



Figure 41. Image Categorization
Wetlands Jurisdictional Determination
Tranvia de Carolina
Carolina Puerto Rico

WETLAND JURISDICTIONAL DETERMINATION
FOR TRANVIA DE CAROLINA LIGHT RAIL TRANSIT PROJECT, CAROLINA, PUERTO RICO.

Table 5 - Summary of the field survey for wetland indicators

Samp	Veg Ind	Soil Ind	Hyd Ind	Wetland	Samp	Veg Ind	Soil Ind	Hyd Ind	Wetlan
Site	A B C	A B C	A B C	A B C	Site	A B C	A B C	A B C	A B C
1	N N N	N N N	N N N	N N N	47	N N N	N N N	N N N	N N N
2	N N N	N N N	N N N	N N N	48	N N N	N N N	N N N	N N N
3	N N N	N N N	N N N	N N N	49	N N N	N N N	N N N	N N N
4	N N N	N N N	N N N	N N N	50	N N N	N N N	N N N	N N N
5	N N N	N N N	N N N	N N N	51	N N N	N N N	N N N	N N N
6	N N N	N N N	N N N	N N N	52	N N N	N N N	N N N	N N N
7	N N N	N N N	N N N	N N N	53	N N N	N N N	N N N	N N N
8	N N N	N N N	N N N	N N N	54	N N N	N N N	N N N	N N N
9	N N N	N N N	N N N	N N N	55	N N N	N N N	N N N	N N N
10	N N N	N N N	N N N	N N N	56	N N N	N N N	N N N	N N N
11	Y Y Y	N N N	Y Y Y	Y Y Y	57	N N N	N N N	N N N	N N N
12	Y Y Y	N N N	Y Y Y	Y Y Y	58	N N N	N N N	N N N	N N N
13	Y Y Y	N N N	Y Y Y	Y Y Y	59	N N N	N N N	N N N	N N N
14	Y Y Y	N N N	Y Y Y	Y Y Y	60	N N N	N N N	N N N	N N N
15	Y Y Y	N N N	Y Y Y	Y Y Y	61	N N N	N N N	N N N	N N N
16	N N N	N N N	N N N	N N N	62	N N N	N N N	N N N	N N N
17	Y Y Y	N N N	Y Y Y	Y Y Y	63	Y Y Y	N N N	Y Y Y	Y Y Y
18	Y Y Y	N N N	Y Y Y	Y Y Y	64	N N N	N N N	N N N	N N N
19	Y Y Y	N N N	Y Y Y	Y Y Y	65	N N N	N N N	N N N	N N N
20	Y Y Y	N N N	Y Y Y	Y Y Y	66	N N N	N N N	N N N	N N N
21	Y Y Y	N N N	Y Y Y	Y Y Y	67	N N N	N N N	N N N	N N N
22	Y Y Y	N N N	Y Y Y	Y Y Y	68	N N N	N N N	N N N	N N N
23	Y Y Y	N N N	Y Y Y	Y Y Y	69	N N N	N N N	N N N	N N N
24	Y Y Y	N N N	Y Y Y	Y Y Y	70	N N N	N N N	N N N	N N N
25	N N N	N N N	N N N	N N N	71	N N N	N N N	N N N	N N N
26	N N N	N N N	N N N	N N N	72	N N N	N N N	N N N	N N N
27	N N N	N N N	N N N	N N N	73	Y Y Y	N N N	Y Y Y	Y Y Y
28	Y Y Y	N N N	Y Y Y	Y Y Y	74	Y Y Y	N N N	Y Y Y	Y Y Y
29	Y Y Y	N N N	Y Y Y	Y Y Y	75	N N N	N N N	N N N	N N N
30	N N N	N N N	N N N	N N N	76	Y Y Y	N N N	Y Y Y	Y Y Y
31	N N N	N N N	N N N	N N N	77	N N N	N N N	N N N	N N N
32	N N N	N N N	N N N	N N N	78	Y Y Y	N N N	Y Y Y	Y Y Y
33	N N N	N N N	N N N	N N N	79	N N N	N N N	N N N	N N N
34	N N N	N N N	N N N	N N N	80	N N N	N N N	N N N	N N N
35	N N N	N N N	N N N	N N N	81	N N N	N N N	N N N	N N N
36	N N N	N N N	N N N	N N N	82	N N N	N N N	N N N	N N N
37	N N N	N N N	N N N	N N N	83	N N N	N N N	N N N	N N N
38	N N N	N N N	N N N	N N N	84	N N N	N N N	N N N	N N N
39	N N N	N N N	N N N	N N N	85	N N N	N N N	N N N	N N N
40	N N N	N N N	N N N	N N N	86	N N N	N N N	N N N	N N N
41	N N N	N N N	N N N	N N N	87	N N N	N N N	N N N	N N N
42	N N N	N N N	N N N	N N N	88	N N N	N N N	N N N	N N N
43	N N N	N N N	N N N	N N N	89	Y Y Y	N N N	Y Y Y	Y Y Y
44	N N N	N N N	N N N	N N N	90	Y Y Y	N N N	Y Y Y	Y Y Y
45	N N N	N N N	N N N	N N N	91	N N N	N N N	N N N	N N N
46	N N N	N N N	N N N	N N N	92	N N N	N N N	N N N	N N N

