APPENDIX VI

Step II Field Survey

The following notes describe several aspects of the Step II field survey conducted on 11-12 October 2000 via LMS boat. The notes pertain to the following:

1) Underwater beach and bottom slope
2) Water clarity
3) A sample of sand and sediment collected and inspected
4) Overall impression of the site based on a boat - based inspection (added to earlier onsite and occasional underwater inspections)

The sites inspected were the 13 sites selected for Step II screening, the 3 sites with currently operating swimming programs on the Hudson (one site, Saugerties, is on a tributary and can not be reached from the river by boat), and 4 swimming sites with future potential (the Hudson River Park in Manhattan was not inspected during this work). Field observations were made at twenty locations, however at some locations more than one site was inspected, as noted in this report, for a total of 25 sites covered by this field survey. The sites are reported in the same sequence as they were inspected, north to south.

152W Henry Hudson Park

Two areas at the Henry Hudson Park were evaluated as proposed beach sites, one at the north end of the park, and the second area fronts the park directly on the Hudson River. The north area is located in a small shoreline depression. The existing north beach area is approximately 550 yards long and consists of rock and cobble along the upper part of the beach grading to gravel and sand near the waterline. At a water depth of 3 ft the sediment is fine gray clay. Sporadic growth of the rooted aquatic plant *Elodea* was observed at the southern end of the beach area.

The southern beach area is a long (600 to 700 yards) narrow strip of rock, cobble and stones used as fill behind a deteriorating wooden crib breakwall, which extends along the entire Hudson River (eastern) side of the park. Bottom sediments collected at a water depth of 3 ft consist of a clay-mud covering of a solid bottom of small stones (same as beach above water line) fine black shale and sand.

Depth measurements to determine beach gradient are presented in the table below:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)	
	North Beach Area	Park Frontage Area
300	32	32

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)	
	North Beach Area	Park Frontage Area
240	20	
210	12	6
165	6	
90	3	3

The slopes at both locations are acceptable for a beach. Due to the Class C water classification of the Hudson River in the vicinity of Henry Hudson Park, no water clarity measurement was taken. The channel current velocity measured at buoy no. 207 was 1.10 fps. The current velocity measured approximately 100 ft from the northern beach area in 3-ft of water was 0.25 fps.

138E Schodack Island State Park

The site shown in the Park Master Plan on Lower Schodack Island as a potential beach site was inspected, as well as two other locations further south on the Island. Water depth recorded along a transect perpendicular to the proposed swimming beach at various distances from shore, to help establish beach gradient, are presented in the following table:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
150	8
120	5
100	4
80	3

Water clarity measured with a Secchi Disk in 8-ft of water approximately 150 ft from shore is 6 ft and channel water clarity was 6.5 ft. Channel velocity on a flood tide was 1.7 fps and near the beach in four feet of water the velocity was 0.3 fps.

Bottom sediments based on a grab sample collected in 3-ft of water showed a layer of clay-mud over a solid base of compacted sand, with the sand probably the result of dredged material placement in the area. The beach slope and exposed sand appear to be excellent. The upland beach configuration needs work. The clay-mud will probably not persist at the site if it is developed as an active swimming facility. The two other sites viewed, one opposite Coeymans, the second approximately 500 ft from the southern end of the island are also promising beach sites.

127W Stuyvesant

The Stuyvesant site consists of a long sandy beach located on the northern side of a small land arm that extends westward from the eastern shore of the Hudson River. Water depth measurements and sediment sampling was conducted along a perpendicular transect in the approximate center of the beach. In addition to the depth readings several incidental depth readings were taken parallel to the beach, which indicated similar conditions at the western end of the beach near the River channel.

