130 ENVIRONMENTAL PARK

APPENDIX IID
WETLANDS DOCUMENTATION

Technically Complete October 28, 2014

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

REPLY TO
ATTENTION OF

June 20, 2014

Regulatory Division

SUBJECT: Project Number SWF-2013-00408, 130 Environmental Park

Mr. Ernest Kaufmann
130 Environmental Park, LLC
132 Riverstone Terrace, Suite 130
Canton, Georgia 30114

Dear Mr. Kaufmann:

This letter is in regard to information received September 9, 2013, and subsequent information received February 26, 2014, and May 20, 2014, concerning a proposal by 130 Environmental Park, LLC to construct roadway crossings of streams associated with a landfill and transfer station located in Caldwell County, Texas. This project has been assigned Project Number SWF-2013-00408. Please include this number in all future correspondence concerning this project.

Under Section 404 of the Clean Water Act the U. S. Army Corps of Engineers (USACE) regulates the discharge of dredged and fill material into waters of the United States, including wetlands. USACE responsibility under Section 10 of the Rivers and Harbors Act of 1899 is to regulate any work in, or affecting, navigable waters of the United States. Based on the description of the proposed work, and other information available to us, we have determined this project will involve activities subject to the requirements of Section 404.

We have reviewed the proposal and based on the information provided, it appears the activity may qualify for Nationwide Permit 14 for Linear Transportation Projects. Please review the enclosed nationwide permit concerning the proposed placement of dredged or fill material into waters of the United States. Provided the permittee complies with all the terms and conditions therein, the project may proceed. If the permittee cannot comply with the conditions of the nationwide permit, please reply.

This nationwide permit is valid until March 18, 2017, unless prior to that date the nationwide permit is suspended, revoked, or modified such that the activity would no longer comply with the terms and conditions of the nationwide permit on a regional or national basis. The USACE will issue a public notice announcing the changes when they occur. Furthermore, activities that have commenced, or are under contract to commence, in reliance on a nationwide permit will remain authorized provided the activity is completed within 12 months of the date of the nationwide permit's expiration, modification, or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 330.4(e) and 33 CFR 330.5(c) or (d). Continued confirmation that an

activity complies with the specifications and conditions, and any changes to the nationwide permit, is the responsibility of the permittee.

The USACE based this decision on an approved jurisdictional determination (JD) that there are waters of the United States on the project site. The basis for this approved JD is enclosed. This approved JD is valid for a period of no more than 5 years from the date of this letter unless new information warrants revision of the delineation before the expiration date.

You may accept or appeal this approved JD or provide new information in accordance with the enclosed Notification of Administration Appeal Options and Process and Request for Appeal (NAAOP-RFA). If you elect to appeal this approved JD, you must complete Section II (Request for Appeal or Objections to an Initial Proffered Permit) of the enclosure and return it to the Division Engineer, ATTN: CESWD-ETO-R, U.S. Army Corps of Engineers, 1100 Commerce Street, Dallas, Texas 75242-0216 within 60 days of the date of this notice. Failure to notify the USACE within 60 days of the date of this notice means you accept the approved JD in its entirety and waive all rights to appeal the approved JD.

Thank you for your interest in our nation's water resources. If you have any questions concerning our regulatory program, please refer to our website at http://www.swf.usace.army.mil/Missions/Regulatory.aspx or contact Mr. Frederick Land at the address above or telephone (817) 886-1729.

Please help the regulatory program improve its service by completing the survey on the following website: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,

ORIGINAL SIGNED

Stephen L Brooks
Chief, Regulatory Division

Enclosures

Copy Furnished:

Russell Marusak
Halff Associates, Inc.
Environmental Scientist
1201 North Bowser Road
Richardson, TX 75081

NATIONWIDE PERMIT 14

Linear Transportation Projects

Effective Date: March 19, 2012

(NWP Final Notice, 77 FR 10184)

Linear Transportation Projects. Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10-acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 31.) (Sections 10 and 404)

Note: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under Section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR §§ 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR § 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity,

including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or

a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.noaa.gov/fisheries.html respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations

governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly

adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment.

(2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) – (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance, and legal

protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____

(Transferee)

_____

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the work and mitigation.

31. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity

complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37,

these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

D. District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. For a linear project, this determination will include an evaluation of the individual crossings to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to intermittent or ephemeral streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51 or 52, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in minimal adverse effects. When making minimal effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse effects

determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

2. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

3. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (a) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (c) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period, with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

E. Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project.

F. Definitions

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term "discharge" means any discharge of dredged or fill material.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities eligible for exemptions under Section 404(f) of the Clean Water Act are not considered when calculating the loss of waters of the United States.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of standing or flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of "open waters" include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas (see 33 CFR 328.3(e)).

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary

source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands adjacent to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist

of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a wetland (i.e., water of the United States) that is inundated by tidal waters. The definitions of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable

rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line, which is defined at 33 CFR 328.3(d).

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a jurisdictional water of the United States. If a jurisdictional wetland is adjacent – meaning bordering, contiguous, or neighboring – to a waterbody determined to be a water of the United States under 33 CFR 328.3(a)(1)-(6), that waterbody and its adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of "waterbodies" include streams, rivers, lakes, ponds, and wetlands.

ADDITIONAL INFORMATION

This nationwide permit is effective March 19, 2012, and expires on March 18, 2017.

Information about the U.S. Army Corps of Engineers regulatory program, including nationwide permits, may also be accessed at http://www.swf.usace.army.mil/regulatory or http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx

NATIONWIDE PERMIT (NWP) REGIONAL CONDITIONS FOR THE STATE OF TEXAS

The following regional conditions apply within the entire State of Texas:

1. Compensatory mitigation is required at a minimum one-for-one ratio for all special aquatic site losses that exceed 1/10 acre and require pre-construction notification (PCN), and for all losses to streams that exceed 300 linear feet and require PCN, unless the appropriate District Engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement.

2. For all discharges proposed for authorization under nationwide permits (NWP) 3, 6, 7, 12, 14, 18, 19, 25, 27, 29, 39, 40, 41, 42, 43, 44, 51, and 52, into the following habitat types or specific areas, the applicant shall notify the appropriate District Engineer in accordance with the NWP General Condition 31, Pre-Construction Notification (PCN). The Corps of Engineers (Corps), except for the Tulsa District, will coordinate with the resource agencies as specified in NWP General Condition 31(d) (PCN). The habitat types or areas are:

a. Pitcher Plant Bogs: Wetlands typically characterized by an organic surface soil layer and include vegetation such as pitcher plants (Sarracenia sp.), sundews (Drosera sp.), and sphagnum moss (Sphagnum sp.).

b. Bald Cypress-Tupelo Swamps: Wetlands comprised predominantly of bald cypress trees (Taxodium distichum), and water tupelo trees (Nyssa aquatica), that are occasionally or regularly

flooded by fresh water. Common associates include red maple (Acer rubrum), swamp privet (Forestiera acuminata), green ash (Fraxinus pennsylvanica) and water elm (Planera aquatica). Associated herbaceous species include lizard's tail (Saururus cernuus), water mermaid weed (Proserpinaca spp.), buttonbush (Cephalanthus occidentalis) and smartweed (Polygonum spp.). (Eyre, F. H. Forest Cover Types of the United States and Canada. 1980. Society of American Foresters, 5400 Grosvenor Lane, Bethesda, Maryland 20814-2198. Library of Congress Catalog Card No. 80-54185)

3. For all activities proposed for authorization under NWP 12 that involve a discharge of fill material associated with mechanized land clearing in a forested wetland, the applicant shall notify the appropriate District Engineer in accordance with the NWP General Condition 31 (Pre-Construction Notification) prior to commencing the activity.

4. For all activities proposed for authorization under NWP 16, the applicant shall notify the appropriate District Engineer in accordance with the NWP General Condition 31 (Pre-Construction Notification), and work cannot begin under NWP 16 until the applicant has received written approval from the Corps.

The following regional conditions apply only within the Fort Worth District in the State of Texas:

5. For all discharges proposed for authorization under all NWPs, into the area of Caddo Lake within Texas that is designated as a "Wetland of International Importance" under the Ramsar Convention, the applicant shall notify the Fort Worth District Engineer in accordance with the NWP General Condition 31. The Corps will coordinate with the resource agencies as specified in NWP General Condition 31(d) (Pre-Construction Notification).

6. For all discharges proposed for authorization under NWP 43 that occur in forested wetlands, the applicant shall notify the Fort Worth District Engineer in accordance with the General Condition 31 (Pre-Construction Notification).

7. For all discharges proposed for authorization under any nationwide permit in Dallas, Denton, and Tarrant Counties that are within the study area of the "Final Regional Environmental Impact Statement (EIS), Trinity River and Tributaries" (May 1986), the applicant shall meet the criteria and follow the guidelines specified in Section III of the Record of Decision for the Regional EIS, including the hydraulic impact requirements. A copy of these guidelines is available upon request from the Fort Worth District and at the District website www.swf.usace.army.mil (select "Permits").

8. Federal Projects. The applicant shall notify the Forth Worth District Engineer in accordance with the NWP General Condition 31, Pre-Construction Notification (PCN) for any regulated activity where the applicant is proposing work that would result in the modification or alteration of any completed Corps of Engineer projects that are either locally or federally maintained and for work that would occur within the conservation pool or flowage easement of any Corps of Engineers lake project. PCN's cannot be deemed complete until such time as the Corps has made

a determination relative to 33 USC Section 408, 33 CFR Part 208, Section 208.10, 33 CFR Part 320, Section 320.4.

9. Invasive and Exotic Species. Best management practices are required where practicable to reduce the risk of transferring invasive plant and animal species to or from project sites. Information concerning state specific lists and threats can be found at: http://www.invasivespeciesinfo.gov/unitedstates/tx.shtml. Best management practices can be found at: http://www.invasivespeciesinfo.gov/toolkit/prevention.shtml. Known zebra mussel waters within can be found at: http://nas.er.usgs.gov/queries/zmbyst.asp.

10. For all discharges proposed for authorization under NWPs 51 and 52, the Corps will provide the PCN to the US Fish and Wildlife Service as specified in NWP General Condition 31(d)(2) for its review and comments.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

April 5, 2012

Ms. Kristi N. McMillan
Galveston District CESWG-PE-RE
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Re: USACE Nationwide Permits

Dear Ms. McMillan:

This letter is in response to your January 23, 2012, letter requesting Clean Water Act Section 401 certification of the United States Army Corps of Engineers (Corps) Nationwide Permits (NWPs). The Final Notice of Reissuance of Nationwide Permits was published in the Federal Register (Vol. 77, No. 34, pages 10184-10290) on February 21, 2012. Proposed regional conditions for NWPs in Texas were proposed in public notices on February 24, 2011 and November 14, 2011.

The Texas Commission on Environmental Quality (TCEQ) has reviewed the Final Notice of Reissuance of Nationwide Permits and the proposed regional conditions. On behalf of the Executive Director and based on our evaluation of the information contained in these documents, the TCEQ certifies that the activities authorized by NWPs 1, 2, 4, 5, 8, 9, 10, 11, 20, 23, 24, 28, 34, 35, and 48 should not result in a violation of established Texas Surface Water Quality Standards as required by Section 401 of the Federal Clean Water Act and pursuant to Title 30, Texas Administrative Code, Chapter 279.

The TCEQ conditionally certifies that the activities authorized by NWPs 3, 6, 7, 12, 13, 14, 15, 17, 18, 19, 21, 22, 25, 27, 29, 30, 31, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 49, 50, 51 and 52 should not result in a violation of established Texas Surface Water Quality Standards as required by Section 401 of the Federal Clean Water Act and pursuant to Title 30, Texas Administrative Code, Chapter 279. Conditions for each NWP are defined in Enclosure 1 and more detail on specific conditions are discussed below.

The TCEQ understands that a prohibition against the use of NWPs in coastal dune swales will be included in the 2012 Texas Regional Conditions (Regional Conditions) for all NWPs, except for NWP 3. Inclusion of a prohibition of using NWPs in coastal dune swales, except for NWP 3, is a condition of this 401 TCEQ certification.

The TCEQ wants to clarify the application of NWP 16 in Texas. NWP 16 should be limited to the return water from upland contained dredged material disposal areas. It is important to emphasize the intent for dredged material disposal. The TCEQ understands dredged material to be associated with navigational dredging activities, not commercial mining activities. To avoid confusion the TCEQ requests that a regional condition be added that prohibits the use of NWP 16 for activities that would be regulated under Standard Industrial Classification (SIC) codes 1442 and 1446 (industrial and construction sand and gravel mining). This condition is also included as part of the 401 certification of NWP 16.

The final NWP 16 states that the quality of the return water is controlled by the state through the 401 certification procedures. Consistent with previous NWPs certification decisions the TCEQ is conditionally certifying NWP 16 for the return water from confined upland disposal not to exceed a 300 mg/L Total Suspended Solids (TSS) concentration and request the Corps to include this condition in the Regional Conditions. The TCEQ recognizes the usefulness of having an instantaneous method to determine compliance with the 300 mg/L TSS limit. However, existing literature and analysis of paired samples of turbidity and TSS from the Texas Surface Water Quality Data indicate this relationship must be a site specific characterization of the actual sediments to be dredged. To address this approach we have continued language in the NWP 16 conditional certification that allows flexibility to use an instantaneous method in implementing the TSS limit when a site specific correlation curve for turbidity (nephelometric turbidity units (NTU)) versus TSS has been approved by TCEQ. The TCEQ remains interested in working with the Corps in the development of these curves. We encourage the Corps to accept the conditional certification of NWP 16 as a Regional Condition and that we work together to find the best methods to implement this limit.

In evaluating this condition for the Regional Conditions for NWPs, the TCEQ encourages the Corps to consider that TSS limits are promulgated as effluent limits under Title 40 of the Code of Federal Regulations. The TCEQ requirement to control return water from confined upland disposal not to exceed a 300 mg/L TSS has also been included in individual 404 permits. It is also important to note that the TCEQ effectively imposes TSS effluent limits in thousands of wastewater discharge permits issued in Texas under Section 402 of the federal Clean Water Act.

The TCEQ is conditionally certifying NWP General Condition #12 *Soil Erosion and Sediment Controls*, and General Condition #25 *Water Quality*. The conditions address three broad categories of water quality management with specific recommendations for Best Management Practices (BMPs) for each category. These BMPs are intended to enhance the water quality protection of these General Conditions. A list of TCEQ-recommended BMPs is included as Enclosure 2.

Enclosure 3 is provided as a quick reference table for all NWPs. A detailed description of the BMPs is provided in Enclosure 4. Runoff from bridge decks has been exempted from the requirement for post-construction total suspended solids (TSS) controls under General Condition 25. As stated in our April 11, 2011 and November 30, 2011 letters to the Corps, the TCEQ would like to include these BMPs for the protection of waters in the state specific to each NWP as part of the regional conditions for Texas.

The TCEQ is conditionally certifying NWPs 13, 29, 39, 40, 41, 42, 43, 44, 50, 51, and 52 to require the Corps to copy TCEQ on all written approvals of waivers for impacts to ephemeral, intermittent or perennial streams. The TCEQ is conditionally certifying NWP 36 to require the Corps to copy TCEQ on all written waivers for discharges greater than the 50 cubic yard limit or boat ramps greater than 20 feet in width. The TCEQ is also conditionally certifying General Condition 23 *Mitigation* to require the Corps to copy TCEQ on any written notification of a mitigation waiver. The TCEQ is requesting this information to fulfill its responsibility to ensure water of the state is appropriately protected by understanding the impact of waivers being granted in Texas.

This certification decision is limited to those activities under the jurisdiction of the TCEQ. For activities related to the production and exploration of oil and gas, a Texas Railroad Commission certification is required as provided in the Texas Water Code §26.131.

The TCEQ has reviewed the Notice of Reissuance of Nationwide Permits for consistency with the Texas Coastal Management Program (CMP) goals and policies in accordance with the CMP regulations {Title 31, Texas Administrative Code (TAC), Chapter (§)505.30} and has determined that the action is consistent with the applicable CMP goals and policies.

This certification was reviewed for consistency with the CMP's development in critical areas policy {31 TAC §501.23} and dredging and dredged material disposal and placement policy {31 TAC §501.25}. This certification complies with the CMP goals {31 TAC §501.12(1, 2, 3, 5)} applicable to these policies.

The TCEQ reserves the right to modify this certification if additional information identifies specific areas where significant impacts, including cumulative or secondary impacts, are occurring, and the use of these NWPs would be inappropriate.

No review of property rights, location of property lines, nor the distinction between public and private ownership has been made, and this certification may not be used in any way with regard to questions of ownership.

If you require further assistance, please contact Mr. John Trevino, Water Quality Assessment Section, Water Quality Division (MC-150), at (512) 239-4600.

Sincerely,

Charles W. Maguire
Water Quality Division Director
Texas Commission on Environmental Quality

CWM/JT/gg

Attachments

ccs: Mr. Stephen Brooks, Branch Chief, U.S. Army Corp of Engineers, Regulatory Branch, CESWF-PER-R, P.O. Box 17300, Fort Worth, Texas 76102-0300
Ms. Kate Zultner, Secretary, Coastal Coordination Council, P.O. Box 12873, Austin, Texas 78711-2873
Mr. Allan E. Steinle, Branch Chief, U.S. Army Corps of Engineers, Albuquerque District, 4101 Jefferson Plaza NE, Room 313, Albuquerque, New Mexico 87109-3435
Regulatory Branch Chief, U.S. Army Corps of Engineers, Regulatory Branch CESWT-PE-R, 1645 South 101st East Avenue, Tulsa, Oklahoma, 74128
Regulatory Branch Chief, U.S. Army Corps of Engineers, El Paso Regulatory Office, CESPA-OD-R-EP, P.O. Box 6096, Fort Bliss, Texas 79906-6096

Attachment 1

Attachment 1
Conditions of Section 401 Certification for Nationwide Permits and General Conditions

General Condition 12 (Soil Erosion and Sediment Controls)

Erosion control and sediment control BMPs described in Attachment 2 are required with the use of this general condition. If the applicant does not choose one of the BMPs listed in Attachment 2, an individual 401 certification is required.

General Condition 25 (Water Quality)

Post-construction total suspended solids (TSS) BMPs described in Attachment 2 are required with the use of this general condition. If the applicant does not choose one of the BMP's listed in Attachment 2, an individual 401 certification is required. Bridge deck runoff is exempt from this requirement.

General Condition 23 (Mitigation)

The U.S. Army Corps of Engineers will copy the TCEQ on all mitigation waivers sent to applicants.

NWPs 13, 29, 39, 40, 41, 42, 43, 44, 50, 51, 52

The U.S. Army Corps of Engineers will copy the TCEQ on all written approvals of waivers for impacts to ephemeral, intermittent or perennial streams.

All NWPs except for NWP 3

These NWPs are not authorized for use in coastal dune swales in Texas.

NWP 3 (Maintenance)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 6 (Survey Activities)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 7 (Outfall Structures and Associated Intake Structures)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 12 (Utility Line Activities)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 13 (Bank Stabilization)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 14 (Linear Transportation Projects)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

Attachment 1
Conditions of Section 401 Certification for Nationwide Permits and General Conditions

NWP 15 (U.S. Coast Guard Approved Bridges)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 16 (Return Water From Upland Contained Disposal Areas)

Activities that would be regulated under Standard Industrial Classification (SIC) codes 1442 and 1446 (industrial and construction sand and gravel mining) are not eligible for this NWP. Effluent from an upland contained disposal area shall not exceed a TSS concentration of 300 mg/L unless a site-specific TSS limit, or a site specific correlation curve for turbidity (nephelometric turbidity units (NTU)) versus (TSS) has been approved by TCEQ.

NWP 17 (Hydropower Projects)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 18 (Minor Discharges)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 19 (Minor Dredging)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 21 (Surface Coal Mining Operations)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 22 (Removal of Vessels)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 25 (Structural Discharges)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 29 (Residential Developments)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

Attachment 1
Conditions of Section 401 Certification for Nationwide Permits and General Conditions

NWP 30 (Moist Soil Management for Wildlife)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 31 (Maintenance of Existing Flood Control Facilities)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 32 (Completed Enforcement Actions)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 33 (Temporary Construction, Access and Dewatering)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 36 (Boat Ramps)

The U.S. Army Corps of Engineers will copy the TCEQ on all written waivers for discharges greater than the 50 cubic yard limit or boat ramps greater than 20 feet in width. Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 37 (Emergency Watershed Protection and Rehabilitation)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 38 (Cleanup of Hazardous and Toxic Waste)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 39 (Commercial and Institutional Developments)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 40 (Agricultural Activities)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 41 (Reshaping Existing Drainage Ditches)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

Attachment 1
Conditions of Section 401 Certification for Nationwide Permits and General Conditions

NWP 42 (Recreational Facilities)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 43 (Stormwater Management Facilities)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 44 (Mining Activities)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 45 (Repair of Uplands Damaged by Discrete Events)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 46 (Discharges in Ditches)

Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 49 (Coal Remining Activities)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 50 (Underground Coal Mining Activities)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 51 (Land-Based Renewal Energy Generation Facilities)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 52 (Water-Based Renewal Energy Generation Pilot Projects)

Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

Attachment 2

Attachment 2
401 Water Quality Certification Best Management Practices (BMPs) for Nationwide Permits

Below are the 401 water quality certification conditions the Texas Commission on Environmental Quality (TCEQ) added to the February 21, 2012 issuance of Nationwide Permits (NWP), as described in the Federal Register (Vol. 77, No. 34, pages 10184-10290).

