROL	-	-	-									
AVERAGE DISCHARGE CONCENTRATION (mg/L)	n/a	n/a	n/a	n/a	n/a	n/a	1.404	0.034	0.216	n/a	n/a	n/a
PERMITTED DISCHARGE CONCENTRATION (mg/L)	-	-	-	-	-	-	0.750	0.227	0.180	-	-	-

EXISTING STORMWATER CONTROLS

As part of the “2012 Railroad Improvement Project” a Manufactured Water Quality Treatment Structure, Type 2 was installed on Dock 20. This treatment device is of the Hydrodynamic Separator type. Per these plans, the drainage area to this structure is 5.94 acres with a treatment flow rate of 1.94 cfs. Per ODOT Location and Design Manual Table 1117-1, the max allowable treatment flow rate for this structure is 2 cfs. The Port has also tested individual inlet filtering devices and found the devices did not treat enough of the industrial pollutants and required frequent maintenance. Therefore, inlet filtering devices are excluded from the Master Plan.

IMPROVEMENT RECOMMENDATIONS

The main purpose of Dock 24 and 26W rehabilitation project is to raise the bulkhead elevation of the docks due to rising Lake Erie water surface elevations. The mean low Lake Erie water surface elevation (NAVD88) used in the plan is 569.46’, while the mean high Lake Erie water surface elevation (NAVD88) used is 573.66’.

The bulkhead elevation is being raised to 580.50' and all future improvements to the remaining dock bulkheads will be raised to the same elevation. This improvement eliminates sheet flow from the dock areas directly into the Lake. Rising lake elevations are not only a concern to the bulkhead elevations, but also the surface drainage, its collection and discharge into the Lake. Implications of rising water surface elevations include high groundwater table and lake water backflowing into the proposed closed drainage system. Drainage improvements on Docks 24 and 26, as well as any other improvement on Port property, requires that all connections and joints shall be silt tight above mean high Lake Erie water surface elevation and all connections and joints shall be leak resistant below mean high Lake Erie water surface elevation. Sensitive features, such as the underground detention vaults, or in key locations, shall be protected from backflow and a backflow prevention practice shall be placed to limit the tailwater conditions of Lake Erie on the gravity system.

The current industrial permit does not prescribe a precipitation depth or volume for the water quality treatment volume. When this is unknown, industry standard assigns a 24-hour storm distribution (related to geographical location) which generates 1 inch of rainfall in that time span. This duration and depth of rainfall is assumed to detach the surface pollutants and transport them to the receiving water.

The new Ohio EPA permit however offers an equation to determine water quality volume as the following:

$$WQ_v = Rv * P * \frac{A}{12}$$

Where:

Rv is the volumetric runoff coefficient (based on site impervious cover),

P is a 0.90-inch precipitation depth and

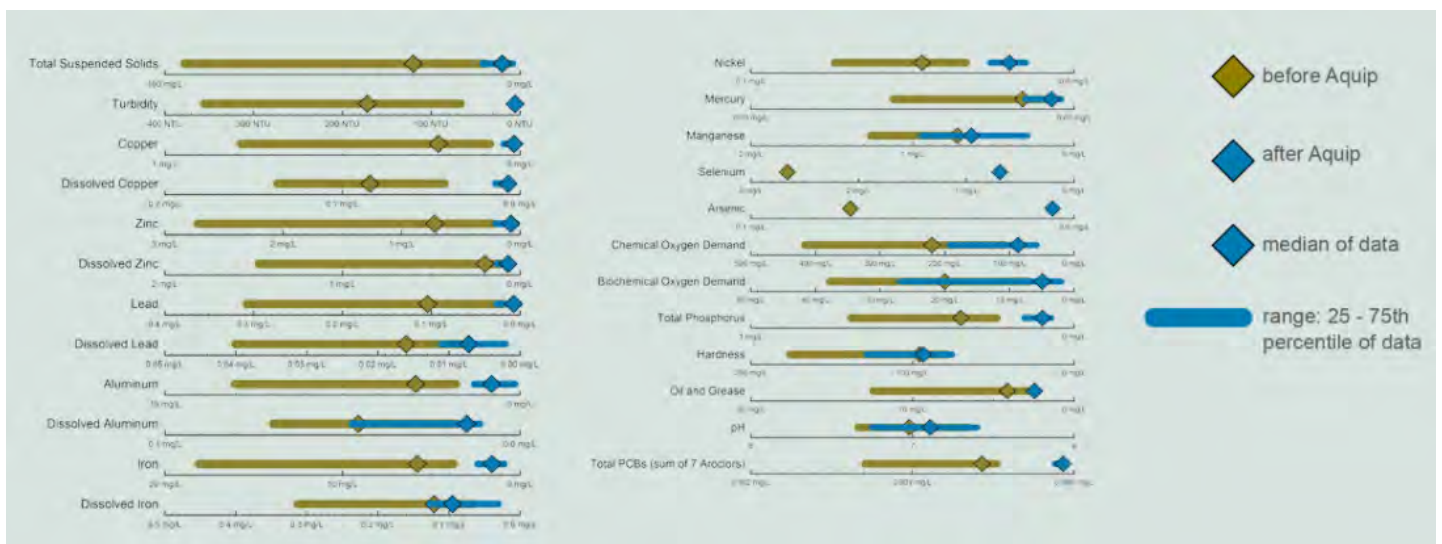
A is the drainage area in acres.

