2010P042

HNTB

LOGAN SIMPSON DESIGN INC.

Tres Rios Environmental Restoration Phase 3B

Specifications

Landscaping Final Submittal
November, 2011

US Army Corps of Engineers®
Los Angeles District

Kiewit

City of Phoenix

2010P043

HNTB

LOGAN SIMPSON DESIGN INC.

Tres Rios Environmental Restoration Phase 3B

Specifications

Landscaping Final Submittal
November, 2011

US Army Corps of Engineers®
Los Angeles District

Kiewit

City of Phoenix

This page is intentionally left Blank.

PROJECT TABLE OF CONTENTS

This page is intentionally left Blank.

SECTION 32 05 33

LANDSCAPE ESTABLISHMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z88.2 (1992) Respiratory Protection

ASTM INTERNATIONAL (ASTM)

ASTM D 5851 (1995; R 2006) Planning and Implementing a Water Monitoring Program

MARICOPA ASSOCIATION OF GOVERNMENTS (MAG)

MAG (2010) Uniform Standard Specifications and Details for Public Works Construction

PHOENIX SUPPLEMENTS (2010) City of Phoenix Supplements to Maricopa Association of Governments Uniform Standard Specifications and Details for Public Works Construction

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910-SUBPART Z Toxic and Hazardous Substances

1.2 DEFINITIONS

1.2.1 Pesticides/Herbicides

Any substance or mixture of substances, including biological control agents, that may prevent, destroy, repel, or mitigate pests and are specifically labeled for use by the U.S. Environmental Protection Agency (EPA). Also, any substance used as a plant regulator, defoliant, disinfectant, or biocide. Examples of pesticides include fumigants, herbicides (for salt cedar control), insecticides, fungicides, nematicides, molluscicides and rodenticides.

1.3 RELATED REQUIREMENTS

Section 32 93 00 EXTERIOR PLANTS applies to this section for installation of trees, shrubs, with additions and modifications herein.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that should review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Integrated Pest and Noxious Plants Management Plan

SD-03 Product Data

Fertilizer: G

Pesticides and Herbicides: G

SD-07 Certificates

Pesticide/Herbicides applicator's certification: G

Maintenance inspection report: G

SD-08 Manufacturer's Instructions

Pesticides and Herbicides

SD-10 Operation and Maintenance Data

Maintenance Manual: G

Monthly maintenance reports: G

Soil Testing: G

SD-11 Closeout Submittals

Pesticides: G

Herbicides: G

1.5 DELIVERY, STORAGE AND HANDLING

1.5.1 Delivery

1.5.1.1 Fertilizer Delivery

Deliver fertilizer to the site in original containers bearing manufacturer's chemical analysis, name, trade name, or trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer and/or gypsum may be furnished in bulk with a certificate indicating the above information.

1.5.1.2 Pesticide/Herbicide Delivery

Deliver to the site in original containers with legible manufacturer's label attached.

1.5.2 Storage

1.5.2.1 Fertilizer Storage

Material shall be stored in designated areas. Fertilizer shall be stored in cool, dry locations away from contaminants.

1.5.2.2 Pesticides and Herbicides Storage

Do not store with fertilizers or other landscape maintenance materials. Store herbicides "downwind," relative to the airflow in the storage building, from other pesticides, and provide physical separation between herbicides and other pesticides.

1.5.3 Handling

Do not drop or dump materials from vehicles.

1.6 QUALITY ASSURANCE

1.6.1 Standard Specifications and Details

CONTRACTOR shall conform to all applicable requirements of Section 430 of the Uniform Standard Specifications to Public Works Construction by the Maricopa Association of Governments (MAG) by the City of Phoenix Supplements 2010 Version. If there is a conflict between MAG Standard Specifications as supplemented by the City of Phoenix and these Specifications, the Provisions of these Specifications shall govern.

