

COMPENSATORY MITIGATION PLAN
Georgia Gulf Corporation Barge Dock
SWG-2010-00641

1.1 Background

The proposed project involves constructing a new barge dock facility along the south shore of the Houston Ship Channel and the north end of Georgia Gulf Corporation's (Applicant) property. This proposed compensatory mitigation plan is submitted as Attachment E as part of an Application for Department of the Army Individual Permit provided to the Galveston District of the Army, Corps of Engineers (USACE) to initiate the process for approval to impact waters of the United States (U.S.), including wetlands, under Section 404 of the Clean Water Act. Additional information on the project purpose, location, and site information is included in the complete permit application report (SWG-2010-00641).

1.2 Objective

The Applicant's compensatory mitigation plan (CMP) provides an overview of avoidance and minimization measures employed by the Applicant during alternative selection, as well as mitigation measures proposed for compensation of unavoidable impacts to waters of the U.S. This mitigation plan has been developed to follow the USACE Regulatory Guidance Letter 02-02 (USACE, 2002), 33CFR 332.4(c)/40CFR 230.92.4(c), and in accordance with the 2008 mitigation regulations (dated April 10, 2008). Mitigation goals are to be met under the following premise: expanding the existing wetland with vegetation from the existing seed bank, recreating and constructing new streams with similar to pre-construction habitat and hydrology, and maintaining existing hydrology and function to the onsite wetlands post construction.

1.3 Site Selection

The location of the proposed project does not provide the opportunity to avoid impacts to waters of the U.S. while still meeting the purpose and need. Impacts to waters of the U.S. were minimized and avoided to the maximum extent practicable through site selection and design measures.

The 404(b)(1) guidelines including the "practicable alternative test" was followed to choose the preferred alternative. The proposed project (On Site Alternative 2) was found to be the most practicable alternative because it meets project objectives, impacts less wetland area than the offsite alternative, and is financially feasible.

The proposed mitigation area is located adjacent to the Houston Ship Channel on the Georgia Gulf Corporation property in an industrially developed area. The hydrogeomorphic and ecological landscape and climate of this industrial area were considered in the development of mitigation. On-site mitigation through expansion of existing resources was chosen because natural ecosystems generally recover rapidly from natural disturbances to which they are adapted. Expansion of existing wetlands adjacent to an existing river bank allows the use of existing soils, native seed bank, and natural water resources to support the mitigation area.

1.4 Site Protection Instrument

The Applicant provides site protection by maintaining ownership of the property. If for any reason the Georgia Gulf Corporation sells or leases their existing facility and property, including the proposed project, impacts by future landowners to any waters of the U.S., including areas that are

considered mitigation for Section 404 permit authorizations, are protected by Section 404 of the Clean Water Act, and impacts will require USACE permit authorization. Compensatory mitigation areas located on the property would be an expansion of the existing jurisdictional wetland areas which would also be protected by Section 404 of the Clean Water Act.

1.5 Baseline Information

The Houston Ship Channel is a tidally influenced ecological resource that periodically provides nutrients during storm surges to the mitigation area. Flooding rivers and tides transport large quantities of water, nutrients, and organic matter in relatively short time periods, subsidizing the adjacent rivers, lakes, wetland, and estuaries. Natural hydrology will be allowed to establish in the wetland mitigation area through the existing and proposed drainage ditches on site. Proposed channels are provided to replace existing drainage needed for the Georgia Gulf Corporation facility to maintain existing storm water runoff capacity and function.

Approximately 1,400 LF of a traditionally navigable water (Houston Ship Channel [S-1]) and 317 LF of ephemeral stream channels (S-2 and S-3) were surveyed for the proposed project. A final delineation report was submitted to the USACE Galveston District on November 8, 2010. Kristin Shivers, Regulatory Specialist Galveston USACE, has verified the delineation and a preliminary jurisdictional determination was received in December 2010.

Streams

The study area was defined to include potential impacts by the proposed project. The study area is on the shore of the Houston Ship Channel (S-1), a traditionally navigable water. The shorelines and banks of the Houston Ship Channel are affected by regular dredging within the water's edge and by continuous mowing along the banks. The shoreline includes sandy substrate, debris, riprap, and an existing bulkhead. The Houston Ship Channel has an approximate 1,000- ft ordinary high-water mark (OHWM) at this location. The portion of S-1, approximately 2.0 acres, that would be impacted by the proposed project is bulkhead. No seagrass, oysters, or other aquatic resources were observed within the proposed work area in S-1.