Additional information regarding these conditions, including descriptions of the best management practices (BMPs), can be obtained from the TCEQ by contacting the 401 Coordinator, MC-150, P.O. Box 13087, Austin, Texas 78711-3087 or from the appropriate U.S. Army Corps of Engineers district office.

I. Erosion Control

Disturbed areas must be stabilized to prevent the introduction of sediment to adjacent wetlands or water bodies during wet weather conditions (erosion). *At least one* of the following BMPs must be maintained and remain in place until the area has been stabilized for NWPs 3, 6, 7, 12, 13, 14, 15, 17, 18, 19, 21, 22, 25, 27, 29, 30, 31, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 49, 50, 51, and 52. If the applicant does not choose one of the BMPs listed, an individual 401 certification is required. BMPs for NWP 52 apply only to land-based impacts from attendant features.

- o Temporary Vegetation
- o Blankets/Matting
- o Mulch
- o Sod
- o Interceptor Swale
- o Diversion Dike
- o Erosion Control Compost
- o Mulch Filter Socks
- o Compost Filter Socks

II. Sedimentation Control

Prior to project initiation, the project area must be isolated from adjacent wetlands and water bodies by the use of BMPs to confine sediment. Dredged material shall be placed in such a manner that prevents sediment runoff into water in the state, including wetlands. Water bodies can be isolated by the use of one or more of the required BMPs identified for sedimentation control. These BMP's must be maintained and remain in place until the dredged material is stabilized. *At least one* of the following BMPs must be maintained and remain in place until the area has been stabilized for NWPs 3, 6, 7, 12, 13, 14, 15, 17, 18, 19, 21, 22, 25, 27, 29, 30, 31, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 49, 50, 51, and 52. If the applicant does not choose one of the BMPs listed, an individual 401 certification is required. BMPs for NWP 52 apply only to land-based impacts from attendant features.

- o Sand Bag Berm
- o Rock Berm
- o Silt Fence
- o Hay Bale Dike
- o Triangular Filter Dike
- o Brush Berms

Attachment 2
401 Water Quality Certification Best Management Practices (BMPs) for Nationwide Permits

- o Stone Outlet Sediment Traps
- o Sediment Basins
- o Erosion Control Compost
- o Mulch Filter Socks
- o Compost Filter Socks

III. Post-Construction TSS Control

After construction has been completed and the site is stabilized, total suspended solids (TSS) loadings shall be controlled by *at least one* of the following BMPs for NWPs 12, 14, 17, 18, 21, 29, 31, 36, 39, 40, 41, 42, 44, 45, 49, 50, 51, and 52. If the applicant does not choose one of the BMPs listed, an individual 401 certification is required. BMPs for NWP 52 apply only to land-based impacts from attendant features. Runoff from bridge decks has been exempted from the requirement for post construction TSS controls.

- o Retention/Irrigation Systems
- o Constructed Wetlands
- o Extended Detention Basin
- o Wet Basins
- o Vegetative Filter Strips
- o Vegetation lined drainage ditches
- o Grassy Swales
- o Sand Filter Systems
- o Erosion Control Compost
- o Mulch Filter Socks
- o Compost Filter Socks
- o Sedimentation Chambers*

* Only to be used when there is no space available for other approved BMPs.

IV. NWP 16: Return Water from Upland Contained Disposal Areas

Effluent from an upland contained disposal area shall not exceed a TSS concentration of 300 mg/L unless a site-specific TSS limit, or a site specific correlation curve for turbidity (nephelometric turbidity units (NTU)) versus (TSS) has been approved by TCEQ.

V. NWP 29, 39, 40, 42, 43, 44, 50, 51, and 52

The Corps will copy the TCEQ on all authorizations for impacts of greater than 300 linear feet of intermittent and ephemeral streams.

Attachment 2
401 Water Quality Certification Best Management Practices (BMPs) for Nationwide Permits

VI. NWP 13 and 41

The Corps will copy the TCEQ on all authorizations for impacts greater than 500 linear feet in length of ephemeral, intermittent, perennial streams or drainage ditches.

VII. NWP 36

The Corps will copy the TCEQ on all authorizations for discharges greater than the 50 cubic yard limit or boat ramps greater than 20 feet in width.

VIII. All NWPs except NWP 3

These NWPs are not authorized for use in coastal dune swales in Texas.

Attachment 3

Attachment 3
Reference to Nationwide Permits Best Management Practices Requirements

NWP	Permit Description	Erosion Control	Sediment Control	Post Construction TSS
1	Aid to Navigation			
2	Structures in Artificial Canals			
3	Maintenance	X	X	
4	Fish and Wildlife Harvesting, Enhancement and Attraction Devices and Activities			
5	Scientific Measurement Devices			
6	Survey Activities *Trenching	X	X	
7	Outfall Structures and Associated Intake Structures	X	X	
8	Oil and Gas Structures on the Outer Continental Shelf			
9	Structures in Fleeting and Anchorage Areas			
10	Mooring Buoys			
11	Temporary Recreational Structures			
12	Utility Line Activities	X	X	X
13	Bank Stabilization	X	X	
14	Linear Transportation Projects	X	X	X
15	U.S. Coast Guard Approved Bridges	X	X	
16	Return Water From Upland Contained Disposal Areas			
17	Hydropower Projects	X	X	X
18	Minor Discharges	X	X	X
19	Minor Dredging	X	X	
20	Response Operations for Oil and Hazardous Substances			
21	Surface Coal Mining Operations	X	X	X
22	Removal of Vessels	X	X	
23	Approved Categorical Exclusions			

Attachment 3
Reference to Nationwide Permits Best Management Practices Requirements

NWP	Permit Description	Erosion Control	Sediment Control	Post Construction TSS
24	Indian Tribe or State Administered Section 404 Programs			
25	Structural Discharges	X	X	
26	[Reserved]			
27	Aquatic Habitat Restoration, Establishment, and Enhancement Activities	X	X	
28	Modifications of Existing Marinas			
29	Residential Developments	X	X	X
30	Moist Soil Management for Wildlife	X	X	
31	Maintenance of Existing Flood Control Facilities	X	X	X
32	Completed Enforcement Actions	X	X	
33	Temporary Construction, Access and Dewatering	X	X	
34	Cranberry Production Activities			
35	Maintenance Dredging of Existing Basins			
36	Boat Ramps	X	X	X
37	Emergency Watershed Protection and Rehabilitation	X	X	
38	Cleanup of Hazardous and Toxic Waste	X	X	
39	Commercial and Institutional Developments	X	X	X
40	Agricultural Activities	X	X	X
41	Reshaping Existing Drainage Ditches	X	X	X
42	Recreational Facilities	X	X	X
43	Stormwater Management Facilities	X	X	
44	Mining Activities	X	X	X
45.	Repair of Uplands Damaged by Discrete Events	X	X	X
46.	Discharges in Ditches	X	X	

Attachment 3
Reference to Nationwide Permits Best Management Practices Requirements

NWP	Permit Description	Erosion Control	Sediment Control	Post Construction TSS
47.	[Reserved]			
48.	Existing Commercial Shellfish Aquaculture Activities			
49.	Coal Remining Activities	X	X	X
50.	Underground Coal Mining Activities	X	X	X
51.	Land-Based Renewable Energy Generation Facilities	X	X	X
52.	Water-Based Renewable Energy Generation Pilot Projects	X	X	X

Attachment 4

Attachment 4
Description of BMPs

EROSION CONTROL BMPs

Temporary Vegetation

Description: Vegetation can be used as a temporary or permanent stabilization technique for areas disturbed by construction. Vegetation effectively reduces erosion in swales, stockpiles, berms, mild to medium slopes, and along roadways. Other techniques such as matting, mulches, and grading may be required to assist in the establishment of vegetation.

Materials:

- The type of temporary vegetation used on a site is a function of the season and the availability of water for irrigation.
- Temporary vegetation should be selected appropriately for the area.
- County agricultural extension agents are a good source for suggestions for temporary vegetation.
- All seed should be high quality, U.S. Dept. of Agriculture certified seed.

Installation:

- Grading must be completed prior to seeding.
- Slopes should be minimized.
- Erosion control structures should be installed.
- Seedbeds should be well pulverized, loose, and uniform.
- Fertilizers should be applied at appropriate rates.
- Seeding rates should be applied as recommended by the county agricultural extension agent.
- The seed should be applied uniformly.
- Steep slopes should be covered with appropriate soil stabilization matting.

Blankets and Matting

Description: Blankets and matting material can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are in channels, interceptor swales, diversion dikes, short, steep slopes, and on tidal or stream banks.
Materials:

New types of blankets and matting materials are continuously being developed. The Texas

Attachment 4
Description of BMPs

Department of Transportation (TxDOT) has defined the critical performance factors for these types of products and has established minimum performance standards which must be met for any product seeking to be approved for use within any of TxDOT's construction or maintenance activities. The products that have been approved by TxDOT are also appropriate for general construction site stabilization. TxDOT maintains a web site at http://www.txdot.gov/business/doing_business/product_evaluation/erosion_control.htm which is updated as new products are evaluated.

Installation:

- Install in accordance with the manufacturer's recommendations.
- Proper anchoring of the material.
- Prepare a friable seed bed relatively free from clods and rocks and any foreign material.
- Fertilize and seed in accordance with seeding or other type of planting plan.
- Erosion stops should extend beyond the channel liner to full design cross-section of the channel.
- A uniform trench perpendicular to line of flow may be dug with a spade or a mechanical trencher.
- Erosion stops should be deep enough to penetrate solid material or below level of ruling in sandy soils.
- Erosion stop mats should be wide enough to allow turnover at bottom of trench for stapling, while maintaining the top edge flush with channel surface.

Mulch

Description: Mulching is the process of applying a material to the exposed soil surface to protect it from erosive forces and to conserve soil moisture until plants can become established. When seeding critical sites, sites with adverse soil conditions or seeding on other than optimum seeding dates, mulch material should be applied immediately after seeding. Seeding during optimum seeding dates and with favorable soils and site conditions will not need to be mulched.

Materials:

- Mulch may be small grain straw which should be applied uniformly.
- On slopes 15 percent or greater, a binding chemical must be applied to the surface.
- Wood-fiber or paper-fiber mulch may be applied by hydroseeding.
- Mulch nettings may be used.

- Wood chips may be used where appropriate.

Installation:

Mulch anchoring should be accomplished immediately after mulch placement. This may be done by one of the following methods: peg and twine, mulch netting, mulch anchoring tool, or liquid mulch binders.

Sod

Description: Sod is appropriate for disturbed areas which require immediate vegetative covers, or where sodding is preferred to other means of grass establishment. Locations particularly suited to stabilization with sod are waterways carrying intermittent flow, areas around drop inlets or in grassed swales, and residential or commercial lawns where quick use or aesthetics are factors. Sod is composed of living plants and those plants must receive adequate care in order to provide vegetative stabilization on a disturbed area.

Materials:

- Sod should be machine cut at a uniform soil thickness.
- Pieces of sod should be cut to the supplier's standard width and length.
- Torn or uneven pads are not acceptable.
- Sections of sod should be strong enough to support their own weight and retain their size and shape when suspended from a firm grasp.
- Sod should be harvested, delivered, and installed within a period of 36 hours.

Installation:

- Areas to be sodded should be brought to final grade.
- The surface should be cleared of all trash and debris.
- Fertilize according to soil tests.
- Fertilizer should be worked into the soil.
- Sod should not be cut or laid in excessively wet or dry weather.
- Sod should not be laid on soil surfaces that are frozen.
- During periods of high temperature, the soil should be lightly irrigated.

- The first row of sod should be laid in a straight line with subsequent rows placed parallel to and butting tightly against each other.
- Lateral joints should be staggered to promote more uniform growth and strength.
- Wherever erosion may be a problem, sod should be laid with staggered joints and secured.
- Sod should be installed with the length perpendicular to the slope (on the contour).
- Sod should be rolled or tamped.
- Sod should be irrigated to a sufficient depth.
- Watering should be performed as often as necessary to maintain soil moisture.
- The first mowing should not be attempted until the sod is firmly rooted.
- Not more than one third of the grass leaf should be removed at any one cutting.

Interceptor Swale

Interceptor swales are used to shorten the length of exposed slope by intercepting runoff, prevent off-site runoff from entering the disturbed area, and prevent sediment-laden runoff from leaving a disturbed site. They may have a v-shape or be trapezoidal with a flat bottom and side slopes of 3:1 or flatter. The outflow from a swale should be directed to a stabilized outlet or sediment trapping device. The swales should remain in place until the disturbed area is permanently stabilized.

Materials:

- Stabilization should consist of a layer of crushed stone three inches thick, riprap or high velocity erosion control mats.
- Stone stabilization should be used when grades exceed 2% or velocities exceed 6 feet per second.
- Stabilization should extend across the bottom of the swale and up both sides of the channel to a minimum height of three inches above the design water surface elevation based on a 2-year, 24-hour storm.

Installation:

- An interceptor swale should be installed across exposed slopes during construction and should intercept no more than 5 acres of runoff.
- All earth removed and not needed in construction should be disposed of in an approved spoils site so that it will not interfere with the functioning of the swale or contribute to siltation in other areas of the site.

- All trees, brush, stumps, obstructions and other material should be removed and disposed of so as not to interfere with the proper functioning of the swale.

- Swales should have a maximum depth of 1.5 feet with side slopes of 3:1 or flatter. Swales should have positive drainage for the entire length to an outlet.

- When the slope exceeds 2 percent, or velocities exceed 6 feet per second (regardless of slope), stabilization is required. Stabilization should be crushed stone placed in a layer of at least 3 inches thick or may be high velocity erosion control matting. Check dams are also recommended to reduce velocities in the swales possibly reducing the amount of stabilization necessary.

- Minimum compaction for the swale should be 90% standard proctor density.

Diversion Dikes

A temporary diversion dike is a barrier created by the placement of an earthen embankment to reroute the flow of runoff to an erosion control device or away from an open, easily erodible area. A diversion dike intercepts runoff from small upland areas and diverts it away from exposed slopes to a stabilized outlet, such as a rock berm, sandbag berm, or stone outlet structure. These controls can be used on the perimeter of the site to prevent runoff from entering the construction area. Dikes are generally used for the duration of construction to intercept and reroute runoff from disturbed areas to prevent excessive erosion until permanent drainage features are installed and/or slopes are stabilized.

Materials:

- Stone stabilization (required for velocities in excess of 6 fps) should consist of riprap placed in a layer at least 3 inches thick and should extend a minimum height of 3 inches above the design water surface up the existing slope and the upstream face of the dike.

- Geotextile fabric should be a non-woven polypropylene fabric designed specifically for use as a soil filtration media with an approximate weight of 6 oz./yd^2, a Mullen burst rating of 140 psi, and having an equivalent opening size (EOS) greater than a #50 sieve.

Installation:

- Diversion dikes should be installed prior to and maintained for the duration of construction and should intercept no more than 10 acres of runoff.

- Dikes should have a minimum top width of 2 feet and a minimum height of compacted fill of 18 inches measured form the top of the existing ground at the upslope toe to top of the dike and have side slopes of 3:1 or flatter.

- The soil for the dike should be placed in lifts of 8 inches or less and be compacted to 95 % standard proctor density.

- The channel, which is formed by the dike, must have positive drainage for its entire length to an outlet.

- When the slope exceeds 2 percent, or velocities exceed 6 feet per second (regardless of slope), stabilization is required. In situations where velocities do not exceed 6 feet per second, vegetation may be used to control erosion.

Erosion Control Compost

Description: Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

Materials:

New types of erosion control compost are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Material used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at http://www.txdot.gov/business/contractors_consultants/recycling/compost.htm that provides information on compost specification data.

ECC used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for ECC to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with current TxDOT specification.
- Use on slopes 3:1 or flatter.
- Apply a 2 inch uniform layer unless otherwise shown on the plans or as directed.
- When rolling is specified, use a light corrugated drum roller.

Mulch and Compost Filter Socks

Description: Mulch and compost filter socks (erosion control logs) are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, mulch and compost filter socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Mulch and compost filter socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The sock should remain in place until the area is permanently stabilized. Mulch and compost filter socks may be installed in construction areas and temporarily moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Mulch and compost filter socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

Materials:

New types of mulch and compost filter socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Mulch and compost filter socks used within any TxDOT construction or maintenance activities must meet material specifications in accordance with TxDOT specification 5049. TxDOT maintains a website at http://www.txdot.gov/business/contractors_consultants/recycling/compost.htm that provides information on compost specification data.

Mulch and compost filter socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used for mulch and compost filter socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for mulch and compost filter socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with TxDOT Special Specification 5049.
- Install socks (erosion control logs) near the downstream perimeter of a disturbed area to intercept sediment from sheet flow.
- Secure socks in a method adequate to prevent displacement as a result of normal rain events such that flow is not allowed under the socks.
- Inspect and maintain the socks in good condition (including staking, anchoring, etc.). Maintain the integrity of the control, including keeping the socks free of accumulated silt, debris, etc., until the disturbed area has been adequately stabilized.

SEDIMENT CONTROL BMPS

Sand Bag Berm

Description: The purpose of a sandbag berm is to detain sediment carried in runoff from disturbed areas. This objective is accomplished by intercepting runoff and causing it to pool behind the sand bag berm. Sediment carried in the runoff is deposited on the upstream side of the sand bag berm due to the reduced flow velocity. Excess runoff volumes are allowed to flow over the top of the sand bag berm. Sand bag berms are used only during construction activities in streambeds when the contributing drainage area is between 5 and 10 acres and the slope is less than 15%, i.e., utility construction in channels, temporary channel crossing for construction equipment, etc. Plastic facing should be installed on the upstream side and the berm should be anchored to the streambed by drilling into the rock and driving in "T" posts or rebar (#5 or #6) spaced appropriately.

Attachment 4
Description of BMPs

Materials:

- The sand bag material should be polypropylene, polyethylene, polyamide or cotton burlap woven fabric, minimum unit weight 4 oz/yd 2, mullen burst strength exceeding 300 psi and ultraviolet stability exceeding 70 percent.
- The bag length should be 24 to 30 inches, width should be 16 to 18 inches and thickness should be 6 to 8 inches.
- Sandbags should be filled with coarse grade sand and free from deleterious material. All sand should pass through a No. 10 sieve. The filled bag should have an approximate weight of 40 pounds.
- Outlet pipe should be schedule 40 or stronger polyvinyl chloride (PVC) having a nominal internal diameter of 4 inches.

Installation:

- The berm should be a minimum height of 18 inches, measured from the top of the existing ground at the upslope toe to the top of the berm.
- The berm should be sized as shown in the plans but should have a minimum width of 48 inches measured at the bottom of the berm and 16 inches measured at the top of the berm.
- Runoff water should flow over the tops of the sandbags or through 4-inch diameter PVC pipes embedded below the top layer of bags.
- When a sandbag is filled with material, the open end of the sandbag should be stapled or tied with nylon or poly cord.
- Sandbags should be stacked in at least three rows abutting each other, and in staggered arrangement.
- The base of the berm should have at least 3 sandbags. These can be reduced to 2 and 1 bag in the second and third rows respectively.
- For each additional 6 inches of height, an additional sandbag must be added to each row width.
- A bypass pump-around system, or similar alternative, should be used on conjunction with the berm for effective dewatering of the work area.

Silt Fence

Description: A silt fence is a barrier consisting of geotextile fabric supported by metal posts to prevent soil and sediment loss from a site. When properly used, silt fences can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. If not properly installed, silt fences are not likely to be effective. The purpose of a silt fence is to intercept and detain water-borne sediment from unprotected areas of a limited

extent. Silt fence is used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This fence should remain in place until the disturbed area is permanently stabilized. Silt fence should not be used where there is a concentration of water in a channel or drainage way. If concentrated flow occurs after installation, corrective action must be taken such as placing a rock berm in the areas of concentrated flow. Silt fencing within the site may be temporarily moved during the day to allow construction activity provided it is replaced and properly anchored to the ground at the end of the day. Silt fences on the perimeter of the site or around drainage ways should not be moved at any time.

Materials:

- Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in 2, ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.

