

**HABITAT RESTORATION AND ENHANCEMENT PLAN FOR THE 102ND
STREET EMBAYMENT**

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OCCIDENTAL CHEMICAL CORPORATION**

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1.0 INTRODUCTION

The Final Engineering Report (FER) for remedial activities at the 102nd Street Landfill includes construction of a slurry wall and bulkhead in the shallow nearshore habitat of the embayment and dredging of sediments in the deeper, offshore habitat. While the nearshore habitat has limited value as habitat for fish and wildlife, the offshore habitat may provide nursery areas for a number of fish species as well as habitat for muskellunge and feeding areas for waterfowl. Following dredging, habitat will be restored and in many areas, enhanced. An objective of habitat restoration for the embayment is to provide a higher quality habitat for fish and wildlife than currently exists.

2.0 EXISTING CONDITIONS

Maps of the bathymetric contours and existing vegetation zones of the embayment are provided in Figure 1 and Figure 2, respectively. Bathymetric contours were identified during the Remedial Investigation and are presented in the Final Report (July 1990). Vegetation zones within the embayment were identified and mapped in July 1994. Results of the vegetation study are presented in the Ecological Resource Impacts and Mitigation Site Study (October 1994).

Water depths in the nearshore habitat range from 0 to 1.8 feet. Wild celery (Valisneria americana) along with several species of pondweed (Potomageton) are the dominant plant species of the nearshore habitat. Vegetative cover in the nearshore habitat is approximately 80 percent at the outer edge with decreasing densities toward shore. The shallow, nearshore habitat corresponds to Zone 2 on the vegetation map in Figure 2. Zone 2 comprises approximately 10 percent of the vegetation cover identified in Figure 2. Water depths in the deeper, offshore habitat range from 1.8 to 3.8 feet. Wild celery is the dominant plant species in the offshore habitat with aerial coverage generally 100 percent but decreasing shoreward to 80 percent. The deeper, offshore habitat corresponds to Zone 1 on the vegetation map in Figure 2. Zone 1 comprises approximately 85 percent of the vegetation cover in Figure 2. A zone of sparse vegetation occurs adjacent to shore near the eastern end of the 102nd Street site. The water depth of this zone of sparse vegetation is generally less than 1.8 feet. This area of sparse vegetation corresponds to Zone 3 on the vegetation map in Figure 2 and represents approximately 5 percent of the vegetation cover in Figure 2. Boring logs indicate that the substrate in the embayment is a silty sand that is at least five feet in depth.

3.0 HABITAT IMPACTS

The area that will be filled for construction of the bulkhead consists of that portion of the nearshore habitat that is generally less than 0.8 feet in depth. The deeper portion of the nearshore habitat and the offshore habitat will be dredged. Dredging in the offshore habitat will be primarily in the shoreward areas of less dense vegetation. The FER calls for removal of 2 feet of sediments. Removal of two feet of sediments is conservative because most of the chemistry has been detected in the uppermost six inches of sediment. With the exception of two areas of elevated concentrations of chemicals, the areas dredged will not be backfilled with clean material. This will result in an increase in water depth in the post-dredging condition. As discussed in the Section 4.1, the increase in water depth will have a positive effect on habitat quality for aquatic vegetation, fish, and other biota. One of the two areas of elevated concentrations will be filled for construction of the slurry wall and bulkhead; the other will be restored to pre-construction elevations by backfilling with clean materials.

4.0 RESTORATION AND ENHANCEMENT PLAN

4.1 WATER DEPTH

According to Korschgen and Green (1988), two of the critical habitat variables for wild celery are water depth and substrate quality. Wild celery occurs in water depths of 2.3 to 5.9 feet, with a preferred depth of 3.0 to 3.9 feet. Most of the existing water depths in both the nearshore habitat and the portion of the offshore habitat that will be dredged are less than the preferred depths. Because the 102nd Street embayment will not be backfilled following dredging with the exception of the one area of elevated concentrations, water depth will increase to 2 to 3.8 feet in the existing nearshore habitat and to 3.8 to 4.8 feet in the offshore habitat. These post-dredging depths are within the range for wild celery, with most of the post-dredging depths within the range of preferred depths. The increased depth will be an enhancement, providing higher quality habitat than currently exists for waterfowl and muskellunge and other species of fish. The area of elevated concentrations will be returned to water depths of 0 to 1.8 feet. Post-dredging bathymetric contours are shown in Figure 3.