The water depth observed in the central portion of the bay, approximately 1250 ft from shore is four ft; however, the water depth appears to be consistent throughout the bay. Water depth readings at various distances from shore to establish beach gradient are presented in the table below:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
750 to 420	6+
105	5
70	4
50	3

Water clarity was 4-ft measured by Secchi Disk in 5-ft of water approximately 100 ft from shore; a Secchi Disk reading of 5-ft was measured in the channel. Water velocity in the channel (red buoy No. 38) was 1.7 fps and 100 ft from shore in 5-ft of water the velocity was 0.7 fps.

Bottom sediment is a cohesive clay-mud over a solid base of compacted dredged material sand. The beach slope is good, upland sand is excellent. The clay-mud will probably not persist at the site after it is used for a few initial weeks. Detailed studies may disclose another location along this ¼ mile long-beach with a more gradual gradient near-shore, and/or a less cohesive, thin deposit of clay-mud.

121W Four Mile Point Road

Two separate beach areas were noted at this site – the north area is located on property owned/managed by Scenic Hudson. Deep water, approximately 30-ft at 300 ft from shore, was noted at the north site with a good upland beach approximately 400-ft in total length. Beach gradient depth readings are presented in the following table:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
210	5 - 6
99	3
75	3

A Secchi disk reading of 3-ft was measured near shore at both potential beach areas. The channel Secchi disk reading was 4 ft. Near shore water velocity was 0.43 fps and the water velocity at the south beach area was 0.65 fps. The channel velocity reading taken at red buoy No. 150 was 0.53 fps.

The beach area is small stones and sand. Bottom sediments consist of mud with some clay over a compact strata of small grained shale. The beach slope is good for a small beach. A small stone base is satisfactory for a narrow beach, but the depth of mud at different levels should be reviewed again if this site is selected.

The south area beach is on a small bay with relatively shallow water 5-ft to 6-ft at approximately 400-ft from shore. The gradient then rises gradually. Water depth at 240-ft from shore was 4-ft and at 80-ft from shore the water depth was 3-ft.

Water clarity is 3-ft measured by Secchi disk near shore. Bottom sediment is fine sand with a trace of clay. The fine gray beach sand appears to extend under the entire gradient reviewed in the survey. The slope is excellent for a small beach. The natural bay indentation appears to trap good sand and offers some protection. From the waterfront aspects of the survey, this would be the preferred Four Mile Point Road site.

119.5 Stockport Middle Ground Island

The NW corner of this island was reviewed, even though a current land ownership issue may condition recommendations regarding public use. Water depth readings presented in the following table were taken along a transect extending from the NW corner of the Island.

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
200	25
130	10
70	3 to 4
50	3

The bottom feels firm to probe, no sediment kicked-up. No water clarity measurements were taken at this site. Several small beaches at this corner of the island appear to be occupied by squatters. The sand quality looks good, and is probably from dredged material deposits.

105W Bristol Beach State Park

The site reviewed at Bristol Beach was the southern corner of the bay located to the south of Eve's Point and the adjoining River shoreline. The bay is very shallow, 2-ft depth at near mid-bay over 300 ft from any shoreline. At the SE (River) corner of the bay the

depth increases to around 3-ft at 150 ft from shore. Another 300 ft further south the depths are a little more promising (Table below).

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
200	5
150	4
100	3

Water clarity is 4-ft measured by Secchi disk near shore in five ft of water. Bottom sediment is mud with some plant material. A compact layer of sand is approximately 6 in below the surface mud layer. Near shore water velocity was recorded at 0.66 fps and the corresponding channel water velocity was 1.81 fps. Dense vegetation is present along this entire shoreline. The only upland beach "visible" from the boat was the southern shore of the shallow bay. It would require a further study to determine if a beach could be built on the base of dredged material (sand) deposit in a cost-effective manner.

97W Ulster Landing County Park

This existing Park beach was inspected to review the location of offshore sand deposits. A water depth of 30 ft was recorded approximately 900-ft from the beach; however, at 320 ft from shore a 4-ft water depth was noted. Approximately 600-ft to the south and 800-ft to the north of the beach site large vegetated sandbars were noted. Both of the sandbars were visible at low tide, indicating both flood and ebb tidal erosion from the beach to these sandbanks.

