JACKSON PARK SECTION 506
GREAT LAKES FISHERY & ECOSYSTEM RESTORATION STUDY
CHICAGO, ILLINOIS
FEASIBILITY STUDY

APPENDIX B
CIVIL DESIGN

NOVEMBER 2013

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INTRODUCTION

General

1. The purpose of this volume is to present the civil engineering analysis for the formation of FEASIBILITY STUDY for the Jackson Park Section 506, Great Lakes Fishery & Ecosystem Restoration (GLFER). The Detailed Project Report (DPR) includes the assessment of ecological conditions and plans to restore migratory bird, fish, and wildlife habitat within a highly urbanized environment. The study addresses the issues of impaired geomorphology, lack of native plant communities, invasive species, fire suppression, poor connectivity, rare wetland communities, and poor native species.

2. Jackson Park is located in the City of Chicago, Cook Country, Illinois. The park is one of many city parks and owned and operated by the Chicago Park District (CPD). The park is located along the western coast of Lake Michigan at the south side of Chicago, between 56th Street and 67th Street. The study area consists of natural area patches that total approximately 156 acres. Refer to Figure 3 of the main report for the project location map.

Purpose and Scope

3. The purposed of this Appendix is to: 1) describe design criteria, engineering methods, procedures, and assumptions that were used for layout and perform preliminary design analysis of the selected alternative, Alternative 5; 2) present the methods used and calculations developed for earthwork quantities 3) present the requirements for the real estate needed; 4) present criteria and requirements for utility interferences; and 5) discuss the engineering design analysis requirements for the next phase of the project.

4. Alternative 5 is the selected alternative for the project and consists of the creation of mudpuppy habitat; fringe marsh, existing island, sedge meadow, and savanna / open woodland plant community types; invasive plant species removal; fish community separator; geomorphic contouring, and vernal pools.

Survey Data Information

5. Local GIS data was used for the site layout and grading design and represents conditions existing at that time. Topography was generated from the Illinois 2005 digital elevation model that was created from the 2005 orthophotography of Illinois. Horizontal accuracy standards for 1”=100’ maps are better than 1' at based on a RMSE (Horizontal) North American Datum of 1983.

6. GIS Data Disclaimer: While the United States Army Corps of Engineers, Chicago District (hereinafter referred to USACE) has made a reasonable effort to insure the accuracy of the maps and associated data, it should be explicitly noted that USACE makes no warranty, representation or guarantee, either express or implied, as to the content, sequence, accuracy, timeliness or completeness of any of the data provided herein. The USACE, its officers, agents, employees, or servants shall assume no liability of any nature for any errors, omissions, or inaccuracies in the information provided regardless of how caused. The USACE, its officers, agents, employees or servants shall assume no liability for any decisions made or actions taken or not taken by the user of the maps and associated data in reliance upon any information or data furnished here. By using these maps and associated data the user does so entirely at their own risk and explicitly acknowledges that he/she is aware of and agrees to be bound by this disclaimer and agrees not to present any claim or demand of any nature against the USACE, its officers, agents, employees or servants in any forum whatsoever for any damages of any nature whatsoever that may result from or may be caused in any way by the use of the maps and associated data.

7. The horizontal coordinates are referenced to the Illinois State Plane Coordinate System, East Zone, North American Datum of 1983 (NAD 83) U.S. Feet.

8. The vertical datum are referenced to the North America Vertical Datum of 1988 (NAVD 88) U.S. Feet.

Geotechnical Data

9. Hand borings were taken at multiple locations throughout the project site. The borings were performed by members of the project team on 15 October 2013. The visual observation of the sample showed that there is 12” to 18” of clayey topsoil and several feet of sandy soil underneath the topsoil, which is consistent throughout the site.

10. Geotechnical borings were not performed for this feasibility study. Boring data may be necessary at the areas to be graded and

to determine the suitability of the excavated material as fill. The need for geotechnical boring should be determined during the design phase of the project.

Utility Survey

11. An Information Retrieval Process (IPR) is being initiated with the City of Chicago Office of Underground Coordination (OUC). A map of the project site was submitted to the OUC. The OUC will send the map to the utility companies for their review and response. The result from the inquires will be available after 30 days and will show the existing utilities within the project site. Utility conflicts identified should be further investigated during the design phase. In addition, site investigation and survey should be performed to verify locations of utilities as necessary.