The new requirement rainfall depth is less than what was used for the master planning dock vault sizes, therefore, it is anticipated the presented design will adhere to the permit requirements; but shall be confirmed once detailed design commences.

Where underground detention vaults are proposed throughout the property, their size was established by routing the 1-inch, 24-hour storm into a HydroCAD storage node and, accounting for a constant discharge rate provided by the pumps, the required peak storage volume was determined. Diversion of the 1-inch storm into the underground vault is achieved through a concrete weir placed upstream of the vault in a catch basin. The weir elevation is to be set just above the 1-year Hydraulic Grade Line elevation at the specific bypass structure location. The volume provided by the underground detention vault, set by the weir elevation, shall provide more storage than the resulting peak storage volume of the HydroCAD storage node.

The water within these vaults will be pumped and discharged into an above ground filtration device. The treatment device filters the water and can remove nutrients such as phosphorus and nitrogen along with sediment and heavy metals such as zinc, lead, and aluminum. Filtration devices were selected in highly impervious areas due to the media's ability to treat heavy metals and its simplified maintenance compared to inground/belowground treatment devices. The pumps associated with the vaults and filter devices shall be sized to match the treatment flow rate of the selected filter while not allowing for the underground detention vault to reach 100% capacity.

Below is a representation of the expected pollutants and their removals. Exact data is site specific, but it is expected filtering practices will bring the stormwater discharge into compliance with the discharge permit due to their high efficiency removal rate.



The sky blue and pink hatching on the maps provided in Appendix A highlights the intended treatment area of Docks 24 and 26 which detailed design is already complete. The brown hatching indicates the additional area that is intended be sent to Dock 24 for treatment once the stormdrain system from the Master Plan is fully designed and installed in this area.

Similarly, the green and yellow hatching on the same maps show treatment areas using the same filtering technique as Docks 24 and 26, but without detailed design of the closed system and pump sizing. This step will follow once the master planning drainage improvements efforts commence.

Indicated in the previous section, there is a single treatment device already installed on Dock 20. It is intended to keep this structure functioning as part of this Plan.

Any future grading will not change the contributing drainage area as this area is nearly at the maximum allowed for the Type 2 separator. The red hatching on the maps provided in Appendix A highlights the existing treatment area of Dock 20 with its previously installed Type 2 device.

The Main Gate Improvements project shall be unimpacted by this Master Plan. This plan has left intact the Manufactured Water Quality Treatment Structure installed as part of the separate project. This is the same hydrodynamic separation practice that is previously installed on Dock 20. These hydrodynamic separators offer non-heavy metal treatment of stormwater runoff, which includes but is not limited to high specific gravity suspended solids, oil, grease, and debris. The only change to the Main Gate project is the potential regrading of the surface adjacent to the base of wall gutter to better treat the area east of Warehouse A through filtration and not hydrodynamic separation practices. The orange hatching on the maps provided in Appendix A highlights the existing treatment area of the Main Gate project area with its previously installed Type 4 device.