Approximately 200 LF of Stream 2 (S-2) were surveyed from the weir on a stormwater ditch to the Houston Ship Channel. S-2 is a continuation of the stormwater ditch that serves the Georgia Gulf facility. S-2 also transfers overflow water from wetland 1 (W-1) to the Houston Ship Channel.

Approximately 100 LF of S-3 were surveyed from the end of concrete culverts to the southern shore of the Houston Ship Channel. S-3 is a drainage ditch that transfers overflow water from a retention area around a cylinder tank in the Georgia Gulf Facility.

S-2 and S-3 drain directly into the Houston Ship Channel. S-2 has a 4-ft OHWM and drains stormwater from the Georgia Gulf Facility and overflow water from W-1. Shallow pooling was present at the weir on S-2 and the culverts on S-3. S-3 has a 1-ft OHWM and drains water from a retention area around a cylinder tank in the Georgia Gulf Facility through concrete culverts into the study area. W-1 is not hydrologically connected to S-3, the culverts for S-3 pass under the berm between W-1 and the Houston Ship Channel.

Wetlands

There are two wetlands located on the property, totaling 1.23 acres.

Wetland (W-1) is located in the southwestern portion of the study area. This emergent wetland formed on top of the slope for the Houston Ship Channel southern bank by collecting local

rainwater run-off. The dominant vegetation in W-1 is spikerush (*Eleocharis carabaea*), southern cattail (*Typha latifolia*), goldenrod (*Solidago Canadensis*), Johnsongrass (*Sorghum halapense*), pennywort (*Hydrocotyle ranunculoides*), and alligator weed (*Alternanthera philoxeroides*). The vegetation is affected by mowing. W-1 is contained on the north by a berm on the top of the slope, a road on the west, increasing topography to the south, and S-2 to the. W-1 drains eastward into S-2 which flows directly into the Houston Ship Channel.

Wetland 2 (W-2) is located in the eastern portion of the study area. It appears that W-2 formed in a depression on the banks of the Houston Ship Channel and collects rainwater runoff. Dominant vegetation in W-2 includes Chinese tallow (*Triadica sebifera*), black willow (*Salix nigra*), Texas mulberry (*Morus microphylla*), switchgrass (*Panicum virgatum*), climbing dayflower (*Commelina diffusa*), Common Reed (*Phragmites australis*), and sumpweed (*Iva annua*). W-2 is a forested wetland which likely flows into the Houston Ship Channel via overland sheet flow. However, there was no channel or drainage identified with distinct OHWM or debris lines which hydrologically connects W-2 with the Houston Ship Channel.

Table 1 summarizes the waters of the U.S. within the proposed project area.

**Table 1
Waters of the U.S. within the Project Area**

| Resource ID | Classification | OHWM width (ft) | Linear Feet in Project Area | Acreage in Project Area |
|---|------------------------|-----------------|-----------------------------|-------------------------|
| W-1 | Jurisdictional Wetland | - | - | 0.350 |
| W-2 | Jurisdictional Wetland | - | - | 0.880 |
| S-1 (Houston Ship Channel) | Perennial Stream | 1,000 | 1,370 | 2.000 ^a |
| S-2 | Ephemeral Stream | 4 | 217 | 0.020 |
| S-3 | Ephemeral Stream | 1 | 100 | 0.002 |
| Total Waters of the U.S. | | | 1,687 | 3.252 |
| a - While the OHWM of the Houston Ship Channel is 1,000 feet, only the area to be mechanically dredged (2.0 acres) within the channel's OHWM would be impacted by the proposed project. | | | | |

1.6 Determination of Credits

The Compensatory Mitigation Plan, as proposed, will mitigate for unavoidable impacts to Perennial and Ephemeral streams and Forested and Emergent wetlands through the establishment of functions and services similar to those impacted as a result of the INEOS Barge Dock Project. To ensure no net loss to wetland functions, the USACE Regulatory Guidance Letter 02-02 (USACE, 2002), 33CFR 332.4(c)/40CFR 230.92.4(c), was used to determine mitigation requirements under the Compensatory Mitigation Rule.

Approximately 1,400 LF of a traditionally navigable waterway and 317 LF of ephemeral stream channels were surveyed to characterize quantifiable variables for the evaluation of functional capacity of waters of the U.S. to facilitate the determination of mitigation measurements required for permanent losses to waters of the U.S. INEOS proposes to mitigate for permanent impacts to waters of the U.S. onsite by expanding the existing wetlands present with vegetation from the existing seed bank, recreating and constructing new streams with similar to pre-construction habitat and hydrology, and maintaining existing hydrology and function to the onsite wetlands post construction.