4.2 SUBSTRATE

Wild celery grows in a variety of substrates and best in silty sand (Korschgen and Green 1988). Boring logs for sediment samples taken during the Remedial Investigation indicate that silty sand, the preferred substrate for wild celery, is present to a depth of at least 5 feet. Accordingly, a minimum of 3 feet of preferred substrate will remain following dredging. Therefore, placement of backfill will not be required to provide an appropriate substrate for the establishment and growth of wild celery. Sediment used to backfill the area of elevated concentration will be favorable to the establishment and maintenance of wild celery.

4.3 PLANTING

Winter buds of wild celery will be planted at a density of 1000 per acre, the density recommended by Korschgen and Green (1988). The buds will be placed in the substrate at depth of 2 to 6 inches in the area within the coffer dam. The areas covered by the coffer dam will be allowed to colonize naturally once the coffer dam is removed. Other species of submerged aquatic vegetation will not be planted but should colonize the dredged areas naturally from adjacent populations.



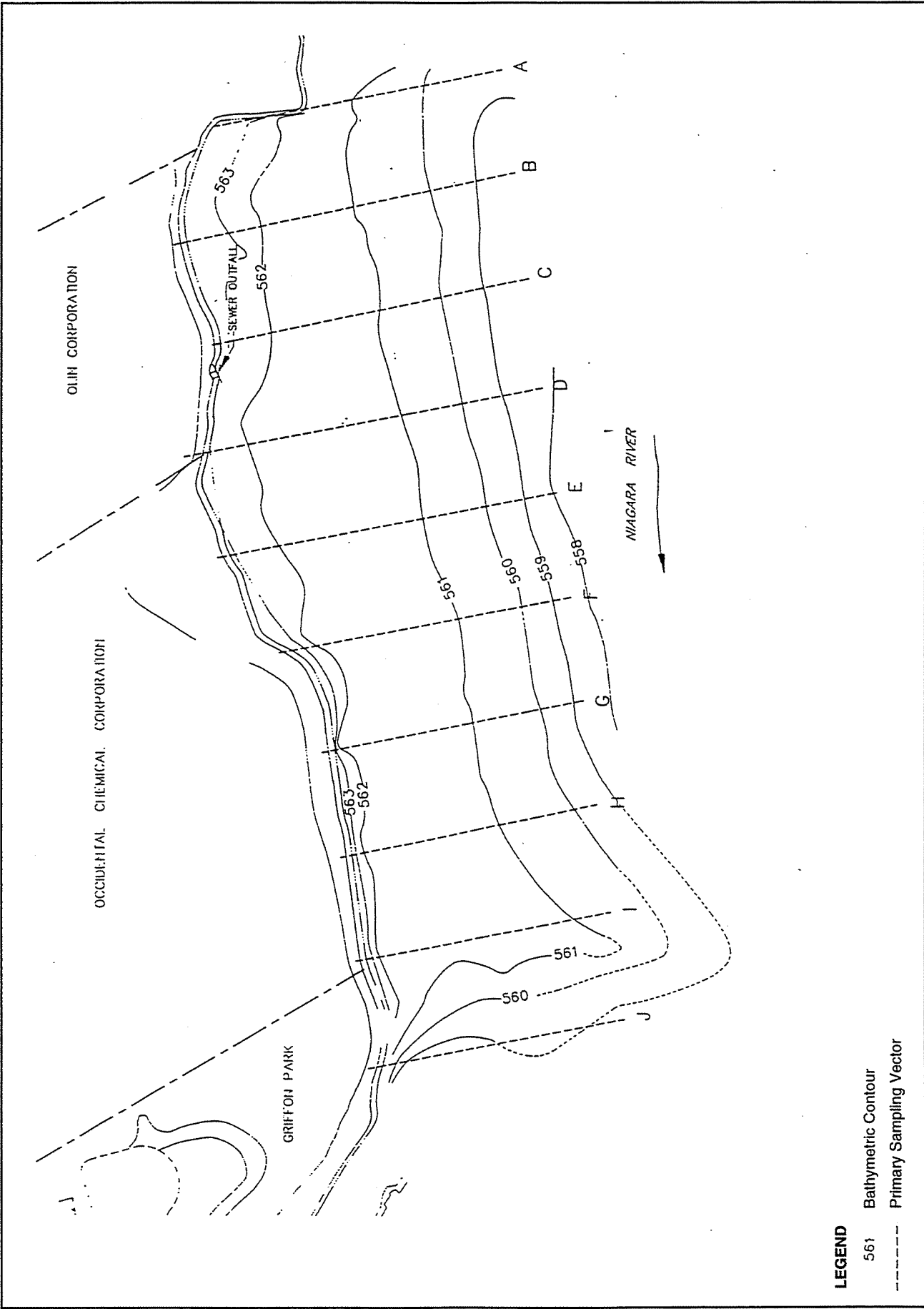
5.0 PERFORMANCE OBJECTIVES

The objective of habitat mitigation for the 102nd Street embayment is to produce beds of wild celery and other submerged aquatic plant species with an aerial coverage of 80 percent or more. Figure 4 provides a map of the expected vegetation cover following implementation of the habitat restoration and enhancement plan. Because some areas near the bulkhead and in the area of