1.7 MAINTENANCE

Submit Operation and Maintenance (O&M) Manual for maintaining all plant materials. Include instructions indicating procedures during one typical year including variations of maintenance for climatic conditions throughout the year. Provide instructions and procedures for watering; promotion of growth, including fertilizing, and pruning; pest management and salt cedar control. O&M Manuals shall include pictures of plant materials cross referenced to botanical and common names, with a description of the normal appearance in each season. Develop a water monitoring program for surface and ground water on the project site in accordance with ASTM D 5851 and consistent with the water management program utilized during construction operations. Operation and Maintenance Manual shall be provided in three ringed binders and each page laminated. Provide monthly O & M logs/reports to Contracting Officer's Representative.

PART 2 PRODUCTS

2.1 POST-PLANT FERTILIZER

2.1.1 Granular Fertilizer

Percentages and application rate of fertilizer shall be in conformance with Soils Fertility Tests.

2.2 WATER

Pole cuttings and wattles that are planted within high ground water areas near the shoreline should not require watering.

Should watering be required in periods of low water table and drought the source of water shall be approved by the Contracting Officer's Representative, and be of suitable quality for plant growth. Water can be pumped from the river into temporary tanks or water trucks and used for the watering plants if required. Any method of water application of planting areas shall not be permitted to discharge into existing water bodies or the river.

2.4 PESTICIDES

Fumigant, Herbicide, Insecticide, Fungicide and Rodenticide: EPA registered and approved. Comply with Federal Insecticide, Fungicide, and Rodenticide Act (Title 7 U.S.C. Section 136) for requirements on contractor's licensing, certification, and record keeping. Contractor to keep records of all pesticide applications and forward data monthly to Contracting Officer's Representative. Submit record keeping format to Contracting Officer's Representative for approval. Contact the Contracting Officer's Representative prior to starting work.

2.4.1 HERBICIDE FOR TREATMENT OF SALTCEDAR (TAMARISK)

The Contractor shall furnish all herbicide materials and application equipment. All herbicides used for Salt Cedar (Tamarisk) control shall be approved for use in and around Waters of the United States. Refer to *www.invasivespeciesinfo.gov/docs/news/workshopJun96/Paper7.html* for available foliar spray herbicide products for treatment of Saltcedar.

All herbicides and their application shall be consistent with the Best Management Plan as set forth in the City of Phoenix NPDES Permit NO. AZ 0024554, a copy of which is available for review at the Phoenix Area Office of the USACE. Herbicides for treatment of Saltcedar shall be as approved by the Contracting Officer's Representative. Herbicide application equipment shall be in good repair and operating condition capable of applying herbicides at rates and methods as set forth on the herbicide container label.

PART 3 EXECUTION

3.1 EXTENT OF WORK

Landscape maintenance work during landscape establishment shall include policing, soil testing, fertilizing, watering (temporary irrigation), weeding, pruning, Saltcedar (Tamarisk) and other noxious weed control and

removal and pesticide application for all terrestrial, riparian and wetland/marsh landscape areas within the project limits.

3.1.1 Policing

The Contractor shall police the project area during each monthly maintenance visit as required. Policing includes removal of paper, trash, garbage, plastic or other man-made debris. Policing shall extend to all areas within the project limits. Collected debris shall be promptly removed and disposed of at an approved disposal site.

3.1.2 Soil Testing and Fertilizer Application

Frequency and quantity of Soil Testing during the plant establishment period shall be determined by the Contractor. Fertilizer shall only be applied to plants if it is evident that the plants are in need of additional fertilization due soil leaching during the plant establishment period.

3.2 LANDSCAPE ESTABLISHMENT PERIOD

The landscape establishment period shall commence following the date that inspection by the Contracting Officer's Representative shows that all plants furnished under this contract have been satisfactorily installed and shall continue for a period of five years (60 consecutive calendar months).

3.2.1 Frequency of Maintenance

Begin maintenance immediately after plants have been installed. Inspect all planted and seeded areas and perform required maintenance at a minimum of once a month during the installation and guarantee period and a minimum of once a month during the landscape establishment period. All required maintenance shall be performed promptly. Watering of plants may be required at a greater frequency than routine maintenance.