VIII. WETLAND FUNCTIONAL VALUES

Wetlands' functional values were evaluated following Wetland Evaluation Technique (WET) method developed by Federal Highway Administration.

WET evaluates 11 different functions and values and assigned a qualitative probability rating of HIGH, MODERATE, or LOW to the functions, in terms of social significance, effectiveness, and opportunity.

Social significance refers to the importance society may attach to the wetland due to recognition-of its natural features, potential economic value, or strategic location.

Effectiveness refers to the capability of a wetland to perform a function due to its physical, chemical, and biological attributes.

Opportunity refers to the chance a wetland has to perform a function.

The wetland functions and values to be evaluated are groundwater recharge, groundwater discharge, flood-flow alteration, sediment stabilization, sediment toxicant retention, nutrient removal transformation, production export, wildlife diversity/abundance, aquatic diversity/abundance, uniqueness heritage, and recreation.

Table 6 shows the results of the functional values evaluation conducted for wetlands in the study area.

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Table 6: Functional value evaluation for wetlands in the study area

FUNCTIONAL VALUE	SOCIAL SIGNIFICANCE	EFFECTIVENESS	OPPORTUNITY
Groundwater Recharge	MODERATE	MODERATE	MODERATE
Groundwater Discharge	HIGH	MODERATE	HIGH
Flood flow Alteration	HIGH	MODERATE	HIGH
Sediment Stabilization	HIGH	MODERATE	HIGH
Sediment Toxicant Retention	HIGH	MODERATE	HIGH
Nutrient Removal Transformation	HIGH	MODERATE	HIGH
Production Export	HIGH	MODERATE	HIGH
Wildlife Diversity/Abundance	MODERATE	HIGH	HIGH
Aquatic Diversity/Abundance	HIGH	HIGH	HIGH
Uniqueness Heritage	HIGH	MODERATE	HIGH
Recreation	HIGH	MODERATE	HIGH

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IX. MITIGATION PLAN

The impact upon wetlands is estimated in 34.56 acres of wetlands including 3.48 acres of Estuarine Intertidal Forested and 31.08 acres of Estuarine Intertidal Emergent Persistent.

The Wetland Jurisdictional Determination report includes wetland descriptions, classification according to the USFWS system (Cowardin et al. 1979). Latin names of plant species are provided as well. Impact areas are presented in Table 7.

Table 7: Wetland Areas

Proposed Development	345 acres
JD Wetlands	34.56 acres
JD Wetlands Impact Herb	31.08 acres
JD Wetlands Impact Forest	3.48 acres
Uplands	310.44 acres
Forested Wetland Creation (3:1)	10.44 acres
Wetland Enhancement (2:1)	62.16 acres

Wetland functions within the project area are considered low values nonetheless some potential functions and values can be slightly impacted including:

- Flood storage/Flow alteration
- Sediment removal
- Habitat for wetland associated wildlife

Tranvia de Carolina has avoided and minimized impacts to wetlands and wetland buffers to the greatest extent possible. Total avoidance was not possible due to project constraints.

