United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

April 13, 2010

Mr. Leonard Houston, Chief
Environmental Analysis Branch, New York District
U.S. Army Corps of Engineers
Jacob K. Javits Federal Building
New York, NY 10278-0090

Attn: Ms. Weichenburg

Dear Mr. Houston:

In accordance with the Scope of Work dated February 1, 2010, the U.S. Fish and Wildlife Service (Service) submits this Draft Fish and Wildlife Coordination Act Planning Aid Letter for the Westchester County Center and Yonkers Avenue Streambank and Shoreline Erosion Protection Projects for review by the U.S. Army Corps of Engineers' New York District (Corps). Please forward any comments on the report at your earliest convenience. Comments/revisions provided by your office will be incorporated into the final version of this document.

PROJECT DESCRIPTION

The Westchester County Center and Yonkers Avenue Streambank and Shoreline Erosion Protection projects are proposed under the Continuing Authorities Section 14 of the Flood Control Act of 1946, as amended (33 U.S.C. 701[r]).

Westchester County Center Project

The Westchester County Department of Planning (WCDP) is the project's prospective sponsor. The Corps provided the following description of the project site (see Figure 1 for site location map) and problem identification/solution in their feasibility report (U.S. Army Corps of Engineers 2009a):

> The project site is located in the vicinity of the Westchester County Center complex, near the intersection of the Bronx River Parkway and Central Avenue. The Central Avenue Bridge connects the Metro North commuter rail parking lot with the County Center. The current bend in the river flow has produced bank erosion which threatens to undermine the adjacent Bronx River Parkway. In addition, the Central Avenue Bridge abutments have become exposed and are also at risk of being undermined. The current bank erosion spans from a few hundred feet north of the bridge to over 1,000 feet south of the bridge, for a total length of approximately 1,600 feet.
>
> Bank stabilization at the project site will utilize bioengineering techniques wherever feasible. For the majority of the site, where stream velocities are low and sheer stress is within acceptable parameters, bioengineering techniques will rely heavily on the use of

> vegetation. A hybrid solution of hard structures, such as rip-rap, in combination with plantings will be utilized in those portions of the reach with greater sheer stress.

The Corps provided undated grading plans (60 percent design), planting details, a materials and layout plan, and an undated planting plan (also 60 percent design). The grading and planting plans and the planting detail are included in Enclosure 1.

The site preparation plan indicates that the majority of the western bank/shoreline of the Bronx River within the project area will be cleared/grubbed (removal of root system) to remove invasive vegetation. Several trees that may affect the stability of adjacent structures (bridge footings, highway concrete, etc.) will also be removed.

The plan calls for the installation of approximately 570 linear feet of boulder walls with adjacent riparian and upland plantings in areas where the shoreline is undercut, primarily in the northern portion and a small section of the southern portion of the project site. Approximately 120 linear feet of stone revetment is proposed in steeply sloped areas, primarily in the northern and southern portions of the site. Approximately 630 linear feet of wetland plantings are proposed in the gradually sloped central portion of the site. The Corps indicated through phone conversations that cofferdams would be used during the construction of the boulder walls and stone revetment.

The Service reviewed the planting plan and its list of proposed plant species for the project. The planting plan separates the project site into the: a) established turf zone (western most portion of site in highest areas) consisting of turf/grass species; b) upland zone (buffer between riparian and meadow/turf zone) consisting of grass/herbaceous species; c) meadow zone (between upland and turf zones) also consisting of herbaceous species; d) riparian zone (transitional zone between wetlands and uplands) consisting of herbaceous and shrub species; and, e) wetland zone (between aquatic and riparian zone) consisting of herbaceous and shrub species. With the exception of the established turf zone (appropriate since it is adjacent to the Bronx River Parkway), all species are native and appropriate for the areas of proposed seeding/planting.

The project also includes the use of bio-engineering in steeply sloped areas requiring stone revetment. This technique consists of the installation of live black willow (*Salix nigra*) and silky willow (*Salix sericea*) stakes within the stone revetment.

Yonkers Avenue Project

The Village of Tuckahoe is the prospective sponsor of this project.

The Corps provided the following description of the project site (see Figure 2 for the site location map) and the problem identification/solution in their feasibility report (U.S. Army Corps of Engineers 2009b):

> The project site is located along Yonkers Avenue between Main Street and Elm Street. The river bank erosion at this location spans 240 feet to the south of Main Street. This portion of the Bronx River is channeled between the stone wall support of Yonkers Avenue and the supports of a parking lot on the opposite bank of the river. The river also makes a ninety degree bend at the base of the Yonkers Avenue support wall. The increased velocity as a product of the channelization and the river bend at this location has resulted in the loosening of the stones on the wall, effectively undermining the Yonkers Avenue support wall.
>
> The District (Corps) and the Village of Tuckahoe are proposing to install steel piling for approximately 240 feet along Yonkers Avenue. The sheet piling will have a total height

of 30 feet: 20 feet will be embedded with a 10-foot high visible structure. In addition, a rip-rap apron is proposed for the erodible surface at the bend to protect the toe of the bend from riverine erosion.

Please see Enclosure 2 for project site plans.

Due to the steep slopes and the need for structural stabilization of the riverbank, no bioengineering techniques to provide riparian habitat, including stream bank plantings, are proposed for this project.

Project Schedule

Each of the projects is expected to take no more than 6 months to complete, are scheduled to occur from late summer (2010) into the winter months. The Westchester County Center Project is scheduled to start construction first, with some overlap in the construction schedule for the Yonkers Avenue project.

NEED FOR BRONX RIVER RIPARIAN HABITAT RESTORATION

Much of the Bronx River watershed has been developed for residential and commercial uses, with some light industry present (Center for Watershed Protection *et al.* 2007). Observations made during site inspections conducted on December 14, 2009, indicate that the Bronx River bank at each site consists of man-made stabilization structures (retaining walls, culverts, rock revetment, etc.) with paved roads/highways/parking lots located directly adjacent to the river.

A group of community based and non-governmental organizations and Federal, State, and local government agencies (including the Corps and the Service) have formed the Bronx River Alliance to address the impacts that development and other land use practices have had on the river ecosystem. This alliance has prepared an ecological restoration and management plan (Bronx River Alliance 2006), whose overall ecological goals for the Bronx River are to:

1. Protect and improve water quality;
2. Protect and improve aquatic and riparian plant and animal biological diversity and habitat; and
3. Reduce environmental stresses on the river ecosystem.

One of the specific goals of the plan for restoring/re-establishing riparian vegetation is to reduce the spread of invasive species and increase populations of native vegetation for improved habitat conditions and storm water retention. Another specific goal of the plan is to establish or maintain channel stability (Bronx River Alliance 2006).

The WCDP developed a Bronx River Watershed Management Plan (Center for Watershed Protection *et al.* 2007). One of the general findings of this plan was that:

> "Invasive plant species in the riparian corridor are ubiquitous throughout the subwatersheds surveyed. Invasive [species] management should be undertaken in conjunction with other stream and buffer restoration activities. From the stream assessment, Japanese knotweed and porcelain berry appear to be dominant species of concern."

Specifically, the Westchester County Center site is within the WCDP-designated Bronx River Upper Direct Drainage sub-watershed. The WCDP recommended in their Watershed Management Plan for this sub-watershed that the riparian buffer be widened; invasive plant species be removed/managed; and the floodplain wetland area be expanded within the project area site (Center for Watershed Protection *et al.* 2007).

The Yonkers Avenue Project site is within the WCDP-designated Bronx River Middle Direct Drainage sub-watershed. Although there are no river bank/riparian restoration recommendations identified by the WCDP for the project area, likely due to the channeling of the river and the amount of development and infrastructure present, the riverbank is characterized as an eroded bank (Center for Watershed Protection *et al.* 2007).

RECOMMENDATIONS FOR INCORPORATING MORE NATURAL FEATURES INTO THE STREAM EROSION PROTECTION DESIGN

Bio-engineering at Westchester County Center Site: As stated above, the use of bio-engineering in the stone revetment will stabilize the river bank and reduce turbidity/suspended solids in the river, while also providing edge habitat, decreasing flow velocities, and increasing the capacity of the river to accumulate/store/filter materials, sediment, and energy (Federal Interagency Stream Restoration Working Group 1998). We recommend making natural stream design features part of the engineering design rather than proposing a more limited suite of potential measures as mitigation for adverse effects, or trying to retrofit a project designed in a more traditional way, proposing measures that affect stream flow direction and/or velocity, affecting the project's ability to achieve project goals and objectives.

Bio-engineering/Vegetative Riverbank Protection: Although bio-engineering is proposed as part of the Westchester County Center Project, there may be more opportunities to incorporate bio-engineering/vegetative riverbank protection techniques in both project sites. The Service understands that steep slopes and high river velocities may limit the feasibility of these techniques, but they may be appropriate in some areas. These techniques are described as follows:

Wattling: This technique uses bundles of branches which are staked into shallow trenches, then covered with soil. They are oriented along the contour and are placed in multiple rows to help stabilize the slope (Urban Soil Erosion and Sediment Control Committee 1991).

Brush Layering: This technique is generally used to stabilize slope areas above the flowline of streambanks. It involves the use of long branches that are placed with cut ends into the slope on bulldozed terraces and the tops protruding outside the finished slope (Urban Soil Erosion and Sediment Control Committee 1991).

Live Cribwall: This is a combination of vegetation and structural elements generally used along streams where flowing water is a hazard. Layers of logs are alternated with long branches protruding out between them. The logs are spiked together and anchored into the bank with earthfill behind them to create a wall. The live stems help tie the logs together and screen the wall (Urban Soil Erosion and Sediment Control Committee 1991).

Live Staking: These are large stakes or poles sharpened at the bottom end and forced vertically into the soft earth along the waterline about 1 foot apart. The poles will grow into a thick barrier (Urban Soil Erosion and Sediment Control Committee 1991).

Brush Matting: This method uses hardwood brush layered along a stream bank as a mattress and anchored in place with a grid of stakes and wire. The toe below the waterline is anchored by rock. This living blanket acts as mulch for seedlings and plantings established in the bank (Urban Soil Erosion and Sediment Control Committee 1991).

Vegetated Gabions: This method involves wire-mesh rectangular baskets filled with small to medium size rock and soil which are laced together to form a structural toe. Live branch cuttings are placed on each consecutive layer between the rock filled baskets to take root, consolidate the structure, and bind it to the slope (Federal Interagency Stream Restoration Working Group 1998).

Articulated Concrete: This technique utilizes concrete mats with spaces to allow for vegetation growth within the mats. This technique was successfully used to stabilize the eroding Gulf Intracoastal Waterway shoreline on the Texas Gulf Coast within the Aransas National Wildlife Refuge (U.S. Army Corps of Engineers 2005).