- Fence posts should be made of hot rolled steel, at least 4 feet long with Tee or Y-bar cross section, surface painted or galvanized, minimum nominal weight 1.25 lb/ft 2, and Brindell hardness exceeding 140.

- Woven wire backing to support the fabric should be galvanized 2" x 4" welded wire, 12 gauge minimum.

Installation:

- Steel posts, which support the silt fence, should be installed on a slight angle toward the anticipated runoff source. Post must be embedded a minimum of 1 foot deep and spaced not more than 8 feet on center. Where water concentrates, the maximum spacing should be 6 feet.

- Lay out fencing down-slope of disturbed area, following the contour as closely as possible. The fence should be sited so that the maximum drainage area is ¼ acre/100 feet of fence.

- The toe of the silt fence should be trenched in with a spade or mechanical trencher, so that the down-slope face of the trench is flat and perpendicular to the line of flow. Where fence cannot be trenched in (e.g., pavement or rock outcrop), weight fabric flap with 3 inches of pea gravel on uphill side to prevent flow from seeping under fence.

- The trench must be a minimum of 6 inches deep and 6 inches wide to allow for the silt fence fabric to be laid in the ground and backfilled with compacted material.

- Silt fence should be securely fastened to each steel support post or to woven wire, which is in turn attached to the steel fence post. There should be a 3-foot overlap, securely fastened where ends of fabric meet.

Triangular Filter Dike

Description: The purpose of a triangular sediment filter dike is to intercept and detain water-

borne sediment from unprotected areas of limited extent. The triangular sediment filter dike is used where there is no concentration of water in a channel or other drainage way above the barrier and the contributing drainage area is less than one acre. If the uphill slope above the dike exceeds 10%, the length of the slope above the dike should be less than 50 feet. If concentrated flow occurs after installation, corrective action should be taken such as placing rock berm in the areas of concentrated flow. This measure is effective on paved areas where installation of silt fence is not possible or where vehicle access must be maintained. The advantage of these controls is the ease with which they can be moved to allow vehicle traffic and then reinstalled to maintain sediment

Materials:

- Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in 2 , ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.

- The dike structure should be 6 gauge 6" x 6" wire mesh folded into triangular form being eighteen (18) inches on each side.

Installation:

- The frame of the triangular sediment filter dike should be constructed of 6" x 6", 6 gauge welded wire mesh, 18 inches per side, and wrapped with geotextile fabric the same composition as that used for silt fences.

- Filter material should lap over ends six (6) inches to cover dike to dike junction; each junction should be secured by shoat rings.

- Position dike parallel to the contours, with the end of each section closely abutting the adjacent sections.

- There are several options for fastening the filter dike to the ground. The fabric skirt may be toed-in with 6 inches of compacted material, or 12 inches of the fabric skirt should extend uphill and be secured with a minimum of 3 inches of open graded rock, or with staples or nails. If these two options are not feasible the dike structure may be trenched in 4 inches.

- Triangular sediment filter dikes should be installed across exposed slopes during construction with ends of the dike tied into existing grades to prevent failure and should intercept no more than one acre of runoff.

- When moved to allow vehicular access, the dikes should be reinstalled as soon as possible, but always at the end of the workday.

Rock Berm

Description: The purpose of a rock berm is to serve as a check dam in areas of concentrated flow, to intercept sediment-laden runoff, detain the sediment and release the water in sheet flow.

The rock berm should be used when the contributing drainage area is less than 5 acres. Rock berms are used in areas where the volume of runoff is too great for a silt fence to contain. They are less effective for sediment removal than silt fences, particularly for fine particles, but are able to withstand higher flows than a silt fence. As such, rock berms are often used in areas of channel flows (ditches, gullies, etc.). Rock berms are most effective at reducing bed load in channels and should not be substituted for other erosion and sediment control measures further up the watershed.

Materials:

- The berm structure should be secured with a woven wire sheathing having maximum opening of 1 inch and a minimum wire diameter of 20 gauge galvanized and should be secured with shoat rings.
- Clean, open graded 3- to 5-inch diameter rock should be used, except in areas where high velocities or large volumes of flow are expected, where 5- to 8-inch diameter rocks may be used.

Installation:

- Lay out the woven wire sheathing perpendicular to the flow line. The sheathing should be 20 gauge woven wire mesh with 1 inch openings.
- Berm should have a top width of 2 feet minimum with side slopes being 2:1 (H:V) or flatter.
- Place the rock along the sheathing to a height not less than 18".
- Wrap the wire sheathing around the rock and secure with tie wire so that the ends of the sheathing overlap at least 2 inches, and the berm retains its shape when walked upon.
- Berm should be built along the contour at zero percent grade or as near as possible.
- The ends of the berm should be tied into existing upslope grade and the berm should be buried in a trench approximately 3 to 4 inches deep to prevent failure of the control.

Hay Bale Dike

Description: The purpose of a hay or straw bale dike is to intercept and detain small amounts of sediment-laden runoff from relatively small unprotected areas. Straw bales are to be used when it is not feasible to install other, more effective measures or when the construction phase is expected to last less than 3 months. Straw bales should not be used on areas where rock or other hard surfaces prevent the full and uniform anchoring of the barrier.

Materials:

Straw: The best quality straw mulch comes from wheat, oats or barley and should be free of weed and grass seed which may not be desired vegetation for the area to be protected. Straw mulch is light and therefore must be properly anchored to the ground.

Hay: This is very similar to straw with the exception that it is made of grasses and weeds and not grain stems. This form of mulch is very inexpensive and is widely available but does introduce weed and grass seed to the area. Like straw, hay is light and must be anchored.

- Straw bales should weigh a minimum of 50 pounds and should be at least 30 inches long.
- Bales should be composed entirely of vegetable matter and be free of seeds.
- Binding should be either wire or nylon string, jute or cotton binding is unacceptable. Bales should be used for not more than two months before being replaced.

Installation:

- Bales should be embedded a minimum of 4 inches and securely anchored using 2" x 2" wood stakes or 3/8" diameter rebar driven through the bales into the ground a minimum of 6 inches.
- Bales are to be placed directly adjacent to one another leaving no gap between them.
- All bales should be placed on the contour.
- The first stake in each bale should be angled toward the previously laid bale to force the bales together.

Brush Berms

Organic litter and spoil material from site clearing operations is usually burned or hauled away to be dumped elsewhere. Much of this material can be used effectively on the construction site itself. The key to constructing an efficient brush berm is in the method used to obtain and place the brush. It will not be acceptable to simply take a bulldozer and push whole trees into a pile. This method does not assure continuous ground contact with the berm and will allow uncontrolled flows under the berm.

Brush berms may be used where there is little or no concentration of water in a channel or other drainage way above the berm. The size of the drainage area should be no greater than one-fourth of an acre per 100 feet of barrier length; the maximum slope length behind the barrier should not exceed 100 feet; and the maximum slope gradient behind the barrier should be less than 50 percent (2:1).

Materials:

- The brush should consist of woody brush and branches, preferably less than 2 inches in diameter.
- The filter fabric should conform to the specifications for filter fence fabric.
- The rope should be ¼ inch polypropylene or nylon rope.

- The anchors should be 3/8-inch diameter rebar stakes that are 18-inches long.

Installation:

- Lay out the brush berm following the contour as closely as possible.
- The juniper limbs should be cut and hand placed with the vegetated part of the limb in close contact with the ground. Each subsequent branch should overlap the previous branch providing a shingle effect.
- The brush berm should be constructed in lifts with each layer extending the entire length of the berm before the next layer is started.
- A trench should be excavated 6-inches wide and 4-inches deep along the length of the barrier and immediately uphill from the barrier.
- The filter fabric should be cut into lengths sufficient to lay across the barrier from its up-slope base to just beyond its peak. The lengths of filter fabric should be draped across the width of the barrier with the uphill edge placed in the trench and the edges of adjacent pieces overlapping each other. Where joints are necessary, the fabric should be spliced together with a minimum 6-inch overlap and securely sealed.
- The trench should be backfilled and the soil compacted over the filter fabric.
- Set stakes into the ground along the downhill edge of the brush barrier, and anchor the fabric by tying rope from the fabric to the stakes. Drive the rope anchors into the ground at approximately a 45-degree angle to the ground on 6-foot centers.
- Fasten the rope to the anchors and tighten berm securely to the ground with a minimum tension of 50 pounds.
- The height of the brush berm should be a minimum of 24 inches after the securing ropes have been tightened.

Stone Outlet Sediment Traps

A stone outlet sediment trap is an impoundment created by the placement of an earthen and stone embankment to prevent soil and sediment loss from a site. The purpose of a sediment trap is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way below the sediment trap from sedimentation. A sediment trap is usually installed at points of discharge from disturbed areas. The drainage area for a sediment trap is recommended to be less than 5 acres.

Larger areas should be treated using a sediment basin. A sediment trap differs from a sediment basin mainly in the type of discharge structure. The trap should be located to obtain the maximum storage benefit from the terrain, for ease of clean out and disposal of the trapped

sediment and to minimize interference with construction activities. The volume of the trap should be at least 3600 cubic feet per acre of drainage area.

Materials:

- All aggregate should be at least 3 inches in diameter and should not exceed a volume of 0.5 cubic foot.
- The geotextile fabric specification should be woven polypropylene, polyethylene or polyamide geotextile, minimum unit weight of 4.5 oz/yd 2, mullen burst strength at least 250 lb/in 2, ultraviolet stability exceeding 70%, and equivalent opening size exceeding 40.

Installation:

- Earth Embankment: Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the material. Compact each layer to 95 percent standard proctor density. Do not place material on surfaces that are muddy or frozen. Side slopes for the embankment are to be 3:1. The minimum width of the embankment should be 3 feet.
- A gap is to be left in the embankment in the location where the natural confluence of runoff crosses the embankment line. The gap is to have a width in feet equal to 6 times the drainage area in acres.
- Geotextile Covered Rock Core: A core of filter stone having a minimum height of 1.5 feet and a minimum width at the base of 3 feet should be placed across the opening of the earth embankment and should be covered by geotextile fabric which should extend a minimum distance of 2 feet in either direction from the base of the filter stone core.
- Filter Stone Embankment: Filter stone should be placed over the geotextile and is to have a side slope which matches that of the earth embankment of 3:1 and should cover the geotextile/rock core a minimum of 6 inches when installation is complete. The crest of the outlet should be at least 1 foot below the top of the embankment.

Sediment Basins:

The purpose of a sediment basin is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way below the sediment basin from sedimentation. A sediment basin is usually installed at points of discharge from disturbed areas. The drainage area for a sediment basin is recommended to be less than 100 acres.

Sediment basins are effective for capturing and slowly releasing the runoff from larger disturbed areas thereby allowing sedimentation to take place. A sediment basin can be created where a permanent pond BMP is being constructed. Guidelines for construction of the permanent BMP should be followed, but revegetation, placement of underdrain piping, and installation of sand or other filter media should not be carried out until the site construction phase is complete.

Materials:

- Riser should be corrugated metal or reinforced concrete pipe or box and should have watertight fittings or end to end connections of sections.
- An outlet pipe of corrugated metal or reinforced concrete should be attached to the riser and should have positive flow to a stabilized outlet on the downstream side of the embankment.
- An anti-vortex device and rubbish screen should be attached to the top of the riser and should be made of polyvinyl chloride or corrugated metal.

Basin Design and Construction:

- For common drainage locations that serve an area with ten or more acres disturbed at one time, a sediment basin should provide storage for a volume of runoff from a two-year, 24-hour storm from each disturbed acre drained.
- The basin length to width ratio should be at least 2:1 to improve trapping efficiency. The shape may be attained by excavation or the use of baffles. The lengths should be measured at the elevation of the riser de-watering hole.
- Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the material. Compact each layer to 95 percent standard proctor density. Do not place material on surfaces that are muddy or frozen. Side slopes for the embankment should be 3:1 (H:V).
- An emergency spillway should be installed adjacent to the embankment on undisturbed soil and should be sized to carry the full amount of flow generated by a 10-year, 3-hour storm with 1 foot of freeboard less the amount which can be carried by the principal outlet control device.
- The emergency spillway should be lined with riprap as should the swale leading from the spillway to the normal watercourse at the base of the embankment.
- The principal outlet control device should consist of a rigid vertically oriented pipe or box of corrugated metal or reinforced concrete. Attached to this structure should be a horizontal pipe, which should extend through the embankment to the toe of fill to provide a de-watering outlet for the basin.
- An anti-vortex device should be attached to the inlet portion of the principal outlet control device to serve as a rubbish screen.
- A concrete base should be used to anchor the principal outlet control device and should be sized to provide a safety factor of 1.5 (downward forces = 1.5 buoyant forces).
- The basin should include a permanent stake to indicate the sediment level in the pool and marked to indicate when the sediment occupies 50% of the basin volume (not the top of the

stake).

- The top of the riser pipe should remain open and be guarded with a trash rack and anti-vortex device. The top of the riser should be 12 inches below the elevation of the emergency spillway. The riser should be sized to convey the runoff from the 2-year, 3-hour storm when the water surface is at the emergency spillway elevation. For basins with no spillway the riser must be sized to convey the runoff from the 10-yr, 3-hour storm.

- Anti-seep collars should be included when soil conditions or length of service make piping through the backfill a possibility.

- The 48-hour drawdown time will be achieved by using a riser pipe perforated at the point measured from the bottom of the riser pipe equal to ½ the volume of the basin. This is the maximum sediment storage elevation. The size of the perforation may be calculated as follows:

$$Ao = \frac{As \times \sqrt{2h}}{Cd \times 980{,}000}$$

Where:
A_o = Area of the de-watering hole, ft 2
A_s = Surface area of the basin, ft 2
C_d = Coefficient of contraction, approximately 0.6
h = head of water above the hole, ft
Perforating the riser with multiple holes with a combined surface area equal to A_o is acceptable.

Erosion Control Compost

Description: Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

Materials:

New types of erosion control compost are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Material used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at http://www.txdot.gov/business/contractors_consultants/recycling/compost.htm that provides information on compost specification data.

ECC used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for ECC to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with current TxDOT specification.
- Use on slopes 3:1 or flatter.
- Apply a 2 inch uniform layer unless otherwise shown on the plans or as directed.
- When rolling is specified, use a light corrugated drum roller.

Mulch and Compost Filter Socks

Description: Mulch and compost filter socks (erosion control logs) are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, mulch and compost filter socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Mulch and compost filter socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The sock should remain in place until the area is permanently stabilized. Mulch and compost filter socks may be installed in construction areas

and temporarily moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Mulch and compost filter socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

Materials:

New types of mulch and compost filter socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Mulch and compost filter socks used within any TxDOT construction or maintenance activities must meet material specifications in accordance with TxDOT specification 5049. TxDOT maintains a website at http://www.txdot.gov/business/contractors_consultants/recycling/compost.htm that provides information on compost specification data.

Mulch and compost filter socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used for mulch and compost filter socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for mulch and compost filter socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with TxDOT Special Specification 5049.

- Install socks (erosion control logs) near the downstream perimeter of a disturbed area to intercept sediment from sheet flow.
- Secure socks in a method adequate to prevent displacement as a result of normal rain events such that flow is not allowed under the socks.
- Inspect and maintain the socks in good condition (including staking, anchoring, etc.). Maintain the integrity of the control, including keeping the socks free of accumulated silt, debris, etc., until the disturbed area has been adequately stabilized.

POST-CONSTRUCTION TSS CONTROLS

Retention/Irrigation Systems

Description: Retention/irrigation systems refer to the capture of runoff in a holding pond, then use of the captured water for irrigation of appropriate landscape areas. Retention/irrigation systems are characterized by the capture and disposal of runoff without direct release of captured flow to receiving streams. Retention systems exhibit excellent pollutant removal but can require regular, proper maintenance. Collection of roof runoff for subsequent use (rainwater harvesting) also qualifies as a retention/irrigation practice, but should be operated and sized to provide adequate volume. This technology, which emphasizes beneficial use of stormwater runoff, is particularly appropriate for arid regions because of increasing demands on water supplies for agricultural irrigation and urban water supply.

Design Considerations: Retention/irrigation practices achieve 100% removal efficiency of total suspended solids contained within the volume of water captured. Design elements of retention/irrigation systems include runoff storage facility configuration and sizing, pump and wet well system components, basin lining, basin detention time, and physical and operational components of the irrigation system. Retention/irrigation systems are appropriate for large drainage areas with low to moderate slopes. The retention capacity should be sufficient considering the average rainfall event for the area.

Maintenance Requirements: Maintenance requirements for retention/irrigation systems include routine inspections, sediment removal, mowing, debris and litter removal, erosion control, and nuisance control.

Extended Detention Basin

Description: Extended detention facilities are basins that temporarily store a portion of stormwater runoff following a storm event. Extended detention basins are normally used to remove particulate pollutants and to reduce maximum runoff rates associated with development to their pre-development levels. The water quality benefits are the removal of sediment and buoyant materials. Furthermore, nutrients, heavy metals, toxic materials, and oxygen-demanding materials associated with the particles also are removed. The control of the maximum runoff rates serves to protect drainage channels below the device from erosion and to reduce downstream flooding. Although detention facilities designed for flood control have different design requirements than those used for water quality enhancement, it is possible to

achieve these two objectives in a single facility.

Design Considerations: Extended detention basins can remove approximately 75% of the total suspended solids contained within the volume of runoff captured in the basin. Design elements of extended detention basins include basin sizing, basin configuration, basin side slopes, basin lining, inlet/outlet structures, and erosion controls. Extended detention basins are appropriate for large drainage areas with low to moderate slopes. The retention capacity should be sufficient considering the average rainfall event for the area.

Maintenance Requirements: Maintenance requirements for extended detention basins include routine inspections, mowing, debris and litter removal, erosion control, structural repairs, nuisance control, and sediment removal.

Vegetative Filter Strips

Description: Filter strips, also known as vegetated buffer strips, are vegetated sections of land similar to grassy swales except they are essentially flat with low slopes, and are designed only to accept runoff as overland sheet flow. They may appear in any vegetated form from grassland to forest, and are designed to intercept upstream flow, lower flow velocity, and spread water out as sheet flow. The dense vegetative cover facilitates conventional pollutant removal through detention, filtration by vegetation, and infiltration.

Filter strips cannot treat high velocity flows, and do not provide enough storage or infiltration to effectively reduce peak discharges to predevelopment levels for design storms. This lack of quantity control favors use in rural or low-density development; however, they can provide water quality benefits even where the impervious cover is as high as 50%. The primary highway application for vegetative filter strips is along rural roadways where runoff that would otherwise discharge directly to a receiving water passes through the filter strip before entering a conveyance system. Properly designed roadway medians and shoulders make effective buffer strips. These devices also can be used on other types of development where land is available and hydraulic conditions are appropriate.

Flat slopes and low to fair permeability of natural subsoil are required for effective performance of filter strips. Although an inexpensive control measure, they are most useful in contributing watershed areas where peak runoff velocities are low as they are unable to treat the high flow velocities typically associated with high impervious cover.

Successful performance of filter strips relies heavily on maintaining shallow unconcentrated flow. To avoid flow channelization and maintain performance, a filter strip should:

- Be equipped with a level spreading device for even distribution of runoff
- Contain dense vegetation with a mix of erosion resistant, soil binding species
- Be graded to a uniform, even and relatively low slope
- Laterally traverse the contributing runoff area

Filter strips can be used upgradient from watercourses, wetlands, or other water bodies along toes and tops of slopes and at outlets of other stormwater management structures. They should be incorporated into street drainage and master drainage planning. The most important criteria for selection and use of this BMP are soils, space, and slope.

Design Considerations: Vegetative filter strips can remove approximately 85% of the total suspended solids contained within the volume of runoff captured. Design elements of vegetative filter strips include uniform, shallow overland flow across the entire filter strip area, hydraulic loading rate, inlet structures, slope, and vegetative cover. The area should be free of gullies or rills which can concentrate flow. Vegetative filter strips are appropriate for small drainage areas with moderate slopes. Other design elements include the following:

- Soils and moisture are adequate to grow relatively dense vegetative stands
- Sufficient space is available
- Slope is less than 12%
- Comparable performance to more expensive structural controls

Maintenance Requirements: Maintenance requirements for vegetative filter strips include pest management, seasonal mowing and lawn care, routine inspections, debris and litter removal, sediment removal, and grass reseeding and mulching.

Constructed Wetlands

Description: Constructed wetlands provide physical, chemical, and biological water quality treatment of stormwater runoff. Physical treatment occurs as a result of decreasing flow velocities in the wetland, and is present in the form of evaporation, sedimentation, adsorption, and/or filtration. Chemical processes include chelation, precipitation, and chemical adsorption. Biological processes include decomposition, plant uptake and removal of nutrients, plus biological transformation and degradation. Hydrology is one of the most influential factors in pollutant removal due to its effects on sedimentation, aeration, biological transformation, and adsorption onto bottom sediments.