Tree Survey

12. All trees over ten inches in Diameter Breast Height (DBH) are being surveyed. The tree survey will include the location, size (DBH) and species of the trees. The tree Survey is on-going and will be completed prior to the design phase.

Additional Topographic and Hydrographic Survey Data

13. Additional topographic survey data is needed to determine the location of the existing concrete path on the east side of Cornell Ave. The existing concrete path will be stripped and replaced during construction. Existing structures adjacent to all graded areas should also be surveyed, including curbs, parking lots, signs, etc. Grading will be performed along western shoreline of the West Lagoon to allow for a gentle slope to the lagoon. Therefore, hydrographic survey of the West Lagoon is needed to determine the depth of the lagoon along the western shoreline.

SECTION 1 – PHYSICAL RESTORATION MEASURES

Clearing and Grubbing (IPR)

14. All trees over ten inches in DBH will be surveyed. The trees will be shown on the plans during the design phase to include the size and species. All trees under 10” in DBH will be removed. Trees within the grading areas will also be removed. Other trees to be removed are being determined by the Planning Group (PL) and will be finalized prior to the design phase. All trees to be removed will be tagged on the field by the PL group. The tree removal plan will be coordinated with the LS. The goal is to remove a small number of trees while maximizing the benefits of the project.

15. For cost estimating purposes the following assumptions were made to determine the number of trees to be removed:

a. Selective Tree Clearing: An acre sample boundary was drawn on an aerial map and the trees within the boundary were counted. Approximately 50 trees were counted. Therefore, 50 trees per acre are assumed within the selective tree clearing area. It is also assumed that 25% of the trees will be removed.

b. Understory Tree Clearing: From observations on an aerial map, there is a much higher density of trees in this area compared to the selective tree clearing area. Therefore, 100 trees per acre is assumed and 25% of the trees will be removed in this area.

16. All trees removed will be chipped on-site and tilled into the surrounding soil. One inch of wood chips will be spread and tilled into approximately ten acres of land prior to planting activities.

Invasive Plant Species Removal (IPR) Herbicide Treatment

17. Invasive plant species removal includes the removal of non-native and invasive vegetation through herbicide. Existing turf grass (Kentucky blue grass) among other invasive vegetations within the work limits will be removed by herbicide. Invasive vegetation within the existing islands will also be removed. The Contractor can access the island using a boat and hand-held herbicide equipment will be used. Refer to the main report for the list of invasive to be removed.

Carp Removal and Fish Fence Installation

18. All fishes within the pond (West and East Lagoons) including carp species will be removed by the application of rotenone. Rotenone will be applied aerially using a helicopter. After application of the rotenone, the dead fishes will be removed from the lagoons and disposed off-site. To prevent undesirable fishes from migrating back into area, a fish fence will be placed under the north bridge to cut off fish migration from the Columbia basin to the lagoons. The Government will restock the lagoons with desirable fish species.

Cornell Ave. Grading

19. A few areas along the western shoreline of the west lagoon have steep slopes and are experiencing some minor erosion problems. The slopes will be graded to allow for a gradual transition into the lagoon. The lagoon will be filled at the shoreline to create the gradual slope. Sounding data of the west lagoon is needed to determine the volume of fill needed in the lagoon. To account for the additional fill in the lagoon in the absent of sounding data, it is assumed that 50% of additional fill will be needed. It is also assumed that the material excavated to create vernal pools or geo-contouring used as fill for Cornell Ave. grading. Further geotechnical investigation is necessary during the design phase to determine if the material will be suitable as fill. The area to be graded will be cleared/stripped of wooded plants prior to grading. Further coordination with the CPD is necessary to verify the trees to remove and extent of removal.

Vernal Pool (VP) Grading

20. The vernal pool measure will create ephemeral wetlands which will hold water long enough to support the habitats for amphibians and invertebrates. Twelve vernal pools will be created at various locations within the project site. Nine vernal pools will be located within the proposed savanna woodland areas and three will be located within the proposed sedge meadow areas. The bottom areas of the pools vary from 100 SF to 1000 SF. The depth also varies between 4 feet at the savanna woodland areas and 6 feet at the sedge meadow areas. The pools have side slopes of 1(V):5(H). For grading, 18” of topsoil will be stripped and stockpiled. 2.5’ – 4’ of the underlying sandy soil will be removed and stockpiled. Six inches of top soil will be replaced and prepared for seeding. Excess material will be used as fill for the Cornell Ave. grading. The existing water table location should be verified during the

design phase to ensure that there is no underground seepage of water to the pool areas.