DESCRIPTION OF FISH AND WILDLIFE RESOURCES

Westchester County Center Project Site

The project site consists of the western bank of the Bronx River, which abuts the Bronx River Parkway (see Enclosure 3 for pictures of the site). This bank is generally steeply-sloped with limited floodplain/riparian/wetland areas in the central portion of the site. The eastern bank of the river has a bit more of a floodplain and sand and sediment bars within the river bed; it abuts the Westchester County Center parking lot. The river substrate is dominated by fine sands (U.S. Army Corps of Engineers 2009a). Dominant vegetation observed along both banks of the river includes sycamore (*Platanus occidentalis*), red maple (*Acer rubrum*), and tree-of-heaven (*Ailanthus altissima*) in the overstory; purple loosestrife (*Lythrum salicaria*), narrow-leaf cattail (*Typha angustifolia*), and Japanese knotweed (*Polygonum cuspidatum*) in the understory; and mugwort (*Artemisia vulgaris*), porcelineberry (*Ampelopsis brevipedunculata*), and giant ragweed (*Ambrosia trifida*) in the herbaceous layer. Many of these species are non-native and invasive, including tree-of-heaven, purple loosestrife, mugwort, giant ragweed, and two species identified by the WCDP as invasive species of concern – Japanese knotweed and porcelineberry (Center for Watershed Protection *et al.* 2007). Bird species observed at the Westchester County Center project site during the December 14, 2009, inspection include mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), and great blue heron (*Ardea herodias*).

Yonkers Avenue Project Site

The project site encompasses the eastern bank of the Bronx River, which abuts Yonkers Avenue (see Enclosure 4 for pictures of the site). The bank consists of a steeply-sloped retaining wall. This section of the river is channeled, with retaining walls on either side of the river, and no floodplain/riparian/wetland area. Vegetation on the site is limited to poison ivy (*Toxicodendron radicans*), honeysuckle (*Lonicera* spp.), and catbrier (*Smilax rotundifolia*) along the retaining wall; and American elm (*Ulmus americanus*) and tree-of-heaven on the top of the bank.

Although no information was available on the river substrate in this area, observed flow velocities were greater here than at the Westchester County Center site; ripples were observed and the river was narrower. As such, it is likely that the river substrate is coarser (medium sand/gravel) at this site than at the Westchester County Center site, where the predominant substrate is fine sand.

Due to the channelization of the river, with the retaining walls on either bank of the river and the adjacent infrastructure, the project area provides little/minimal habitat for most species. The following discussion of fish and wildlife resources occurring on both sites is provided with the understanding that transient species may be present at this project site as they migrate to more suitable habitats, and that some habitat, albeit limited in value, is present on this site.

Fish Species Occurring at Both Project Sites

Based upon baseline data collection efforts, the Corps has identified the following freshwater fish species as being likely to utilize the Bronx River at each of the sites: largemouth bass (*Micropterus salmoides*), banded sunfish (*Enneacanthus obesus*), blacknose dace (*Rhinichthys atratulus*), tessellated darter (*Etheostoma olmstedi*), white perch (*Morone americana*), white sucker (*Catostomus commersoni*), pumpkinseed (*Lepomis gibbosus*), and banded killifish (*Fundulus diaphanus*) (U.S. Army Corps of Engineers 2009a). The Corps specified that the Yonkers Avenue site lacks in-channel habitat, and has little shade and urbanized surroundings, thereby providing limited resources for fish communities (U.S. Army Corps of Engineers 2009a, 2009b).

The Bronx River Ecological and Watershed Management Plan included the findings of fish surveys conducted in the New York City portion of the Bronx River by Dr. Joseph Rachlin of Lehman College's Laboratory for Marine and Estuarine Research (Rachlin 2003). The most widely distributed freshwater species found in the river in 2002-2003 were mummichog (*Fundulus heteroclitus*), fourspine stickleback (*Apeltes quadracus*), and tesselated darter. These species are generalists in diet and habitat requirements and the mummichog is relatively resilient to water quality impairment and habitat modification (Bronx River Alliance 2006). Surveys conducted in the northern portion of Bronx County within the Bronx River identified, from most to least abundant: white sucker, fourspine stickleback, mummichog, tesselated darter, and blacknose dace. White sucker, fourspine stickleback, and mummichog accounted for 72 percent of all individuals caught (Bronx River Alliance 2006). It is expected that the fish communities within the two project sites would be similar to those in northern Bronx County, although the number of brackish water species, such as the fourspine stickleback and mummichog, would not be as great. The white sucker and blacknose dace spawn in April-June in shallow riffles and gravel bottom (Werner 1980). Refer to Appendix H of the Bronx River Ecological and Watershed Management Plan for a complete listing of fish species present in the Bronx River (Bronx River Alliance 2006).

Although the Bronx River is designated as trout waters within the Westchester County Center site area, and stocking of trout has occurred in the past, the temperature of the river is presently deemed to be too high to support a trout population (Flaherty pers. comm. 2010).

Bird Species Occurring at Both Project Sites

The Corps identified the following bird species, which are expected to occur at each site and are common in suburban/urban areas: American robin (*Turdus migratoriusi*), American crow (*Corvus brachyrhynchos*), European starling (*Sturnus vulgaris*), black-capped chickadee (*Poesile atricapillus*), common grackle (*Quiscalus quiscula*), Canada goose (*Branta canadensis*), song sparrow (*Melospiza melodia*), northern cardinal (*Cardinalis cardinalis*), northern mockingbird (*Mimus polyglottos*), mourning dove (*Zenaida macroura*), mallard (*Anas platyrhynchos*, observed at Westchester County Center site), common egret (*Ardea alba*), herring gull (*Larus argentatus*), and black duck (*Anas rubripes*) (U.S. Army Corps of Engineers 2009a, 2009b). Bird species observed by the Wildlife Conservation Society within the Bronx River corridor include gray catbird (*Dumetella carolinensis*), yellow warbler (*Dendroica petechia*), red-winged blackbird (*Agelaius phoeniceus*), tufted titmouse (*Parus bicolor*), and northern flicker (*Colaptes auratus*) (Bronx River Alliance 2006). Refer to Appendix H of the Bronx River Ecological and Watershed Management Plan for a complete listing of bird species present in the Bronx River corridor (Bronx River Alliance 2006).

Mammalian Species Occurring at Both Project Sites

The Corps identified the following mammalian species, which are expected to occur at each site and are common in suburban/urban areas: raccoon (*Procyon lotor*), eastern grey squirrel (*Sciurus carolinensis*), red squirrel (*Tamiasciurus hudsonicus*), Norway rat (*Rattus norvegicus*), opossum (*Didelphs virginiana*), muskrat (*Ondatra zibethica*), white-tailed deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), and muskrat (*Ondatra zibethicus*) (U.S. Army Corps of Engineers 2009a, 2009b). Refer to Appendix H of the Bronx River Ecological and Watershed Management Plan for a complete listing of mammalian species present in the Bronx River corridor (Bronx River Alliance 2006).

Reptiles and Amphibians Occurring at Both Project Sites

Reptilian species observed within the Bronx River corridor and likely to occur within both project sites include the garter snake (*Thamnophis sirtalis sirtalis*), snapping turtle (*Chelydra serpentine*), and painted turtle (*Chrysemys picta*). Amphibian species observed within the Bronx River corridor and likely to occur within both project sites include the grey tree frog (*Hyla versicolor)*, wood frog (*Rana sylvatica*), and red-back salamander (*Plethodon cinereus*) (Bronx River Alliance 2006). These species prefer aquatic habitats with overhanging vegetation and/or adjacent woodland habitat and leaf litter. Refer to Appendix H of the Bronx River Ecological and Watershed Management Plan for a complete listing of reptiles and amphibians present in the Bronx River corridor (Bronx River Alliance 2006).

Water Quality

The Bronx River watershed drains approximately 48.3 square miles of urbanized land in Westchester County. Water quality in the Bronx River has been degraded, similar to other urban streams, primarily due to the conversion of forested lands to development and impervious surfaces. Pollution enters the Bronx River from non-point and point sources, which include discharges from sewage outfalls (Center for Watershed Protection *et al.* 2007).

The Bronx River is classified as C(T), with the best usage being fishing, and is designated as trout waters within the Westchester County Center Project site, and classified as C, with the best usage being fishing, within the Yonkers Avenue Project site (New York State Department of Environmental Conservation 2009). The Bronx River in Westchester County is on New York State's 2004 303(d) list of impaired waters for both high dissolved oxygen demand and pathogens (Center for Watershed Protection *et al.* 2007).

PROJECT IMPACTS

Adverse Impacts of Westchester County Center and Yonkers Avenue Projects

The anticipated impacts of these projects (primarily direct impacts) on fish and wildlife resources include turbidity of the water column and disturbance to fish and wildlife from visual and sound stimuli associated with construction activities. Impacts specific to the Westchester County Center site include habitat modification from armoring the riverbank and disturbances associated with the installation of cofferdams.

The installation of revetment/sheet piling could cause turbidity within the river's water column. Turbidity, while comparatively unimportant to benthic organisms, may be relatively more important to fish and the fish community structure. Suspended solids in water can affect fish populations by delaying the hatching time of fish eggs (Schubel and Wang 1973) and killing fish both by coating their gills and by anoxia (O'Connor *et al.* 1976). Sherk *et al.* (1974) found that demersal fish are more tolerant of suspended solids and filter-feeding fish are least tolerant, resulting in an advantage to demersal fish and a disadvantage to filter-feeders. Turbidity is a significant contributor to declines in aquatic organisms and causes cascading effects through depleted food availability to zooplankton, insects, freshwater mollusks, and fish (Henley *et al.* 2000).

Fish and wildlife species could also potentially be disturbed during foraging and breeding behavior due to the visual and sound stimuli associated with the construction activities. These disturbances could cause a disruption in these behaviors and/or site abandonment.

Adverse Impacts of Westchester County Center Project Only

The construction of boulder walls and stone revetment along the riverbank will alter/modify the habitat at the Westchester County Center site. (Since the Yonkers Avenue site was previously armored, this is not an issue for that site.) Armoring of the river shoreline has numerous potential impacts to this habitat, including (but not limited to): decreased infiltration of surface runoff; increased flow velocities; decreased opportunity for habitat development; and loss of edge habitat (Federal Interagency Stream Restoration Working Group 1998).

Cofferdams, proposed for the Westchester County Center project, are temporary structures, usually built in-place, and tight enough so that the water can be pumped out of the structure and kept out while construction of the boulder walls and stone revetment is in progress. The cofferdam could affect the river flow in the area adjacent to the structure. The dewatering of the river bank within the cofferdam will also affect/disturb fish and aquatic organisms, potentially causing fatality of sessile aquatic organisms. The installation of the cofferdams and associated dewatering process would also likely increase turbidity in the adjacent water column initially during construction, but would also minimize turbidity during installation of armoring since river water will be removed from the work space.