elevated concentrations may remain at depths that are less than optimal for wild celery, the performance standard of 80 percent will apply only to those areas that are deeper than 2.8 feet. Also, because small patches of sparse vegetation occur in natural systems and provide structural diversity, the performance standard of 80 percent will be applied to an average aerial coverage.

The embayment will be monitored annually for a period of five years to ensure that the performance objectives are achieved. The Companies are committed to meet or exceed the performance objective of 80 percent aerial coverage. The performance objective will be met if (1) 80 percent aerial coverage is achieved by the end of the fifth growing season or (2) percent aerial coverage has not been reached but has increased in each consecutive year during the five year monitoring period. If the performance objective is not met by the end of fifth growing season, additional plantings of wild celery buds will be done as necessary to achieve the performance goal.

6.0 REFERENCES

Korschgen, C.E. and Green, W.L. 1988. "*American Wildcelery Ecological Considerations for Restoration*", U.S. Fish and Service, pp 1-24.



LEGEND

- 561 Bathymetric Contour
- Primary Sampling Vector

BCM Project No. 00-7074-0203

0 240 FT







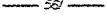
NORTH

Figure 1

**Pre-dredging Bathymetric Contours
102nd Street Landfill Site**



LEGEND

-  VEGETATION ZONE 1 (OUTER BOUNDARY OF ZONE 1 UNDETERMINED)
-  VEGETATION ZONE 2
-  VEGETATION ZONE 3
-  VEGETATION ZONE 4
-  PRESENT BATHYMETRIC CONTOURS