3.2.2 Promotion of Plant Growth and Vigor

Water, fertilize, eradicate salt cedar, remove noxious weeds/invasive species and perform other operations necessary to promote plant growth, and vigor.

3.2.4 Tracking of Unhealthy Plants

It is unlikely that riparian plants will require replacement during the landscape establishment period however track plants not in healthy growing condition and determine cause of plant decline or death.

3.4.5 Replacement of Unhealthy Plants

Plants that decline and /or die due to neglect of the contractor shall be replaced at no additional cost to the Government with plants of the same species and sizes as originally specified as soon as seasonal conditions permit. Plant replacements shall only occur one time during the landscape establishment period.

Plant Material Replacements during Landscape Establishment shall comply as follows:

Original Size	Replacement Size
Pole Planting	Like size pole cutting
Brush Wattles	Like size brush wattles

3.2.6 Final Inspection

Final inspection should be made upon written request from the Contractor at least 30 days prior to the last day of the Landscape Establishment Period.

3.2.6.1 Plant Survivability

Plant survivability shall be monitored during the 5 year Landscape Establishment period as described in the project O & M Manual.

3.3 PESTICIDE/HERBICIDE APPLICATION

Use pesticides when required to eliminate plant diseases and harmful insects or insect eggs from plant materials. Use herbicides when required to control Saltcedar (Tamarisk) and other invasive species and noxious weeds as defined by the AZDA . The Contractor shall furnish all labor, supervision, tools, materials, equipment, and transportation necessary to provide Pest Control Services as required.

3.3.1 Foliar Herbicide Spraying

Except in areas within 15 feet of existing floodwalls, levees, embankment dams, and appurtenant structures, use foliar spraying to control young Saltcedar (Tamarisk) and re-growth/sprouting of plants less than 15-inches tall in areas where mechanical removal or cut stump treatment is impractical or in areas previously root plowed, mowed, or cleared where Salt Cedar is beginning to invade. Application should be conducted by spraying the herbicide mixture on foliage to wet, but not to drip, making certain the terminal ends of branches are treated. Contractor shall conduct foliar spraying to control Salt Cedar so that the herbicide does not drift, overspray or otherwise have incidental contact with foliage and harm existing and/or newly planted desirable trees, shrubs, and or groundcover(s).

3.3.2 State Licensing

The Contractor shall be licensed by the State to provide pest/vegetation control in the categories in which work should be performed.

3.3.3 Certified and Licensed Applicators

All pesticide/herbicide applications shall be performed by individuals who are state licensed or certified in the appropriate categories for the type of pest control to be performed. The applicator must be capable of reading, understanding and executing all of the requirements and recommendations outlined on the manufacturer's label. All pesticides must be used in accordance with the Federal, state, local, and installation laws, publications, and any requirements identified in attachments. All pesticides/herbicides shall be procured, processed, handled, and applied in strict accordance with the manufacturer's label. All pesticides/herbicides

shall be registered with the U.S. Environmental Protection Agency and State in which they should be used.

3.3.4 Pesticide/Herbicide Use Inspections

Pesticide/herbicide applications should be inspected by a Government designated Pest Management Coordinator. The Contractor shall notify the Contracting Officer's Representative immediately, by telephone, of any inspection visits by any Federal or State enforcement officials.

3.3.5 Pesticide/Herbicide Approval

The Contractor shall submit to the Contracting Officer's Representative a list of pesticides/herbicides "proposed for use" prior to initiation of work on the correct submission form. The Contracting Officer's Representative must approve the pesticides proposed before they can be used. Copies of the pesticide complete label and Material Safety Data Sheet (MSDS) for each pesticide proposed for use must be included. Copies of the State business license as an applicator of pesticides and the pesticide applicator's certification information must also be attached. If the Contractor wishes to use a pesticide not currently on the "list" (previously submitted), the new pesticide must be submitted to the Contracting Officer's Representative for approval on the correct submission form. Once pesticides are approved by the Contracting Officer's Representative, they can be used throughout the course of the contract provided that registration is not revoked by the EPA or the State. The government reserves the right to remove any pesticide from use at anytime.