Beneficial Impacts of the Westchester County Center Project

As stated above, one of the specific goals of the Bronx River Alliance's ecological restoration and management plan for riparian vegetation is to reduce the spread of invasive species, while increasing populations of native vegetation for improved habitat conditions and storm water retention. Additionally, the WCDP recommended in their Watershed Management Plan for the sub-watershed within the project site that the invasive plant species be removed/managed. The proposed project helps to attain these goals in the removal of non-native vegetation and the planting and seeding of native species which will improve habitat conditions, thereby increasing ecosystem diversity and storm damage protection. The planting of woody vegetation on the river banks may also increase the amount of shade, which could potentially reduce the temperature of the stream/river channel, increase dissolved oxygen solubility, and improve aquatic (fish/amphibians/reptiles) species habitat suitability (Federal Interagency Stream Restoration Working Group 1998). The river bank woody vegetation will also provide forage, cover, and breeding habitat for song birds, wading birds, and waterfowl.

The use of bioengineering in the stone revetment will stabilize the river bank and reduce turbidity/suspended solids in the river while also providing edge habitat, decreasing flow velocities, and increasing the capacity of the river to accumulate/store/filter materials, sediment, and energy (Federal Interagency Stream Restoration Working Group 1998).

Beneficial Impacts of the Yonkers Avenue Project

The WCDP, in their Bronx River Watershed Management Plan (Center for Watershed Protection *et al.* 2007), characterized the riverbank in the project area as an eroded bank. One of the goals of the Bronx River Alliance's ecological restoration and management plan is to establish or maintain channel stability. The Yonkers Avenue Project will attain this goal by stabilizing the river bank and reducing the amount of suspended solids in the river.

PROPOSED MITIGATION MEASURES

Service Mitigation Policy

The Service's Mitigation Policy (Policy) (U.S. Fish and Wildlife Service 1981) was developed to guide our preparation of recommendations on mitigating the adverse impacts of land and water developments on fish, wildlife, their habitats, and uses thereof. It helps both the Service and the Federal action agency, in this case the Corps, by assuring consistent and effective recommendations, by outlining policy for the levels of habitat mitigation needed, and the various methods for accomplishing mitigation for habitat losses associated with such projects. It allows Federal action agencies to anticipate Service recommendations and to assist in preparation of mitigation measures early, thus avoiding delays and assuring equal consideration of fish and wildlife resources with other project features and purposes (Fish and Wildlife Coordination Act 16 USC 661-667[e]).

The Policy instructs us to evaluate the habitat that may be adversely impacted and to determine whether it is of:

1) high value for evaluation species and is unique and irreplaceable on a national basis or in the eco-region; for which our goal would be no loss of existing habitat value, because these one-of-a-kind areas cannot be replaced;

2) high value for evaluation species and is relatively scarce or becoming scarce on a national basis or in the eco-region section; for which our goal is no net loss of in-kind habitat value;

3) high to medium value for evaluation species and is relatively abundant on a national basis; for which our goal would be no net loss of habitat value, while minimizing loss of in-kind habitat value; or

4) medium to low value for evaluation species; for which our goal would be to avoid or minimize losses of habitat value.

The habitats present in each of the project sites are characterized by the Service as Category 4 due the steep slopes, the presence of river bank armoring, their location next to paved roadways and commercial development, the watersheds consisting of impervious surfaces, and the presence of non-native and invasive vegetation. As such, the goal for these habitats is no net loss, while avoiding/minimizing the loss of habitat value.

Proposed Mitigative/Conservation Measures

Project Schedule: The proposed projects are both scheduled to occur in late summer and to be completed in the winter months. This schedule would avoid the spawning season of the freshwater fish species likely to occur in the area (white sucker, fourspine stickleback, black-

nose dace, and tessellated darter), which occurs in April-June (Werner 1980). This schedule would also avoid the breeding season of bird species present in the area.

Removal of Invasive Plant Species and Planting Seeding of Native Vegetation at Westchester County Center Site: As stated above, the removal of non-native vegetation and the planting and seeding of native species will improve habitat conditions, while increasing ecosystem diversity and storm damage protection. The planting of woody vegetation on the river banks may: a) increase the amount of shade, which could potentially reduce the temperature of the stream/river channel; b) increase dissolved oxygen solubility; and, c) improve habitat suitability for aquatic species, songbirds, wading birds, and waterfowl (Federal Interagency Stream Restoration Working Group 1998).

Recommended Additional Mitigative/Conservation Measures

Cofferdams at Westchester County Center Site: A fish salvage plan should be implemented to ensure that any fish observed inadvertently trapped within the cofferdam would be retrieved and released into the river. The Corps might want to consider installing sections of cofferdams, as opposed to installing cofferdams along the entire work area at once, to allow for aquatic species refuge to adjacent areas.

Best Management Practices: Standard best management practices for work in wetland areas should be followed during the construction of these projects, including:

- No staging of construction equipment in vegetated wetlands;
- No storage of materials or equipment in vegetated wetlands; and
- Replanting of damaged wetland vegetation.

Post-Construction Monitoring and Management: The Corps should develop and implement a post-construction invasive species monitoring and management plan to ensure that the seeding and planting efforts are successful (at least 85 percent survival) and that invasive species do not dominate the project area. Such plans usually provide for monitoring for at least 5 years after project completion.

In-river Measures: Measures could be incorporated in the Bronx River to improve habitat suitability for fish species. As described above, the white sucker and blacknose dace prefer shallow riffles and gravel bottom for spawning. This habitat is preferred by numerous other fish species, as well. Measures could be implemented to help create shallow riffles and gravel bottom, increasing the habitat diversity of the river. Boulder clusters could be strategically placed to provide cover and areas of reduced velocity, and create scour holes. Wing deflectors, made of either rock or wood, are structures that protrude from either streambank but do not extend entirely across the river. These structures deflect flows away from the bank and scour pools by constricting the river and accelerating flow (Federal Interagency Stream Restoration Working Group 1998). The Service is available to assist in the specific design of these measures should the Corps wish to pursue these options. Coordination with the New York State Department of Environmental Conservation (NYSDEC) would be required to determine regulatory requirements.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION COORDINATION

The Service coordinated with NYSDEC Region 3 staff and reviewed Environmental Conservation Law Title 5 of Article 15 to determine the New York State regulatory requirements for these projects. The NYSDEC's Environmental Resource Mapper (New York State

Department of Environmental Conservation 2009) does not depict any NYSDEC-regulated freshwater wetlands on either site.

Westchester County Center Project

The Bronx River is classified as C(T), with the best usage being fishing, and is designated as trout waters within the Westchester County Center Project site. Streams/rivers that are designated as C(T) or higher (C[TS], B, or A) are collectively referred to as "protected streams" and are subject to stream protection provisions of the Protection of Waters regulations (Environmental Conservation Law Title 5 of Article 15, 6 NYCRR, Parts 608 and 621). The proposed action involves the placing of fill in protected streams and their adjacent contiguous wetlands for bank stabilization, identified as a regulated activity within protected streams (New York State Department of Environmental Conservation 2004). As such, a Protection of Waters Program permit would be required for this project. This action meets the NYSDEC definition as a major protected stream project (not a repair or in-kind replacement of existing structures and one that involves disturbance of greater than 50 linear feet along a watercourse). This project would also require a Section 401 Water Quality Certification from the NYSDEC. The applicant, be it the Corps or the WCDP, should schedule a pre-application conference with the NYSDEC to confirm which permits are required and application content.

Yonkers Avenue Project

The Bronx River is classified as C, with the best usage being fishing, within the Yonkers Avenue Project site. This section of the river is, therefore, not considered a "protected stream." It does not appear as though a Protection of Waters Program permit would be required for the proposed action, but it would require a Section 401 Water Quality Certification from the NYSDEC. The applicant, be it the Corps or the Village of Tuckahoe, should schedule a pre-application conference with the NYSDEC to confirm which permits are required and application content.

CONCLUSIONS

Although these projects have the potential to adversely impact fish and wildlife resources as described above, these impacts are not expected to be significant. The river bank at the Yonkers Avenue site is steeply-sloped and was previously armored, with no riparian/wetland habitat present. Commercial development is also present in the vicinity of the Yonkers Avenue site where traffic and pedestrian activity is common. The Bronx River Parkway and associated traffic activity is directly adjacent to the Westchester County Center site, and the areas where armoring is proposed is steeply-sloped, with some past armoring already present. Turbidity would be minimized by the cofferdams, would be temporary, and would occur in a riverine environment where significant sediment loads enter the river during storm events (Bronx River Alliance 2006).

These projects would also occur from late summer into the winter months, thereby avoiding bird breeding and fish spawning seasons.

In conclusion, although the proposed actions have the potential to impact fish and wildlife resources, these areas are previously disturbed and the mitigative measures incorporated in the design of each project ameliorate these impacts. The Service's mitigation policy goal for these habitats - that there is no net loss while avoiding/minimizing the loss of habitat value - has been met. As such, these projects are not likely to significantly impact fish and wildlife resources.

The Service appreciates the opportunity to provide comments and assessment of the impacts of these projects. If you have any questions or require additional information, please contact Mr. Steven Sinkevich of the Long Island Field Office at (631) 776-1401.

Sincerely,

David A. Stilwell
Field Supervisor

REFERENCES

Bronx River Alliance. 2006. Bronx River Alliance Ecological Restoration and Management Plan. Bronx, NY. www.bronxriver.org/plans.

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Enclosures

FIGURES

Westchester County Center Site
Site Location Map

Yonkers Avenue Site
Site Location Map

FIGURE 1

Westchester County Center Site
Site Location Map
(Not to Scale)