The sediment characterization sample collected at the 3-ft depth indicated sand and some mud. No water clarity measurements were recorded at this location.

92 Kingston Point Beach

Only a few observations were taken at this existing swimming beach facility since the issues at this site are not related to the beach, but rather to bathhouse rehabilitation needs. The beach is relatively shallow, 3-ft at 550 ft from shore at low tide.

A bottom probe at 3-ft water depth showed sand and some mud. No water clarity measurements were recorded at this location.

90W Port Ewen Town Park

The water depth in the bay in front of the Port Ewen Town Park is very shallow. Approaching from the NE, 1-ft water depth was encountered at approximately 1000 ft

from shore. Approaching the beach from the ESE, 1-ft water depth was encountered at approximately 700-ft from shore (at low tide conditions). The beach viewed from this distance looked flat and muddy. The dense mats of water chestnut observed during the summer site visit covering the bay had died off and were not observed.

A bottom sediment sample collected in 2 ft of water consisted of unconsolidated clay with a little mud and ample plant and other organic materials including water chestnut seed-pods. The mud had a strong odor. Water clarity could not be observed because of the stirred-up mud. Large numbers of cormorants and swans were observed in the shallow bay.

87E Mills Norrie State Park

Three potential sites at Mills Norrie State Park were observed during the survey. The three sites are noted below:

1) A west facing beach near the Mills maintenance area (Site A)
2) A north facing beach near the former groundskeeper's house (Site B)
3) The shoreline near the Norrie picnic area

Mills Site a: In general, the water depth off the bay west of the Mills Mansion and near the maintenance garage was shallow. Approaching the entrance to the bay from the northeast showed 2-ft of water depth at low tide approximately 500-ft from shore. Within the bay, the 2-ft bathymetric contour was again encountered 246-ft from the beach. Suberged aquatic vegetation was extensive throughout the northern part of the bay.

Bottom sediment consisted of black organic silt with trapped water chestnut seedpods. The mud had a strong odor. Water clarity could not be observed because of the stirred-up mud.

Mills Site b: The beach near the former groundskeeper's house had the best overall characteristics, probably due to the cleansing and depositional action of a small stream that empties into this section of the bay. This section of bay was first surveyed from a perpendicular approach toward the stream entrance with results as follows:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
400	5
350	3
261	1

Water clarity is 3-ft measured by Secchi disk near shore. Bottom type is solid, made up of fine sand. Water current velocity averaged 0.14 fps.

A depth profile transect was conducted parallel to this beach consisting of two observations to the east, and two to the west of the initial perpendicular approach to the beach. The measurements were approximately 200 ft apart, as follows:

This beach site (Site B) probably has the best underwater configuration and sand conditions to the west of the stream entrance. This site is also well removed and screened from the visual and auditory range of Mills Mansion visitors.

The Norrie picnic areas were surveyed from the small shale beach at the north of the picnic area at the pump house, to the southern end of the picnic area. Periodic readings of depth taken at distances of approximately 100-ft from shore showed radical changes in depths from 25 ft to 50 ft or more. The changing depth may indicate exposed rock outcrops at the edge of a glacially carved deep section of the Hudson. Two approaches to shore showed 19 ft depth at approximately 40-ft from the pumphouse beach, and 22' at approximately 35 ft from the middle of the picnic area.

Water clarity is 3.5-ft measured by Secchi disk near shore. This exposed and deep site may be a good location for a floating pool that is moved during the winter to prevent ice damage.

58W Kowawese Unique Area at Plum Point

Observations were taken at two locations at Plum Point (Orange County managed park). The first was at the smaller beach located north of the former barge landing inlet, and the second at the larger beach located south of the former barge inlet and in front of the pavilion. The northern beach is comprised of small shale stones and has the following depth conditions:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
400	6
225	4
90	3

Water clarity is 2.5 ft measured by Secchi disk near shore. Bottom sediment is shale-sand, some small stones and silt. Current velocity at this site averaged 0.08 fps.