3.3.6 Application and Reporting Procedure

Notify the Contracting Officer's Representative 24 hours before application. Apply pesticides/herbicides in accordance with EPA label restrictions and recommendations and federal and state laws. Make daily reports to the Contracting Officer's Representative stating areas treated with each chemical, the quantity applied, and spray mixture or formulation used. The Contractor shall maintain a label book of pesticides/herbicides used, including all appropriate Material Safety Data Sheets (MSDS), and have it readily available at all times for inspection. Pesticides/herbicides shall always be stored in original containers having EPA-registered labels attached or in service containers that conform to all federal, state, or local regulations regarding containers for pesticide storage.

3.3.7 Application Safety Precautions

Apply in well ventilated areas. Avoid inhalation, injection, or spilling on clothing or skin. Wear personal protective equipment (PPE) that meets or exceeds the requirements indicated by the manufacturer's pesticide label. Do not expose personnel to pesticides/herbicides exceeding the exposure levels recommended in the most stringent of the following: OSHA, 29 CFR 1910-SUBPART Z, or the manufacturer's material safety data sheet. If excessive exposures are unavoidable, use respirators approved by the National Institute for Occupational Safety and Health for protection from pesticides. Conform to the selection and usage guidance in ANSI Z88.2. Ensure that application sites are clearly posted with re-entry intervals as required by the manufacturer's pesticide label.

3.3.8 Hydraulic Equipment

For liquid application of chemicals, hydraulic equipment shall have leakproof tanks and a positive agitation method. Calibrate and meter equipment so that application of chemicals in specified amounts can be determined. Provide equipment with gauges and valves capable of maintaining constant application pressures. Use application equipment appropriate for the nature and size of work, that is clean, calibrated, and in proper operational condition. Never leave equipment unattended during filling, and during application usage.

3.3.9 Personnel Injury and Property Damage Prevention

Apply in a manner to prevent injury to personnel, and damage to property, from either direct spray, or drifting of chemicals both on and off Government property.

3.3.10 Pesticide/Herbicide Disposal

The Contractor shall dispose of all excess pesticides/herbicides, rinse water, empty containers, and any contaminated article in accordance with the label, applicable State and Federal regulations and Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION. Pesticides, pesticide containers, pesticide residue, pesticide rinse water, or any pesticide contaminated articles shall not be disposed of on the installation or on any Federally owned property. However, rinse water may be used as diluents for the mixing the same pesticide.

3.3.11 Pesticide/Herbicide Spills, Clean Up and Decontamination

The Contractor shall be responsible for proper reporting, containment, clean up and decontamination of pesticide/herbicide spills, as required by EPA and State Laws and Regulations. All spills shall be immediately reported to the Contracting Officer's Representative.

3.4 WATER DELIVERY METHODS AND/OR SYSTEMS

The Contractor may incorporate various methods for delivering water to plant materials which may include distribution from pressurized tank-trucks, hydroseeders or a temporary irrigation system.

In any case, the contractor shall describe in the O & M Manual, the means and methods if needed to adequately water the planted riparian areas from the time of planting through the establishment period.

3.5 FIELD QUALITY CONTROL

3.5.1 Maintenance Inspection Report

Provide maintenance inspection logs/reports to assure that landscape maintenance is being performed in accordance with the specifications and in the best interest of plant growth and survivability. Site observations and maintenance activities shall be documented at the start of the warranty period, then monthly following the start, and at the end of establishment period. Contractor shall complete a maintenance log/report summarizing

activities and site conditions of each maintenance visit and submit to the Contracting Officer's Representative no later than 7 days after each visit.

-- End of Section --

This page is intentionally left Blank.