The wetland should be designed such that a minimum amount of maintenance is required. The natural surroundings, including such things as the potential energy of a stream or flooding river, should be utilized as much as possible. The wetland should approximate a natural situation and unnatural attributes, such as rectangular shape or rigid channel, should be avoided.

Site considerations should include the water table depth, soil/substrate, and space requirements. Because the wetland must have a source of flow, it is desirable that the water table is at or near the surface. If runoff is the only source of inflow for the wetland, the water level often fluctuates and establishment of vegetation may be difficult. The soil or substrate of an artificial wetland should be loose loam to clay. A perennial baseflow must be present to sustain the artificial wetland. The presence of organic material is often helpful in increasing pollutant removal and retention. A greater amount of space is required for a wetland system than is required for a detention facility treating the same amount of area.

Design Considerations: Constructed wetlands can remove over 90% of the total suspended solids contained within the volume of runoff captured in the wetland. Design elements of constructed wetlands include wetland sizing, wetland configuration, sediment forebay, vegetation, outflow structure, depth of inundation during storm events, depth of micropools, and aeration. Constructed wetlands are appropriate for large drainage areas with low to moderate slopes.

Maintenance Requirements: Maintenance requirements for constructed wetlands include mowing, routine inspections, debris and litter removal, erosion control, nuisance control, structural repairs, sediment removal, harvesting, and maintenance of water levels.

Wet Basins

Description: Wet basins are runoff control facilities that maintain a permanent wet pool and a standing crop of emergent littoral vegetation. These facilities may vary in appearance from natural ponds to enlarged, bermed (manmade) sections of drainage systems and may function as online or offline facilities, although offline configuration is preferable. Offline designs can prevent scour and other damage to the wet pond and minimize costly outflow structure elements needed to accommodate extreme runoff events.

During storm events, runoff inflows displace part or all of the existing basin volume and are retained and treated in the facility until the next storm event. The pollutant removal mechanisms are settling of solids, wetland plant uptake, and microbial degradation. When the wet basin is adequately sized, pollutant removal performance can be excellent, especially for the dissolved fraction. Wet basins also help provide erosion protection for the receiving channel by limiting peak flows during larger storm events. Wet basins are often perceived as a positive aesthetic element in a community and offer significant opportunity for creative pond configuration and landscape design. Participation of an experienced wetland designer is suggested. A significant potential drawback for wet ponds in arid climates is that the contributing watershed for these facilities is often incapable of providing an adequate water supply to maintain the permanent pool, especially during the summer months. Makeup water (i.e., well water or municipal drinking water) is sometimes used to supplement the rainfall/runoff process, especially for wet basin facilities treating watersheds that generate insufficient runoff.

Design Considerations: Wet basins can remove over 90% of the total suspended solids contained within the volume of runoff captured in the basin. Design elements of wet basins include basin sizing, basin configuration, basin side slopes, sediment forebay, inflow and outflow structures, vegetation, depth of permanent pool, aeration, and erosion control. Wet basins are appropriate for large drainage areas with low to moderate slopes.

Maintenance Requirements: Maintenance requirements for wet basins include mowing, routine inspections, debris and litter removal, erosion control, nuisance control, structural repairs, sediment removal, and harvesting.

Attachment 4
Description of BMPs

Grassy Swales

Grassy swales are vegetated channels that convey stormwater and remove pollutants by filtration through grass and infiltration through soil. They require shallow slopes and soils that drain well. Pollutant removal capability is related to channel dimensions, longitudinal slope, and type of vegetation. Optimum design of these components will increase contact time of runoff through the swale and improve pollutant removal rates.

Grassy swales are primarily stormwater conveyance systems. They can provide sufficient control under light to moderate runoff conditions, but their ability to control large storms is limited. Therefore, they are most applicable in low to moderate sloped areas or along highway medians as an alternative to ditches and curb and gutter drainage. Their performance diminishes sharply in highly urbanized settings, and they are generally not effective enough to receive construction stage runoff where high sediment loads can overwhelm the system. Grassy swales can be used as a pretreatment measure for other downstream BMPs, such as extended detention basins. Enhanced grassy swales utilize check dams and wide depressions to increase runoff storage and promote greater settling of pollutants.

Grassy swales can be more aesthetically pleasing than concrete or rock-lined drainage systems and are generally less expensive to construct and maintain. Swales can slightly reduce impervious area and reduce the pollutant accumulation and delivery associated with curbs and gutters. The disadvantages of this technique include the possibility of erosion and channelization over time, and the need for more right-of-way as compared to a storm drain system. When properly constructed, inspected, and maintained, the life expectancy of a swale is estimated to be 20 years.

Design Considerations:

- Comparable performance to wet basins
- Limited to treating a few acres
- Availability of water during dry periods to maintain vegetation
- Sufficient available land area

The suitability of a swale at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the swale system. In general, swales can be used to serve areas of less than 10 acres, with slopes no greater than 5 %. The seasonal high water table should be at least 4 feet below the surface. Use of natural topographic lows is encouraged, and natural drainage courses should be regarded as significant local resources to be kept in use.

Maintenance Requirements:

Research in the Austin area indicates that vegetated controls are effective at removing pollutants even when dormant. Therefore, irrigation is not required to maintain growth during dry periods, but may be necessary only to prevent the vegetation from dying.

Attachment 4
Description of BMPs

Vegetation Lined Drainage Ditches

Vegetation lined drainage ditches are similar to grassy swales. These drainage ditches are vegetated channels that convey storm water and remove pollutants by filtration through grass and infiltration through soil. They require soils that drain well. Pollutant removal capability is related to channel dimensions, longitudinal slope, and type of vegetation. Optimum design of these components will increase contact time of runoff through the ditch and improve pollutant removal rates. Vegetation lined drainage ditches are primarily storm water conveyance systems. They have vegetation lined in the low flow channel and may include vegetated shelves.

Vegetation in drainage ditches reduces erosion and removes pollutants by lowering water velocity over the soil surface, binding soil particles with roots, and by filtration through grass and infiltration through soil. Vegetation lined drainage ditches can be used where:

- A vegetative lining can provide sufficient stability for the channel grade by increasing maximum permissible velocity

- Slopes are generally less than 5%, with protection from sheer stress as needed through the use of BMPs, such as erosion control blankets

- Site conditions required to establish vegetation, i.e. climate, soils, topography, are present

Design Criteria: The suitability of a vegetation lined drainage ditch at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the ditch system. The hydraulic capacity of the drainage ditch and other elements such as erosion, siltation, and pollutant removal capability, must be taken into consideration. Use of natural topographic lows is encouraged, and natural drainage courses should be regarded as significant local resources to be kept in use. Other items to consider include the following:

- Capacity, cross-section shape, side slopes, and grade

- Select appropriate native vegetation

- Construct in stable, low areas to conform with the natural drainage system. To reduce erosion potential, design the channel to avoid sharp bends and steep grades.

- Design and build drainage ditches with appropriate scour and erosion protection. Surface water should be able to enter over the vegetated banks without erosion occurring.

- BMPs, such as erosion control blankets, may need to be installed at the time of seeding to provide stability until the vegetation is fully established. It may also be necessary to divert water from the channel until vegetation is established or to line the channel with sod.

- Vegetated ditches must not be subject to sedimentation from disturbed areas.

• Sediment traps may be needed at channel inlets to prevent entry of muddy runoff and channel sedimentation.

- Availability of water during dry periods to maintain vegetation
- Sufficient available land area

Maintenance:

During establishment, vegetation lined drainage ditches should be inspected, repaired, and vegetation reestablished if necessary. After the vegetation has become established, the ditch should be checked periodically to determine if the channel is withstanding flow velocities without damage. Check the ditch for debris, scour, or erosion and immediately make repairs if needed. Check the channel outlet and all road crossings for bank stability and evidence of piping or scour holes and make repairs immediately. Remove all significant sediment accumulations to maintain the designed carrying capacity. Keep the vegetation in a healthy condition at all times, since it is the primary erosion protection for the channel. Vegetation lined drainage ditches should be seasonally maintained by mowing or irrigating, depending on the vegetation selected. The long-term management of ditches as stable, vegetated, "natural" drainage systems with native vegetation buffers is highly recommended due to the inherent stability offered by grasses, shrubs, trees, and other vegetation.

Research in the Austin area indicates that vegetated controls are effective at removing pollutants even when dormant. Therefore, irrigation is not required to maintain growth during dry periods, but may be necessary only to prevent the vegetation from dying.

Sand Filter Systems

The objective of sand filters is to remove sediment and the pollutants from the first flush of pavement and impervious area runoff. The filtration of nutrients, organics, and coliform bacteria is enhanced by a mat of bacterial slime that develops during normal operations. One of the main advantages of sand filters is their adaptability; they can be used on areas with thin soils, high evaporation rates, low-soil infiltration rates, in limited-space areas, and where groundwater is to be protected.

Since their original inception in Austin, Texas, hundreds of intermittent sand filters have been implemented to treat stormwater runoff. There have been numerous alterations or variations in the original design as engineers in other jurisdictions have improved and adapted the technology to meet their specific requirements. Major types include the Austin Sand Filter, the District of Columbia Underground Sand Filter, the Alexandria Dry Vault Sand Filter, the Delaware Sand Filter, and peat-sand filters which are adapted to provide a sorption layer and vegetative cover to various sand filter designs .

Design Considerations:

- Appropriate for space-limited areas

- Applicable in arid climates where wet basins and constructed wetlands are not appropriate
- High TSS removal efficiency

Cost Considerations:

Filtration Systems may require less land than some other BMPs, reducing the land acquisition cost; however the structure itself is one of the more expensive BMPs. In addition, maintenance cost can be substantial.

Erosion Control Compost

Description: Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

Materials:

New types of erosion control compost are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Material used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at http://www.txdot.gov/business/contractors_consultants/recycling/compost.htm that provides information on compost specification data.

ECC used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.
Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for ECC to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous

parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with current TxDOT specification.
- Use on slopes 3:1 or flatter.
- Apply a 2 inch uniform layer unless otherwise shown on the plans or as directed.
- When rolling is specified, use a light corrugated drum roller.

Mulch and Compost Filter Socks

Description: Mulch and compost filter socks (erosion control logs) are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, mulch and compost filter socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Mulch and compost filter socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The sock should remain in place until the area is permanently stabilized. Mulch and compost filter socks may be installed in construction areas and temporarily moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Mulch and compost filter socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

Materials:

New types of mulch and compost filter socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Mulch and compost filter socks used within any TxDOT construction or maintenance activities must meet material specifications in accordance with TxDOT specification 5049. TxDOT maintains a website at http://www.txdot.gov/business/contractors_consultants/recycling/compost.htm that provides information on compost specification data.

Mulch and compost filter socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used for mulch and compost filter socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other

relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for mulch and compost filter socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with TxDOT Special Specification 5049.
- Install socks (erosion control logs) near the downstream perimeter of a disturbed area to intercept sediment from sheet flow.
- Secure socks in a method adequate to prevent displacement as a result of normal rain events such that flow is not allowed under the socks.
- Inspect and maintain the socks in good condition (including staking, anchoring, etc.). Maintain the integrity of the control, including keeping the socks free of accumulated silt, debris, etc., until the disturbed area has been adequately stabilized.

Sedimentation Chambers (only to be used when there is no space available for other approved BMP's)

Description: Sedimentation chambers are stormwater treatment structures that can be used when space is limited such as urban settings. These structures are often tied into stormwater drainage systems for treatment of stormwater prior to entering state waters. The water quality benefits are the removal of sediment and buoyant materials. These structures are not designed as a catch basin or detention basin and not typically used for floodwater attenuation.

Design Considerations: Average rainfall and surface area should be considered when following manufacturer's recommendations for chamber sizing and/or number of units needed to achieve effective TSS removal. If properly sized, 50-80% removal of TSS can be expected.

Attachment 4
Description of BMPs

Maintenance Requirements: Maintenance requirements include routine inspections, sediment, debris and litter removal, erosion control and nuisance control.

PERMIT COMPLIANCE CERTIFICATION

U.S. Army Corps of Engineers Project Number:

Permit Number:

Name of Permittee:

Date of Issuance:

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

Regulatory Branch
CESWF-PER-R
U.S. Army Corps of Engineers
P.O. Box 17300
Fort Worth, Texas 76102-0300

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee Date

HALFF

September 6, 2013
AVO 29520

Ms. Jennifer Walker
Fort Worth District, USACE – Regulatory Branch
819 Taylor Street, Room 3A37
P.O. Box 17300
Fort Worth, Texas 76102

RE: Approved Jurisdictional Determination Forms for 130 Environmental Park in Caldwell County, Texas

Dear Ms. Walker:

As part of the regulatory approval process for the proposed 130 Environmental Park in Caldwell County, on behalf of 130 Environmental Park, LLC, Halff Associates (Halff) has conducted an investigation of the referenced site to assess the study area for the presence of potential waters of the United States and wetlands. A field delineation of Waters of the United States was conducted in June and July 2013, the findings of which were compiled into a summary report dated August 2013. The study concluded that several areas would fall under USACE jurisdiction, either as wetlands or other surface water features. However, several apparent man-made wetland features were deemed isolated and therefore not considered waters of the United States.

Prior to the submittal of a pre-construction notification under an applicable nationwide permit, Halff has completed Approved Jurisdictional Determination (AJD) Forms for select surface water features so that the USACE may determine that jurisdiction does not exist over a particular waterbody or wetland. Other delineated stream and wetland features for which forms are not provided are assumed jurisdictional; any nationwide permit verification will treat these features, which could be affected by the permitted activity, as if they are waters of the United States.

Several features identified in the delineation that were excavated and created as excavated, off-channel stock ponds are not considered waters of the Untied States, since they are generally not included in the definition of waters of the United States under 33 CFR 328.3. These are identified as OW-4, OW-5, OW-8, EW-19, EW-20, and EW-34.

Within the surveyed area, all water features deemed isolated consist of emergent wetlands that seem to be man-made features; these include features identified as EW-21 through EW-33, and EW-35. The AJD Forms are provided in **Attachment A.** As noted above, forms are only provided for those features for which a verification of non-jurisdiction is sought. **Attachment B** provides the entire delineation report which serves as the basis for information provided in the AJD forms. **Attachment C** provides the summary table from the delineation report containing physical information for each of the mapped features.

HALFF ASSOCIATES, INC.
1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081-2275
TEL (214) 346-6200
FAX (214) 739-0095
WWW.HALFF.COM

If you have any questions, please do not hesitate to call at 214-346-6367.

Sincerely,

HALFF ASSOCIATES, INC.

Russell Marusak
Environmental Scientist

C: Mr. Kenneth Welch – Biggs and Mathews
Mr. Ernest Kaufmann, 130 Environmental Park, LLC

Attachments

CONTENTS

APPENDIX IID.1

WATERS OF THE UNITED STATES DELINEATION REPORT
AND
WETLAND DETERMINATION AND IDENTIFICATION

Technically Complete October 28, 2014

WATERS OF THE UNITED STATES DELINEATION REPORT AND WETLAND DETERMINATION AND IDENTIFICATION

For:

130 Environmental Park

Prepared by:

HALFF ASSOCIATES, INC.

1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081

TEL (214) 346-6200
FAX (214) 739-0095

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AVO 29520

August 2013

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Figures (at the end of the report text)

Appendices

1.0 PURPOSE

Halff Associates (Halff) has been retained to provide to 130 Environmental Park, LLC the environmental services necessary to perform a Section 404 jurisdictional delineation and a wetlands determination and identification for the proposed 130 Environmental Park in Caldwell County, Texas. The study area consists of approximately 1,200 acres and is located on the east side of State Highway (SH) 130/US 183 north of the City of Lockhart, Texas, extending from the intersection of US 183 and FM 1185 east to Homannville Trail. **Figure 1** shows the general project location with respect to larger metropolitan areas. **Figure 2** shows the location within Caldwell County and in relation to the City of Lockhart.

130 Environmental Park, LLC intends to permit and operate a new municipal solid waste facility in northern Caldwell County. The 130 Environmental Park will include a Type I municipal solid waste disposal facility and a Type V municipal solid waste transfer station. This document has been prepared to meet wetland delineation guidelines published by the U.S. Army Corps of Engineers (USACE), to serve as supporting documentation for a jurisdictional determination under Section 404 of the Clean Water Act, and to provide information for a wetlands determination and identification pursuant to Texas Commission on Environmental Quality rules at 30 TAC 330.61(m)(2) and (3).

2.0 METHODS

Supporting information including aerial photographs, United States Geological Survey (USGS) quadrangle maps, soil survey maps, and floodplain maps were reviewed prior to conducting site investigations. In June and July 2013, site investigations were conducted to determine the present day extent of wetlands and waters of the United States. Limits of wetlands and waters of the United States were identified in the field by Halff personnel with training and experience in the identification and mapping of such waters and wetlands. Water feature limits were based on the presence of the ordinary high water mark (OHWM) of the surface tributary system, or the presence of wetland indicators where applicable. Limits of wetlands and waters of the United States were measured in the field in June and July 2013 by two different techniques. The majority of the survey data, specifically the wetlands and stream locations that were within and in the vicinity of the proposed project area, were collected using a Spectra Precision Epoch 50 Global Positioning System (GPS) receiver and conventional methods utilizing survey control points within the project. Other features which were measured with Global Positioning System

(GPS) receivers, either with a Spectra Precision Epoch 50 or Trimble GeoXT GPS receiver. Survey data were then converted and analyzed using ArcView Geographic Information System (GIS) software. All coordinates are State Plane South-Central Texas Zone 4204 (NAD 1983) coordinates.

Prior to conducting the field study, Halff utilized background information to establish a series of transects to provide adequate coverage of the study area. Transects were established perpendicular to the hydrological gradient of three distinct stream systems identified on USGS quadrangle maps in order to intersect areas suspected to contain wetlands or other aquatic features (e.g., reservoir on USGS map, apparent inundation on aerial photography, and riparian woodlands). Twenty-one east-west and 6 north-south transects were established, with multiple wetland determination data points recorded, documenting vegetation, hydrology, and soil characteristics along each transect. Given that a substantial portion of the study area consisted of dense mesquite uplands and post oak woodlands, Halff determined that the approximate 500-foot spacing between transects was necessary to provide representative coverage of the study area. Halff also investigated areas between these transects, especially areas known or suspected to contain aquatic features. The collection of information for wetland data points was consistent with the USACE guidelines for wetland delineations per the "1987 Corps of Engineers Wetlands Delineation Manual," in addition to the "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)." **Figure B-1** (**Appendix B**) shows the location of transects with respect to aquatic features identified in the field. **Figure 3.1** through **Figure 3.6** shows all mapped aquatic features on an aerial photograph.

3.0 RESULTS

Supporting information for this report includes current and historical aerial photographs, a USGS topographic map, and a soil survey map which are in **Appendix A**. A discussion of these maps is provided in **Section 3.1**. Results of the site investigation are provided in **Section 3.2**.

3.1 Supporting Information

3.1.1 Topographic Map Information

The USGS Quadrangle Map for "Lockhart North, Texas" (**Appendix A**, **Figure A-1**) shows the study area with topography peaking in the northern portion of the study area and generally sloping south and east towards Dry Creek. The Dry Creek tributary system enters the study area from the east and flows south to a large on-channel impoundment near the southern study area boundary. Contours suggest the presence of a potential drainage network that would flow north to south toward Dry Creek, representing a secondary tributary system to Dry Creek. Much of the area surrounding Dry Creek and its on-channel impoundment is depicted within the mapped limits of the maximum pool elevation, as determined by the emergency spillway elevation. Another tributary enters the study area from the north and flows south until it outfalls into the on-channel impoundment of Dry Creek. Several headwater tributaries are mapped as flowing west to east into this tributary, one of which includes an on-channel open water pond along its stream course. Another tributary enters the study area from the north in the southwestern portion of the study area. This tributary flows north to south and exits the study area under FM 1185. Contours suggest the presence of other drainages that would flow west to east toward this receiving tributary, one of which includes an on-channel open water pond along its course. Several apparent off channel open water ponds are shown in the central portion of the study area.

3.1.2 Soil Survey Information

Soils data for the study area was obtained from the Natural Resource Conservation Service (NRCS) Soil Data Mart, which is derived from the U.S. Department of Agriculture (USDA) soil survey for Caldwell County (1978). The soil units mapped from USDA GIS data are shown atop a 2012 aerial photograph of the study area in **Appendix A**, **Figure A-2**. **Table 1** provides key characteristics for these soil types.