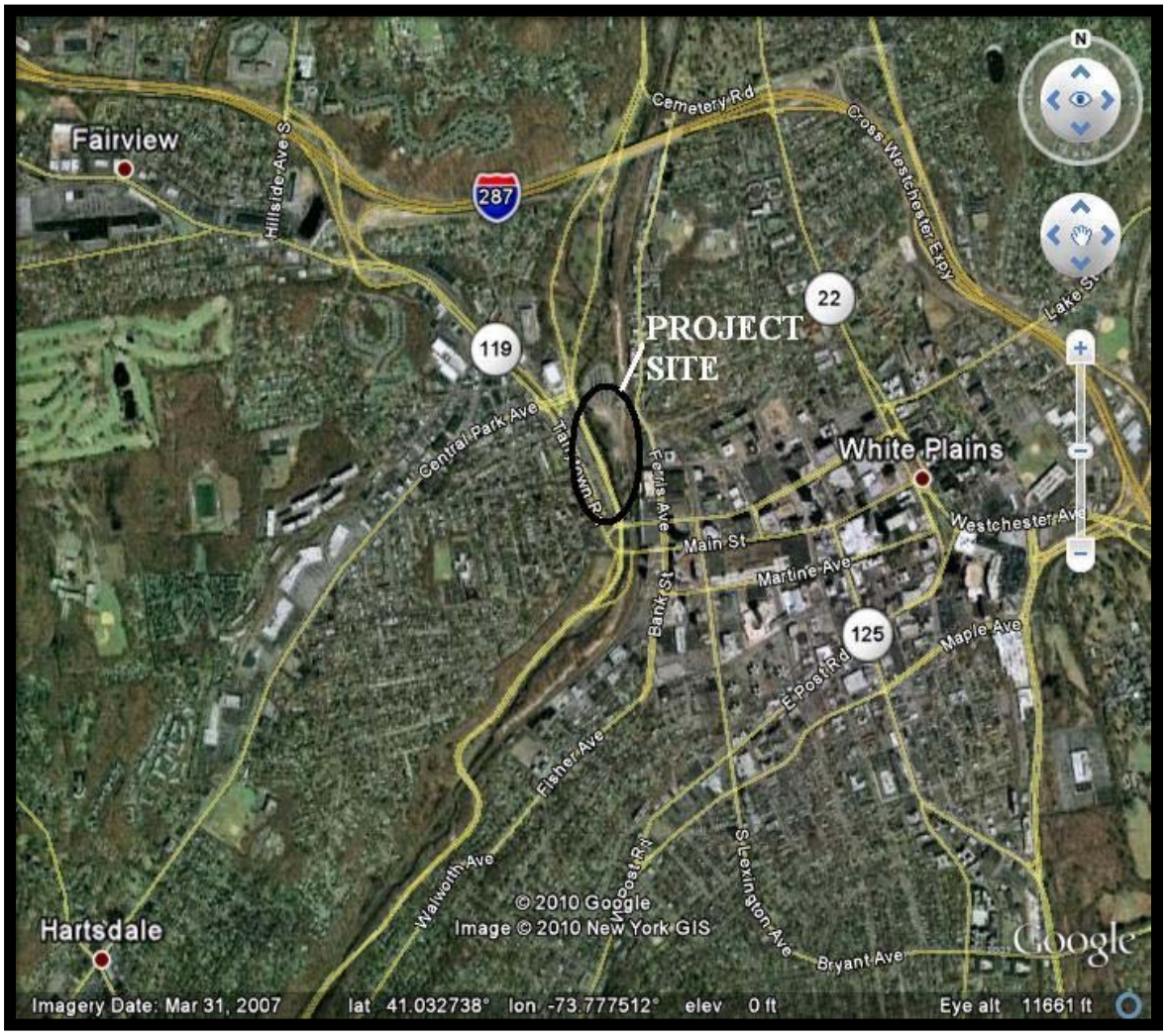
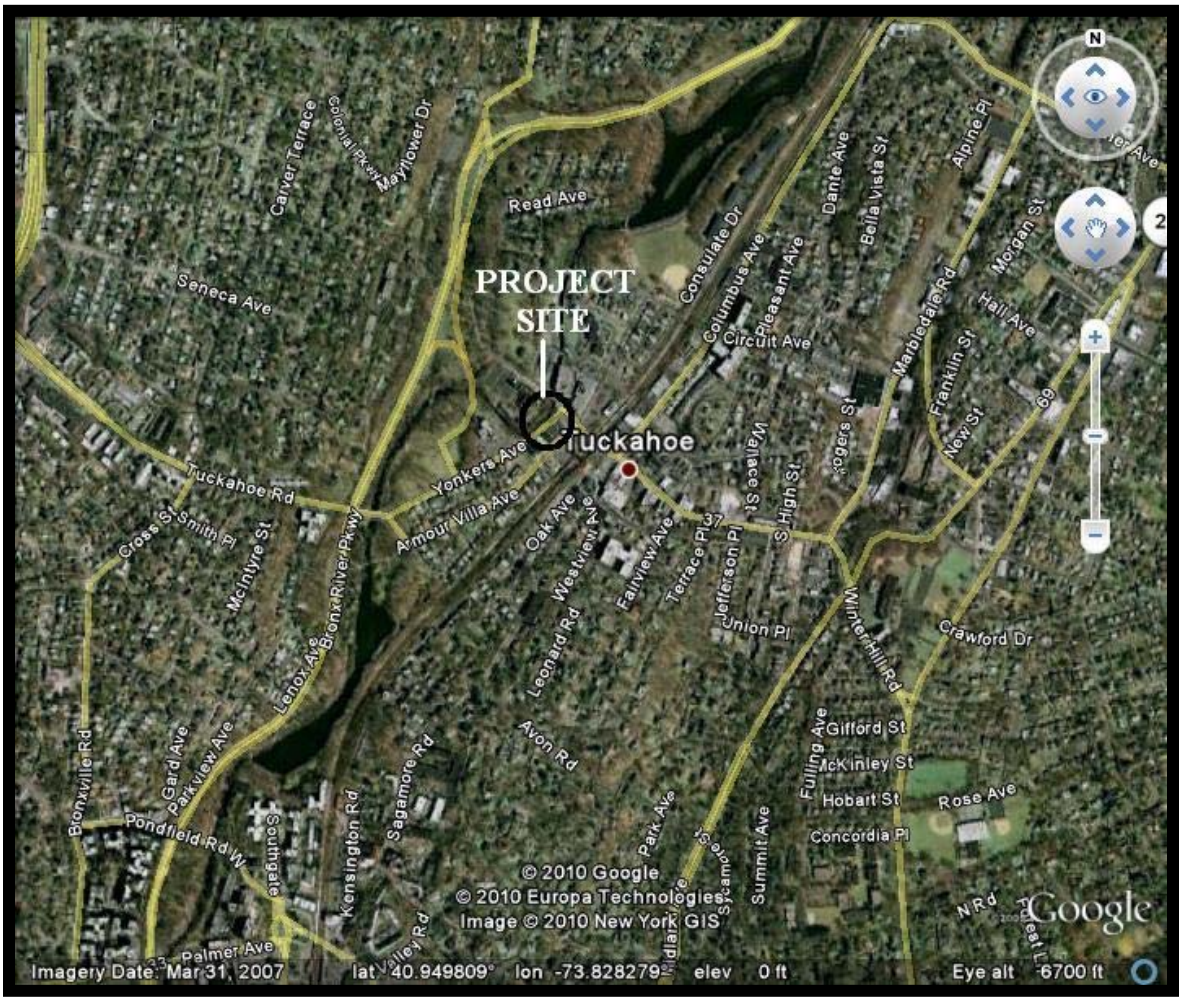


FIGURE 2

Yonkers Avenue Site
Site Location Map
(Not to Scale)



ENCLOSURE 1

Westchester County Center
Grading and Planting Plan and Planting Detail

INVASIVES REMOVAL SCHEDULE *

DATE	ACTIVITY
SPRING 2010	CLEARING & GRUBBING/SLOPE STABILIZATION
SUMMER 2010	
FALL 2010	
SPRING 2011	

* See Specifications for information on herbicides & application methods

PLANT SCHEDULE *

ITEM #	SYM	QTY	BOTANICAL NAME	COMMON NAME	SIZE (CAL/H/W)	RT.	SPACING	REMARKS
			TREES					
W611.0801	AC	XX	AMELANCHIER CANADENSIS	SERVICEBERRY	4'-5' HT.	B & B	AS SHOWN	
W611.0802	NS	XX	NYSSA SYLVATICA	BLACK TUPELO	2-2 1/2" CAL.	B & B	AS SHOWN	
			SHRUBS					
W611.0803	AM	XX	ARONIA MELANOCARPA	BLACK CHOKEBERRY	3'-4' HT.	2 GAL.	AS SHOWN	MIN. 3' O.C.
W611.0804	CA	XX	CORNUS AMOMUM	SILKY DOGWOOD	3'-4' HT.	2 GAL.	AS SHOWN	MIN. 3' O.C.
W611.0805	CO	XX	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	3'-4' HT.	2 GAL.	AS SHOWN	MIN. 3' O.C.
W611.0806	CS	XX	CORNUS SERICEA	RED-OSIER DOGWOOD	3'-4' HT.	2 GAL.	AS SHOWN	MIN. 4' O.C.
W611.0807	IV	XX	ILEX VERTICILLATA	WINTERBERRY	2'-3' HT.	3 GAL.	AS SHOWN	MIN. 4' O.C.
			PLUGS					
			UPLAND PLANTING ZONE					
W611.0809	PV	XX	PANICUM VIRGATUM	SWITCH GRASS	2" PLUGS @ 12" O.C.			
W611.0810	SN	XX	SORGHASTRUM NUTANS	INDIAN GRASS	2" PLUGS @ 24" O.C.			
W611.0811	SN	XX	SCHYZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	2" PLUGS @ 24" O.C.			
W611.0812	PD	XX	PENSTREMON DIGITALIS	FOXGLOVE BEARD TONGUE	2" PLUGS @ 24" O.C			
W611.0813	JT	XX	JUNCUS TENUIS	PATH RUSH	2" PLUGS @ 24" O.C.			
			RIPARIAN PLANTING ZONE				WATER DEPTH ZONE	
W611.0814	CV	XX	CAREX CRINITA	FRINGED SEDGE	2" PLUGS @ 12" O.C.		0-3"	
W611.0815	CV	XX	CAREX VULPINOIDEA	FOX SEDGE	2" PLUGS @ 12" O.C.			
W611.0816	JC	XX	JUNCUS CANADENSIS	CANADA RUSH	2" PLUGS @ 12" O.C.			
W611.0817	JE	XX	JUNCUS EFFUSUS	SOFT RUSH	2" PLUGS @ 12" O.C.		0-3"	
W611.0818	LC	XX	LOBELIA CARDINALIS	CARDINAL FLOWER	2" PLUGS @ 12" O.C.			
			WETLAND PLANTING ZONE					
W611.0819	CG	XX	CHELONE GLABRA	WHITE TURTLEHEAD	2" PLUGS @ 24" O.C.		0-3"	
W611.0820	PC	XX	PONDETERA CORDATA	PICKERELWEED	2" PLUGS @ 24" O.C.		6"-12"	
W611.0821	SP	XX	SCIRPUS PUNGENS	COMMON 3-SQUARE	2" PLUGS @ 24" O.C.		6"-12"	
			LIVE STAKES					
W611.0810	SN	XX	SALIX NIGRA	BLACK WILLOW	LIVE STAKE		SEE PLANS FOR LOCATIONS	
W611.0810	SS	XX	SALIX SERICEA	SILKY WILLOW	LIVE STAKE		SEE PLANS FOR LOCATIONS	
			SEED MIXES					
W610.02034		XX LBS.	FOR MEADOW ZONE: NATIVE UPLAND WILDLIFE FORAGE AND COVER MEADOW MIX (ERNMX-123) - SEE SPECS.				ESTABLISH AS PER SPEC. IN AREAS INDICATED ON PLANS	
W610.02035		XX LBS.	OAT SEED FOR TEMPORARY STABILIZATION OF DISTURBED AREAS - SEE SPECS.					