**Table 2
Proposed Mitigation**

| Resource ID | Classification | Linear Feet of Temporary Impacts | Acreage of Temporary Impacts | Linear Feet of Permanent Impacts | Acreage of Permanent Impacts | Mitigation |
|----------------------------|------------------------|----------------------------------|------------------------------|----------------------------------|------------------------------|-----------------------------|
| W-1 | Jurisdictional Wetland | - | 0 | - | 0 | n/a |
| W-2 | Jurisdictional Wetland | - | 0 | - | 0.01 | 0.160 ac |
| S-1 (Houston Ship Channel) | Perennial Stream | 0 | 0 | 387 (shoreline) | 2 | n/a ^a |
| S-2 ^b | Ephemeral Stream | 0 | 0 | 133 | 0.03 | 0.037 ac (159 LF x 10 OHWM) |
| S-2c | Ephemeral Stream | 0 | 0 | 217 | 0.018 | 0.007 ac (72 LF x 4 OHWM) |
| S-3 | Ephemeral Stream | 100 | 0.002 | 0 | 0 | 0.002 ac (100 LF x 1 OHWM) |
| Total | | 100 | 0.002 | 737 | 2.058 | 0.206 ac |

a - after construction is complete the 2.0 acres will still exist as open water; therefore, mitigation is not proposed for this impact

b - 217 LF of S-2 located within study area directly impacted by proposed barge dock.

c - 133 LF of S-2 located outside of study area upstream of weir. Although this portion of S-2 is located outside of the study area, the impacts are included in this analysis to explain how hydrology will be maintained for the facility.

1.7 Mitigation Work Plan

Approximately 2.0 acres of the Houston Ship Channel would be permanently impacted by deepening. However, after construction is complete the 2.0 acres will still exist as open water within a traditionally navigable water; therefore, mitigation is not proposed for this impact.

W-1 would not be impacted by the proposed project; however, its existing hydrologic connection to S-2 would be affected. After S-2 is removed, the water from W-1 would be redirected into S-3. A culvert would be placed between W-1 and S-3 under the existing berm to allow W-1 to maintain its existing hydrology.

Approximately 200 LF of S-2 downstream of the weir would be removed and 133 LF of S-2 from outside the study area, upstream of the weir, would be re-directed. The weir would also be removed. S-2 outside of the study area has an approximate 10-ft OHWM. The 133 LF of S-2 outside of the study area would be re-directed to the east into W-2 through a proposed 159 LF ditch. This portion of S-2 from outside of the study area provides stormwater drainage from the facility; therefore, its hydrologic connection to the Houston Ship Channel must be maintained. The proposed re-directed stream would be graded to allow flow and hydrology similar to the existing S-2 conditions and would be revegetated through the existing seed bank. As shown in Table 2 by S-2B the 159 LF of constructed ditch with a 10-ft OHWM would provide partial mitigation (0.037 acre) for impacts to S-2.

S-3, including 100 LF of stream and 100 LF of culvert, would be temporarily impacted by construction. Post-construction, the 100 LF of culvert on S-3 would be removed and an open stream would be left in place creating a 200 LF open channel. The removal of the culverts would provide 100 LF with 1-ft OHWM of partial mitigation (0.002 acre) for impacts to S-2. As previously described, W-1 would be connected through culverts to S-3 post-construction to maintain the hydrology of W-1.

According to the ephemeral stream assessment form (Form Ia) the compensation requirement for the impacts to ephemeral streams (S-2) is 105 LF. Therefore, the proposed mitigation creating 231 LF of onsite streams exceeds the compensation requirement for permanent impacts to S-2. S-3 would not be permanently impacted; however, the 100 LF of open stream created by removing the culverts would improve the stream habitat in the study area.

The eastern dock loading arm pad would impact 0.01 acre of W-2. This permanent impact would be mitigated on site by expanding W-2 to the southeast. Approximately 0.2 acre southeast of W-2 would be constructed to match W-2's existing topography. The top 6 inches of topsoil removed from the impact area would be retained separate from other soils removed during construction. The top 6 inches of soil would be used in the constructed mitigation area to allow the seed bank from the existing vegetation to grow in the mitigation area. Because of the re-route of S-2 into W-2, W-2 would likely receive more stormwater runoff post-construction. In order to maintain its current hydrology, a 72 LF ditch with a 4-ft OHWM would be excavated on the north side of W-2 to a proposed outfall structure on the Houston Ship Channel. As shown in Table 2 by S-2C this 72 LF of ditch would provide partial mitigation (0.007 acre) for impacts to S-2.