A third unique treatment practice is proposed in the grassed area of Dock 20 between the silos and bulkhead. Due to the nature of the land cover and the lack of vehicular travel, attributed to the existing grades or access to the south side of the raised tracks, an extended detention pond with forebays is proposed. This practice provides both water quality and quantity benefits, but not heavy metal reduction. Since a large percentage of this area is pervious and the remaining impervious has little potential for heavy metals deposition on the surface, this practice was selected for the most removal with the least construction costs. A closed drainage system is proposed to the west of the railroad tracks to intercept upslope drainage and route it to the extended detention basin. It is believed that the existing drainage of the pervious area and the pavement southeast of the raised railroad tracks can also be intercepted and routed to this basin. Two forebays will provide pretreatment before flowing into the main basin and outlet to Cuyahoga River. This basin should be sized using the equation presented earlier in this Plan. The blue hatching on the maps provided in Appendix A highlights the intended treatment area of Docks 20 and 22.

Lastly, while not improving water quality, another goal of the master plan is to consolidate outfalls. This is a request by the Port to reduce the number of outfalls into Lake Erie for ease of water quality testing and maintenance. This is achieved through removal and or abandonment of the existing stormwater infrastructure and tying it to the proposed improvements where applicable. This strategy allows for the maximum treatment area while keeping as much of the existing drainage network operable as possible.

IMPLEMENTATION PLAN

The master plan is to be constructed in phases based on the Port’s funding allotment. The various drainage basins outlined in this Plan were designed to function independently, therefore can be installed in phases. A preliminary stormwater cost estimate has been provided for each basin and can be found in the Appendix B. Based on the lowest cost per treated acre provided below, JMT recommends improvements to the Warehouse A West basin area first (brown hatching from Appendix A). However, JMT is unaware of future Port expansion and the Master Plan should be considered when upgrades to Port facilities are being undertaken.

Basin ID	Treatment Acreage	Cost	Cost/Acre
Warehouse A East	11.7	\$1,212,218	\$103,608
Warehouse A West	10.0	\$224,700	\$22,470
Dock 22	12.0	\$1,539,706	\$128,309
Dock 20	15.1	\$381,436	\$25,260

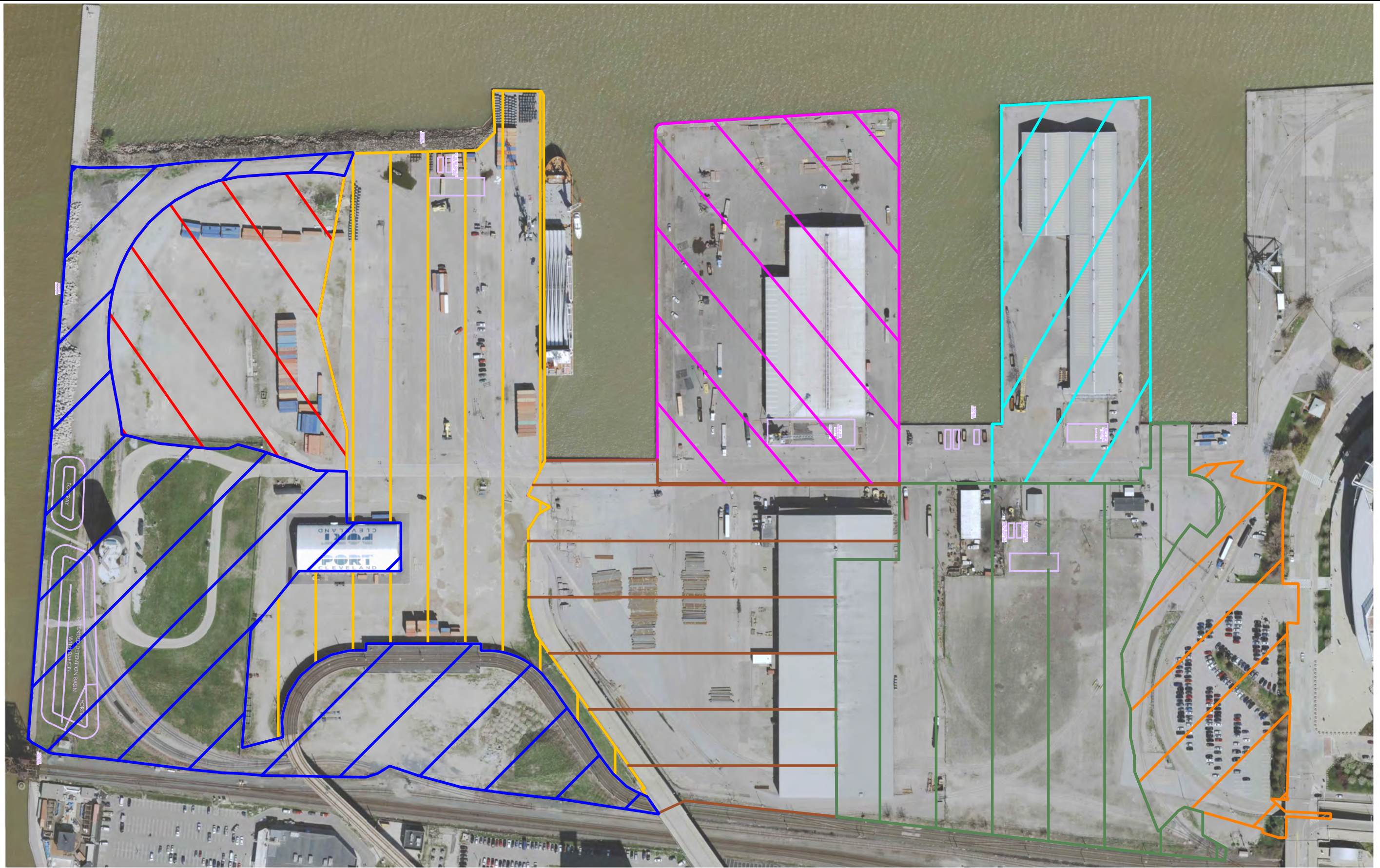
Consideration was also given for the Docks 24 and 26 rehabilitation project when it came to stormdrain layout and final treatment area. For example, the proposed stormwater system, water quality device, vault, and pumps on Dock 26 have been sized to accommodate future expansion of Dock 26 to the east. Similarly, Dock 24 closed drainage and treatment system has been designed to allow for connection of an improved drainage system of the area to the west of Warehouse A. As stated earlier, this plan also allows for the consolidation of outfalls based on the active phase.