Geo-contouring (GC) Grading

21. Geo-contouring measure consists of grading bank areas that are unnaturally steep to expose hydrology and promote healthy native plant cover. This measure also includes the creation of wetland scrapes within the existing golf courses to be consistent with Olmsted designs. There are a total of four areas to receive geo-contouring. Two of the areas are within the Fringe Marsh habitat area and the other two are within the sedge meadow habitat area. Three vernal pools are located within the sedge meadow geo-contouring area as described above. For grading, 18” of topsoil will be stripped and stockpiled. 1.5’ to 2’ of the underlying sandy soil will be removed and stockpiled. Six inches of top soil will be replaced and prepared for seeding. Additional material will be removed to create vernal pools. The area will have side slopes that vary between 1(V):5(H) and 1(V):8(H). Areas adjacent to the lagoon shoreline will gradually slope into the lagoon. Excess material will be used as fill for the Cornell Ave. grading.

Mudpuppy Habitat (MH)

22. This measure will provide mudpuppy habitat within the Jackson Park south lagoon. Two habitat areas are proposed. Each habitat will include 9, 3’ x 3’ x 3” stones layered in a pyramid. The stones will be placed over six inches of pea gravel.

SECTION 2 – PLANT RESTORATION HABITATS

Fringe Marsh (FM) Habitat

23. Fringe Marsh habitat is located along the shoreline of the lagoons. This measure will establish fringe/hemi marsh to provide habitat structure and quality. IPR activities will occur at these areas and prepared for planting. The area will receive native seeds, plugs, and shrubs. The fringe Marsh habitat also includes two geo-contouring areas as described above. Refer to the main report for the planting list and map of the area.

Existing Island (EI) Habitat

24. The existing islands within the lagoons will be restored to improve the structure and quality of the lagoons. IPR activities will occur at these areas and prepared for planting. The area will receive native seeds, plugs, and shrubs. Refer to the main report for the planting list and map of the area.

Sedge Meadow (SM) Habitat

25. The sedge meadow habitat is consistent with Olmsted's plan and will create plant communities with lower growing vegetation. The habitat comprises of two geo-contouring areas and three vernal pools as describe above. These areas will receive native seeds and plugs. Refer to the main report for the planting list and map of the area.

Savanna/Woodland (OSW) Habitat

26. This habitat will restore intertwined savanna and open woodland habitats. This measure is also consistent with Olmsted's plan and will create more open fields that are currently occupied by non-native shrubs. These areas will receive native seeds, plugs, shrubs, and trees. Refer to the main report for the planting list and map of the area.

SECTION 3 – OTHER CONSTRUCTION ACTIVITIES

Demolition and Removal

27. Concrete Pathway: The existing concrete pathway within the work limits located on the east side of Cornell Ave. will be stripped and replaced with 6" concrete pavement with 6x6 W2xW2 welded wire fabric.

28. Existing Light Pole: There is an abandon electrical light pole located at on the east side of Cornell Ave. The pole will be removed and disposed off-site.

Temporary Construction Facilities

29. It is assumed that a construction trailer will be used at the project site for the duration of the construction contract. The need for a trailer should be verified and coordinated with the field office and the CPD.

30. The project work limits are shown on the plates. Chainlink or plastic snow fencing will be placed along the worklimits to secure the project site. Chainlink fencing will be place along the work limits of the Cornell Ave. grading where heavy equipment grading work will occur. Chainlink fence will also be placed at the staging areas. Plastic snow fence will be placed along all other work limits. The plate also shows pathways for the contractor's used to access isolated seeding areas within the existing golf courses. These areas will not be fenced and will be used solely for access. It is assumed that the golf courses will be operational during construction activities and minimal disruption is desired.