Table 1 - Soil Types within the Study Area

Soil Id	Soil Series	Topography	Available Water Capacity	Drainage Class	Flooded	Ponded
BuB	Burleson Clay	1-3% slopes	Moderate	Moderately Well Drained	No	No
CfB	Crocket fine sandy loam	1-3% slopes	Moderate	Moderately Well Drained	No	No
CrC2	Crockett soils	2-5% slopes, eroded	Moderate	Moderately Well Drained	No	No
CrD3	Crockett soils	3-8% slopes, eroded	Moderate	Moderately Well Drained	No	No
DAM	Dams	---	---	---	---	---
FeE	Fett gravelly soils	1-12% slopes	Low	Somewhat Poorly Drained	No	No
HeC2	Heiden clay	3-5% slopes, eroded	Moderate	Well Drained	No	No
HmB	Heiden-Wilson complex	1-3% slopes	Moderate	Well Drained 55% / Moderately Well Drained 30%	No	No
HoC2	Houston Black clay	3-5% slopes, eroded	Moderate	Moderately Well Drained	No	No
MaA	Mabank loam	0-1% slopes	Moderate	Moderately Well Drained	No	Yes
MaB	Mabank loam	1-3% slopes	Moderate	Moderately Well Drained	No	No
Ts	Tinn soils, frequently flooded	0-1 % slopes	High	Moderately Well Drained	No	No
W	Water	---	---	---	---	---
WgC	Wilson gravelly loam	1-5% slopes	Moderate	Moderately Well Drained	No	No

The majority of the study area is mapped as Fett gravelly soils and Wilson gravelly loam (soil map symbols FeE and WgC). The Tinn soil unit (map symbol Ts) is associated with the floodplains of the larger drainages across the study area, and typically floods more than once a year. None of the listed soils are considered hydric soils according to the USDA Soil Data Mart. However, the database shows that the Tinn Soils, frequently flooded unit and the Mabank loam 0-1% slopes unit contain unnamed minor components located in depressions that may meet hydric criteria, based on ponding and/or flooding.

3.1.3 Aerial Photography

Infrared aerial photographs from 1996, and true color aerial photographs from 2010 and 2012 (**Appendix A, Figure A-3** through **Figure A-5**), show the study area in different climatic conditions. Consistent with the USGS topographic map, all aerial photographs show several stream courses across the study area along with a large on-channel impoundment and several scattered off-channel impoundments. In the 1996 photograph (**Figure A-3**), densely wooded areas are mostly limited to narrow riparian areas along the major drainages across the study area, while the remainder of the wooded areas appears to be sparse, younger tree growth. The remainder of the study area appears to be open pasture land with some apparent terracing of hillside slopes readily observable. The 1996 aerial photograph shows the study area with the large on-channel impoundment of Dry Creek at a higher capacity, compared to noticeably lower water surface levels in the more recent photographs. The 1996 aerial photograph also indicates the general location of the headwater streams suggested on the USGS map in the remainder of the study area. The 2010 aerial photograph (**Figure A-4**) shows denser woody growth than the 1996 photograph, especially in the western portion of the study area, and also shows the apparent succession of scrub/shrub growth in observed terraced areas. The 2012 aerial photograph (**Figure A-5**) shows the Dry Creek on-channel impoundment at its lowest water surface elevation, even when compared to the 2010 photograph. Headwater streams are not as readily observable on the 2010 or the 2012 aerial photographs.

3.1.4 Floodplain Information

According to the Flood Insurance Rate Map (FIRM) published by the National Flood Insurance Program, Dry Creek is mapped with a wide floodplain across the length of the study area. The secondary tributary system to Dry Cry lacks a substantial floodplain, while the remaining tributary systems have a narrow floodplain consistent with their stream courses as observed on aerial photography. The overbank areas of the Dry Creek and its tributaries are located within the 1% chance annual flood hazard zone with base elevations not determined (Zone A). The remainder of the study area is mapped as outside of the 0.2% annual chance flood zone (Zone X). **Figure A-6** shows the limits of flood zones on 2012 aerial photography.

3.2 Field Conditions

3.2.1 Streams

Three distinct tributary systems were identified in the study area (Dry Creek, IS-1, and ES-9). The limits of the streams were based on the presence of a discernible OHWM consistent with physical characteristics outlined in USACE Regulatory Guidance Letter 05-05. The OHWM of each bank was flagged and surveyed at regular intervals to adequately characterize the sinuousity of the stream. Observed physical characteristics used to delineate the OHWM generally included the following: destruction of terrestrial vegetation; leaf litter washed away; scour; and/or bed and banks. A brief description of each of the tributary systems is provided below and descriptions are followed by a summary of pertinent physical characteristics in **Table 2** through **Table 5**. The locations of these streams are shown on **Figure 3.1** through **Figure 3.6**.

Dry Creek System

Dry creek enters the study area from the east via box culverts under Homannville Trail. Stream flow is from north to south through a channel varying from 5 to 20 feet wide. Dry Creek flows within a narrow riparian corridor consisting of green ash (*Fraxinus pennsylvanica*), cedar elm (*Ulmus crassifolia*), pecan (*Carya illinoensis*), hackberry (*Celtis laevigata*), and chinaberry (*Melia azeradach*). Throughout much of the stream course, the riparian corridor generally extends less than 25 feet from the top of the channel bank and is absent along portions of Dry Creek closer to the outfall into OW-1. With the exception of cattle and game crossings and one vehicular low-water crossing, the channel within the study area shows little signs of alteration and there are multiple types of instream habitat features (e.g., overhanging vegetation, woody debris, etc.). Dry Creek has intermittent pools throughout its course within the study area, but no active stream flows were observed; Dry Creek has been classified as an intermittent tributary. One ephemeral stream (ESD-1) enters the study area from the east and outfalls into Dry Creek upstream of its outfall into OW-1 and two additional headwater ephemeral streams (ESD-2 and ESD-3) outfall into Dry Creek from the north. None of the ephemeral streams associated with Dry Creek had standing or flowing water at the time of site investigations.

Secondary to the Dry Creek system, the ESD-4 stream system is a series of headwater streams (ESD-4A, ESD-4B, ESD-4C, and ESD-4D) that originate in the northeastern portion of the study area and flow generally north to south before outfalling into Dry Creek. Tributary ESD-4 is in the approximate location of the unnamed tributary suggested on the USGS topographic map (**Figure A-1**) in the eastern portion of the study area. The headwater channels are generally 2 to 4 feet wide with a cobble bottom and flowed north to south within an upland corridor consisting primarily of mesquite (*Prosopis glandulosa*) trees. After the headwater channels converge into one main channel (ESD-4), the OHWM widens to an average of 6 to 8 feet and surrounding woody vegetation is dominated by post oak (*Quercus stellata*) and cedar elm with some green ash near the confluence with Dry Creek. The shallow channel shows no sign of incision and the channel area shows little signs of alteration.

Table 2 - Summary of Dry Creek Stream Segments

Name	Figure Location	Stream Classification	Length (ft)	OHWM Width (ft)
Dry Creek	3.2, 3.4, 3.6	Intermittent	6,264	5-20
ESD-1	3.4	Ephemeral	1,878	8-10
ESD-2	3.4	Ephemeral	1,065	8
ESD-2A	3.4	Ephemeral	89	6
ESD-3	3.4	Ephemeral	419	4-8
ESD-4	3.2	Ephemeral	3,912	6-8
ESD-4A	3.2	Ephemeral	252	4-7
ESD-4B	3.2	Ephemeral	1,638	5
ESD-4C	3.2	Ephemeral	115	4
ESD-4D	3.2	Ephemeral	280	4

Intermittent Stream 1 (IS-1)

This stream segment, located in the central portion of the study area, is a larger stream which outfalls into Dry Creek at OW-1. Stream flow is from north to south through a channel approximately 10-15 feet wide. The riparian corridor is historically narrow based on available aerial photography. However, the surrounding post oak woodland has contributed to a wider corridor in recent years. Stream banks were incised, particularly in the downstream areas, but there was very little evidence of cattle grazing near or crossing the stream, and there are multiple types of instream habitat features (e.g., overhanging vegetation, woody debris, etc.). This feature is classified as an intermittent stream because it was dry for much of its reach, but multiple deep pools and signs of inundation within the channel were common. Twelve additional ephemeral tributaries associated with IS-1 are included in this system. Five of these

ephemeral tributaries (ES-5, ES-5A, ES-5B, ES-7, and ES-7A) flow west to east into IS-1, and two tributaries (ES-8 and ES-6) flow north to south into IS-1. Tributaries ES-10, ES-11, ES-12 are short feeder tributaries that flow into IS-1 from the east. Tributaries ES-3 and ES-4 do not outfall into IS-1 within the study area, but likely had a historic OHWM connection with IS-1 prior to construction of the Soil Conservation Service impoundment along Dry Creek and IS-1. Currently, the historic courses are maintained as grassland pasture. ES-3 has an on-channel pond (OW-6) with a fringe wetland (EW-40) along the overhead utility easement. Tributaries ES-1, ES-2, and ES-2A are actually direct tributaries to Dry Creek and outfall to Dry Creek south of the study area. They were included within the discussion of the IS-1 system because of their geographic location within the study area. Additionally, due to their location within the landscape, they were characteristically more similar to the tributaries observed within the IS-1 system than the tributaries to Dry Creek on the eastern portion of the study area.

Table 3 - Summary of IS-1 Stream Segments

Name	Figure Location	Stream Classification	Length (ft)	OHWM Width (ft)
IS-1	3.1, 3.3, 3.6	Intermittent	10,017	10-15
ES-1	3.5	Ephemeral	567	5
ES-2	3.5, 3.6	Ephemeral	3,452	5-6
ES-2A	3.6	Ephemeral	116	3
ES-3	3.3	Ephemeral	1,393	3
ES-4	3.3	Ephemeral	1,245	3
ES-5	3.3	Ephemeral	3,258	4
ES-5A	3.3	Ephemeral	532	4
ES-5B	3.3	Ephemeral	135	3
ES-6	3.3	Ephemeral	959	3-6
ES-7	3.1	Ephemeral	1,414	7-10
ES-7A	3.1	Ephemeral	226	4-8
ES-8	3.1	Ephemeral	432	5-10
ES-10	3.3	Ephemeral	105	4-6
ES-11	3.3	Ephemeral	117	2-4
ES-12	3.3	Ephemeral	127	4-6

Ephemeral Stream 9 (ES-9)

This is a smaller stream system located in the southwestern portion of the study area. The main ES-9 channel is an 8 to 10 foot wide cobbled channel flowing north to south within dense post oak woodland. The channel was smaller and less incised in comparison with IS-1 and there was little evidence of cattle grazing in this portion of the study area. ES-9 is joined by a smaller headwater stream system from the west, which included one on-channel open water pond (OW-7) and an on-channel emergent wetland (EW-45) downstream of the pond dam. Near the

southern study area boundary, ES-9 outfalls into a culvert under FM 1185 and multiple emergent and forested wetlands (EW-43, EW-44, and FW-8) were observed adjacent to the channel in this area.

Table 4 - Summary of ES-9 Stream Segments

Name	Figure Location	Stream Classification	Length (ft)	OHWM Width (ft)
ES-9	3.5	Ephemeral	2,453	8-10
ES-9A	3.5	Ephemeral	306	3-10
ES-9B	3.5	Ephemeral	605	3-10
ES-9C	3.5	Ephemeral	96	4-5
ES-9D	3.5	Ephemeral	78	3
ES-9E	3.5	Ephemeral	187	3
ES-9F	3.5	Ephemeral	148	3-6

3.2.2 Open Water

A total of eight open water features were observed in the study area. Of these eight, three (OW-1, OW-6, and OW-7) were considered to be on-channel impoundments. During the July 2013 field investigation, OW-4, OW-5, and OW-8 were determined to be isolated impoundments, in upland areas, that are not associated with defined channels. For OW-6 and OW-7, Halff observed channel segments (ES-3 and ES-9B), with defined ordinary high water marks upstream and downstream of the impoundments. The same cannot be said for OW-2 and OW-3; however, evidence of historic drainages may have been affected by the construction of OW-1. Based on the proximity to OW-1 and its associated wetland complex, it is reasonable to conclude these may have been impoundments of some past tributary. OW-1 was the largest water feature observed within the study area and is an on-channel impoundment of Dry Creek. During the July 2013 site investigation, the open water features within the study area exhibited varying water levels. The on-channel impoundments (OW-6 and OW-7) appeared to be full, while the isolated stock ponds in uplands were several feet low. OW-1 has a much greater capacity than was observed during the field investigation. However, the limits of the pond that were mapped in the field are consistent with recent aerial imagery. **Table 5** provides a summary of all mapped open water areas. The locations of open water features are shown on **Figure 3.1** through **Figure 3.6**.

Table 5 - Summary of Open Water Features

Name	Figure Location	On-channel Impoundment	Area (Acres)
OW-1	3.4, 3.6	Yes	20.32
OW-2	3.4	No	0.42
OW-3	3.4	No*	0.28
OW-4	3.2	No*	0.28
OW-5	3.3	No	0.17
OW-6	3.3	Yes	0.22
OW-7	3.5	Yes	0.15
OW-8	3.4	No	0.18

* - Although there is no discernible evidence of a tributary, evidence supports that there at times may be a hydrologic connection to OW-1.

3.2.3 Wetlands

As noted in **Section 2.0**, Halff established multiple transects perpendicular to the hydrological gradient of the different drainages located in the study area, along which multiple data points were sampled (**Figure B-1, Appendix B**). Consistent with the delineation manual, data points were taken along each transect to characterize the different vegetation communities encountered. Initially, data points were collected in wetland and non-wetland areas to establish the various vegetation communities within the study area. Once sufficient data was collected within each community, reference data points (including representative photography) were used to delineate the boundaries between vegetation communities, as well as the wetland/non-wetland boundaries. Based on guidance from the USACE Fort Worth District, an evaluation of soils and hydrology was not necessary at data points that did not meet hydrophytic vegetation criteria.

The following discussion provides a general summary of each of the vegetation communities observed within the study area. For communities associated with wetland areas, a discussion of the hydric soil indicators and wetland hydrology indicators observed is included. **Appendix B** contains copies of wetland data sheets completed for each area. Photographs from representative data point locations are provided following the data sheets for each transect. A summary table of mapped aquatic features is included following the narrative for each vegetation community in which wetlands were encountered. The locations of these wetland features are shown on **Figure 3.1** through **Figure 3.6**.

Mesquite Grassland Mosaic

The mesquite grassland mosaic was one of the most frequently encountered vegetation communities within the study area. Tree canopy was absent from this community and dominant vegetation was a relatively homogenous mix of scrub brush and various grasses and forbs. Dominant woody species observed included mesquite, agarita (*Mahonia trifoliolata*), allthorn goatbush (*Castela erecta*), and Texas persimmon (*Diospyros texana*). Dominant herbaceous species included Texas wintergrass (*Nassella leucotricha*), Texas prickly pear (*Opuntia engelmannii var. lindheimeri*), pencil cactus (*Cylindropuntia leptocaulis*), lemon bee balm (*Monarda citriodora*), and plains coreopsis (*Coreopsis tinctoria*). Because the mesquite grassland mosaic was dominated by facultative upland vegetation, soils and hydrology were not documented at data points within this community.

Mesquite Woods

The mesquite woods community typically occurred within transition areas between the mesquite grassland mosaic and post oak or cedar elm woods. Generally, species composition was similar to the mesquite grassland mosaic, with larger mesquites, post oak, cedar elm, and hackberry comprising a sparse canopy layer. Because the mesquite woods community was dominated by facultative upland vegetation, soils and hydrology were not documented at data points within this community.

Sumpweed Depressions

The sumpweed depressions vegetation community was typically observed within terraced areas of the mesquite grassland mosaic landscape. These communities were very distinct from the surrounding vegetation and represented clear shift in local hydrology. Due to their geomorphic position, and the presence of moderately slow draining soils, these depressions appeared to experience shallow inundation with frequency and duration sufficient to support hydrophytic vegetation in a landscape otherwise dominated by upland species. A pronounced shift in vegetation was observed at each depression and, in conjunction with presence or absence of soil and hydrology indicators, was utilized to delineate the wetland/non-wetland boundary. Dominant herbaceous vegetation within the sumpweed depressions community included sumpweed (*Iva annua*), common spikerush (*Eleocharis palustris*), shortbeak sedge (*Carex brevior*), giant ragweed (*Ambrosia trifida*), savannah panicgrass (*Phanopyrum gymnocarpon*), and lanceleaf frogfruit (*Phyla lanceolata*). Tree canopy was absent from this community, as

woody vegetation was limited to mesquite, agarita, and Texas persimmon located at the edges of the depressions in the mesquite grassland mosaic community.

Soils observed within the sumpweed depressions community were relatively homogenous and consisted of a shallow layer (4 to 8 inches thick) of black clay, atop a hard layer of dense cobble and claypan. Though matrix color and texture were consistent with the surrounding upland soils, discernible redoximorphic features were observed within each of the sumpweed depressions. The most common hydric soil indicator observed within these soils was F6-Redox Dark Surface. Other hydric soils observed included F3-Depleted Matrix and F7-Depleted Dark Surface.

Wetland hydrology indicators observed within the sumpweed depressions community included D2-Geomorphic Position, C9-Saturation Visible on Aerial Imagery (see 1996 CIR aerial photography), and C3-Oxidized Rhizospheres on Living Roots. The presence or absence of the C3-Oxidized Rhizospheres on Living Roots indicator was frequently used to determine the wetland/non-wetland boundary. See **Table 6** below for a summary of the emergent wetlands that were mapped within the sumpweed depressions vegetation community.

Table 6 - Summary of Emergent Wetlands in Sumpweed Depressions

Name	Figure Location	Data Point	Type	Area (Acres)
EW-21	3.2	T1-DP1	Emergent Wetland (Sumpweed Depressions)	0.07
EW-22	3.2	T1-DP2	Emergent Wetland (Sumpweed Depressions)	0.02
EW-23	3.1	T3-DP3	Emergent Wetland (Sumpweed Depressions)	0.03
EW-24	3.1	T3-DP4	Emergent Wetland (Sumpweed Depressions)	0.09
EW-25	3.1	T3-DP5	Emergent Wetland (Sumpweed Depressions)	0.04
EW-26	3.1	T3-DP6	Emergent Wetland (Sumpweed Depressions)	0.08
EW-27	3.1	T3-DP7	Emergent Wetland (Sumpweed Depressions)	0.03
EW-28	3.1	T4-DP7	Emergent Wetland (Sumpweed Depressions)	0.02
EW-29	3.1	T4-DP8	Emergent Wetland (Sumpweed Depressions)	0.02
EW-30	3.1	T4-DP10	Emergent Wetland (Sumpweed Depressions)	0.02
EW-31	3.1	T4-DP11	Emergent Wetland (Sumpweed Depressions)	0.02
EW-32	3.1	T4-DP12	Emergent Wetland (Sumpweed Depressions)	0.04
EW-33	3.1	T6-DP2	Emergent Wetland (Sumpweed Depressions)	0.05

Post Oak/Cedar Elm Woods

The majority of the western portion of the study area was comprised of the post oak and cedar elm woods vegetation community. This community was dominated by post oak and cedar elm in the canopy layer, and mesquite, agarita, Texas persimmon, yaupon holly (*Ilex vomitoria*),

deciduous holly (*Ilex decidua*), and hackberry in the understory layer. Herbaceous vegetation observed within this community included slimleaf panicgrass (*Dicanthelium linearifolium*), wild oat (*Avena fatua*), Virginia wildrye (*Elymus virginicus*), pencil cactus, Texas prickly pear, Texas wintergrass, pink thoroughwort (*Eupatorium incarnatum*), and perennial ryegrass (*Lolium perenne*). Because the post oak and cedar elm woods vegetation community was dominated by facultative upland vegetation, soils and hydrology were not documented at data points within this community.

Riparian Woods

The riparian woods vegetation complex occurred along the riparian corridors of the intermittent and ephemeral streams within the study area. Two distinct riparian vegetation communities were observed within this complex. The first community occurred at higher elevations, along ephemeral streams, and along the upper reaches of intermittent streams. This community was dominated by cedar elm, post oak, hackberry, and live oak (*Quercus virginiana*) in the canopy layer, and mesquite, littlehip hawthorn (*Crataegus spathulata*), chittamwood (*Bumelia lanuginosa*), and yaupon holly in the understory layer. Herbaceous vegetation in this community was generally sparse and dominant species included giant ragweed (*Ambrosia trifida*), Virginia wildrye, pencil cactus, blackeyed susan (*Rudbeckia hirta*), Texas wintergrass, prairie croton (*Croton monanthogynus*), pink thoroughwort, ironweed (*Vernonia baldwinii*), itchgrass (*Rottboellia cochichenensis*), and lean flatsedge (*Cyperus setigerus*).

The second vegetation community in the riparian woods complex occurred at lower elevations along the stream corridor of the two primary drainages within the study area. Dominant woody vegetation within this community included hackberry, green ash, pecan, and cedar elm. Herbaceous vegetation in this community was generally sparse and dominant species included Virginia wildrye and giant ragweed.

While hydric soil and wetland hydrology indicators were observed within portions of the riparian woods complex within the study area, they were typically accompanied by a transition in dominant vegetation and located in topographical depressions. Therefore, wetland features that occurred within the vicinity of the riparian woods complex were categorized according to the shift in vegetation community and topography, and the soil and hydrology characteristics are described within the context of the forested wetland community.