Based on the Upper Cuyahoga River Total Maximum Daily Load (TMDL) report, approved by U.S. EPA on September 27th, the known water quality problems include organic and nutrient enrichment, siltation, low dissolved oxygen, and habitat and flow alterations related issues. The same report provided recommendations for water quality treatment solutions, and it is anticipated that the master plan provides adequate compliance as the proposed filters will remove nutrient contributions from both point and nonpoint sources as long as proper maintenance is performed on the filter units.

Lastly, The Ohio Industrial Stormwater General Permit expires May 31st, 2022. The renewal of this permit shall be facilitated by the Port. It is anticipated that if the water treatment facilities are not treating for the removal of any new pollutants required by the new permit, the filter media could be changed to target new pollutants with similar removal rates.



APPENDIX A – MASTER PLANNING MAPS



LEGEND

	DOCK 24 TREATMENT AREA 9.3 AC		DOCK 20 TREATMENT AREA (EXISTING) 5.9 AC		DOCK 20 TREATMENT AREA 15.1 AC		WAREHOUSE A EAST TREATMENT AREA 11.7 AC		WATER QUALITY TREATMENT DEVICE
	DOCK 26 TREATMENT AREA 6.0 AC		MAIN GATE TREATMENT AREA (EXISTING) 4.9 AC		DOCK 22 TREATMENT AREA 12.0 AC		WAREHOUSE A WEST TREATMENT AREA 10.0 AC		



CALCULATED CEG
 CHECKED NBC
MASTER PLAN LAYOUT TREATMENT AREA SHEET

PORT OF CLEVELAND




LEGEND
[Symbol] PIPE TO BE REMOVED
[Symbol] PIPE TO BE ABANDONED

PORT OF CLEVELAND

MASTER PLAN LAYOUT OVERVIEW SHEET

CALCULATED CEG CHECKED NBC



0
8

O:\2019\1900265_001_Dock_26w_Rehabilitat\CADD\drainage\sheets\1900265DP002.dgn Sheet 1/6/2022 8:12:00 AM CGoldsborough

MATCHLINE- SEE SHEET 4A



0 15 30 60
HORIZONTAL
SCALE IN FEET

CALCULATED
CEG
CHECKED
NBC

MASTER PLAN LAYOUT SHEET

SHEET 1

1
8



MATCHLINE- SEE SHEET 4

MATCHLINE- SEE SHEET 2

LEGEND PIPE TO BE REMOVED PIPE TO BE ABANDONED



MATCHLINE- SEE SHEET 1

MATCHLINE- SEE SHEET 5

MATCHLINE- SEE SHEET 3



CALCULATED	0	30	60
CEG	15 HORIZONTAL SCALE IN FEET		
CHECKED			
NBC			

MASTER PLAN LAYOUT SHEET

SHEET 2

2
8

LEGEND PIPE TO BE REMOVED PIPE TO BE ABANDONED

MATCHLINE - SEE SHEET 4

PROVIDE BACK FLOW REVERTER/CHECK VALVE

O:\2019\1900265_001_Dock_26w_Rehabilitat\CADD\drainage\sheet\1900265DP004.dgn Sheet 1/6/2022 8:19:04 AM CGoldsborough