Design alternatives were considered to reduce wetland impacts. On site mitigation alternatives were selected because of practical and cost effectiveness issues.

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Design modifications to avoid/minimize wetland impacts given the final development footprint were modeled and recommended.

The project contemplates the creation of 10.44 acres of forested wetlands and the enhancement of 62.16 acre of herbaceous wetlands to forested wetlands. The product will consist of 72.6 acres of forested wetlands. All the mitigation will be conducted on site in the same parcel of land.

The onsite mitigation is an obvious selection in terms of land tenancy, existing wetlands, hydrology, location within the sub-basin, construction access, existing vegetation (buffer & wetland), and other on-site features. The proposed mitigation will connect to on-site and off-site wetland areas.

The mitigation consists of the creation of forested wetlands and enhancement of herbaceous wetlands to forested wetlands. Grading to adequate levels is of outmost importance toward a successful effort. Hydrology determines many wetland functions and design specifies grades. The proposed mitigation will connect to on-site and off-site wetland areas by means of canopy connection, enhancing both riparian corridor habitats.

Among the work plan we can include the following general tasks.

- Access control
- Herbivore control (fencing)
- Erosion control (double fencing)
- Grading revision
- Decrease soil permeability
- Modify water inlet/outlet controls
- Substrate amendment
- Weed control
- Plant vegetation
- Supplement surface water inputs

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Work Plan Bi-Month Periods	1	2	3	4	5	6	7	8	9	10	11	12
Preplanning	X	X	-	-	-	-	-	-	-	-	-	-
Grading	-	X	X	X	X	X	X	-	-	-	-	-
Planting Preparation	-	X	X	X	X	-	-	-	-	-	-	-
Planting	-	X	X	X	X	X		X	-	-	-	-
Maintenance	-	-	X	X	X	X	X	X	X	X	X	X
Monitoring	X	X	X	X	X	X	X	X	X	X	X	X

Two fencing approaches are to be conducted.

- Barbwire will be placed around all the mitigation area to exclude cattle from the site.
- High visibility fencing will allocated to mark construction boundaries and JD.

Wetland mitigation site construction plans includes fencing of critical areas to prevent unintended and non permitted impacts that could lead to violations of local, state, and/or federal environmental permits. Critical areas may be wetlands, existing vegetation, or other aquatic resources such as streams and lakes that are shown in the plans. Existing critical areas must be identified and protected during construction.

Protection will require the use of high visibility fencing to define construction limits near wetlands and other sensitive areas. The General Construction contractor, as part of their ESC plan, will set erosion control measures. A double fence will be installed at the top of the cut and the graded area.

Measures must be taken to minimize soil compaction. Compacted soils can decrease the success of wetland mitigation sites by changing surface hydrology and increasing competition pressure on native plants.

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These measures to minimize soil compaction include:

- Using low ground pressure equipment.
- Restricting ingress and egress points on the mitigation site.
- Limiting paths or roadways within the site.
- Ripping or tilling compacted soils.
- Using mats such as steel or plastic plates to reduce compaction caused by equipment.

Special attention should be paid to the sequencing construction activity of wetland mitigation sites, and the timing shall not be compromised without prior permission from regulatory agencies. The following must be considered.

1. Storage
2. Staging
3. Excavation
4. Weed Control
5. Planting
6. Contingencies

Temporary Erosion and Sedimentation Control (TESC) plans will be physically present, easily accessible, and closely followed during construction by grading contractor.

The various components and sequence of site grading and construction includes clearing and grubbing, soil preparation/weed control, temporary erosion control, general site grading, drainage structures, topsoil and soil amendments necessary for wetland and upland development, and stockpile/ haul areas.