31. Staging areas are required during construction for setting up temporary facilities, staging equipment and supplies, and staging stockpile and debris as needed. Two locations are identified on the plates for the staging areas. The northern staging area is located on an old Nike missile site. This site has been cleaned and suitable to be used as a staging area since there will be no construction work taking place. Adjacent to this staging area is an existing golf driving range, which will be operational during construction. The southern staging area is located at an existing parking lot. The staging areas will be fenced with chainlink fencing and secured. The contractor will be required to restore the staging areas to pre-construction condition upon construction complete.

Maintenance of Traffic

32. Maintenance of traffic during construction is required per IDOT. Pavement for the road surfaces damaged during construction will be removed and replaced as in accordance with IDOT specifications for pavement patching.

Prescribe Burning

33. Control burn will be performed in all areas, except where existing trees will be protected. A small percentage of the area will need a second burn based on the outcome of the first burn.

Tree Protection

34. The existing trees to remain throughout the site and within the work limits will be protected using plastic snow fence.

Erosion Control

35. Soil erosion and sediment control measures will be designed during design phase and will comply with local and federal environmental requirements. The minimum measures required at the project site include:

a. Hydroseeding, seeding, and mulching to stabilize disturbed areas.
b. Installation of silt fences around graded slopes and stockpile areas.
c. Protection of the ponds where grading occurs with silt fencing that retain debris and prevent sediments from traveling into the ponds.
d. Stabilizing construction entrances to limit soil disturbance at the ingress/egress from the site.
e. Installing erosion blanket over unprotected finished grades that are to be unplanted for at least two weeks.

Real Estate Requirements

36. The Real Estate is preliminary and will be finalized at the design phase.

JACKSON PARK SECTION 506
GREAT LAKES FISHERY & ECOSYSTEM RESTORATION STUDY

ATTACHMENT 3
Plates

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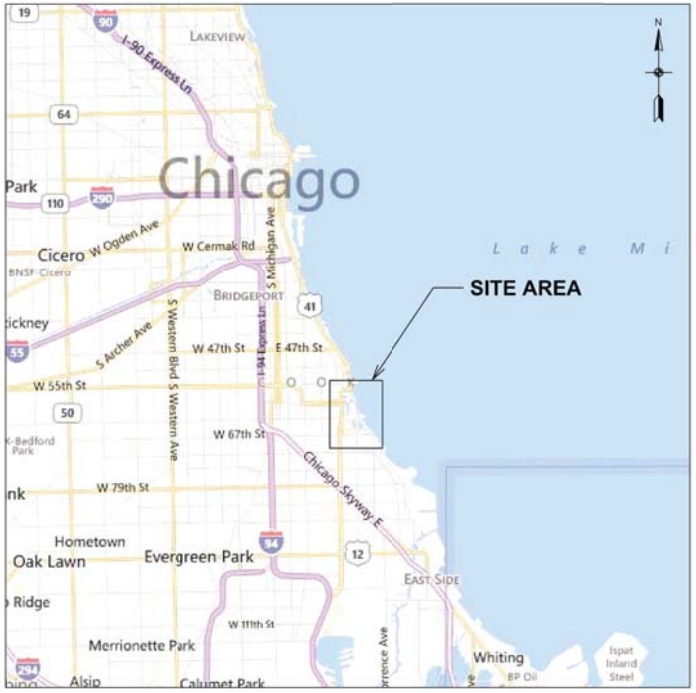
Chicago District

JACKSON PARK
SECTION 506 - GREAT LAKES FISHERIES AND ECOSYSTEM RESTORATION (GLFER)
CHICAGO, ILLINOIS



LOCATION MAP
(N.T.S.)

VICINITY MAP
(N.T.S.)

Preliminary Submittal - 30% DESIGN

Solicitation: W912P6-XX-X-XXXX

Contract: W912P6-XX-X-XXXX

NOV 2013

THIS PROJECT WAS DESIGNED BY THE CHICAGO DISTRICT CORPS OF ENGINEERS. THE INITIALS OR SIGNATURES AND REGISTRATION NUMBERS AND SEALS OF THE PERSONS WHO APPEAR ON THESE PROJECT DOCUMENTS WITHIN THE SCOPE OF THEIR EMPLOYMENT AS REQUIRED BY ER 1110-1-8159 AND ER 1110-345-700 INDICATE OFFICIAL RECOMMENDATION OF ALL DRAWINGS IN THIS SET.