SECTION 32 93 00

EXTERIOR PLANTS

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

The work under this Section shall consist of furnishing all materials, preparing the soil, and installation of plants within the riparian planting areas as shown on the Landscape Plans. The work shall also include removal of invasive species of salt cedar and stockpiling of non-invasive deadwood debris for wildlife habitat in areas as designated by the project landscape architect.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A300	(1995) Tree Care Operations - Trees, Shrubs and Other Woody Plant Maintenance
ANSI Z60.1	(1996) Nursery Stock

ASTM INTERNATIONAL (ASTM)

ASTM C 602	(2007) Agricultural Liming Materials
ASTM D 4427	(2007) Peat Samples by Laboratory Testing
ASTM D 4972	(2001; R 2007) pH of Soils

L.H. BAILEY HORTORIUM (LHBH)

LHBH	(1976) Hortus Third

U.S. DEPARTMENT OF AGRICULTURE (USDA)

DOA SSIR 42	(1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce planting soil.

C. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

D. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

E. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

F. Subgrade: Surface or elevation of subsoil remaining after excavation is complete or top surface of a fill or backfill before planting soil is placed.

G. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

H. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as a flood plain, the surface soil can be subsoil.

1.4 RELATED REQUIREMENTS

Section 32 05 33 LANDSCAPE ESTABLISHMENT applies to this section for pesticide/herbicide use and plant establishment requirements, with additions and modifications herein.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

State Landscape Contractor's License - G

SD-03 Product Data

Fertilizer- G

Erosion Control Materials - G

SD-06 Test Reports

Topsoil composition tests; G

Soil Test of proposed planting areas; G

Soil Test location map - G

SD-07 Certificates

Nursery certifications - G

Indicate names of plants in accordance with the LHBH, including type, quality, and size - G

1.6 QUALITY ASSURANCE

1.6.1 Secure Plant Materials

Contractor shall supply within 15 calendar days of the anticipated start of landscape construction a complete list of all plants needed for this project. The list shall include the confirmed plant material source for the plant material, species and varieties of plant materials, assuring the availability of each species and quantity specified on the plans and herein. The list shall include the species name, common name and type (i.e. pole cuttings and brush wattles) It is anticipated that the plant materials for the riparian planting area shall be harvested from the project site as pole cuttings or brush wattles for the species specified. The contractor shall confirm the source for the plant materials and the approximate date the plant material will be harvested for planting..

1.6.2 Standard Specifications and Details

Contractor shall conform to all applicable requirements of Section 430 of the Uniform Standard Specifications to Public Works Construction by the Maricopa Association of Governments (MAG) as supplemented by the City of Phoenix. If there is a conflict between MAG Standard Specifications as supplemented by the City of Phoenix and these Specifications, the Provisions of these specifications shall govern.

1.6.4 Soils Testing

Contractor shall provide a total of 9 soils test provided by an independent testing laboratory including basic soil groups (moisture and saturation percentages, Nitrogen-Phosphorus-Potassium (N-P-K) ratio, pH (ASTM D 4972), soil salinity), secondary nutrient groups (calcium, magnesium, sodium, Sodium Absorption Ratio (SAR)), micronutrients (zinc, manganese, iron, copper), toxic soil elements (boron, chloride, sulfate), cation exchange and base saturation percentages, and, soil amendment and fertilizer recommendations with quantities for plant material being transplanted. Soil required for each test shall include a maximum depth of 18 inches of approximately 1 quart volume for each test. Areas sampled should not be larger than 1.0 acre and should contain at least 6-8 cores for each sample area and be thoroughly mixed. Problem areas should be sampled separately and compared with samples taken from adjacent non-problem areas. Samples should

be taken from proposed riparian planting areas as shown on the plans and taken after final grading operations are complete and ready for planting. The location of the sample areas should be noted and marked with GPS coordinates on the planting plans for future reference and provided to the Contracting Officer's Representative.