*LAYOUT & INSTALLATION OF ALL PLANTINGS SHALL BE COMPLETED UNDER THE SUPERVISION OF THE RESTORATION SPECIALIST

PLANT SCHEDULE

SCALE: N/A

NOT FOR CONSTRUCTION
ISSUED FOR REVEW ONLY

60% DESIGN

ALL DIMENSIONS/EXISTING CONDITIONS SHOWN SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE GOVERNMENT FOR CLARIFICATIONS. DRAWING SHALL NOT BE SCALED TO OBTAIN DIMENSIONS OR DISTANCES.

SCALE: AS SHOWN

0' 1' 2' 3' 4' 5'

PROFESSIONAL STAMP AND SEAL

US Army Corps of Engineers New York District

U. S. ARMY ENGINEER DISTRICT NEW YORK

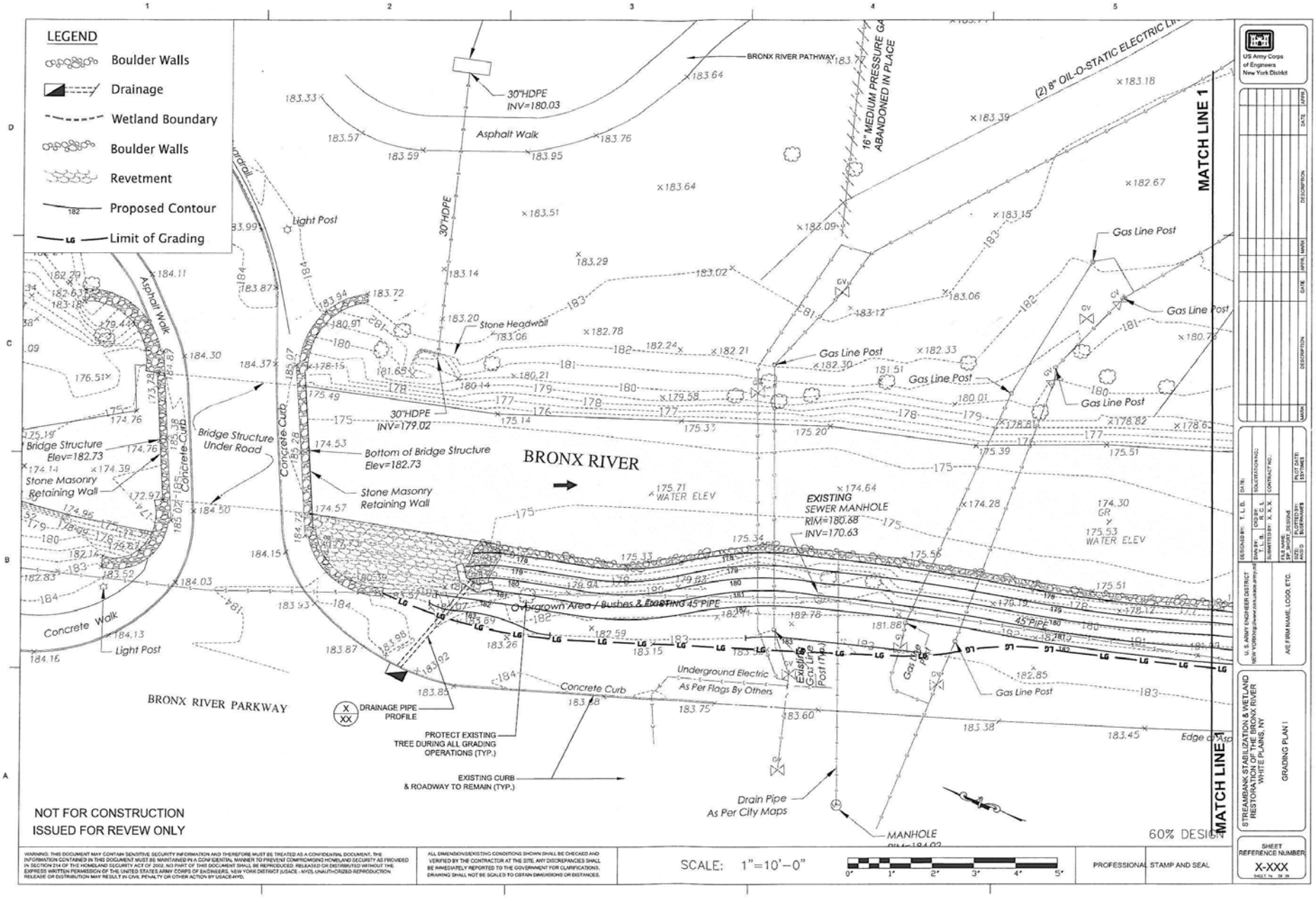
A/E FIRM NAME, LOGO, ETC.

DESIGNED BY: T. L. B. | DWN BY: T. L. B. | CKD BY: R. C. L. | SUBMITTED BY: X. X. X.

STREAMBANK STABILIZATION & WETLAND RESTORATION OF THE BRONX RIVER WHITE PLAINS, NY

PLANTING DETAILS II

SHEET REFERENCE NUMBER
X-XXX



US Army Corps of Engineers New York District

STREAMBANK STABILIZATION & WETLAND RESTORATION OF THE BRONX RIVER
WHITE PLAINS, NY

GRADING PLAN I

SHEET REFERENCE NUMBER
X-XXX

SCALE: 1"=10'-0"

PROFESSIONAL STAMP AND SEAL

WARNING: THIS DOCUMENT MAY CONTAIN SENSITIVE SECURITY INFORMATION AND THEREFORE MUST BE TREATED AS A CONFIDENTIAL DOCUMENT. THE INFORMATION CONTAINED IN THIS DOCUMENT MUST BE MAINTAINED IN A CONFIDENTIAL MANNER TO PREVENT COMPROMISING HOMELAND SECURITY AS PROVIDED IN SECTION 214 OF THE HOMELAND SECURITY ACT OF 2002. NO PART OF THIS DOCUMENT SHALL BE REPRODUCED, RELEASED OR DISTRIBUTED WITHOUT THE EXPRESS WRITTEN PERMISSION OF THE UNITED STATES ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT (USACE - NYD). UNAUTHORIZED REPRODUCTION, RELEASE OR DISTRIBUTION MAY RESULT IN CIVIL PENALTY OR OTHER ACTION BY USACE-NYD.

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MAY 2009 NYD BORDER

Submitted by:TLB USERNAME Plot Date: 11-30-2009 HH:MM
FILE NAME BRONX RIVER STREAMBANK RESTORATION

US Army Corps of Engineers New York District

STREAMBANK STABILIZATION & WETLAND RESTORATION OF THE BRONX RIVER WHITE PLAINS, NY

GRADING PLAN II

SHEET REFERENCE NUMBER X-XXX

WARNING: THIS DOCUMENT MAY CONTAIN SENSITIVE SECURITY INFORMATION AND THEREFORE MUST BE TREATED AS A CONFIDENTIAL DOCUMENT. THE INFORMATION CONTAINED IN THIS DOCUMENT MUST BE MAINTAINED IN A CONFIDENTIAL MANNER TO PREVENT COMPROMISING HOMELAND SECURITY AS PROVIDED IN SECTION 214 OF THE HOMELAND SECURITY ACT OF 2002. NO PART OF THIS DOCUMENT SHALL BE REPRODUCED, RELEASED OR DISTRIBUTED WITHOUT THE EXPRESS WRITTEN PERMISSION OF THE UNITED STATES ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT (USACE - NYD). UNAUTHORIZED REPRODUCTION, RELEASE OR DISTRIBUTION MAY RESULT IN CIVIL PENALTY OR OTHER ACTION BY USACE-NYD.

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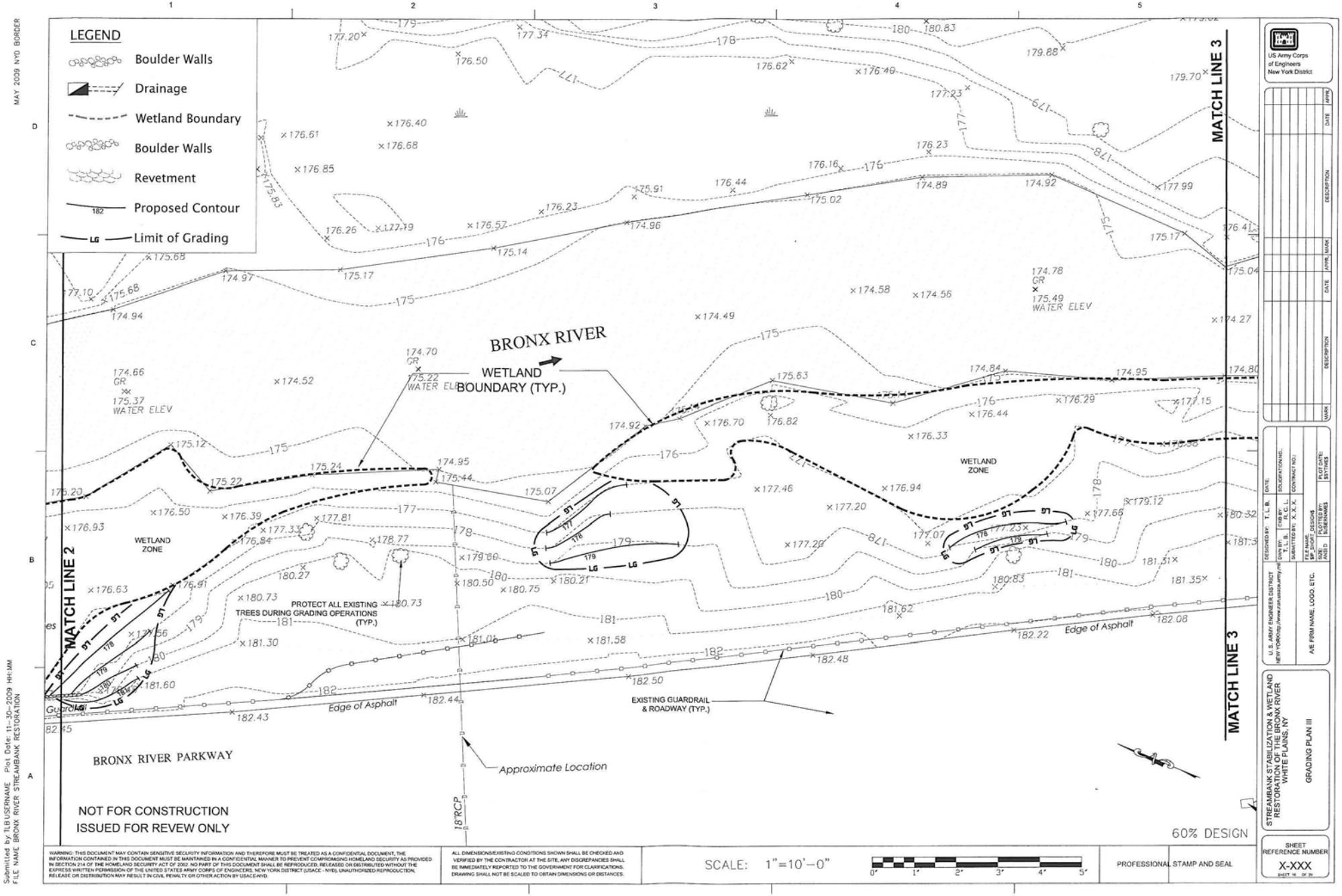
SCALE: 1"=10'-0"

PROFESSIONAL STAMP AND SEAL

MAY 2009 NYD BORDER

Submitted by: TLB USERNAME Plot Date: 11-30-2009 HH:MM
FILE NAME: BRONX RIVER STREAMBANK RESTORATION

Fill in wetland



MAY 2009 NYD BORDER

Submitted by: TLB USERNAME Plot Date: 11-30-2009 HH:MM
FILE NAME: BRONX RIVER STREAMBANK RESTORATION

US Army Corps of Engineers New York District

MARK	DESCRIPTION	DATE	APPR.