The southern beach is comprised of gray shale sand and has the following depth conditions:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
600	6
258	3

Water clarity is 2.5 ft measured by Secchi disk approximately 1500 ft from shore. The discharge from the tributary stream may account for reduced clarity in this area. Current velocity averaged 0.3 fps off shore of the beach. Channel current velocity averaged 0.94 fps.

Both beach sites are good for public swimming feasibility at Kowawese, however the larger, southern beach is the preferable site when sand and slope conditions are considered.

55E Little Stony Point State Park

The beach at Little Stony Point was approached for observations at mid-beach from the northeast. Locations approximately 200 ft to the east and 222 ft to the west were observed for water depth as follows:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
300	10
200	6
122	5

Water clarity was 2 ft measured by Secchi disk near shore. Bottom sediments consist of fine grained sand with a little silt. Water current velocity averaged 0.39 fps.

The beach slope as observed from the boat and from an in-water survey indicate that a beach located at the eastern half of the peninsula may have the better slope for most swimmers. This beach section may also be less exposed to waves. The beach is approximately 1000 ft long with sand that is excellent for a public swimming area.

41E Verplanck

Two locations were examined at Consolidated Edison Company of New York, Incorporated's Verplanck site; 1) approximately 300 ft north of the electrical transmission tower, and 2) 150 ft south of the abandoned line of piles standing just off shore (also 483 ft southwest of the hatchery building). The observations were as follows:

Location 1, Transmission tower area, north end of site: The water depths were found to be as follows

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
300	25
90	10
66	8
40	4

Water clarity was 3 ft measured by Secchi disk near shore. Water current velocity averaged 0.19 fps and the corresponding channel current velocity was 1.50 fps. Bottom sediments consist of fine grained, compact sandy silt with small pebbles. The slope gradient is very steep at this location with a particularly steep gradient found between the shoreline and 40 ft out. The entire shoreline segment from the high tension line tower base to this location (600 ft) appears to have the same configuration.

Location 2, located south of hatchery building (approximately 1000 ft in length) has bottom contours that are more gradual, with water depths as follows:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
123	7
99	4.5
72	3

Water clarity was 2.5 ft measured by Secchi disk near shore in7 ft of water. Water clarity in the channel was found to be 3.5 ft measured by Secchi disk at navigational buoy No. 27. Near shore water current velocity averaged 0.49 fps. Bottom sediments are fine grained, compact sandy silt. The gradient and beach at this Verplanck location is good for a small swimming facility. The sand conditions are excellent. The close location of the hatchery building is good if it's adaptively used. The view of a fuel facility to the south is a negative aspect of this site. With some clean-up of the remnant piles the beach location may extend another 50 to 70 ft further north allowing more buffer space from the incompatible land uses to the south.

39W Riverfront Park

Two beach areas are at this location, the first facing north backed by a small, but well organized Town Park, and the second is east facing beaches formed by groins placed to protect a shorefront road. The first would provide the best option for a swimming facility, so the observations were taken at the Town's north facing beach. Approaching from the northeast, the near shore rise is gradual and water depths are as follows:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
300	8
93	4
66	3

Water clarity was 2.5 ft measured by Secchi disk in 4 ft of water approximately 60 ft off the beach area. Water current velocity was found to be 0.08 fps with a corresponding channel velocity of 0.37 fps. Bottom sediments are 1 to 2 inch rocks and compacted sand. The gradient and size of this beach is good for a small community based swimming program. The sand at the shoreline is excellent for a beach. Some relatively simple actions, such as raking and careful selection of swimming site will probably minimize problems with small stones underfoot a few feet from shore.