1.6.5 Nursery Certifications

Indicate on nursery letterhead the name of plants in accordance with the LHBH, including botanical and common names, quantity, and size. Provide state and/or federal Inspection certificate.

Nursery certifications would not be required for plant materials harvested from the project site.

1.6.6 State Landscape Contractor's License

Construction company shall hold a Landscape Contractor's license in the State of Arizona and have a minimum of five years landscape construction experience. Submit copy of license and three references for similar work completed in the last five years.

1.6.7 Plant Material Photographs

Contractor shall submit typical photographs plant sources, for government approval prior to cutting plants.

1.7 DELIVERY, STORAGE, AND HANDLING

1.7.1 Soil Amendment Delivery

Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, or trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer, gypsum, sulfur, iron, and lime may be furnished in bulk with a certificate indicating the above information. Store in dry locations away from contaminates.

1.7.3 Handling Pole Cuttings and Branch Wattles

All poles/wattles cuttings shall be harvested and immediately placed in soaking tanks or ponds located on the project site and shall be allowed to soak 5 to 7 days. The poles shall not be permitted to dry out at anytime. Cuttings shall be protected at all times against freezing temperatures, the sun, the wind and other adverse weather conditions. Pole plantings shall be planted the same day they have been removed from the soak treatment.

The contractor shall notify the Contracting Officer's Representative at least 24 hours prior to the date for inspection of the cutting operation at the project site. The Contracting Officer's Representative will inspect all poles for conformity with the specifications, and upon the Contracting Officer's Representative's acceptance, planting may begin. The contractor's project supervisor shall attend all plant inspections.

Do not drop or dump cuttings from vehicles. Avoid damage to cuttings being moved from storage area to planting site. Handle cuttings carefully to avoid damaging or breaking of cuttings.

1.7.4 Time Limitations

The time limitation from harvesting pole cuttings and branch wattles to installation shall be a maximum of 7 days.

1.8 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.8.1 Planting Dates

Pole Cuttings and wattles shall be installed during the local dormant season (January 1 - February 28).

1.8.2 Restrictions

Do not plant when ground is muddy and only when water can be obtained. When excessive moisture or other unsatisfactory conditions prevail, the planting work shall be stopped when directed by the Contracting Officer's Representative. When special conditions warrant a variance to planting operations proposed changes shall be submitted for approval.

1.9 GUARANTEE

All plants shall be guaranteed for one year (12 consecutive calendar months) beginning on the date of inspection and written acceptance by the Contracting Officer's Representative to commence the plant guarantee period. Plants shall be guaranteed against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by the Government or by weather conditions unusual for the warranty period.

The one year guarantee shall include that all plant materials are watered, fertilized, and control of pest as necessary with all plant materials maintained in a sound, healthy, vigorous growing condition free from insects, bark abrasions, or other objectionable disfigurements as determined by the Contracting Officer's Representative.

1.9.1 Plant Replacements

Contractor shall replace any plant which is found unacceptable during the one year guarantee period. Replace plants as required during the guarantee period with like kind and size. If replacement is required, it shall be accomplished at the end of the guarantee period and within the planting time (January - February) for pole cuttings and wattles. Replaced plants shall only be accomplished one time during the guarantee period and further monitoring of questionable plants shall carry over to the Landscape Establishment period.

1.9.2 Maintenance During the Guarantee Period

Unless otherwise authorized by the Contracting Officer's Representative, the Contractor shall maintain all landscaped areas on a continuous basis as they are completed during the course of work and until final project acceptance and the termination of the plant guarantee period.

Maintenance during the guarantee period shall include but not be limited to keeping the landscape areas watered, fertilized, and free of damaging insects, debris, including removal and control of all salt cedars, and weeding and cultivating the planted areas at intervals acceptable to the Contracting Officer's Representative. The guarantee period does not start until all plantings have been accepted in writing by the Contracting Officer's Representative.