DESIGNED BY: T. L. B. DATE:
DRAWN BY: T. L. B. CHK'D BY: K. C. L. SOLICITATION NO.:
SUBMITTED BY: X. X. X. CONTRACT NO.:
FILE NAME: \$P_SHORT_DESIGN\$ PLOT DATE: \$STYME\$
SIZE: ANSI D PLOTTED BY: \$USERNAME\$

U.S. ARMY ENGINEER DISTRICT NEW YORK

A/E FIRM NAME, LOGO, ETC.

STREAMBANK STABILIZATION & WETLAND RESTORATION OF THE BRONX RIVER
WHITE PLAINS, NY

GRADING PLAN III

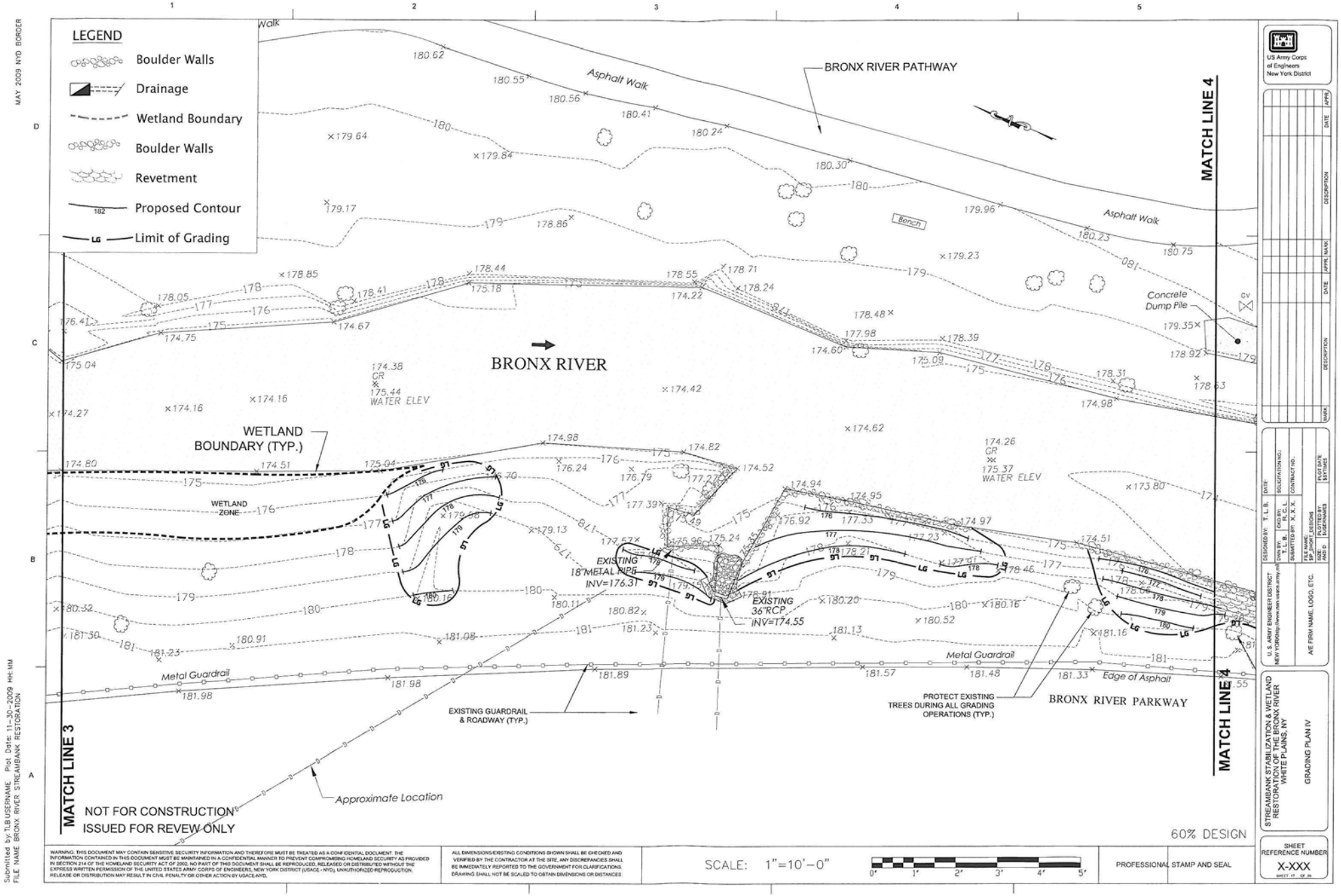
SHEET REFERENCE NUMBER
X-XXX
SHEET 14 OF 29

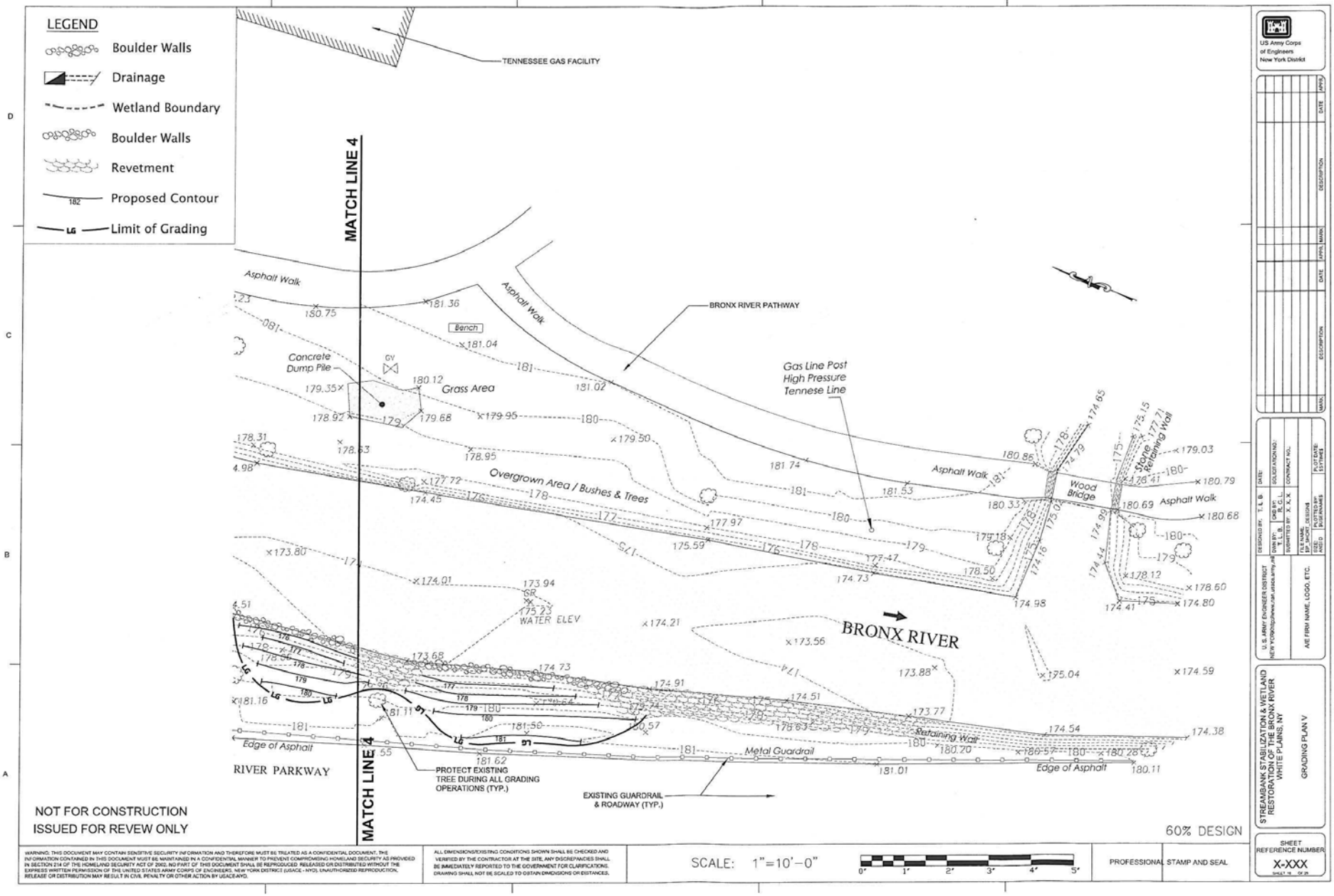
ALL DIMENSIONS/EXISTING CONDITIONS SHOWN SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE GOVERNMENT FOR CLARIFICATIONS. DRAWING SHALL NOT BE SCALED TO OBTAIN DIMENSIONS OR DISTANCES.

SCALE: 1"=10'-0"

0' 1' 2' 3' 4' 5'

PROFESSIONAL STAMP AND SEAL


LEGEND
Boulder Walls
Drainage
Wetland Boundary
Boulder Walls
Revetment
Proposed Contour
Limit of Grading
BRONX RIVER PATHWAY
Asphalt Walk
Bench
Concrete Dump Pile
BRONX RIVER
WETLAND BOUNDARY (TYP.)
WETLAND ZONE
174.38 CR 175.44 WATER ELEV
174.26 GR 175.37 WATER ELEV
EXISTING 18"METAL RCP INV=176.31
EXISTING 36"RCP INV=174.55
Metal Guardrail
EXISTING GUARDRAIL & ROADWAY (TYP.)
PROTECT EXISTING TREES DURING ALL GRADING OPERATIONS (TYP.)
BRONX RIVER PARKWAY
Edge of Asphalt
Approximate Location
MATCH LINE 3
MATCH LINE 4
NOT FOR CONSTRUCTION
ISSUED FOR REVEW ONLY
60% DESIGN
US Army Corps of Engineers, New York District
STREAMBANK STABILIZATION & WETLAND RESTORATION OF THE BRONX RIVER
WHITE PLAINS, NY
GRADING PLAN IV
SHEET REFERENCE NUMBER
X-XXX
SCALE: 1"=10'-0"
PROFESSIONAL STAMP AND SEAL
MAY 2009 NYD BORDER
Submitted by: TLB USERNAME Plot Date: 11-30-2009 HH:MM
FILE NAME: BRONX RIVER STREAMBANK RESTORATION



MAY 2009 NYD BORDER

Submitted by: TLB USERNAME Plot Date: 11-JC-2009 HH:MM
FILE NAME BRONX RIVER STREAMBANK RESTORATION

US Army Corps of Engineers
New York District

STREAMBANK STABILIZATION & WETLAND RESTORATION OF THE BRONX RIVER
WHITE PLAINS, NY

GRADING PLAN V

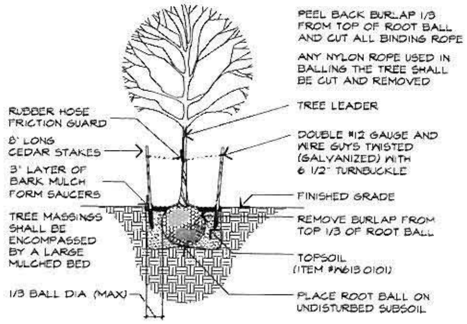
SHEET REFERENCE NUMBER
X-XXX

ALL DIMENSIONS/EXISTING CONDITIONS SHOWN SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE GOVERNMENT FOR CLARIFICATIONS. DRAWING SHALL NOT BE SCALED TO OBTAIN DIMENSIONS OR DISTANCES.