REVIEWED BY:

ATR TEAM LEADER DATE

SIGNATURE AFFIXED BELOW INDICATE OFFICIAL RECOMMENDATION AND APPROVAL FOR ALL DRAWINGS CONTAINED IN THE SHEET INDEX.

APPROVAL RECOMMENDED BY:

PROJECT MANAGER DATE

APPROVED BY:

CHIEF, DESIGN BRANCH DATE

US Army Corps of Engineers®
Chicago District

MARK	DESCRIPTION	TRACKING NO.	ACTION	DATE	MARK	DESCRIPTION	TRACKING NO.	ACTION	DATE

DESIGNED BY: P. LEPPERT
DRN BY: SM
CHD BY:
SUBMITTED BY:
PLOT SCALE: AS NOTED
PLOT DATE: 11/20/2013
SIZE: ANSI D
U.S. ARMY CORPS OF ENGINEERS
CHICAGO DISTRICT
CHICAGO, IL
SOLICITATION NO.:
CONTRACT NO.:
FILE NUMBER:
DATA: NAD 1983
PROJECTION: STATE PLANE
ZONE: EAST
UNITS: US SURVEY FEET
DATUM: NAD 83
GEOID: GEOID12A
VERTICAL DATUM: NAVD 88
FILE NAME: JACKSON PARK SECTION 506 - GREAT LAKES FISHERIES AND ECOSYSTEM RESTORATION (GLFER) CHICAGO, ILLINOIS LOCATION AND VICINITY MAP.dgn

JACKSON PARK
SECTION 506 - GREAT LAKES FISHERIES AND ECOSYSTEM RESTORATION (GLFER)
CHICAGO, ILLINOIS
LOCATION AND VICINITY MAP

SHEET IDENTIFICATION
G-001
SHEET 1 OF 4

LEGEND	
———	WORK LIMITS

NOTES:

1. THE SURVEY CONDITIONS SHOWN ON THESE DRAWINGS ARE FROM A LOCAL GIS DATA AND REPRESENTS CONDITIONS EXISTING AT THAT TIME.
2. ALL COORDINATES SHOWN ARE REFERENCED TO THE ILLINOIS STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83) U.S. FEET.
3. ALL ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICA VERTICAL DATUM OF 1988 (NAVD 88) U.S. FEET.
4. ALL MATERIAL EXCAVATED WILL BE MANAGED ON SITE. EXCESS MATERIALS WILL BE GRADED ADJACENT TO THE VERNAL POOL AREAS.
5. THE EXISTING SIDE WALK WITHIN THE WORK LIMITS ALONG CORNELL AVE. WILL BE REPLACED. REFER TO SHEET C-301 FOR THE TYPICAL SECTION.

0 250' 500'

US Army Corps of Engineers
Chicago District

MARK	DESCRIPTION	TRACKING NO.	ACTION	DATE

U.S. ARMY CORPS OF ENGINEERS
CHICAGO DISTRICT
CHICAGO, IL

DESIGNED BY: P. LEPPER
DWN BY: DB
SUBMITTED BY:
PLOT SCALE: 1:1000
PLOT DATE: 11/20/2015
SIZE: 24 X 36
FILE NAME: JP15R_C-101.dgn
DATE: NOV 2015
SOLICITATION NO.:
CONTRACT NO.:
FILE NUMBER:

JACKSON PARK
SECTION 506 - GREAT LAKES FISHERIES AND ECOSYSTEM RESTORATION (GLFER)
CHICAGO, ILLINOIS
SITE PLAN

SHEET IDENTIFICATION
C-101
SHEET 2 OF 4

LEGEND

WORK LIMITS

CONTRACTOR'S PATH FOR ACCESS ONLY

0 250' 500'

US Army Corps of Engineers
Chicago District

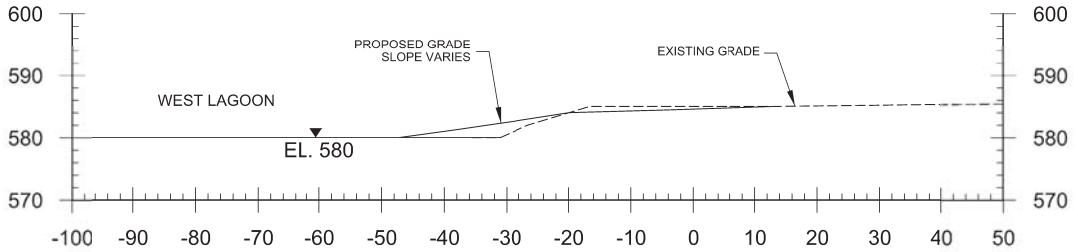
MARK	DESCRIPTION	TRACKING NO.	ACTION	DATE