MATCHLINE - SEE SHEET 2



MATCHLINE - SEE SHEET 6

LEGEND [Hatched Box] PIPE TO BE REMOVED [Cross-hatched Box] PIPE TO BE ABANDONED

CALCULATED
CEG
CHECKED
NBC

0 30 60
15
HORIZONTAL
SCALE IN FEET

MASTER PLAN LAYOUT SHEET

SHEET 3

3
8



LEGEND

- PIPE TO BE REMOVED
- PIPE TO BE ABANDONED

CALCULATED 0
 CEG
 CHECKED NBC

0 15 30 60
 HORIZONTAL SCALE IN FEET

MASTER PLAN LAYOUT SHEET

o:\2019\900265_001_Dock_26w_Renabilt\at\CADD\drainage\sheet\900265DP00.dgn_Sheet 1/6/2022 8:43:49 AM CGolasborough



MATCHLINE - SEE SHEET 1

MATCHLINE - SEE SHEET 4

LEGEND PIPE TO BE REMOVED PIPE TO BE ABANDONED



MASTER PLAN LAYOUT SHEET

SHEET 4A

4A
8



MATCHLINE- SEE SHEET 3

MATCHLINE- SEE SHEET 8

CALCULATED
CEG
CHECKED
NBC

MASTER PLAN LAYOUT
SHEET

SHEET 6

6
8



LEGEND
 PIPE TO BE REMOVED
 PIPE TO BE ABANDONED



MATCHLINE- SEE SHEET 8

LEGEND. [Hatched Box] PIPE TO BE REMOVED [Cross-hatched Box] PIPE TO BE ABANDONED

CALCULATED 0
 CEG
 CHECKED NBC

0 30 60
 HORIZONTAL SCALE IN FEET

MASTER PLAN LAYOUT SHEET



O:\2019\1900265_001_Dock_26w_Rehabilitat\CADD\drainage\sheets\19002650P009.dgn Sheet 1/6/2022 8:42:45 AM cGoldsborough
 MATCHLINE- SEE SHEET 7