SCALE: 1"=10'-0"

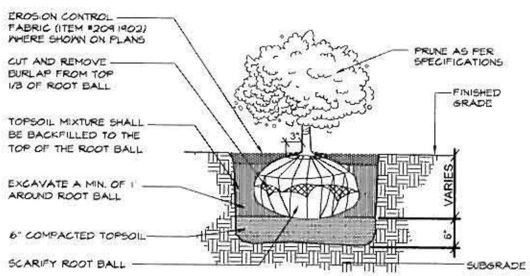
0' 1' 2' 3' 4' 5'

PROFESSIONAL STAMP AND SEAL



1 DECIDUOUS TREE PLANTING

NOT TO SCALE



NOTE

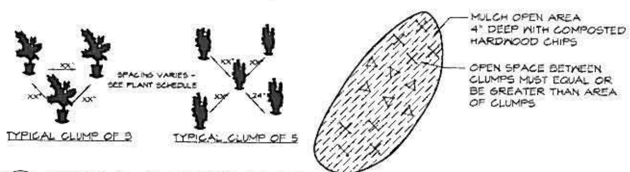
FOR ALL AREAS INDICATED ON CONTRACT DRAWINGS AS MASSED SHRUB BEDS THE ENTIRE BED SHALL BE EXCAVATED TO A DEPTH OF AT LEAST 18", AND BACKFILLED WITH TOPSOIL AS PER SPECIFICATIONS.

2 SHRUB PLANTING

NOT TO SCALE

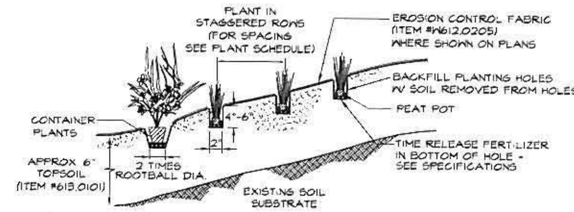
1 ARRANGE PLANT MATERIAL INTO CLUMPS OF INDIVIDUAL PLANTS OF THE SAME SPECIES

2 ARRANGE CLUMPS INTO LARGER PATCHES AS SHOWN BELOW.



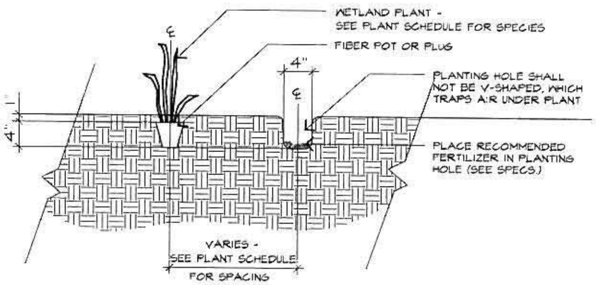
3 TYPICAL PLANTING PLAN FOR PLANT MASSINGS

N.T.S.



4 RIPARIAN & UPLAND PLANTINGS

NOT TO SCALE

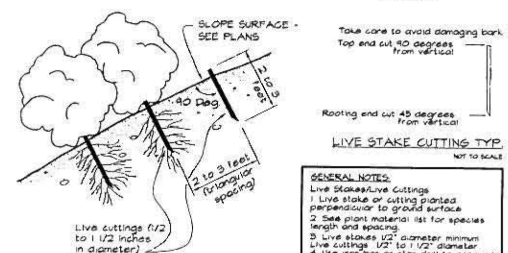


5 WETLAND PLANTING

SCALE 1 1/2"=1'-0"

LIVE CUTTING

LIVE STAKE



LIVE STAKE CUTTING TYP.

NOT TO SCALE

GENERAL NOTES:

Live Stakes/Live Cuttings

1 Live stake or cutting planted perpendicular to ground surface

2 See plant material list for species length and spacing.

3 Live stakes 1/2" diameter minimum. Live cuttings 1/2" to 1 1/2" diameter

4 Use iron bar or star drill to prepare hole in hard or rocky soil

5 Orient buds pointing upwards

NOTE

AVOID STRIPPING THE BARK OR BRUISING OF STAKES DURING INSTALLATION. DO NOT USE AXE OR SLEDGE FOR DRIVING STAKES. IN HARD GROUND USE AN IRON BAR OR STAR DRILL TO PREPARE HOLES FOR THE STAKES.

6 LIVE STAKE INSTALLATION

NOT TO SCALE

NOT FOR CONSTRUCTION
ISSUED FOR REVEW ONLY

60% DESIGN

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SCALE: AS SHOWN

0' 1' 2' 3' 4' 5'

PROFESSIONAL STAMP AND SEAL

US Army Corps of Engineers
New York District

MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY ENGINEER DISTRICT
NEW YORK

A/E FIRM NAME, LOGO, ETC.

DESIGNED BY: T. L. B.		DATE:
DWN BY: T. L. B.	CKD BY: R. C. L.	SOLICITATION NO.:
SUBMITTED BY: X. X. X.		CONTRACT NO.:
FILE NAME: P_SHORT_DESIGN		
SIZE: ANSI D	PLOTTED BY: $USERNAME$	PLOT DATE: $SYTIME$

STREAMBANK STABILIZATION & WETLAND RESTORATION OF THE BRONX RIVER
WHITE PLAINS, NY

PLANTING DETAILS I

SHEET REFERENCE NUMBER:
X-XXX

ENCLOSURE 2

Yonkers Avenue Project Site Plans

VICINITY MAP
NOT TO SCALE

BRONX RIVER - YONKERS AVENUE STREAMBANK STABILIZATION TUCKAHOE, NEW YORK WESTCHESTER COUNTY

LOCATION PLAN
NOT TO SCALE

LOCATION MAP
NOT TO SCALE

CONCEPTUAL DESIGN
17 AUGUST 2009

SHEET NO.	SHEET REFERENCE NO.	TITLE
1	GI001	Cover Sheet & Table of Contents
2	SS101	Sheetpile Site Plan
3	SB501	Sheetpile Details
3	B601	Boring Logs

SIGNATURES AFFIXED BELOW INDICATE OFFICIAL RECOMMENDATION AND APPROVAL OF ALL DRAWINGS IN THIS SET AS INDEXED ON THIS SHEET

APPROVED FOR TECHNICAL ADEQUACY BY:
DESIGN TEAM LEADER — DATE

CONCURRED BY:
TECHNICAL MANAGER — DATE

APPROVAL RECOMMENDED BY:
CHIEF, DESIGN BRANCH — DATE

APPROVAL RECOMMENDED BY:
CHIEF, ENGINEERING MANAGEMENT BRANCH — DATE

APPROVED BY:
CHIEF, ENGINEERING DIVISION — DATE

This project was designed by the U.S. Army Corps of Engineers. The initials or signatures and registration designations of individuals appear on these project documents, within the scope of their employment as required by ER 1110-1-8152.

ALL DIMENSIONS/EXISTING CONDITIONS SHOWN SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE GOVERNMENT FOR CLARIFICATIONS. DRAWING SHALL NOT BE SCALED TO OBTAIN DIMENSIONS OR DISTANCES.

US Army Corps of Engineers
New York District

U.S. ARMY ENGINEER DISTRICT
NEW YORK
http://www.nan.usace.army.mil

DESIGNED BY: X.X.X. | DWN BY: X.X.X. | CKD BY: X.X.X. | SUBMITTED BY: X.X.X.

BRONX RIVER - YONKERS AVENUE
STREAMBANK STABILIZATION
TUCKAHOE, NEW YORK

Cover Sheet &
Table of Contents

SHEET REFERENCE NUMBER
GI001
SHEET 1 OF 4

SUBMITTED BY: E3END5RO PLOT DATE: 13 OCT 2009 17:41
MAY 2009 NYD BORDER

NTS

NOTES:

1. INSTALL SHEET PILE BEHIND CURB. SHEET PILE DEPTH SHALL BE DESIGNED PER CURRENT ENGINEERING STANDARD AND SPECIFICATIONS.
2. LENGTH OF SHEETPILE IS APPROXIMATELY 170 LINEAR FEET.
3. RIPRAP SHALL BE PLACED AT BENDS TO OFFSET RIVER FORCES. REPLACE EXISTING RIP RAP WITH 12"-15" STONE 15" THICK.
4. ROCK BOLTS MAY BE REQUIRED FROM STA 0+00 TO STA 0+60 TO REINFORCE THE EXPOSED ROCK.