37.5W Rockland County Park

The observations for this property were taken approximately 600 ft south of the sheet piling for the former barge landing site, in line with a communications tower behind the existing tree line of this undeveloped park. Approach from the northeast indicated a gradual slope. Water depths recorded at this site were found as follows:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
210	6.5
105	5
72	4
45	3

Water clarity was 3.5 ft measured by Secchi disk in 4 ft of water approximately 75 ft from shore. Channel water clarity was also 3.5-ft measured by Secchi disk. Water current velocity averaged approximately 0.20 fps recorded 75 feet from shore and 0.37fps in the channel. The bottom sediment is a compact sand mixed with a little silt, and with small, well-rounded rocks and brick remnants. Some larger brick fragments and stone are visible on shore.

The slope and length is good for a beach. The larger fragments and rock remnants (from the former quarrying operation located inland) can be racked or moved, preferably to form mini-groins to help retain sand. The land base can support a larger beach at this location.

37W Bowline Point Town Park

Observations were taken at the beach that is in line with the playground, just south of the band-shell in this park. Several groins have collected sand partly composed of well-

weathered brick remnants. The site consists of a small beach area with upland facilities. The underwater bottom contour rises a little more rapidly than would be ideal for a beach. Depths were found to be as follows:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
120	6.5
90	5.5
72	4

Water clarity was 3.5 ft measured by Secchi disk in 4 ft of water approximately 75 ft from shore. Water current velocity measured approximately 75 ft off-shore averaged 0.17 fps and channel velocity was approximately 0.37 fps. Bottom sediment is composed of compact red sand with a few broken shells and brick remnants.

The Bowline Point Park beach is relatively close to a power plant fuel barge docking facility, just north of the park. Additionally the beach measured was a little steeper than optimal. If a County swimming beach is established one mile to the north, then this is probably not a high priority beach project. If a project was proposed in this park, then the groin fields further to the south should also be inspected for their suitability.

36E Croton Point Westchester County Park

The existing swimming beach at this site was examined for comparison to other sample sites. The observations were from approximately the mid point of the guarded beach (in season), as follows:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
486	6
426	4
291	3

Water clarity was 3 ft measured by Secchi disk near shore. Bottom sediment is composed of compact sand.

32E Louis Engel Jr. Park, Ossining

This small beach was approached at the center, from the west. The wastewater treatment plant located approximately 500 ft to the south was noticeable by it's characteristic smell, but this is not necessarily related to a discharge in the water. The beach itself is approximately 1500 ft long, but has very little upland depth. The following depth observations were recorded:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
550	8
375	7
300	7
153	6
111	5
90	3

Water clarity was 3 ft measured by Secchi disk measured in 4 ft of water 100 ft from shore. Water clarity was 3.5-ft measured by Secchi disk at mid river. Water current velocity 60 feet off shore averaged approximately 0.06 fps. Channel velocity averaged 0.62 fps. Bottom sediment is composed of compact, clean sand. The limited upland parkland constraints and the odor issue at this property require considerable study, which may be significant impediments considering the close proximity of the beach at Croton Point County Park. These issues notwithstanding, the beach conditions are favorable should the other issues be resolved and need dictate two beaches in this region.

30.5W Nyack Beach State Park

Nyack Beach was a popular swimming area in the first half of the 20th century. Historic photos indicate this activity was located near the large building constructed by the WPA at this site (now serving as a meeting hall and bathrooms). It is possible that the stone vertical wall built at the waterfront during this era contributed to the erosion of part of this beach at this location, due to the wave scour at the base of the vertical wall. The section of beach still remaining, located south of the rock wall, was therefore the obvious location for study at this time.