Floodplain Meadows

The floodplain meadows vegetation complex occurred along the floodplain of Dry Creek in the eastern portion of the study area. This complex was dominated by herbaceous vegetation and was bordered by riparian forest along the stream corridor and the mesquite grassland mosaic in the adjacent uplands. Woody vegetation was mostly absent within this community and was limited to patches of southern dewberry (*Rubus trivialis*) and scattered cedar elm and bois d' arc (*Maclura pomifera*). Dominant herbaceous vegetation included Virginia wildrye, common ragweed (*Ambrosia artemisifolia*), giant ragweed, ironweed, bermudagrass (*Cynodon dactylon*), shortbeak sedge, buffalograss (*Buchloe dactyloides*), Carolina canarygrass (*Phalaris caroliniana*), annual canarygrass (*Phalaris canariensis*), and rough cocklebur (*Xanthium strumarium*).

Within this complex, emergent wetland communities were encountered within topographic depressions. Dominant vegetation in these communities included the aforementioned species along the fringe and topographic transitions, and emergent wetland communities in the interior of the depressions. Species observed in the emergent communities within this complex included flat-stemmed spike rush (*Eleocharis compressa*), lanceleaf frogfruit, common spikerush, and common carpetgrass (*Axonopus fissifolius*).

Soils within the floodplain meadows complex were comprised of very dense, dark brown clay. Within the topographic depressions hydric soil indicators F3-Depleted Matrix and F-6 Redox Dark Surface were observed. Wetland hydrology indicators for the emergent wetland features observed within this complex included C3-Oxidized Rhizospheres on Living Roots, B7-Inundation Visible on Aerial Imagery, C9-Saturation Visible on Aerial Imagery, and D2-Geomorphic Position. See **Table 7** below for a summary of the emergent wetland features mapped within the floodplain meadows vegetation complex.

Table 7 - Summary of Emergent Wetlands in Floodplain Meadows

Name	Figure Location	Data Point	Type	Area (Acres)
EW-16	3.4	T11-DP3	Emergent Wetland (Floodplain Meadows)	0.11
EW-17	3.4	T11-DP2	Emergent Wetland (Floodplain Meadows)	0.23
EW-18	3.4	T9-DP10	Emergent Wetland (Floodplain Meadows)	0.13

Forested Wetlands

Forested wetlands within the study area generally occurred at lower elevations, within the floodplain of the two primary drainages (Dry Creek and IS-1), and near the shoreline of the large lake (OW-1) in the southern portion of the study area. The vegetation observed was similar to that of the riparian woods vegetation complex, but was accompanied by hydric soil and wetland hydrology indicators. Dominant woody species included green ash, black willow (*Salix nigra*), cedar elm, hackberry, and Chinese tallow (*Triadica sebifera*). Herbaceous vegetation was sparse within this community and dominant species included giant ragweed, sumpweed, balloonvine (*Cardiospermum halicacabum*), and bentawn flatsedge (*Cyperus reflexus*).

Soils within the forested wetlands were comprised of very dense, dark brown clay. Hydric soil indicators observed included F6-Redox Dark Surface and F7-Depleted Dark Surface. Wetland hydrology indicators included B1-Water Marks, B3-Drift Deposits, C3-Oxidized Rhizospheres on Living Roots, B6-Surface Soil Cracks, B8-Sparsely Vegetated Concave Surface, B10-Drainage Patterns, and D2-Geomorphic Position. See **Table 8** for a summary of mapped forested wetlands within the study area.

Table 8 - Summary of Forested Wetlands

Name	Figure Location	Data Point	Type	Area (Acres)
FW-1	3.4	T15-DP6	Forested Wetland	0.40
FW-2	3.4	T15-DP7	Forested Wetland	0.16
FW-3	3.4	T15-DP9	Forested Wetland	0.13
FW-4	3.4	T15-DP8	Forested Wetland	0.07
FW-5	3.4	T14-DP12	Forested Wetland	0.10
FW-6	3.2	T8-DP4	Forested Wetland	0.15
FW-7	3.2	T8-DP5	Forested Wetland	0.03
FW-8	3.5	T27-DP3	Forested Wetland	0.20

Other Emergent Wetlands

In addition to the previously discussed sumpweed depressions emergent wetland community and the floodplain meadows emergent wetland communities, several other distinct emergent communities were observed within the study area. These communities included lacustrine fringe emergent wetlands surrounding OW-1, pond fringe emergent wetlands surrounding many of the upland stock ponds, and various other emergent wetland communities that did not fit into any of the aforementioned categories.

The lacustrine fringe emergent community was observed along the perimeter of OW-1 in the southern portion of the study area. Woody vegetation was mostly absent from this community with the exception of scattered sesbania (*Sesbania drummondii*). Dominant herbaceous vegetation included common spikerush, Engelman's spikerush (*Eleocharis engelmannii*), Pennsylvania smartweed (*Persicaria pennsylvanicum*), upright burhead (*Echinodorus berteroi*), broadleaf arrowhead (*Sagittaria latifolia*), squarestem spikerush (*Eleocharis quadrangulata*), and water-clover (*Marsilea vestita*).

Soils within the lacustrine fringe emergent wetland community were comprised of very dense, dark brown clay. F6-Redox Dark Surface was the only hydric soil indicator observed within this community. Wetland hydrology indicators observed within this community included C3-Oxidized Rhizospheres on Living Roots, B8-Sparsely Vegetated Concave Surface, C9-Saturation Visible on Aerial Imagery, D2-Geomorphic Position, and D5-FAC-Neutral Test.

The pond fringe emergent wetland community was observed along the perimeter of many of the stock ponds within the study area. These wetlands are heavily affected by the variable water levels within the ponds and may vary significantly in size and species composition depending on seasonal climatic conditions. Woody vegetation was mostly absent from these communities and was limited to scattered sesbania and occasional upland species (hackberry, cedar elm, mesquite) at the wetland/non-wetland boundary. Dominant herbaceous vegetation included flat-stemmed spikerush, manyspike flatsedge (*Cyperus polystachyos*), knotgrass (*Paspalum distichum*), Engelman's spikerush, camphor pluchea (*Pluchea camphorata*), and water-pepper (*Persicaria hydropiper*).

Soils within the pond fringe emergent wetland community were comprised of very dense, dark brown clay, and at some data points, depleted, light gray, dense clay. Hydric soil indicators observed within this community included F3-Depleted Matrix, F2-Loamy Gleyed Matrix, and F6-Redox Dark Surface. Wetland hydrology indicators observed included A1-Surface Water, A3-Saturation, B7-Inundation Visible on Aerial Imagery, C3-Oxidized Rhizospheres on Living Roots, B6-Surface Soil Cracks, C8-Crayfish Burrows, C9-Saturation Visible on Aerial Imagery, and D2-Geomorphic Position.

Other emergent wetland communities observed within the study area included depressions along drainages, dry stock ponds, and in-channel portions of ephemeral streams that did not

exhibit an ordinary high water mark. Vegetation in these communities was similar to vegetation observed in other emergent wetlands within the study area. Dominant species included cedar elm, green ash, and black willow scrub at the fringe of the emergent wetlands, and swamp smartweed (*Persicaria hydropiperoides*), flat-stemmed spikerush, spotted lady's-thumb (*Persicaria maculosa*), shortbeak sedge, Engleman's spikerush, common spikerush, Pennsylvania smartweed, manyspike flatsedge, and needle spikerush (*Eleocharis acicularis*) in the herbaceous layer.

Soils within these emergent wetlands were composed of very dense, dark brown clay, and at some data points, depleted, light gray, dense clay. Hydric soil indicators observed within this community included F3-Depleted Matrix and F6-Redox Dark Surface. Wetland hydrology indicators observed included B1-Water Marks, C3-Oxidized Rhizospheres on Living Roots, B6-Surface Soil Cracks, B8-Sparsely Vegetated Concave Surface, B10-Drainage Patterns, and D2-Geomorphic Position. See **Table 9** below for a summary of the mapped emergent wetlands that were encountered in these communities.

Table 9 - Summary of Other Emergent Wetlands

Name	Figure Location	Data Point	Type	Area (Acres)
EW-1	3.6	T16-DP11	Emergent Wetland (Lacustrine Fringe)	0.04
EW-2	3.4	T15-DP1	Emergent Wetland (Lacustrine Fringe)	0.62
EW-3	3.4	T14-DP1	Emergent Wetland (Pond Fringe)	0.18
EW-4	3.4	T14-DP4	Emergent Wetland (Lacustrine Fringe)	1.71
EW-5	3.4	T15-DP5	Emergent Wetland (Lacustrine Fringe)	1.63
EW-6	3.4	T15-DP7	Emergent Wetland (Lacustrine Fringe)	0.38
EW-7	3.4	T14-DP10	Emergent Wetland (Lacustrine Fringe) / Upland Complex	2.10
EW-8	3.4	T15-DP9	Emergent Wetland (Lacustrine Fringe)	1.18
EW-9	3.4	T15-DP10	Emergent Wetland (Lacustrine Fringe)	0.21
EW-10	3.4	T16-DP8	Emergent Wetland (Lacustrine Fringe)	0.11
EW-11	3.4	T16-DP8	Emergent Wetland (Lacustrine Fringe)	0.37
EW-12	3.6	T16-DP9	Emergent Wetland (Lacustrine Fringe)	0.04
EW-13	3.6	T16-DP10	Emergent Wetland (Lacustrine Fringe)	0.37
EW-14	3.4	T15-DP11	Emergent Wetland (Pond Fringe)	0.06
EW-15	3.4	T13-DP1	Emergent Wetland (On-Channel)	0.17
EW-19	3.4	T11-DP4	Emergent Wetland (Dry Pond)	0.11
EW-20	3.2	T4-DP16	Emergent Wetland (Pond Fringe)	0.24
EW-34	3.3	T9-DP5	Emergent Wetland (Pond Fringe)	0.08
EW-35	3.3	T9-DP6	Emergent Wetland (Depressions)	0.03
EW-36	3.3	T9-DP2	Emergent Wetland (Depressions)	0.01
EW-37	3.3	T9-DP3	Emergent Wetland (On-Channel)	0.14
EW-38	3.1	T19-DP1	Emergent Wetland (On-Channel)	0.21
EW-39	3.3	T20-DP3	Emergent Wetland (On-Channel)	0.13
EW-40	3.3	T20-DP2	Emergent Wetland (Pond Fringe)	0.16
EW-41	3.6	T16-DP4	Emergent Wetland (Depressions)	0.03
EW-42	3.6	T16-DP3	Emergent Wetland (Depressions)	0.26
EW-43	3.5	T27-DP2	Emergent Wetland (Depressions)	0.07
EW-44	3.5	T27-DP1	Emergent Wetland (Depressions)	0.33
EW-45	3.5	T26-DP2	Emergent Wetland (On-Channel)	0.16
EW-46	3.5	T26-DP1	Emergent Wetland (Pond Fringe)	0.16

Scrub/Shrub Wetlands

The scrub/shrub wetland community was observed at four locations around the perimeter of OW-1 in the southern portion of the study area. Dominant vegetation included sesbania, green ash and cedar elm saplings, as well as common spikerush, Engleman's spikerush, and sumpweed in the herbaceous layer.

Soils within these wetlands were comprised of very dense, dark brown clay, and at some data points, depleted, light gray, dense clay. Hydric soil indicators observed within this community included F3-Depleted Matrix and F6-Redox Dark Surface. Wetland hydrology indicators observed included C3-Oxidized Rhizospheres on Living Roots, C9-Saturation Visible on Aerial

Imagery, D2-Geomorphic Position, and D5-FAC-Neutral Test. See **Table 10** below for a summary of the mapped scrub/shrub wetlands encountered within the study area.

Table 10 - Summary of the Scrub/Shrub Wetlands

Name	Figure Location	Data Point	Type	Area (Acres)
SSW-1	3.6	T16-DP11	Scrub/Shrub Wetland	0.01
SSW-2	3.6	T16-DP9a	Scrub/Shrub Wetland	0.16
SSW-3	3.4	T16-DP9b	Scrub/Shrub Wetland	0.22
SSW-4	3.4	T14-DP6	Scrub/Shrub Wetland	0.55

4.0 CONCLUSION

Federal regulations (33 CFR § 328.3(a)) define waters of the United States to include intrastate rivers and streams, including impoundments and other waters. In response to a Supreme Court decision (Rapanos v. U.S., 547 *S. Ct.* 715 [2006]) addressing the limits of federal jurisdiction, the USACE and Environmental Protection Agency (EPA) have issued further guidance, and require additional documentation to support jurisdiction. The USACE continues to assert jurisdiction over traditionally navigable waters and non-navigable tributaries of traditionally navigable waters where the tributaries are relatively permanent waters (i.e., tributaries that typically flow year round or have continuous flow at least seasonally). All streams in the study area are tributaries of Dry Creek which is part of the Guadalupe River (a traditionally navigable water) tributary system. Field and photographic evidence supports that Dry Creek and the intermittent tributary on the western half of the study area (IS-1) are both relatively permanent water features, that as a tributary of a navigable water would be considered waters of the United States.

Further evaluation of water features is provided below to support conclusions of jurisdictional status for the remainder of the aquatic features in the study area. The current USACE guidelines require a jurisdictional evaluation to determine if the features have a significant nexus to traditionally navigable waters for: (1) waterbodies and tributaries that are not relatively permanent waters, including adjacent wetlands if present; and, (2) wetlands adjacent to, but not directly abutting, a relatively permanent tributary. A significant nexus exists if the feature has more than a speculative or insubstantial effect on the chemical, physical, and/or biological

integrity of a traditionally navigable water. Establishment of a significant nexus is necessary to establish jurisdiction as a water of the United States.

As non-permanent waters, all ephemeral streams in the study area require a significant nexus determination. As demonstrated herein, portions of the study area have been modified in the past and are dominated by dense invasive tree and shrub growth. However, the ephemeral streams and associated riparian areas by comparison have remained relatively undisturbed. The byproduct is a natural stratification between the herbaceous, shrub, and tree layers which allows for distinct corridors that are important as forested connectors between habitats for wildlife. On some portions of the study area, riparian corridors provide substantial edge at the interface between stream channel and riparian vegetation and at the transition from natural woodland communities to invasive upland plant communities. The interface is of great value to wildlife because both density and diversity of species tend to be higher at this ecotone than in adjacent uplands. Field observations of wildlife (e.g., deer, coyote, feral hogs) support these notions, as most wildlife observed during the field investigation was in close association with these riparian corridors. Additionally, sediment carried by overland flow from adjacent uplands is generally intercepted by the riparian area, where it settles out. Nutrients that could be transported with sediment, as may be expected in areas where cattle or wildlife concentrate, would also be trapped in the riparian area. These would then be broken down by physical or biochemical processes, and reduced to harmless forms. In sum, Halff believes that all ephemeral tributaries have more than a speculative effect on the chemical, physical, and/or biological integrity of the Dry Creek tributary system, and in turn, the eventual receiving navigable water. Halff believes that all ephemeral streams in the study area would be considered waters of the United States.

The USACE Fort Worth District interpretation of "adjacent" generally begins with aquatic features located within the 100-year floodplain (referred to as "1% annual chance flood hazard zone" on **Figure A-6**). The majority of the mapped wetland features are located within the 100-year floodplain of Dry Creek, IS-1, and its tributaries, and each feature would be considered an adjacent wetland. As noted above, wetlands adjacent to a relatively permanent tributary or other previously defined water of the United States, require a determination of significant nexus to establish jurisdiction. An argument for significant nexus can be made for these features in that they function in the same manner as the previously described riparian corridors. In sum, these features would be considered waters of the United States.

In contrast, several wetland features are located well beyond the mapped floodplains displayed on **Figure A-6**. All of these appear to be the result of man-made modifications and would otherwise be expected to absent in the landscape at their locations. These are listed as follows:

- EW-21
- EW-22
- EW-23
- EW-24
- EW-25
- EW-26
- EW-27
- EW-28
- EW-29
- EW-30
- EW-31
- EW-32
- EW-33

Features EW-21 and EW-22 are located in the far northeastern corner of the study area, both of which appear to be excavated, perhaps as past stock ponds, or to facilitate drainage from the interior access road. Both of these features are near the peak of the local drainage basin, and are likely never sufficiently full to overflow from their depressions. Features EW-23 through EW-33 are the result of terracing along a natural slope. Given the discontinuous nature of the mapped wetlands, it is reasonable to conclude that none of the features are sufficiently full to overflow to even the next terrace. An inspection of the adjacent landscape did not show any evidence suggesting that these features would be connected to any tributary by surface flow, even during the wettest of conditions. In sum, a case can be made that these features are isolated. Isolated aquatic features the degradation or destruction of which could affect interstate trade or commerce, are still regulated under CFR § 328.3(a)(3). However, given the remote location of and restricted access to these features, it is unlikely these features would meet these regulatory criteria and it is Halff's opinion that they should not be considered waters of the United States.

Open water classifications continue to be regulated under 33 CFR § 328.3(a)(4), which states that waters of the United States include "all impoundments of waters otherwise defined as waters of the United States" under 33 CFR § 328.3(a)(1)-(3). Review of available background information from USGS quadrangle maps, soil survey maps, and historical aerial photographs supports a conclusion that most features were constructed as an impoundment of the surface tributary system. As these impoundments are considered waters of the United States, the wetland classifications associated with the littoral fringes from these impoundments would also be considered waters of the United States under 33 CFR § 328.3(a)(7) which includes abutting

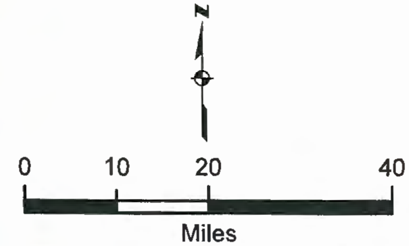
(i.e. adjacent) wetlands of other defined waters within the definition of waters of the United States.

For features OW-4, OW-5, and OW-8, historical data suggest no association with a past tributary system, and it is unclear from any data whether or not vegetated swales in the vicinity of these features ever had a discernible OHWM to establish regulatory jurisdiction. Moreover, no discernible OHWM, or vegetated swale meeting wetland criteria, is present today to sufficiently satisfy the definition of waters of the United States under 33 CFR § 328.3(a)(4). In sum, these remaining open water features on the study area are not considered impoundments of the current surface tributary system and rather appear to have been excavated to capture and retain surface runoff for livestock use. As these features are not on-channel impoundments, they are typically not regulated by the USACE Fort Worth District, and it is Halff's opinion that they should not be considered waters of the United States. The wetland fringes mapped with these features (EW-20, EW-34, and EW-35) are interim conditions that are present as the result of drawdown conditions of each impoundment. As a condition of a non-regulated impoundment, the USACE Fort Worth District does not consider these features waters of the United States.

Feature EW-19 is an interim condition which is likely an open water habitat for the greater part of the year. Excavated and constructed as an impoundment for livestock, the feature also appears to be constructed in the absence of any mapped tributary (i.e. off-channel). As an off-channel impoundment intended for watering livestock, Halff believes that EW-19 should not be considered a water of the United States under 33 CFR § 328.3(a)(4), and as an interim condition, should not be separately evaluated and considered a jurisdictional wetland.

Based on the foregoing descriptions and analyses, **Appendix C** summarizes the classification, proposed jurisdictional determination, and physical characteristics for mapped water features in the study area (shown in **Figures 3.1** through **3.6**).