NORTH

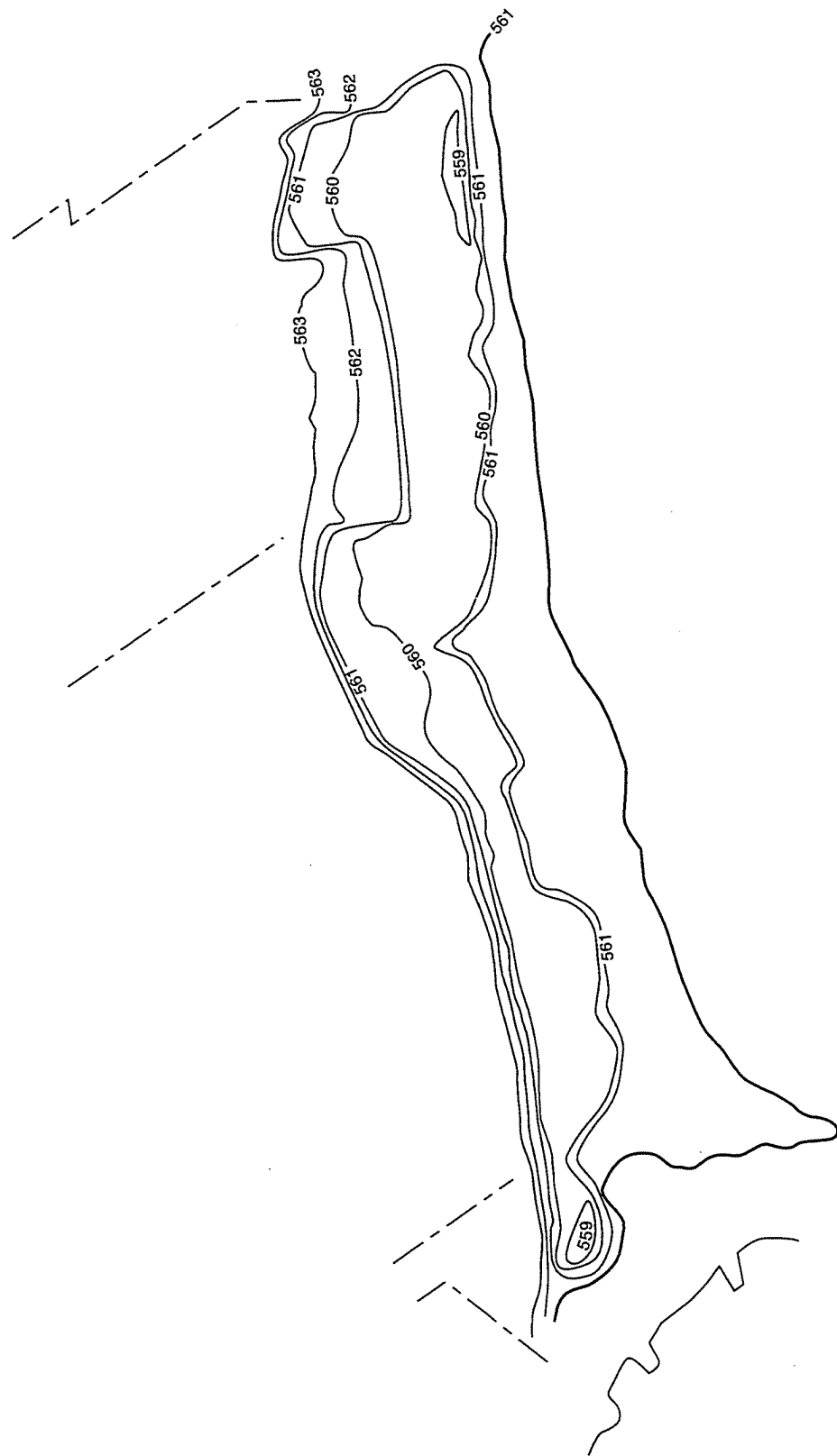


0 125 250 375

RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 2
PRE-DREDGING VEGETATION ZONES