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Soil topography is directly associated to site hydrology. Being hydrology the most critical element to wetland establishments soil grading is also as critical. The Construction Contractor will conduct all grading and related activities including erosion control plan and level assurances will be coordinated with project leader.

A series of level stations will be established, maintained, and used to monitor the grading levels with laser levels. By grading, we will create the proper hydrology including saturation of soils at 25 centimeters above graded sites. The geoclimatic life zone of the site shows abundant rain periods with peaks in May and October. An average of 80 inches of rain is estimated for the area. The water table will be maintained high mainly due to hydrological regimes. In addition, storm water management from commercial complex may input to the wetlands.

Tilling will be conducted mainly in the enhancement areas with a large agricultural tractor with one hoe as deep as possible (40-60 cm). The tractor will ride through a single sinuous pathway followed by the planters. Site hydrology will aim for high water table mark.

Planting Guidelines

Planting methods will include linear and clumps plantings. Planting will be done manually with shovels. Every tree will be anchor, fertilized with Agriform 20-15-5 plus in 21 grams tablets, mulched with Vispore mats and or hey. The more water loving species will be planted in the center or lower areas and the less water loving species will be planted in the outer ranges or higher areas. So, *Pterocarpus*, *Annona*, *Sthalia* and *Enallagma* will be planted in the lower sites and other species like *Manilkara*, *Machaerium*, *Erythrina*, *Thespesia*, *Hibiscus tiliaceus*, *Cassia allata* and *Conocarpus erectus* will be planted from the core toward the outer layers and bank.

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Plant establishment is essential to plant community development and the success of the overall mitigation site. The establishment period for this project is of seven months after initial planting, assuming that grading is developed continuously in coordination with the wetland creation management.

During this time, Contractor will monitor the site for plant survival, health and growth, herbivory, weeds, and vandalism.

Plant establishment activities such as plant replacement, adjustment of planting layout to reflect specific site conditions, weed control, operation and maintenance of any irrigation system, maintenance and adjustment of flow control structures to provide the necessary site hydrology, litter pickup, installation and adjustment of tree protection devices, and repair of any vandalism will be conducted parallel to the mitigation effort.

Plant Species

Nine tree species will be planted in the mitigation area. A diverse array of species will provide higher diversity indexes, will minimize pest attacks and will also provide a robust and balanced forest structure.

Species Name	Quantity	Contingency 10%	Size	Pot
<i>Annona glabra</i>	2618	262	3'	1 lt
<i>Manilkara bidentata</i>	2618	262	3'	1 lt
<i>Pterocarpus officinalis</i>	2618	262	3'	1 lt
<i>Sthalia monesperma</i>	2618	262	3'	1 lt
<i>Machaerium lunatum</i>	2618	262	3'	1 lt
<i>Conocarpus erectus</i>	2618	262	3'	1 lt
<i>Hibiscus tiliaceus</i>	2618	262	3'	1 lt
<i>Myrica cerifera</i>	2618	262	3'	1 lt
<i>Erythrihna fusca</i>	2618	262	3'	1 lt
<i>Enalagama latifolia</i>	2618	262	3'	1 lt
<i>Thespesia populnea</i>	2618	262	3'	1 lt
Gran total	28880	31762		

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Plant Specifications

Planting types and densities should be specific to demonstrated hydrology and site conditions. The following densities should enable mitigations to meet their performance standards. Quantities are average, based on container-grown material. Rough equation to correlate is: 1'-3' = 1 lt.; 2'-4' = 1 gal.; 4'-6' = 3 gal. Planting densities only give figures for total plants per area. Plants should be placed in random, naturalized clusters. The following minimum acceptable densities per plant community are:

FORESTED WETLANDS SPECIES ARE TO BE PLANTED TO:
Trees 3m O.C., or 400 trees per acre ; (this assumes 1ft. size).

The performance goal for these wet areas is the creation of mature, forested wetlands with some herb, shrub (sub-canopy), and tree layers.