CALCULATED 0
 CEG 15
 CHECKED NBC
 HORIZONTAL SCALE IN FEET 60

MASTER PLAN LAYOUT SHEET

SHEET 8

8

LEGEND
 PIPE TO BE REMOVED
 PIPE TO BE ABANDONED



APPENDIX B – PRELIMINARY STORMWATER TREATMENT AREA COST ESTIMATE

Treatment Area Cost Estimate- Warehouse A East					
Unit	Item Description	Supplemental Description	Quantity	Unit Price	Total Price
FT	PIPE REMOVED, 24" AND UNDER		511	\$ 14.64	\$ 7,480.83
FT	PIPE REMOVED, OVER 24"		150	\$ 32.28	\$ 4,842.60
EACH	CATCH BASIN REMOVED		3	\$ 500.00	\$ 1,500.00
FT	FENCE, TYPE CL		250	\$ 26.00	\$ 6,500.00
EACH	GATE, TYPE CL		2	\$ 2,000.00	\$ 4,000.00
EACH	SPECIAL - BOLLARD		4	\$ 800.00	\$ 3,200.00
FT	8" CONDUIT, TYPE B		125	\$ 18.00	\$ 2,250.00
FT	18" CONDUIT, TYPE B	706.02	1912	\$ 70.00	\$ 133,840.00
FT	24" CONDUIT, TYPE B	706.02	333	\$ 130.00	\$ 43,290.00
FT	30" CONDUIT, TYPE B	706.02	212	\$ 150.00	\$ 31,800.00
FT	36" CONDUIT, TYPE B	706.02	153	\$ 175.00	\$ 26,775.00
FT	8' X 4' CONDUIT, TYPE A, 706.05		408	\$ 650.00	\$ 265,200.00
EACH	CATCH BASIN, NO. 2-2B, AS PER PLAN		13	\$ 1,800.00	\$ 23,400.00
EACH	CATCH BASIN, NO. 2-3, AS PER PLAN		4	\$ 2,000.00	\$ 8,000.00
EACH	CATCH BASIN, NO. 2-2B, AS PER PLAN	DOUBLE STRUCTURE	1	\$ 3,500.00	\$ 3,500.00
EACH	CATCH BASIN, NO. 2-4, AS PER PLAN	DOUBLE STRUCTURE	1	\$ 4,500.00	\$ 4,500.00
EACH	CATCH BASIN, NO. 2-4, AS PER PLAN		1	\$ 2,500.00	\$ 2,500.00
EACH	MANHOLE, NO. 3, AS PER PLAN		4	\$ 3,800.00	\$ 15,200.00
EACH	MANHOLE FRAME AND COVER, AS PER PLAN		6	\$ 400.00	\$ 2,400.00
EACH	DRAINAGE STRUCTURE, MISC.:	PUMP STATION, ADD ALTERNATE INTERIOR COMPONENTS	1	\$ 70,000.00	\$ 70,000.00
LS	DRAINAGE STRUCTURE, MISC.:	WATER QUALITY TREATMENT BMP, ADD ALTERNATE	1	\$ 475,000.00	\$ 475,000.00
FT	SPECIAL - 6" WATER MAIN DIP CLASS 52 PUSH ON JOINTS AND FITTINGS		258	\$ 130.00	\$ 33,540.00
EACH	SPECIAL - BACKFLOW PREVENTER	IN LINE CHECK VALVE	1	\$ 8,500.00	\$ 8,500.00
LS	STORM WATER POLLUTION PREVENTION PLAN		1	\$ 20,000.00	\$ 20,000.00
EACH	EROSION CONTROL		15000	\$ 1.00	\$ 15,000.00
Total					\$ 1,212,218.43

Treatment Area Cost Estimate- Warehouse A West

Unit	Item Description	Supplemental Description	Quantity	Unit Price	Total Price
FT	18" CONDUIT, TYPE B	706.02	1073	\$ 70.00	\$ 75,110.00
FT	24" CONDUIT, TYPE B	706.02	208	\$ 130.00	\$ 27,040.00
FT	36" CONDUIT, TYPE B	706.02	110	\$ 175.00	\$ 19,250.00
FT	42" CONDUIT, TYPE B	706.02	198	\$ 200.00	\$ 39,600.00
EACH	CATCH BASIN, NO. 2-2B, AS PER PLAN		6	\$ 1,800.00	\$ 10,800.00
EACH	CATCH BASIN, NO. 2-3, AS PER PLAN		1	\$ 2,000.00	\$ 2,000.00
EACH	CATCH BASIN, NO. 2-4, AS PER PLAN		3	\$ 2,500.00	\$ 7,500.00
EACH	MANHOLE, NO. 3, AS PER PLAN		2	\$ 3,800.00	\$ 7,600.00
EACH	MANHOLE FRAME AND COVER, AS PER PLAN		2	\$ 400.00	\$ 800.00
LS	STORM WATER POLLUTION PREVENTION PLAN		1	\$ 20,000.00	\$ 20,000.00
EACH	EROSION CONTROL		15000	\$ 1.00	\$ 15,000.00
				Total	\$ 224,700.00