FIGURES



Legend

Study Area

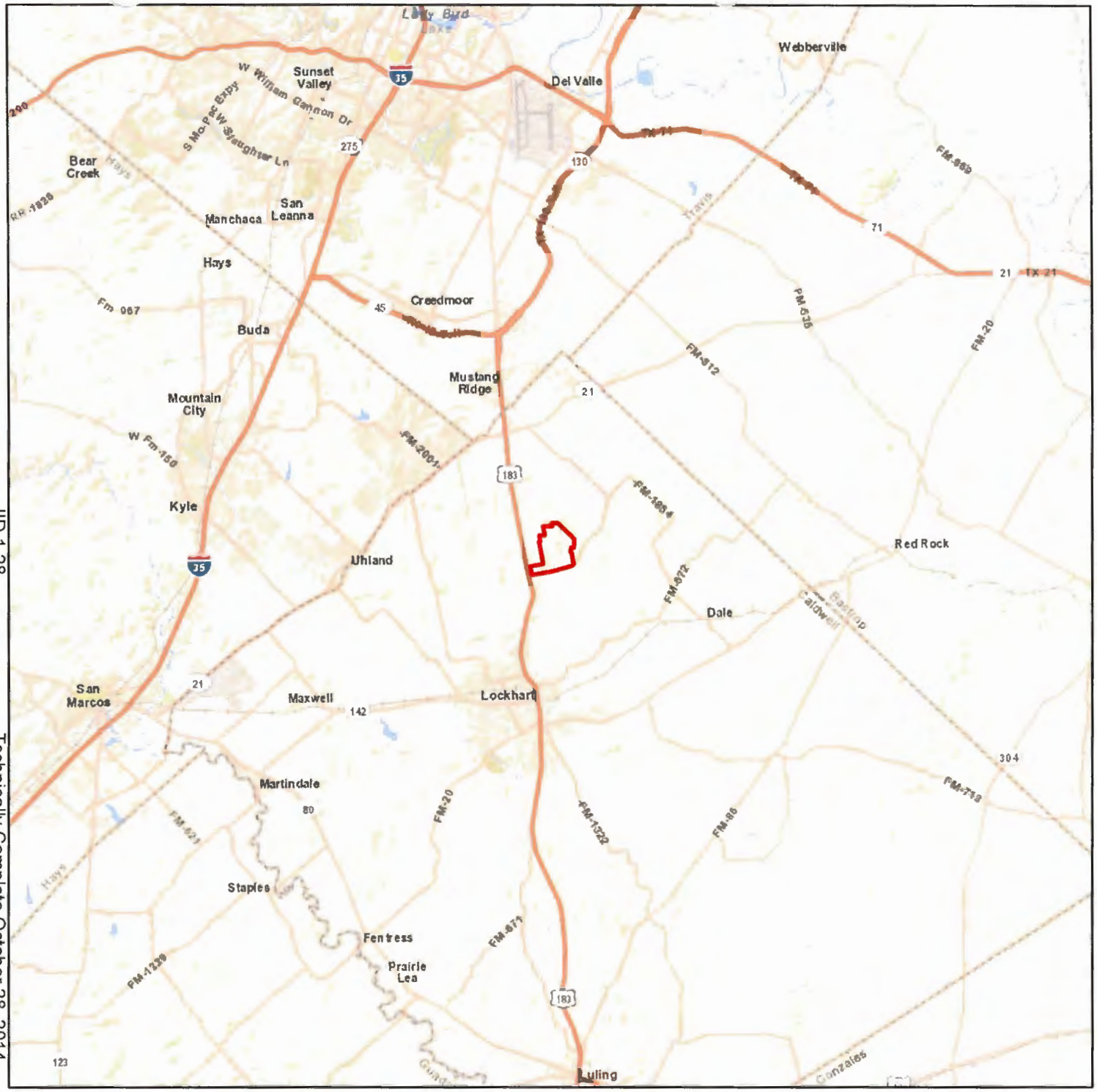
Notes:
1. Source/Year of Base Map: ESRI, World Street Map/2013
2.
3.
4.
5.

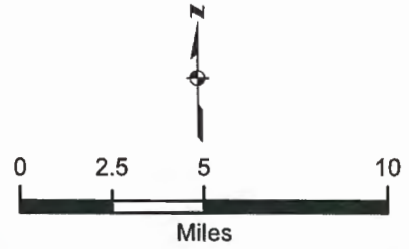
Project Title: 130 ENVIRONMENTAL PARK	
Project Number: <USACE #>	
Date: 08/2013	AVO: 29520
Sheet Title: PROJECT LOCATION MAP	
Sheet Number: FIGURE 1	

HALFF

IID.1-27

Technically Complete October 28, 2014





Legend

Study Area

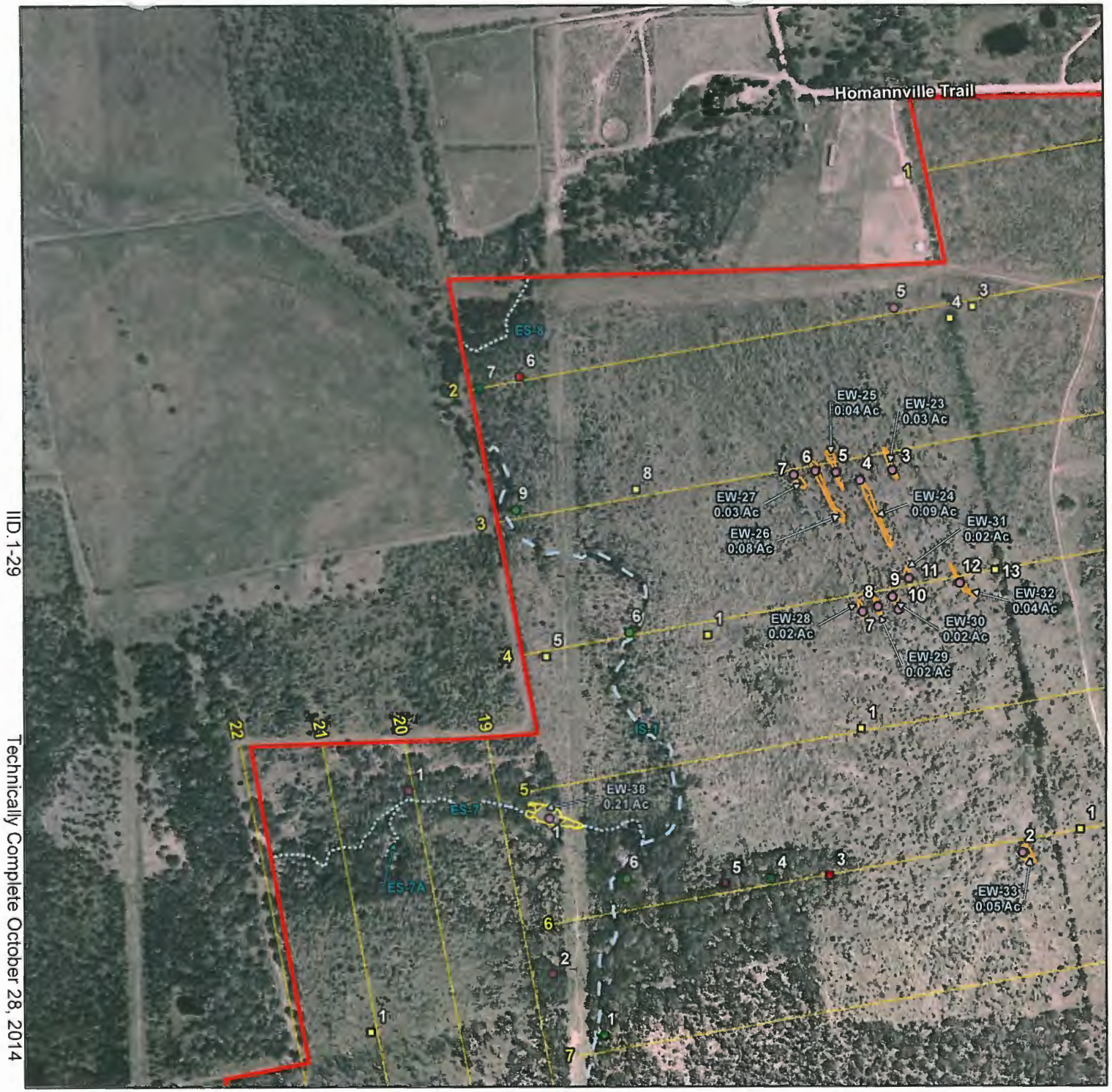
Notes:
1. Source/Year of Base Map: ESRI, World Street Map Service/2013
2.
3.
4.
5.

Project Title: 130 ENVIRONMENTAL PARK	
Project Number: <USACE #>	
Date: 08/2013	AVO: 29520
Sheet Title: PROJECT VICINITY MAP	
Sheet Number: FIGURE 2	

HALFF

IID.1-28

Technically Complete October 28, 2014



N

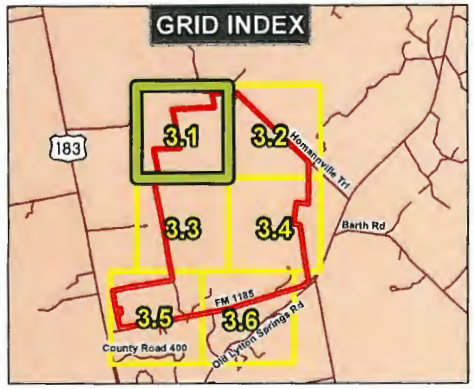
0 250 500 1,000

Feet

Legend

- Study Area
- Transects
- Intermittent Stream (water of the US)
- Ephemeral Stream (water of the US)
- Emergent Wetland (water of the US)
- Forested Wetland (water of the US)
- Scrub Shrub Wetland (water of the US)
- Open Water (water of the US)
- Open Water (non-water of the US)
- Emergent Wetland (non-water of the US)

Aerial photo from Dallas Aerial Service flown May 13, 2013



Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 08/2013 AVO: 29520
Sheet Title: WATERS OF THE UNITED STATES MAP
Sheet Number: FIGURE - 3.1

HALFF

IID.1-29

Technically Complete October 28, 2014

IID.1-30

Technically Complete October 28, 2014

N

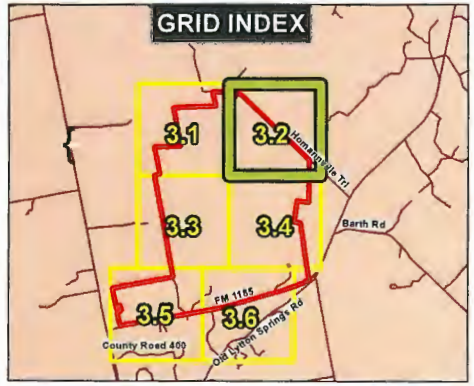
0 250 500 1,000

Feet

Legend

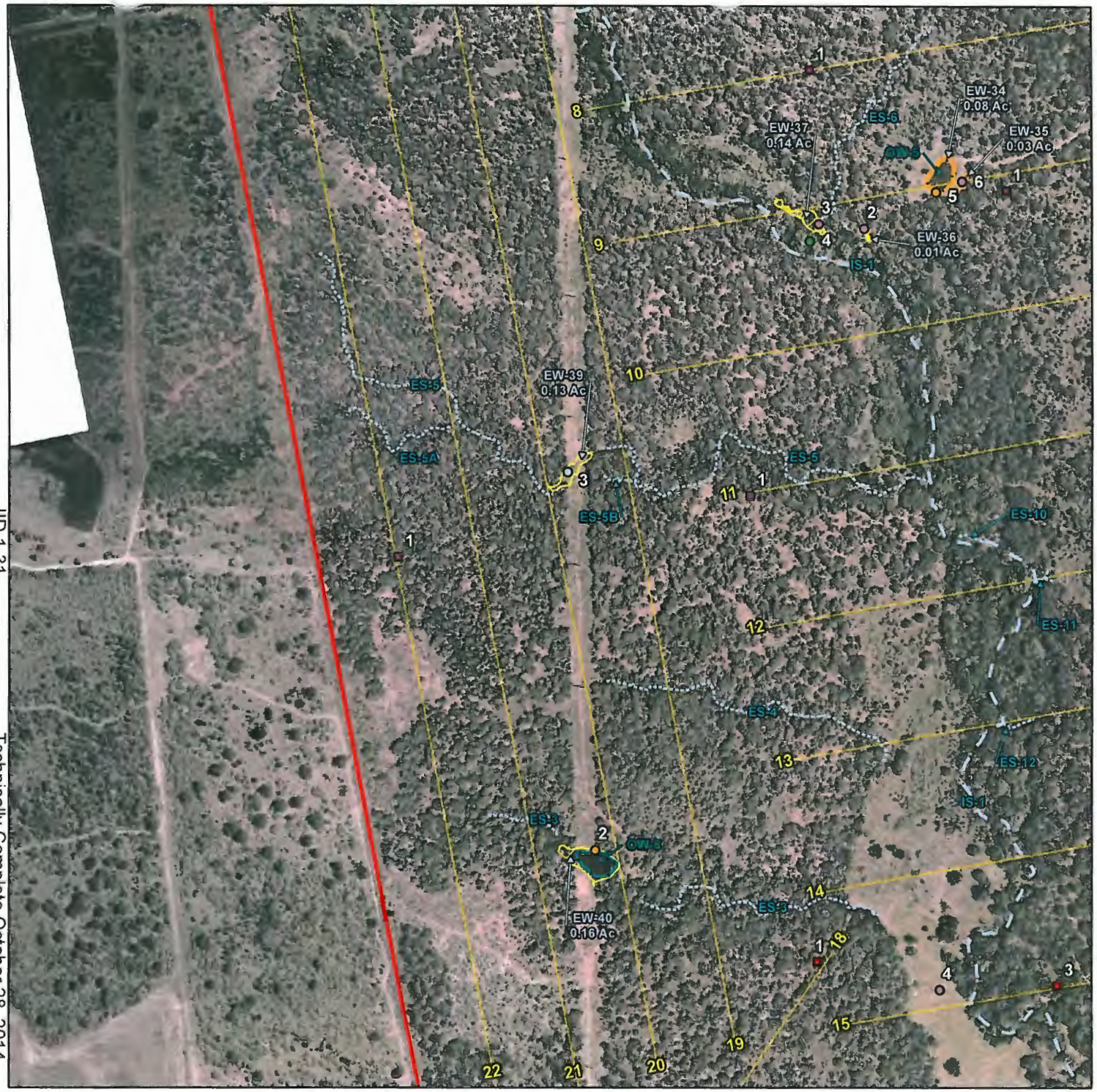
- Study Area
- Transects
- Intermittent Stream (water of the US)
- Ephemeral Stream (water of the US)
- Emergent Wetland (water of the US)
- Forested Wetland (water of the US)
- Scrub Shrub Wetland (water of the US)
- Open Water (water of the US)
- Open Water (non-water of the US)
- Emergent Wetland (non-water of the US)

Aerial photo from Dallas Aerial Service flown May 13, 2013



Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 08/2013 AVO: 29520
Sheet Title: WATERS OF THE UNITED STATES MAP
Sheet Number: FIGURE - 3.2

HALFF



N

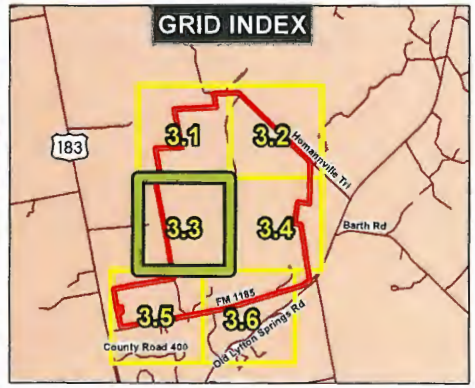
0 250 500 1,000

Feet

Legend

- Study Area
- Transects
- Intermittent Stream (water of the US)
- Ephemeral Stream (water of the US)
- Emergent Wetland (water of the US)
- Forested Wetland (water of the US)
- Scrub Shrub Wetland (water of the US)
- Open Water (water of the US)
- Open Water (non-water of the US)
- Emergent Wetland (non-water of the US)

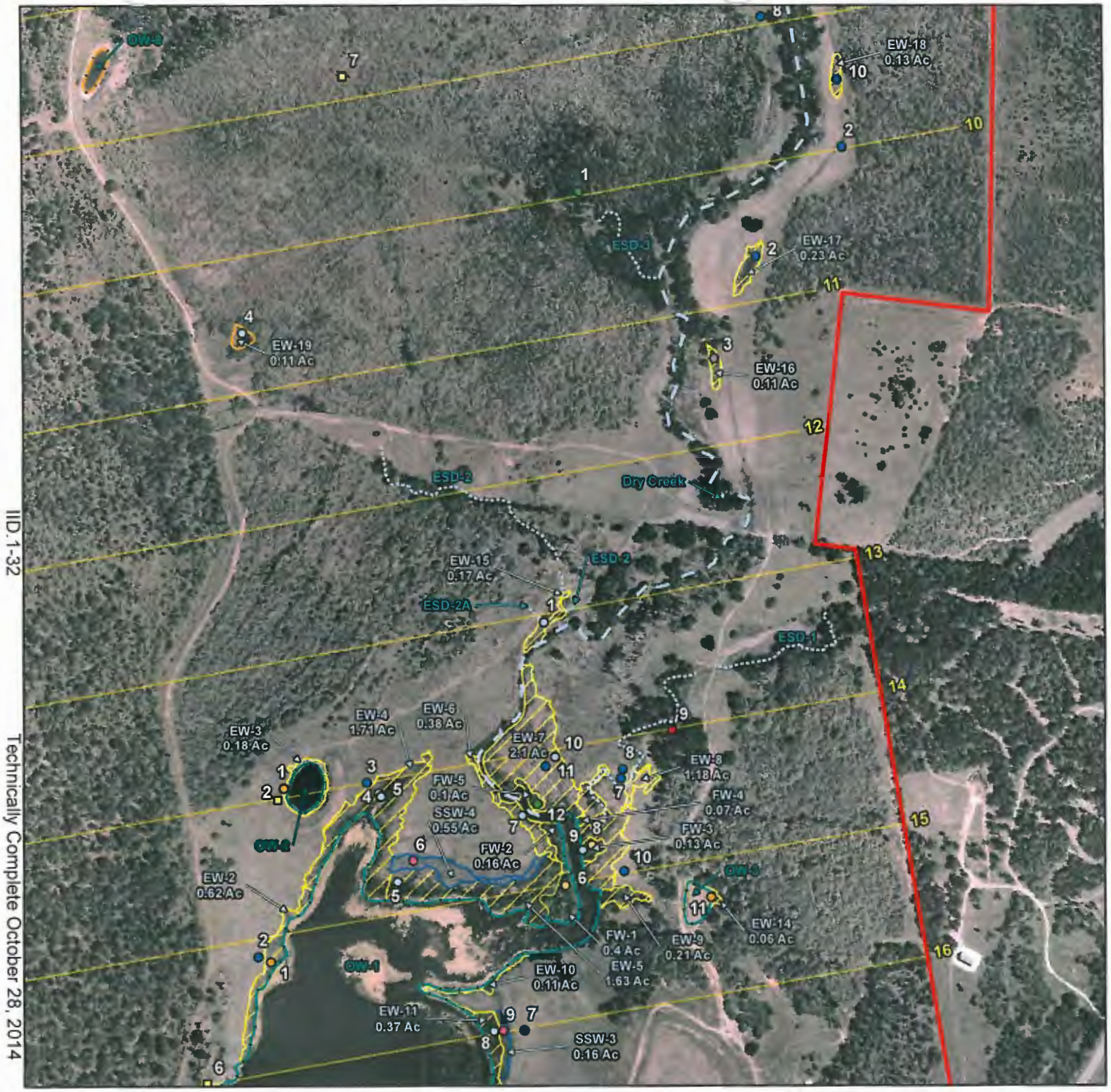
Aerial photo from Dallas Aerial Service flown May 13, 2013



Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 08/2013 AVO: 29520
Sheet Title: WATERS OF THE UNITED STATES MAP
Sheet Number: FIGURE - 3.3

HALFF

Technically Complete October 28, 2014



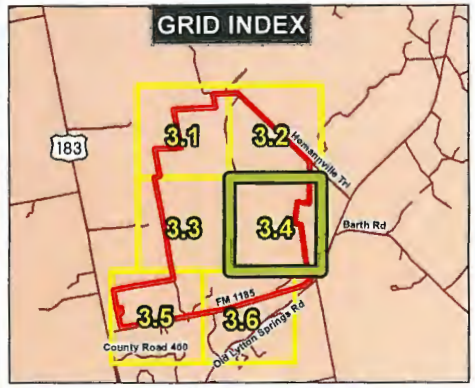
0 250 500 1,000

Feet

Legend

- Study Area
- Transects
- Intermittent Stream (water of the US)
- Ephemeral Stream (water of the US)
- Emergent Wetland (water of the US)
- Forested Wetland (water of the US)
- Scrub Shrub Wetland (water of the US)
- Open Water (water of the US)
- Open Water (non-water of the US)
- Emergent Wetland (non-water of the US)

Aerial photo from Dallas Aerial Service flown May 13, 2013



Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 08/2013 AVO: 29520
Sheet Title: WATERS OF THE UNITED STATES MAP
Sheet Number: FIGURE - 3.4
HALFF

IID.1-32

Technically Complete October 28, 2014

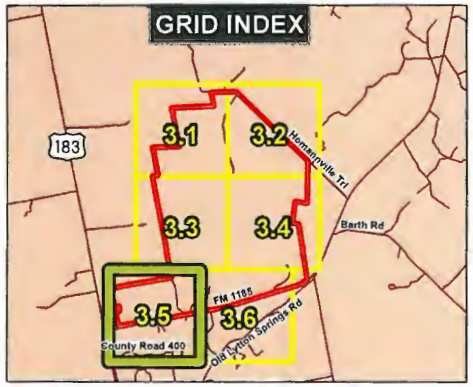
0 250 500 1,000

Feet

Legend

- Study Area
- Transects
- Intermittent Stream (water of the US)
- Ephemeral Stream (water of the US)
- Emergent Wetland (water of the US)
- Forested Wetland (water of the US)
- Scrub Shrub Wetland (water of the US)
- Open Water (water of the US)
- Open Water (non-water of the US)
- Emergent Wetland (non-water of the US)