U.S. ARMY CORPS OF ENGINEERS
CHICAGO DISTRICT
CHICAGO, IL

DESIGNED BY: | DATE:
DWN BY: | CKD BY: | SOLICITATION NO.:
SUBMITTED BY: | CONTRACT NO.:
PLOT SCALE: | PLOT DATE: 11/20/2015 | FILE NUMBER:
SIZE: | FILE NAME: JWTER_C-102.dgn

JACKSON PARK
SECTION 506 - GREAT LAKES FISHERIES AND ECOSYSTEM RESTORATION (GLFER)
CHICAGO, ILLINOIS
SITE PLAN

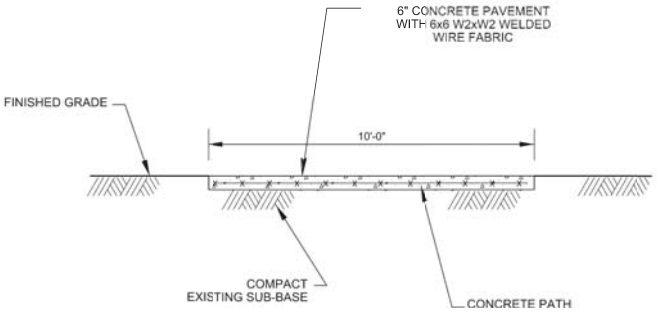
SHEET IDENTIFICATION
C-102
SHEET 2 OF 0



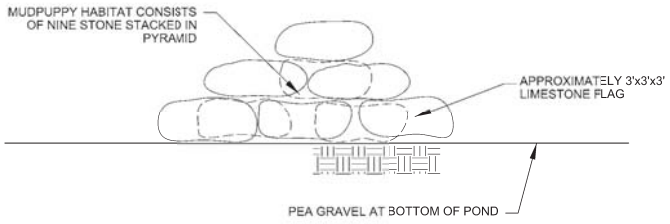
NOTE:

WATER LEVEL IS APPROXIMATE
ACTUAL WATER ELEVATION VARIES

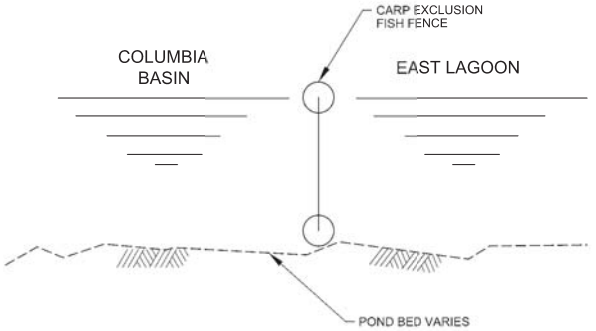
CORNELL AVE. GRADING TYPICAL SECTION A-A



CONCRETE WALKWAY TYPICAL SECTION
N.T.S



MUDPUPPY HABITAT DETAIL
N.T.S.



CARP EXCLUSION FISH FENCE TYPICAL SECTION
N.T.S

US Army Corps of Engineers
Chicago District

MARK	DESCRIPTION	TRACKING NO	ACTION	DATE
MARK	DESCRIPTION	TRACKING NO	ACTION	DATE

U.S. ARMY CORPS OF ENGINEERS
CHICAGO DISTRICT
CHICAGO, IL

DESIGNED BY: P. LEPPERT
DWN BY: DB
CHD BY:
SUBMITTED BY:
PLOT SCALE:
PLOT DATE: 11/20/2015
FILE NAME: JPWTR_C-301.dgn
SOLICITATION NO.:
CONTRACT NO.:
FILE NUMBER:
SIZE: 24 X 36

JACKSON PARK
SECTION 506 - GREAT LAKES FISHERIES AND ECOSYSTEM RESTORATION (GLFER)
CHICAGO, ILLINOIS
TYPICAL SECTIONS

SHEET IDENTIFICATION
C-301
SHEET 4 OF 4