Treatment Area Cost Estimate- Dock 22					
Unit	Item Description	Supplemental Description	Quantity	Unit Price	Total Price
FT	PIPE REMOVED, 24" AND UNDER		800	\$ 14.64	\$ 11,711.67
EACH	CATCH BASIN REMOVED		5	\$ 366.79	\$ 1,833.95
EACH	REMOVAL MISC.:	OUTFALL ABANDONED, 13" TO 25"	3	\$ 300.00	\$ 900.00
FT	FENCE, TYPE CL	ADD ALTERNATE	225	\$ 26.00	\$ 5,850.00
EACH	GATE, TYPE CL	ADD ALTERNATE	2	\$ 2,000.00	\$ 4,000.00
EACH	SPECIAL - BOLLARD		4	\$ 800.00	\$ 3,200.00
FT	8" CONDUIT, TYPE B		130	\$ 18.00	\$ 2,340.00
FT	18" CONDUIT, TYPE B	706.02	1508	\$ 70.00	\$ 105,560.00
FT	24" CONDUIT, TYPE B	706.02	891	\$ 130.00	\$ 115,830.00
FT	36" CONDUIT, TYPE B	706.02	338	\$ 150.00	\$ 50,700.00
FT	42" CONDUIT, TYPE B	706.02	256	\$ 200.00	\$ 51,200.00
FT	48" CONDUIT, TYPE B	706.02	182	\$ 210.00	\$ 38,220.00
FT	8' X 4' CONDUIT, TYPE A, 706.05		460	\$ 650.00	\$ 299,000.00
EACH	CATCH BASIN, NO. 2-2B, AS PER PLAN		9	\$ 1,800.00	\$ 16,200.00
EACH	CATCH BASIN, NO. 2-3, AS PER PLAN		7	\$ 2,000.00	\$ 14,000.00
EACH	CATCH BASIN, NO. 2-4, AS PER PLAN		3	\$ 2,500.00	\$ 7,500.00
EACH	CATCH BASIN, NO. 2-5, AS PER PLAN		2	\$ 3,000.00	\$ 6,000.00
EACH	CATCH BASIN, NO. 2-5, AS PER PLAN	DOUBLE STRUCTURE	1	\$ 4,500.00	\$ 4,500.00
EACH	MANHOLE, NO. 3, AS PER PLAN		2	\$ 3,800.00	\$ 7,600.00
EACH	MANHOLE FRAME AND COVER, AS PER PLAN		3	\$ 400.00	\$ 1,200.00
EACH	DRAINAGE STRUCTURE, MISC.:	PUMP STATION, ADD ALTERNATE INTERIOR COMPONENTS	1	\$ 70,000.00	\$ 70,000.00
LS	DRAINAGE STRUCTURE, MISC.:	WATER QUALITY TREATMENT BMP, ADD ALTERNATE	1	\$ 650,000.00	\$ 650,000.00
FT	SPECIAL - 6" WATER MAIN DIP CLASS 52 PUSH ON JOINTS AND FITTINGS		222	\$ 130.00	\$ 28,860.00
EACH	SPECIAL - BACKFLOW PREVENTER	IN LINE CHECK VALVE	1	\$ 8,500.00	\$ 8,500.00
LS	STORM WATER POLLUTION PREVENTION PLAN		1	\$ 20,000.00	\$ 20,000.00
EACH	EROSION CONTROL		15000	\$ 1.00	\$ 15,000.00
				Total	\$ 1,539,705.62

Treatment Area Cost Estimate- Dock 20

Unit	Item Description	Supplemental Description	Quantity	Unit Price	Total Price
FT	PIPE REMOVED, OVER 24"		77	\$ 32.28	\$ 2,485.87
FT	FENCE, TYPE CL		800	\$ 26.00	\$ 20,800.00
EACH	GATE, TYPE CL		2	\$ 2,000.00	\$ 4,000.00
FT	18" CONDUIT, TYPE B	706.02	480	\$ 70.00	\$ 33,600.00
FT	24" CONDUIT, TYPE B	706.02	285	\$ 130.00	\$ 37,050.00
FT	30" CONDUIT, TYPE B	706.02	532	\$ 150.00	\$ 79,800.00
EACH	CATCH BASIN, NO. 2-2B, AS PER PLAN		2	\$ 1,800.00	\$ 3,600.00
EACH	CATCH BASIN, NO. 2-3, AS PER PLAN		3	\$ 2,000.00	\$ 6,000.00
EACH	MANHOLE, NO. 3, AS PER PLAN		2	\$ 3,800.00	\$ 7,600.00
EACH	MANHOLE FRAME AND COVER, AS PER PLAN		2	\$ 400.00	\$ 800.00
EACH	DRAINAGE STRUCTURE, MISC.:	WATER QUALITY OUTFALL STRUCTURE	1	\$ 2,000.00	\$ 2,000.00
CY	GRADING	WATER QUALITY TREATMENT BMP	8600	\$ 15.00	\$ 129,000.00
SY	SEEDING	WATER QUALITY TREATMENT BMP	5600	\$ 2.00	\$ 11,200.00
EACH	SPECIAL - BACKFLOW PREVENTER	IN LINE CHECK VALVE	1	\$ 8,500.00	\$ 8,500.00
LS	STORM WATER POLLUTION PREVENTION PLAN		1	\$ 20,000.00	\$ 20,000.00
EACH	EROSION CONTROL		15000	\$ 1.00	\$ 15,000.00
				Total	\$ 381,435.87