OXYCHEM/OLIN
102nd STREET LANDFILL
Niagara Falls, New York



LEGEND
562 Bathymetric Contour

BCM Project No. 00-7074-0203

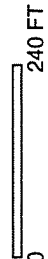
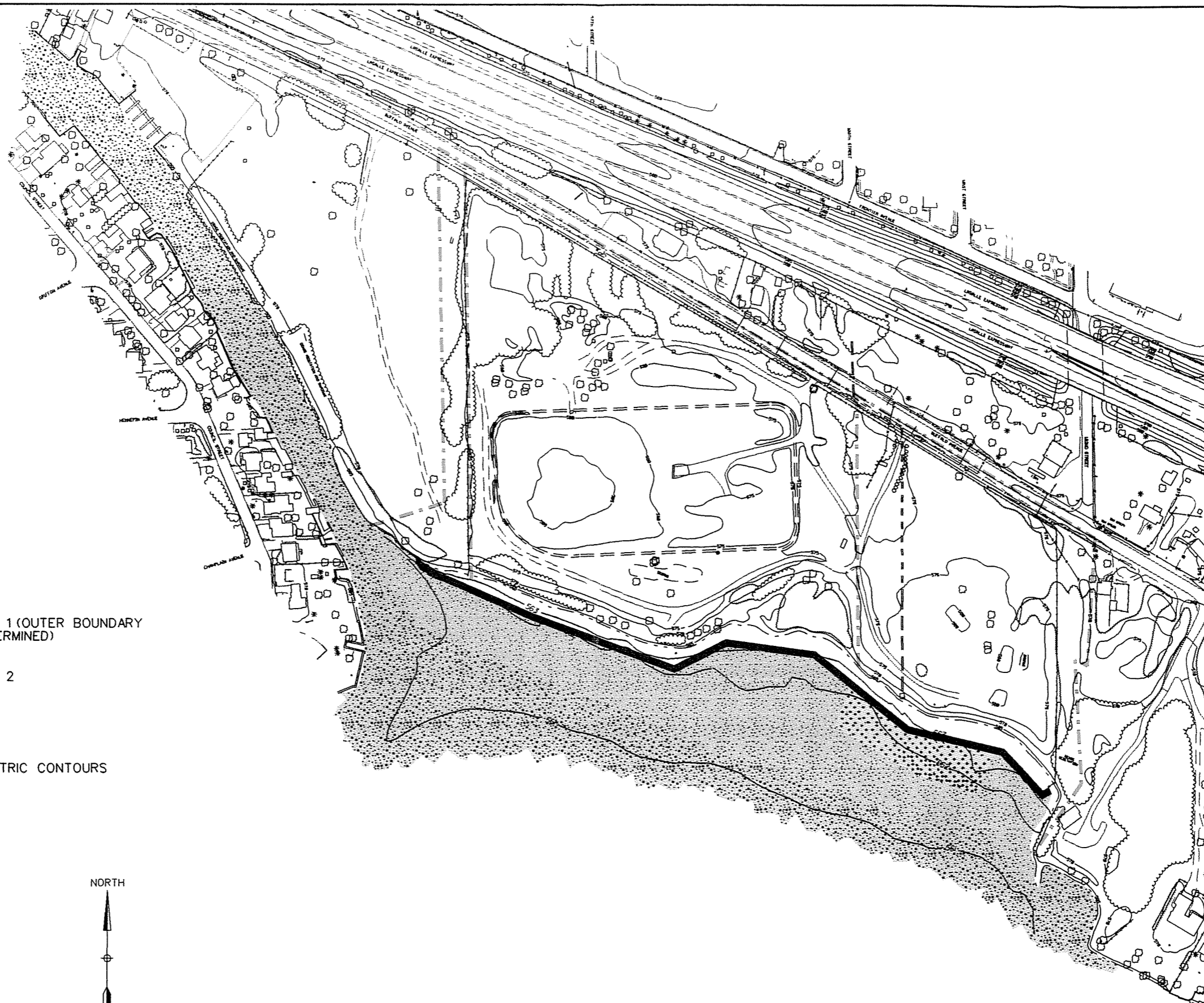

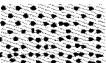




Figure 3
**Post-dredging Bathymetric Contours
102nd Street Landfill Site**



LEGEND

-  VEGETATION ZONE 1 (OUTER BOUNDARY OF ZONE 1 UNDETERMINED)
-  VEGETATION ZONE 2
-  BULKHEAD
-  PRESENT BATHYMETRIC CONTOURS

NORTH



0 125 250 375

RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 4
POST-DREDGING VEGETATION ZONES

OXYCHEM/OLIN
102nd STREET LANDFILL
Niagara Falls, New York