The barge dock has been sited to the northwest as far as feasible to reduce impacts to W-2 and temporarily impact one on site ephemeral stream during construction. This preferred plan avoids fill impacts to 1.22 acres of wetland and avoids permanent impacts to 100 LF of ephemeral streams. The Applicant would construct the project such that avoided wetlands (W-1 and majority

of W-2) are not impacted indirectly by modifications to adjacent contours, i.e. the wetlands would not be drained by the proposed stream mitigation.

In addition to the avoidance measures, the proposed bulkhead would be constructed before removing the existing 385-foot long bulkhead. Once removed, the proposed barge slip will be mechanically dredged. By constructing the land portion of the project first, impacts to the Houston Ship Channel will be minimized. Approximately 100 LF of S-3 would be temporarily impacted by the construction of the project but would be returned to pre-construction condition. Therefore, impacts to ephemeral streams in the area were minimized. The Applicant would mitigate for impacts to W-2 and S-2 after construction of the proposed barge dock is complete.

In areas where fill in streams is unavoidable, stabilization of the stream channels using native soils and vegetation would be conducted in order to minimize downstream hydrologic and water quality impacts. The Applicant will design and implement water quality best management practices (BMPs) to control erosion during construction, post-construction total suspended solids (TSS), and sedimentation control in accordance with the Section 401 Water Quality Certification. Clearing would be limited to the project footprint. Silt fences will be installed at the edge of the grading limits to minimize indirect effects of sediment outside of the project area.

Mitigation measures are proposed to address avoidance and/or minimization of construction impacts to water quality. BMPs would be used to control erosion during construction, for sedimentation control, and post-construction for TSS in accordance with Section 401 Water Quality Certification of the Clean Water Act. Erosion control BMPs such as vegetation, blankets and matting, mulch, and erosion control compost would be used during construction. Sediment control BMPs such as silt fences, hay bale dikes, and erosion control compost would be used during construction. During construction, the Applicant shall prohibit project-related construction vehicles from driving in or crossing streams at other than established and permitted crossing points. During construction, the Applicant shall require all contractors to conduct daily inspections of all equipment for any fuel, lube oil, hydraulic, or antifreeze leaks. If leaks are found, the Applicant shall require the contractor to immediately remove the equipment from service and repair or replace it.

The Applicant will maintain existing surface drainage patterns, to the extent practicable, through the design of the project as not to impede or increase drainage conditions outside of the project area. The Applicant shall establish staging and lay down areas for project-related construction material and equipment at least 50 feet from waters of the U.S. and in areas that are not environmentally sensitive. The Applicant shall not clear any vegetation between the staging area and the waterway or wetlands. When project-related construction activities require work in streambeds, the Applicant shall conduct these activities, to the extent practicable, during low-flow conditions. The Applicant shall, to the extent practicable, ensure that any fill placed below the OHWM of wetlands and streams is appropriate material (i.e. clean soil and/or rock) selected to minimize impacts to the wetlands and streams.

1.8 Maintenance Plan

Following construction activities in or adjacent to streams, disturbed areas will be returned to pre-construction contours as soon as practicable and stabilized using appropriate BMPs (e.g. seeding, erosion control blankets). The Applicant shall disturb the smallest area possible around any streams and shall conduct reseeding efforts to ensure proper revegetation of disturbed areas, as soon as practicable, following project-related construction activities. Existing regular maintenance will

continue post construction which includes mowing of vegetation and collection of trash/debris in the study area.

1.9 Performance Standards

Performance standards will be evaluated within the proposed wetland establishment areas. This will include the assessment of the establishment of wetland conditions (i.e. wetland hydrology, soils, and vegetation) via visual assessments at pre-determined locations within wetland establishment areas. Information gathered during these assessments will be used for comparative analysis with previous assessments, as well as, track the progress of the establishment of the wetland as it matures.

The establishment and expansion of the existing forested wetland will be considered successful if annually, and at the end of 3 years from planting and mitigation activities, the following conditions are met.

1. A survival rate of at least 56 percent (300 seedlings/trees per acre) for areas planted within the onsite mitigating site.
2. Less than 5 percent relative cover of nuisance, invasive, noxious, and exotic species.

Adaptive management provides a critical instrument for continuous evaluation and modifications to mitigation efforts, as needed, to satisfy the required compensatory mitigation for impacts to waters of the U.S., including wetlands as a result of the proposed project. INEOS is responsible for implementing adaptive management to achieve mitigation success.