The Contractor shall provide adequate personnel to accomplish the required maintenance for the complexity of this project, salt cedar removal and containment, and as directed by the Contracting Officer's Representative. At the termination of the Guarantee period a written acceptance from the Contracting Officer's Representative shall be provided to the Contractor.

1.10 LANDSCAPE ESTABLISHMENT

Landscape establishment shall be 60 consecutive calendar months (5 years) in accordance with Section 32 05 33 LANDSCAPE ESTABLISHMENT.

The landscape contractor shall be the only contractor that performs the work under Landscape Establishment Phase. Subcontracting of this work shall not be permitted, except, if needed, for weed eradication with herbicides which require special licensing.

PART 2 PRODUCTS

2.1 PLANTS

2.1.1 Regulations and Varieties

Existing trees and plants as shown on the plans to remain shall be protected and the planting design arranged around them.

Plants of the same specified size shall be of uniform size and character of growth. All plants shall comply with all Federal and State Laws requiring inspection for plant diseases and infestation.

2.1.2 Pole Cuttings

Poles shall be harvested from young vigorous trees from several individuals on the project site or from other Salt and Gila River sites within Maricopa County as approved by the Contracting Officer's Representative. All collections from the project site require Contracting Officer's Representative approval prior to any cutting. Pole cuttings shall have a minimum diameter of ½" up to a maximum of 2"-3" diameter. Poles should be cut during the months of January and February. The total length of the poles depends on the lowest depth of the water table at the project site, usually no longer than 6 feet long. Two small branches at the uppermost tip shall be left on the pole. All other branches shall be cut off and dormant buds shall be removed. After harvesting, the poles must be soaked in water for 5 to 7 days prior to planting and planted immediately after soaking.

Each vertical pole planting location shall be augured or punched to create a planting hole to the depth of the lowest anticipated ground water elevation

and in accordance with the drawings. Plants suitable for planting as pole cuttings are Cottonwood, Seep Willow and Goodings Willow.

2.1.3 Branch Wattles or Bundles

The contractor may chose to utilize a horizontal method of planting the cuttings in areas near the edges of marshes in saturated and adequate in-situ soil to promote rooting for the full length of the cutting. These cuttings are referred to a branch wattles or bundles and are usually ½"-1" in diameter and 3'-4' long. Plants suitable for installing as wattles are Seep Willows and Gooddings Willow. Details for assembling and installation of branch wattles are shown on the Landscape Plans.

2.2 TOPSOIL

2.2.1 Existing In-situ Soil

Modify to conform to requirements specified in paragraph entitled "Composition."

2.2.2 Off-Site Topsoil

Conform to requirements specified in paragraph entitled "Composition." Additional topsoil as required shall be furnished by the Contractor.

2.2.3 Composition

From 5 to 10 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 3/4 inch, with maximum 3 percent retained on 1/4 inch screen. The pH shall be tested in accordance with ASTM D 4972. Topsoil shall be reasonably free of sticks, stones, roots, and other debris and objectionable materials.

2.3 SOIL CONDITIONERS

Provide singly or in combination as required to meet specified requirements for topsoil. Soil conditioners shall be nontoxic to plants.

2.3.1 Aluminum Sulfate

Commercial grade.

2.3.2 Sulfur

Sulfur: Shall be 100 percent elemental and granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

2.3.3 Iron Sulfate

Iron Sulfate: 100% elemental and granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

2.3.4 Composted Derivatives

Composted Derivatives: Compost shall consist of composted organic vegetative materials free of stones and sticks. Prior to being furnished on the project, compost mulch samples shall be tested for the specified microbiological and nutrient conditions, including maturity and stability, by a testing laboratory approved for testing of organic materials. Written test results shall be submitted to the Contracting Officer's Representative for approval.

Compost material shall be dark brown in color with the parent material composted and no longer visible. The structure shall be a mixture of fine and medium size particles and humus crumbs. The maximum particle size shall be within the capacity of the contractor's equipment for application to the constructed slopes. The odor shall be that of rich humus with no ammonia or anaerobic odors.