- o Vegetation performance standards (FAC, FACW, or OBL species):
- o Emergent Cover: 60% by Year One, 80% by Year Three, 85% by Year Five;
- o Shrub or sapling tree cover by Year Three -- > 85%.
- o 100% survival by Year One, 85% survival by Year Three.
- o Emergent vegetation will be measured by coverage.
- o Shrubs and trees will be measured by individual survival.

Cover	Year1	Year2	Year3	Year4	Year 5
Emergent	60%	80%	80%	85%	85%
Shrub/Tree	100%	90%	85%	85%	85%

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Irrigation

Irrigation will be contemplated at the initial planting phase, there after it will be considered a supplementary activity. In case of drought, we will apply supplementary water. With an agricultural tractor and hitch water tanks and a PTO Pump with air sprayers will distribute water as needed.

We rely heavily on the grading and achieving the ideal hydrological regime to minimize irrigation efforts.

Post-Construction

Within a month of completing wetland construction and early planting (or initial acceptance), as-built plans should be sent to the lead consultant and to the contractor liaison, including an as-built topographic survey, plant species and quantities used, photographs of the site, and notes about any changes to the original approved plan. Also list the contractor's responsibility concerning plant replacement; fertilization and irrigation, protection from wildlife, and contingency plan requirements.

REGULATORY COMPLIANCE

The proposed mitigation site will be monitored for 5 years to demonstrate the provision of intended functions. Goals describe the overall intent of mitigation efforts and objectives describe individual components of the mitigation site in detail. Performance measures and success standards describe specific on-site characteristics that indicate a function is being provided. Performance measures are used to guide management of the mitigation site. Success standards are thresholds to be measured during the final year of the monitoring period that demonstrate the site has complied with regulatory requirements and is providing intended functions. Contingency plans describe what actions can be taken to correct site deficiencies.

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A. Goals

The goal of the proposed compensatory mitigation is to replace wetland types, acreage and functions, which will be lost due to wetland impacts associated with the proposed project. The created and enhanced wetlands are anticipated to provide the following functions:

B. Functions and Values

The following is a general list of functions and values that will be provided by the proposed mitigation site.

Storm water management

Bio-filtration

Wildlife Habitat

Landscape

Functions are placed in three categories:

Water quality improvement

Hydrology

Habitat

C. Objectives/Goals, Performance Criteria Measures, and Success Standards

The following list describes the thresholds that will determine site success and guide management.

Objective/Goals

The mitigation site will provide feature/attribute, such as “ground or surface water inundation or saturation sufficient to support the wetland sites”.

Wildlife habitat will be provided by establishing woody cover within the mitigation area zones, this will increase habitat diversity within the mitigation site.

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Measure Performance Criteria

The development of complete, well-articulated performance criteria is a key component of each wetland mitigation plan. A performance criterion is a clear description of a measurable standard, desired state, threshold value, amount of change, or trend used to achieve for a particular population or habitat characteristic. It may also set a limit on the extent of an undesirable change.

As part of the adaptive management cycle the performance criteria will include:

- Focus and sharpen thinking about the desired state or condition of the resource.
- Describe to others the desired condition of the resource.
- Determine the management that will be implemented, and set the stage for alternative management if measures or standards are not met.
- Provide direction for the appropriate type of monitoring.
- Provide a measure of management success.
- Identify resource needs.

Performance criteria must be meaningful, measurable, and achievable and it should include the following components to be complete:

- Species or Habitat Indicator: identifies what will be monitored
- Hydrology performance standards: Saturation between soil surface and 12" depth March 1 through May 15, on average.
- Soil performance standards: Soil deconsolidated to at least 12" depth (measured at installation). Soil to contain at least 30% organic matter by bulk density, estimated.
- Location: geographical area (site)
- Attribute: aspect of the species or indicator (e.g. size, density, cover)
- Action: the verb of your objective (e.g. increase, decrease, maintain)
- Quantity/Status: measurable state or degree of change for the attribute (e.g., 30%)
- Time Frame: the time needed for management to prove itself effective (Monitoring Year X)

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Performance Measures for Objectives/Goals

Year 1 - All woody plant material will exhibit a survival rate of 100% during the first semester following installation.