A monitoring/reporting program will be implemented to determine whether or not success criteria have been met. The Applicant (or their contractor) will conduct annual monitoring to document the success of the mitigation area. Monitoring of the mitigation site will include conducting survey and photo documentation of the mitigation area.

1.10 Monitoring Requirements

Within one month of project construction completion, the Applicant (or their contractor) would conduct a baseline investigation for future mitigation monitoring efforts. This report would be used to assess the success of the mitigation plan each year based on hydrology and vegetation. The baseline post-construction report would include documentation that the project was constructed such that the hydrology of W-1 and W-2 was not significantly altered from their pre- construction state. In the event that the seed bank has not provided similar vegetative cover to the undisturbed portions of W-2 one-year post construction supplemental planning may be necessary. The Applicant could plant native vegetation currently found in W-2 such as cottonwood (*Populus deltoids*), black willow (*Salix nigra*), and river cane (*Arundinaria gigantea*) in early spring to encourage wetland establishment.

An annual compliance report will be prepared and submitted to the USACE Galveston District, Regulatory Branch by the Applicant (or their contractor) each year for three years. The first annual monitoring will be conducted within 1 year of construction of the mitigation areas. Subsequent monitoring efforts will be conducted at 2 and 3 years thereafter. Each monitoring report will include the following information:

A description of changes in the construction or mitigation plan implementation schedule;

A summary of the activities that occurred during the reporting period, including demonstration of the Applicant's compliance with the permit conditions, and documentation of the progress and/or completion of all authorized work, including mitigation plan activities in meeting performance standards and planting success;

A description of pre-construction (baseline) conditions of the project area, including mitigation site, in the initial report;

Documentation that the Applicant is in compliance with the authorized mitigation plan;

Documentation of the progress and/or completion of all authorized work, including mitigation plan activities;

A description of the project's actual impact to waters of the United States;

Documentation that disturbed areas, such as drainage ditches, stream banks, and temporary impact areas are re-vegetating adequately and not suffering erosion damage;

Documentation that adjacent aquatic areas are adequately protected from construction activities; and

Photographs, maps, and drawings to support the written components of the mitigation plan.

1.11 Long-term Management Plan

Long-term management practices conducted by the Applicant following attainment of the performance standards may include such activities as:

1. Mechanical vegetation control,
2. Selective tree removal to control insect-damaged, diseased, or storm-felled trees,
3. Water regime management, and
4. Visual monitoring of activities on the mitigation site.

1.12 Adaptive Management Plan

To address unforeseen changes in site conditions or other components of the mitigation project the Applicant would coordinate with USACE as necessary as changes occur. In the case of a change in property ownership or management the new owner would request a permit transfer from the Galveston District USACE.

1.13 Financial Assurances

The Applicant will ensure that financial resources are available to protect mitigation areas. The financial resources will also be able to provide for maintenance and remedial actions that may be necessary in the future. Financial assurances in the form of performance bonds, irrevocable trusts, escrow accounts, casualty insurance or letters of credit will not be provided due to the current ownership by the Applicant. The Applicant is a self-insured entity and can provide proof of financial assurance upon request.

1.14 Conclusion

The proposed project involves constructing a new barge dock facility along the south shore of the Houston Ship Channel and the north end of the Applicant's property which would result in temporary impacts to 2.0 acres of the Houston Ship Channel (385 LF along the shoreline) and 100

LF of an ephemeral channel (S-3). The proposed project would result in permanent impacts to 217 LF of an ephemeral channel (S-2) and 0.01 acre of wetland impact to W-2. As summarized in Table 2, 217 LF of impact to S-2 would be mitigated through the creation of 100 LF (1-ft OHWM) of stream from the removal of culverts on S-3, the creation of a 72 LF (4-ft OHWM) ditch connecting W-2 to the Houston Ship Channel, and 159 LF (10-ft OHWM) of S-2 rerouted from outside the study area into W-2. The 0.01 acre of impact to W-2 would be mitigated on-site by the 0.16-acre expansion of W-2 to the northeast.

Although impacts to waters of the U.S. could not be completely avoided, the Applicant avoided and minimized impacts to the extent practicable and proposes this compensatory mitigation plan for unavoidable impacts. This proposed compensatory mitigation plan is submitted as Attachment E as part of an Application for Department of the Army Individual Permit provided to the Galveston District of the USACE for approval to impact waters of the U.S., including wetlands, under Section 404 of the Clean Water Act.

1.15 References

- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, Department of the Army, Waterways Experiment Station. 100 p.
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