Compost shall also meet the requirements of Compost Table below:

COMPOST TABLE	
Cation Exchange Capacity (CEC)	Greater than 50 meq/100 g
Carbon: Nitrogen Ratio (C:N)	Less than 20:1
PH (of extract)	6 - 8.5
Organic Matter Content	Greater than 25%
Total Nitrogen (not added)	Greater than 1%
Humic Acid	Greater than 5%
Maturity Index	Greater than 50% on Maturity Index at a 10:1 ratio
Stability	Less than 100 mg O2/Kg compost dry solids - hour

2.4 PLANTING SOIL MIXTURES

2/3 parts in-situ soils and 1/3 parts compost mulch. Thoroughly mix all parts of planting soil mixture to a uniform blend throughout.

2.5 WATER

Source of water to be approved by Contracting Officer's Representative and suitable quality for temporary irrigation and shall not contain elements toxic to plant life.

2.6 SOURCE QUALITY CONTROL

The Contracting Officer's Representative will inspect plant materials at the project site and approve them.

PART 3 EXECUTION

3.1 EXTENT OF WORK

Provide soil preparation, fertilizing, and planting, of riparian planting areas as shown on the plans.

3.2 PREPARATION

3.2.1 Protection

Protect existing and proposed landscape features, elements, and sites from damage or contamination. Protect existing trees, vegetation, and other designated features by erecting high-visibility, reusable construction fencing. Locate fence no closer to trees than the drip line. Plan equipment and vehicle access to minimize and confine soil disturbance and compaction to areas indicated on Drawings.

3.2.2 Layout

Stake out approved plant material locations and outlines of riparian planting areas on the project site before installing poles and wattles and obtain approval of the Contracting Officer's Representative. The Contracting Officer's Representative reserves the right to adjust plant material locations to meet field conditions. Do not plant closer than 12 feet to proposed maintenance roads.

3.2.3 Soil Preparation

3.2.3.1 pH Adjuster Application Rates

Apply pH adjuster at rates as determined by laboratory soil analysis of the soils at the job site.

3.2.3.2 Soil Conditioner Application Rates

Apply soil conditioners at rates as determined by laboratory soil analysis of the soils at the job site.

3.2.3.3 Fertilizer Application Rates

Apply fertilizer at rates as determined by laboratory soil analysis of the soils at the job site.

3.3 PLANTING AREA PREPARATION

Verify location of underground utilities prior to planting. Measure depth of pole plantings to finished grade. Determine depth of ground water before planting. Install poles and wattles as specified in paragraph entitled "Plant Installation." Do not install trees within 10 feet of any utility lines.

During the clear and grub operation, and in preparation for planting, the contractor shall machine clear and grub the site ridding the area of debris

larger than 3 inch in diameter. Underbrush beneath natural vegetation along with drift wood shall remain intact not disturbing the integrity of trees and vegetation that are designated to be protected in place.

The Contractor shall work outside the drip line of protected trees or a minimum of 5 feet from the trunk removing only non-organic material.

The contractor shall seek the approval of the project landscape architect at the contractor's expense to determine the status of non-invasive debris and deadwood to remain on site.

3.4 PLANT INSTALLATION

3.4.1 Pole Cuttings and Wattles

Install as detailed on the Landscape plans.

3.4.2 Fertilization

Pole plantings and wattles will not require fertilizer tablets.

3.4.3 Watering

Start watering areas planted as required by temperature, wind conditions and presence of ground water contact with newly planted poles and wattles.

3.4.4 Pruning

Poles and wattles shall not require pruning.

3.5 RESTORATION AND CLEAN UP

3.5.1 Restoration

Areas that have been damaged from the planting operation shall be restored to original condition.

3.5.2 Clean Up

Excess waste material from Saltcedar clearing and grubbing shall be removed and disposed of offsite. Adjacent paved areas shall be cleared of construction materials, mud and debris.

-- End of Section --