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THIS BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

US Army Corps of Engineers
New York District

U.S. ARMY ENGINEER DISTRICT
NEW YORK
http://www.nan.usace.army.mil

DESIGNED BY: X.X.X. | DATE:
DWN BY: X.X.X. | CKD BY: X.X.X. | SOLICITATION NO.:
SUBMITTED BY: X.X.X. | CONTRACT NO.:
FILE NAME: WCHESBRXYNKRSS101XXX.dgn
SIZE: ANSI D | PLOTTED BY: e3en0sbo | PLOT DATE: 13-OCT-2009 17:44

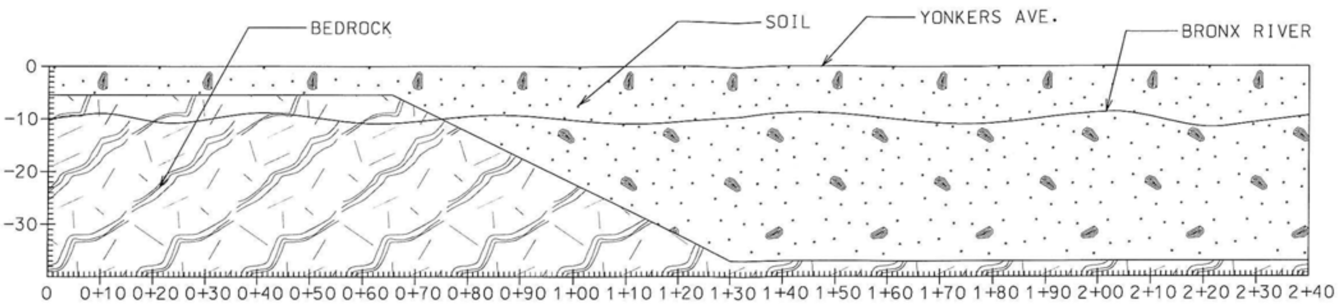
BRONX RIVER - YONKERS AVENUE
STREAMBANK STABILIZATION
TUCKAHOE, NEW YORK

PLAN AND NOTES

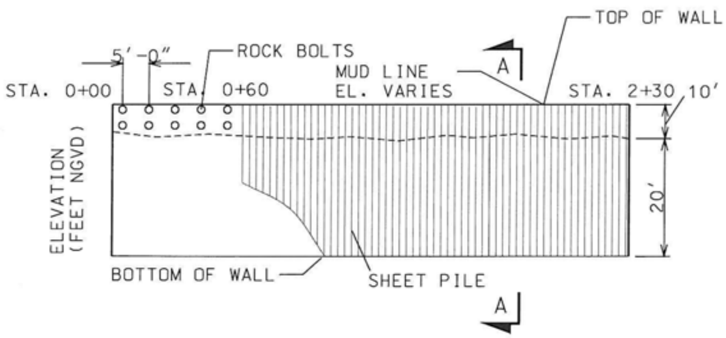
SHEET REFERENCE NUMBER
S-101

SUBMITTED BY: E3EN0SBO PLOT DATE: 13-OCT-2009 17:44
S:\FILEROOM\CIVIL\BRONX RIVER BASIN (NEW YORK)\YONKERS AVE (TUCKAHOE VILLAGE)\SHEET FILES\WCHESBRXYNKRSS101XXX.DGN

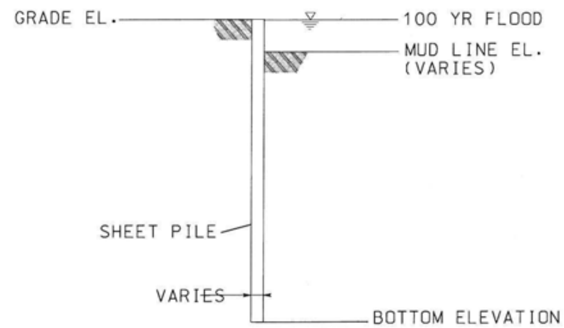
MAY 2009 NYD BORDER



SOIL PROFILE
NOT TO SCALE



BULKHEAD TOE & GRADE ELEVATIONS
NOT TO SCALE



SECTION A-A
NOT TO SCALE

NOTES:

1. INSTALL SHEETPILE BETWEEN STA 0+60 AND STA 2+30. APPROXIMATE LENGTH OF SHEET PILE IS 170'. VERIFY ROCK DEPTH ADDITIONAL REINFORCEMENT MAY BE NEEDED.
2. VERIFY EXISTING ROCK CONDITIONS BETWEEN STA 0+00 AND 0+60. ROCK BOLTS MAY BE NEEDED TO REINFORCE EXPOSED BEDROCK.
3. REPLACE ALL MISSING SOIL BEHIND SHEET PILE IN ORDER TO HAVE A LEVEL ROAD.
4. EXPOSURE AND EMBEDMENT OF SHEET PILE ARE APPROXIMATELY SHOWN HERE FOR COST ESTIMATE PURPOSE. THE CONTRACTOR AND HIS ENGINEER SHALL BE RESPONSIBLE FOR THE FINAL RESULTS.

ALL DIMENSIONS/EXISTING CONDITIONS SHOWN SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE GOVERNMENT FOR CLARIFICATIONS. DRAWING SHALL NOT BE SCALED TO OBTAIN DIMENSIONS OR DISTANCES.

THIS BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

US Army Corps of Engineers
New York District

U.S. ARMY ENGINEER DISTRICT
NEW YORK
http://www.nan.usace.army.mil

DESIGNED BY: X.X.X. | DATE
DWN BY: X.X.X. | CKD BY: X.X.X. | SOLICITATION NO.
SUBMITTED BY: X.X.X. | CONTRACT NO.
PLOT DATE: 09-OCT-2009 10:15
SIZE: ANSI D

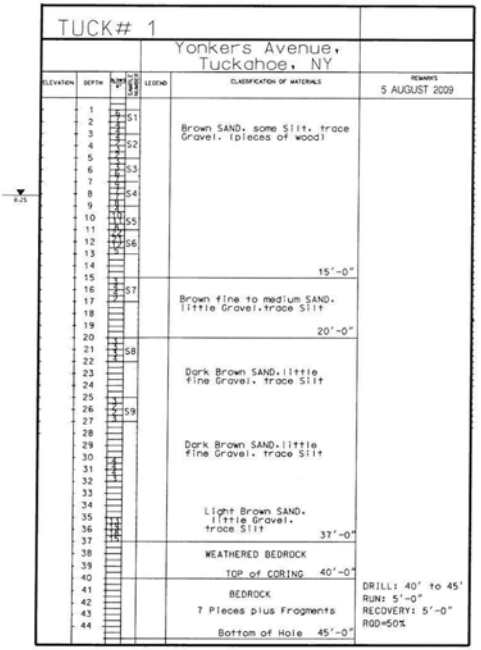
BRONX RIVER - YONKERS AVENUE
STREAMBANK STABILIZATION
TUCKAHOE, NEW YORK

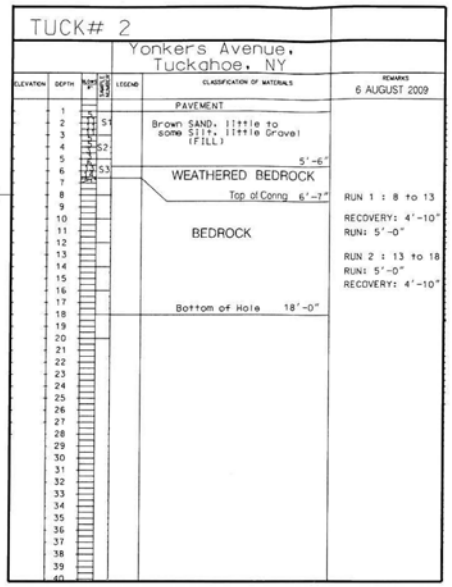
SECTION AND DETAILS

SHEET REFERENCE NUMBER
S-501

MAY 2009 NYD BORDER

SUBMITTED BY: EJENOSGO PLOT DATE: 09-OCT-2009 10:15





SUBSURFACE EXPLORATION NOTES

1. NOTES:

FOR BORING LOCATIONS SEE PLAN SHEETS.

SOILS WERE VISUALLY CLASSIFIED ACCORDING TO THE "UNIFIED SOIL CLASSIFICATION SYSTEM."

SUBSURFACE EXPLORATION WAS CONDUCTED BY NY DISTRICT, U.S. ARMY CORPS OF ENGINEERS

STANDARD PENETRATION TEST (SPT) METHODS AND PROCEDURES (140# HAMMER, THIRTY-INCH DROP, AND TWO-INCH SPLIT SPOON) WERE EMPLOYED TO COLLECT SAMPLES, EXCEPT WHERE NOTED

VIBRACORES ARE NOTED BY VC

DATUM = NGVD

2. CLASSIFICATION AND TERMS

BEDROCK: NATURAL SOLID MINERAL MATTER (ROCK) OCCURRING IN GREAT THICKNESS AND EXTENT IN ITS NATURAL LOCATION. NORMALLY UNDERLIES SOIL.

SOILS: SEDIMENT OR OTHER UNCONSOLIDATED PARTICLES PRODUCED BY THE PHYSICAL AND CHEMICAL WEATHERING OF ROCKS, AND WHICH MAY CONTAIN ORGANIC MATTER. SOILS ARE TYPICALLY CLASSIFIED AS FOLLOWS:

BOULDER ... larger than 8"
COBBLE OR SMALL STONE 8" - 3"
GRAVEL: coarse...3" to 3/4"
medium...3/4" to 4.76 mm
SAND: coarse...4.76 mm to 2 mm
medium...2 mm to 0.42 mm
fine.....0.42 mm to 0.074 mm
SILT and CLAY...finer than 0.074 mm

Major soil size component is shown with all letters CAPITALIZED. Minor component % in terms of the total sample are as follows:

and.....40 to 50%
some....40 to 20%
little..20 to 10%
trace...10 to 1%

3. ABBREVIATIONS

WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER
NR = No Recovery NS = No Sample
TABLE OF SOIL TESTING - ABBREVIATIONS
USCS = Unified Soil Classification Symbol
% G = Percent Gravel-sized particles
% S = Percent sand-sized particles
% F = Percent fines (silt and clay)
LL = Liquid Limit PL = Plastic Limit
PI = Plasticity Index (LL- PL)
% H2O = Water Content (Wt H2O / Wt Dry Soil)
SG = Specific Gravity

4. Drilling Company: Micon Drilling Inc.

LEGEND

Well graded SAND with trace of Silt and Clay (SW)
Poorly graded SAND, or SAND and GRAVEL with trace or no fines (SP)
SAND with a trace to little Silt (SP-SM)
Silty SAND or SAND-SILT mixtures (SM)
Sample selected for laboratory testing
Groundwater level at time boring was completed

US Army Corps of Engineers
New York District

MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY ENGINEER DISTRICT NEW YORK
http://www.nan.usace.army.mil

DESIGNED BY X.X.X. DATE
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SUBMITTED BY X.X.X. CONTRACT NO.
FILE NAME: P:\...\SUPS_B-601.dgn
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PLOT DATE: 09-OCT-2009 10:44

BRONX RIVER - YONKERS AVENUE
STREAMBANK STABILIZATION
TUCKAHOE, NEW YORK
BORING LOGS

SHEET REFERENCE NUMBER
B-601
SHEET XX OF X

ALL DIMENSIONS/EXISTING CONDITIONS SHOWN SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE GOVERNMENT FOR CLARIFICATIONS. DRAWING SHALL NOT BE SCALED TO OBTAIN DIMENSIONS OR DISTANCES.

0 1"
THIS BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

SUBMITTED BY: EJENDS90
PLOT DATE: 09-OCT-2009 10:44
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MAY 2009 NYD BORDER

ENCLOSURE 3

Pictures of Westchester County Center Site

Pictures of Westchester County Center Site

Bronx River West River Bank, facing southwest, northern portion of the site

Bronx River facing north, southern portion of the site

ENCLOSURE 4

Pictures of the Yonkers Avenue Site

Pictures of the Yonkers Avenue Site

Bronx River facing north, northern portion of the site

Bronx River facing north, southern portion of the site