A mid-beach location was used to obtain the following measurements, approaching from an east-northeast direction:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
360	7
255	5
204	3

Water clarity was 2.5 ft measured by Secchi disk measured in 3 ft of water 200 ft from shore. Water current velocity averaged approximately 0.05 fps. Bottom sediment consists of fine grained, silty, firm sand, with approximately 5 inches of light silty sediments at the surface. In order to further evaluate the shape of this eroded beach, a line was measured paralleling the shore, starting at the end of the rock wall, and ending near the property line to the south, measurements were taken revealing the following depths:

DISTANCE FROM SHORE (ft)	WATER DEPTH
195	3 feet
204	3 feet
210	3 feet
213	2 inches

The beach gradient appears to be less steep at the south boundary of the Park property; though the back beach area is limited. The private property abutting the Park appears to have a little better beach continuing this trend. This observation may indicate that the restoration of a natural shoreline along the unused, paved area may help restore additional beach. This issue requires study in advance of any swimming beach development at this site.

28E Kingsland County Park

The beach at this Park was a popular swimming site, managed by a large staff, 26 years ago. Regular sand replenishment from upland sources was a part of the operation of the site. The swimming programs were ended due to concerns regarding water quality and budgeting issues. A formidable fence and 8 ft tall hedges currently keep all but the most persistent from even seeing this beach. The beach looks excellent from the water or on shore. Observations were taken and recorded from the western third of the beach, approximately in line with the secondary (closed) entrance. Depths were recorded as follows:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
540	7
404	6
345	6
269	5
216	5
84	4

Water clarity was 3.5 ft measured by Secchi disk measured in 5 ft of water approximately 85 ft from shore. Water current velocity at the site averaged 0.06 fps, channel velocity averaged 2.17 fps. Bottom sediment is composed of gritty, silty sand. The beach sand quality is excellent at this site. Considering the gradual rise in the water depth a few hundred feet from shore, the near-shore slope is a little steep. This may indicate the 26 years of sand loss due to wave action during the time that sand replenishment has not been done. Even in it's current condition the beach is a good prospect for a swimming program.

23E Dobbs Ferry Park

The survey observation was at approximately mid beach, however as sediments and water depth became a problem, the survey line was varied somewhat to try, unsuccessfully, to find less muddy locations. The following water depth observations were recorded; all measurements of distance were to the nearest point on the beach.

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
609	31
495	25
405	20
342	15
270	10
225	5
213	2

The boat could not be moved closer to the beach due to the deep mud. Hand driven probes (1 man, no extra effort) showed 2.5 ft of cohesive mud and clay. It was only with some difficulty that the 1.0 in diameter probe was removed from this mud. Water clarity could not be measured because of the stirred-up mud. The conditions noted at this site are not suitable for a swimming facility.

22.5E Dobbs Ferry, Wickers Creek

A secondary site was examined, approximately one quarter mile north of the Dobbs Ferry park. Though this small bay has many similarities to the park, the creek appears to keep sediments out, producing instead a small sand delta. The site observed was near the creek mouth, and the following depth measurements were taken:

DISTANCE FROM SHORE (ft)	WATER DEPTH (ft)
228	10
159	14
90	17
75	6
69	4

The water currents were difficult near shore, too uncertain to take water currents or clarity (Secchi disk was carried laterally). Bottom sample was silty sand with small pebbles. The bathymetrics at this location were too uncertain to decipher from a brief survey. The potential flaws of this site for a swimming program would be the uncertain currents. Other locations just a few hundred feet from this creek, may yield completely different results.

Three other locations were observed and photographed from a 500 ft distance during the survey, confirming earlier decisions to defer these sites from consideration. These locations were:

- 139E Schodack Island, near the northern end of the peninsula. The protective structure along this shoreline edge, combined with little upland property, poor access and no visible beach (from a distance) are not characteristics of a good public beach.

- 59.5W Eastern Harbor Marine, a highly industrialized, but partially abandoned site, and

- 26E BA “Beach”, which appears to be a small stand of trees, perhaps a half acre of land outside of the railroad tracks (no access). A small strip of sand, perhaps 30 ft in width, appears to be the beach.