Year 3 - The mitigation area zones (see planting plan, Appendix 4) will include an average of living woody stems per acre during the 3rd year of monitoring.

Cover	Year1	Year2	Year3	Year4	Year 5
Emergent	60%	80%	80%	85%	85%
Shrub/Tree	100%	90%	85%	85%	85%

Success Standards

Most wetland functions cannot be measured easily (if at all) in a manner that allows them to be monitored directly. Instead, indicators are most often used to support the supposition that a particular function will be provided by a wetland if certain characteristics are present. The following success standards should be used sparingly. Several are listed in order to cover the wide range of possible performance objectives that may be used in mitigation planning. However, each standard should be used only as needed to verify establishment of a site characteristic that must be present in order for the site to provide a particular function.

Success Standards

- S1 - Wetland hydrology: saturation
- S2 - Size of wetland area: %
- S3 - Herbaceous cover: %
- S4 - Survival of planted individuals: 100%- 85%
- S5 - Woody cover: %
- S6 - Control of invasives: %
- S7 - Size of any specified area: %
- S8 - Relative presence of wetland classes: herbaceous, forested
- S9 - Plant species diversity: Shannon
- S10 --Slope:%
- S11 - Aquatic invertebrate diversity: BI

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S12- Aquatic invertebrate taxa presence: Cumulative

S13 - Area and depth of open water: cm

S14 - Surface water depth and duration: cm/day

S15 - Canalized water flow: gal/min

S16 - % invasive species area

S17 - Presence of ___ (miscellaneous design features)

S18 - Presence of ___ (amphibians, birds, reptiles, etc.):

Final Success Standard

Year 5 - Woody vegetation within the mitigation area zones will attain a minimum aerial cover of 85% during the 5th year of monitoring. Years 1-5

- Plant coverage will be at least 85% of the total mitigated area.
- Water levels will be sufficient to support facultative or wetter vegetative species within the created wetland areas.
- The mitigation area will have an average of 300 stems per acre or a canopy/crown coverage of 85% for the area.

Cover	Year1	Year2	Year3	Year4	Year 5
Emergent	60%	80%	80%	85%	85%
Shrub/Tree	100%	90%	85%	85%	85%

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Monitoring

Monitoring is driven by performance criteria, which describe the desired condition. Management activities are planned to meet the performance criteria for that site. Monitoring activities are designed to determine if the performance criteria have been achieved. Valid monitoring data are critical to making meaningful management decisions that help meet the objectives for the site.

When activities such as excavation, grading, or hydrology modification occur, a wetland response is difficult to predict. Wetlands are dynamic systems where plant communities can evolve rapidly as conditions change. Static monitoring plans that remain the same from year to year do not adequately address the possibility of dynamic change in the plant communities they are intended to measure. Thus, the monitoring uses annual site conditions and plant community development to develop monitoring plans and strategies for measuring performance criteria. These factors are considered with performance criteria to develop site-specific monitoring plans at the beginning of each field season. Appropriate monitoring activities are used to make sure valid data is provided to guide site management decisions.

All wetland creation and enhancement and buffer enhancement areas will be monitored for a minimum of five years. Formal monitoring procedures will be performed every years on a monthly basis, after Initial Acceptance of the mitigation construction. The site should be evaluated formally following plant installation to evaluate survival rates and to document the presence of any non-native invasive species. A monitoring report will be submitted to the Corps of Engineers, and other resource agencies for review and comment. Report submittals will occur for monitoring every year. Successful mitigation will be measured by attainment of the performance standards described in this mitigation plan document. Reports will be submitted at the beginning of the project; every month during the first year; every six months during years for years 2-5 a year report during years 2-5 and a final report at the end of the project.