Aerial photo from Dallas Aerial Service flown May 13, 2013



Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 08/2013 AVO: 29520
Sheet Title: WATERS OF THE UNITED STATES MAP
Sheet Number: FIGURE - 3.5
HALFF

IID.1-33 Technically Complete October 28, 2014

N

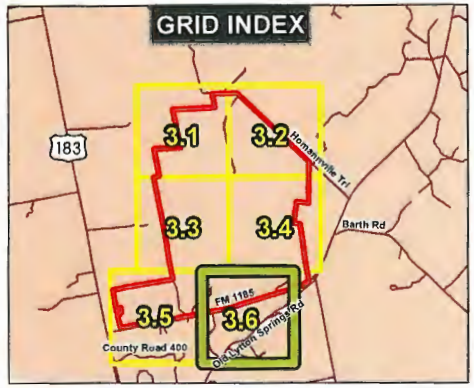
0 250 500 1,000

Feet

Legend

- Study Area
- Transects
- Intermittent Stream (water of the US)
- Ephemeral Stream (water of the US)
- Emergent Wetland (water of the US)
- Forested Wetland (water of the US)
- Scrub Shrub Wetland (water of the US)
- Open Water (water of the US)
- Open Water (non-water of the US)
- Emergent Wetland (non-water of the US)

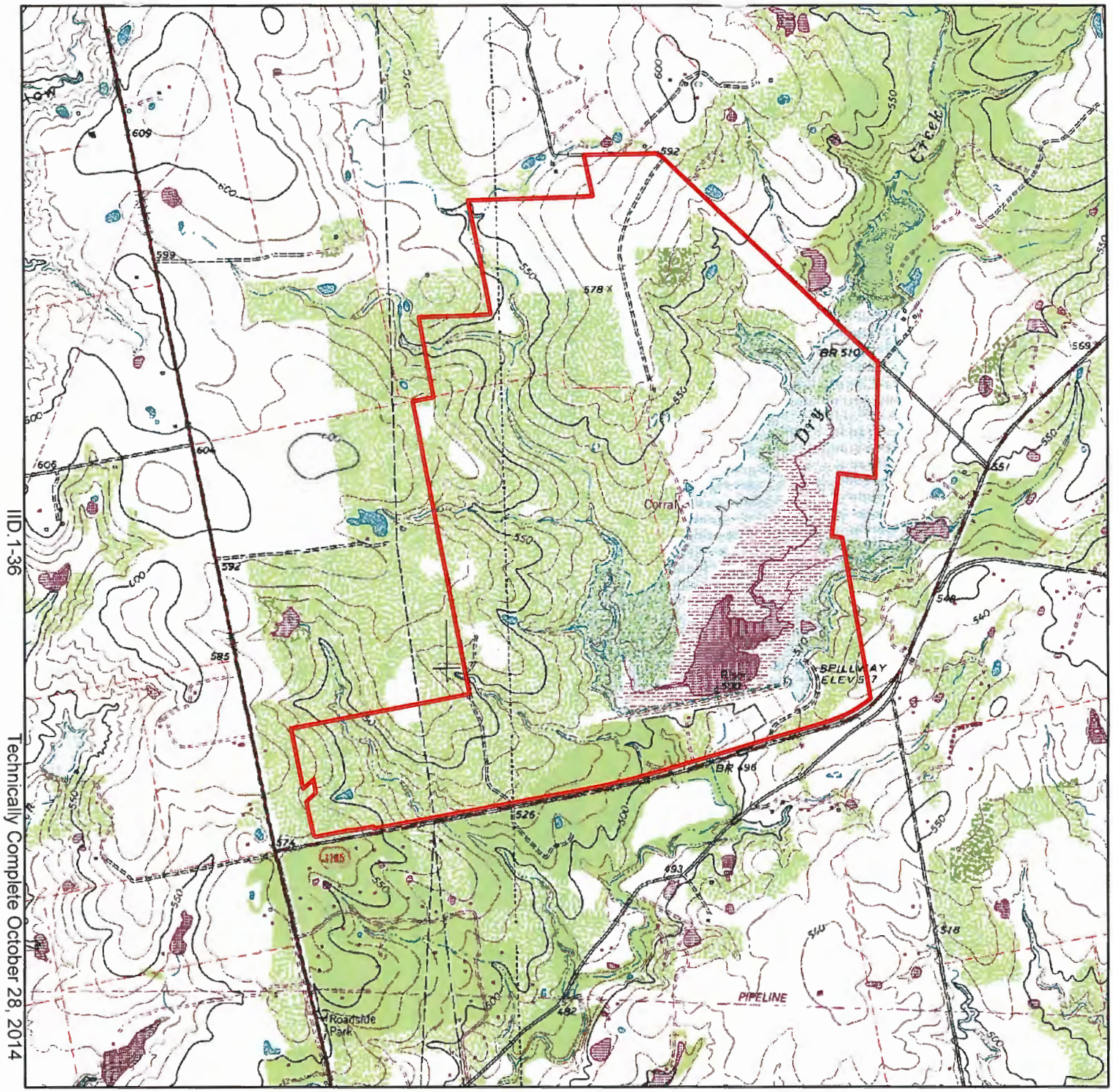
Aerial photo from Dallas Aerial Service flown May 13, 2013



Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 08/2013 AVO: 29520
Sheet Title: WATERS OF THE UNITED STATES MAP
Sheet Number: FIGURE - 3.6
HALFF

Technically Complete October 28, 2014

APPENDIX A
BACKGROUND INFORMATION



0 1,000 2,000 4,000

Feet

Legend

Study Area

Notes:

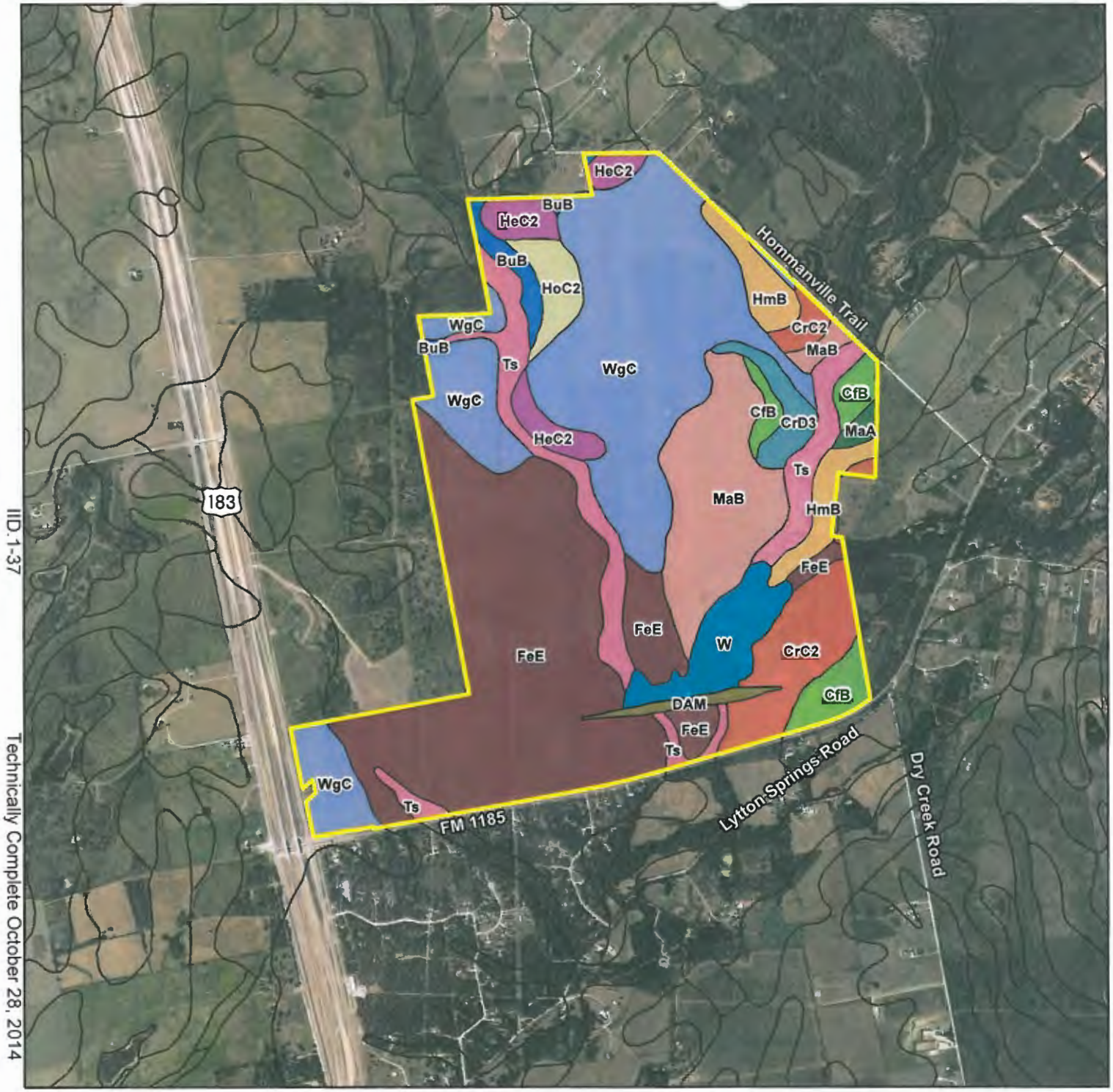
1. Source/Year of Base Map: Copyright:© 2013 National Geographic Society, i-cubed Map Service
2. USGS Quarter Quadrangle: Lockhart North
3.

Project Title: 130 ENVIRONMENTAL PARK
Project Number: <USACE #>
Date: 08/2013 AVO: 29520
Sheet Title:USGS TOPOGRAPHICAL MAP
Sheet Number: FIGURE A-1

HALFF

IID.1-36

Technically Complete October 28, 2014



IID.1-37

Technically Complete October 28, 2014

N

0 1,000 2,000 4,000

Feet

Legend

Study Area

BuB - Burleson clay, 1 to 3 percent slopes

CfB - Crockett fine sandy loam, 1 to 3 percent slopes

CrC2 - Crockett soils, 2 to 5 percent slopes, eroded

CrD3 - Crockett soils, 3 to 8 percent slopes, severely eroded

DAM - Dams

FeE - Fett gravelly soils, 1 to 12 percent slopes

HeC2 - Heiden clay, 3 to 5 percent slopes, eroded

HmB - Heiden-Wilson complex, 1 to 3 percent slopes

HoC2 - Houston Black clay, 3 to 5 percent slopes, eroded

MaA - Mabank loam, 0 to 1 percent slopes

MaB - Mabank loam, 1 to 3 percent slopes

Ts - Tinn soils, frequently flooded

W - Water

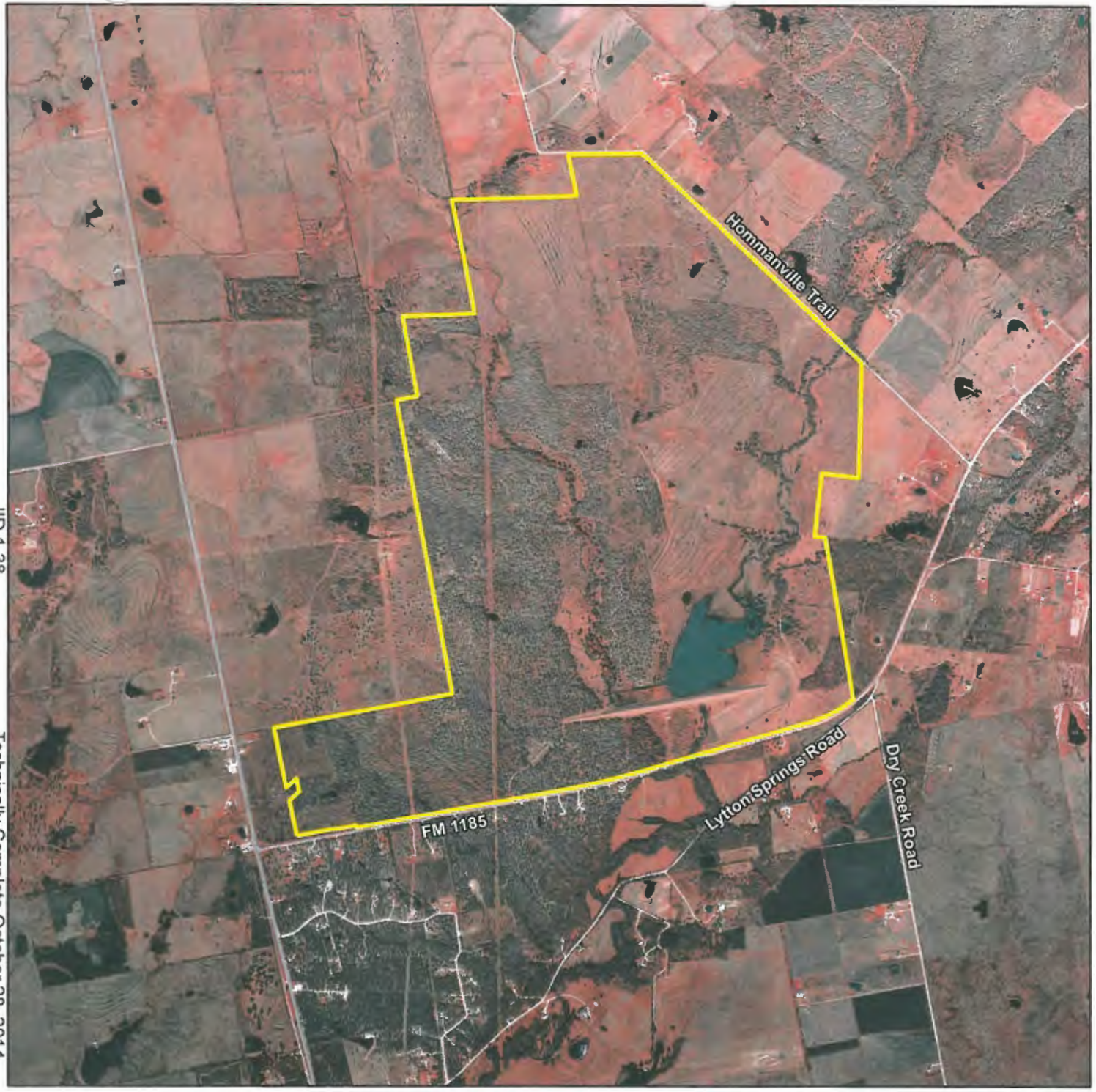
WgC - Wilson gravelly loam, 1 to 5 percent slopes

Notes:

1. Source/Year of Soil Survey: NRCS/USDA Web Soil Survey downloader for Caldwell County/2012
2.

Project Title: 130 ENVIRONMENTAL PARK
Project Number: <USACE #>
Date: 08/2013 AVO: 29520
Sheet Title: SOIL SURVEY MAP
Sheet Number: FIGURE A-2

HALFF



N

0 1,000 2,000 4,000

Feet

Legend

Study Area

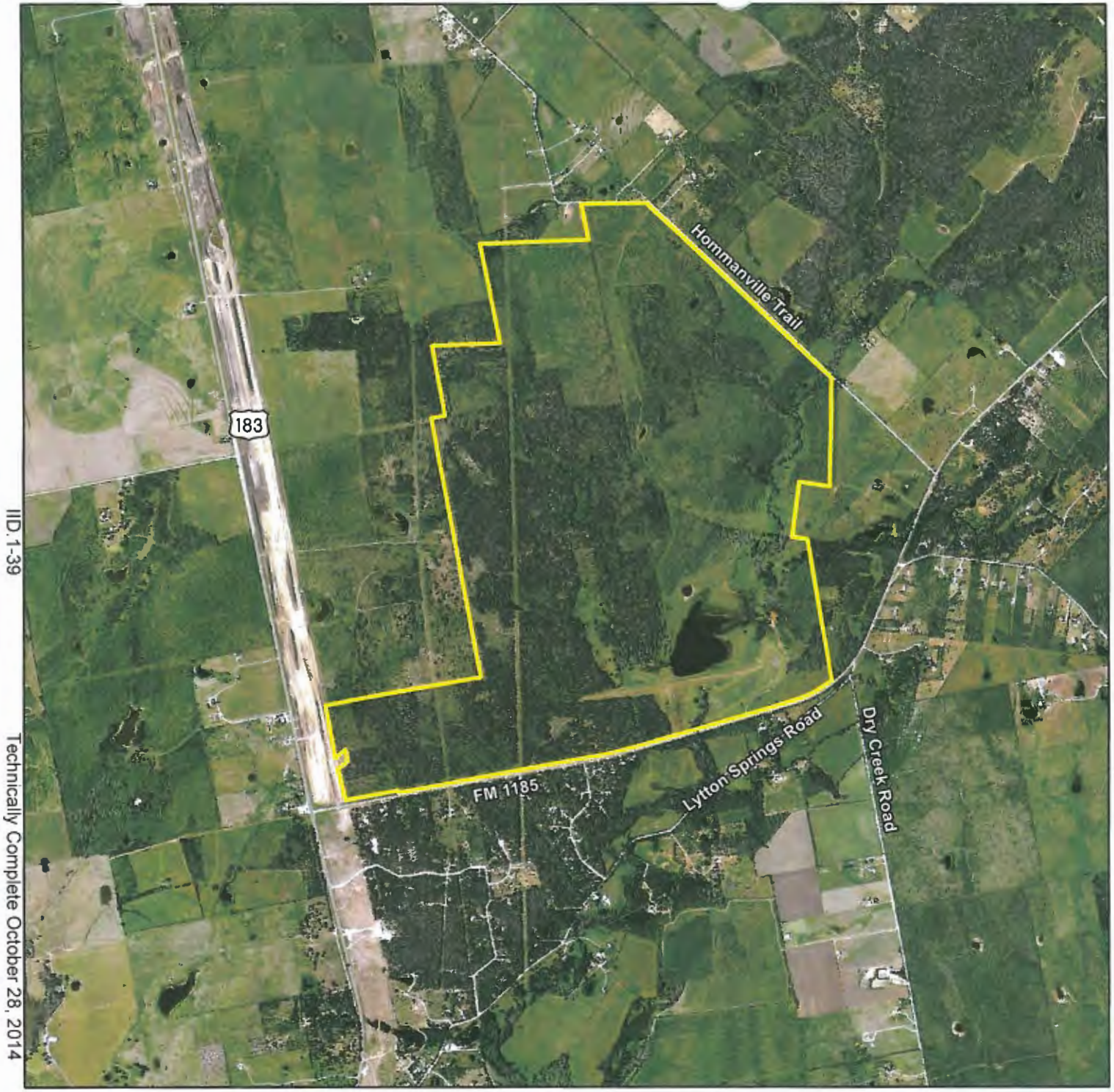
Notes:
1. Source/Year of Orthophoto: TNRIS, Lockhart North NE DOQQ Raster Dataset/1996
2.
3.
4.

Project Title: 130 ENVIRONMENTAL PARK
Project Number: <USACE #>
Date: 08/2013 AVO: 29520
Sheet Title: 1996 ORTHOPHOTO MAP
Sheet Number: FIGURE A-3

HALFF

IID: 1-38

Technically Complete October 28, 2014



N

0 1,000 2,000 4,000

Feet

Legend

Study Area

Notes:
1. Source/Year of Orthophoto: TNRIS, Lockhart North NE DOQQ Raster Dataset/2010
2.
3.
4.

Project Title: 130 ENVIRONMENTAL PARK
Project Number: <USACE #>
Date: 08/2013 AVO: 29520
Sheet Title: 2010 NAIP ORTHOPHOTO
Sheet Number: FIGURE A-4

HALFF

IID.1-39 Technically Complete October 28, 2014

N

0 1,000 2,000 4,000

Feet

Legend

Study Area

Notes:
1. Source/Year of Orthophoto: APFO-USDA NAIP Imagery web service/2012
2.
3.
4.
5.

Project Title: 130 ENVIRONMENTAL PARK
Project Number: <USACE #>
Date: 08/2013 AVO: 29520
Sheet Title: 2012 NAIP ORTHOPHOTO
Sheet Number: FIGURE A-5

HALFF

IID.1-40 Technically Complete October 28, 2014

N

0 1,000 2,000 4,000

Feet

Legend

- Study Area
- 1-Percent Annual Flood Risk Zone
- River or Stream

Notes:
1. Source/Year of Effective Floodplain Data: FEMA/2012
3. Source/Year of Streams: National Hydrography Dataset/2011
4.
5.

Project Title: 130 ENVIRONMENTAL PARK
Project Number: <USACE #>
Date: 08/2013 AVO: 29520
Sheet Title: FLOODPLAIN MAP
Sheet Number: FIGURE A-6

HALFF

IID: 1-41

Technically Complete October 28, 2014