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X. CONCLUSION

A wetland jurisdictional delineation was conducted along 28 km alignment proposed for the Tranvia de Carolina. The wetland delineation was conducted following the guidelines of the 1987 US Army Corps of Engineers Wetland Delineation Manual. A "Routine Approach, On site Inspection" was used for this jurisdictional delineation. Accordingly, this wetland jurisdictional delineation was developed by characterizing the vegetation, soils, and hydrology of the study area.

The soils in the studied area were found to be form mixed origin for fill purposes. which are classified by the US Soil Conservation Service as non hydric soils.

The analysis of the field data shows that a total of approximately 34.56 acres of land are to be considered wetlands. 31.8 of those are herbaceous and 3.48 acre are forested wetlands. Approximately 310.44 acres are uplands. Refer to Figure 9: Jurisdictional Delineation Boundaries.

The compensatory mitigation includes the creation of 10.44 acres of forested wetlands and the enhancement of 62.16 acres of herbaceous wetlands converted to forested wetlands. All the mitigation will be conducted on site in the same parcel of land.

Proposed Development	345 acres
JD Wetlands	34.56 acres
JD Wetlands Impact Herb	31.08 acres
JD Wetlands Impact Forest	3.48 acres
Uplands	310.44 acres
Forested Wetland Creation (3:1)	10.44 acres
Wetland Enhancement (2:1)	62.16 acres

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XI. REFERENCES

- ❖ Adamus, P. R, E. J. Clairain Jr., RD. Smith, and R E. Young, 1987, Wetlands Evaluation Technique (WET); Volume II: Methodology, Operational Draft Technical Report, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS.
- ❖ B.G. Gopal, RE. Turner, RG. Wetzel, and D.F. Whigham (eds.), Wetlands: ecology and management. Proceedings of the first international wetlands conference. National Institute of Ecology of Jaipur, and International Scientific Publications. Jaipur, India.
- ❖ Carolina Quadrangle. Geologic Map, Puerto Rico. USGS 1994 Revised Digital Version
- ❖ Carolina Quadrangle. Topographic Map. USGS N 18066-D2-TM-020. Photo Revised 1982.
- ❖ Cowardin, LM., V. Carter, F.C. Golet, and E.T. La Roe, 1979, Classification of Wetlands and Deepwater Habitats of the United States, FWS/OBS-79-31 , U.S. Fish and Wildlife Service, Washington, D.C., 103 p.
- ❖ Department of Natural Resources, 2005, Regulations to Govern the Management of Threatened and - Endanger Species in the Commonwealth of Puerto Rico.
- ❖ Hitchcock, A. S., 1950, Manual of the Grasses of the United States, U.S. Department of Agriculture Miscellaneous Publication No. 200, U.S. Government Printing Office, Washington, D.C.
- ❖ Liogier, H. A., 1995, Descriptive Flora of Puerto Rico and Adjacent Island, *Spermatophyta* Volume IV Melastomataceae to Lentibulariaceae, Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico, 617 p.
- ❖ Liogier, H. A. 1994, Descriptive Flora of Puerto Rico and Adjacent Island, *Spermatophyta* Volume III Cyrillaceae to Myrtaceae, Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico, 461 p.
- ❖ Liogier, H. A. 1985. Descriptive Flora of Puerto Rico and Adjacent Islands, *Spermatophyta* Volume I Casuarinaceae to Connaraceae, Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico, 352 p.
- ❖ Liogier, H. A., 1985, Descriptive Flora of Puerto Rico and Adjacent Island, Volume 2 Leguminosae to Anacardiaceae, Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico, 481 p.
- ❖ Liogier, H. A., 2000, Descriptive Flora of Puerto Rico and Adjacent Island, Volume 5. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico,
- ❖ Little, E.L. Jr, Wadsworth, F.H., Marrero, J., 1977, Arboles Comunes de Puerto Rico y Las Islas Vtrgenes, Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico, 731 p.
- ❖ Odum, H.T., B.J. Copeland, and E.A. McMahan, 1974, Coastal ecological Systems of the United States, The Conservation Foundation, 1717 Massachusetts Avenue,

WETLAND JURISDICTIONAL DETERMINATION
FOR TRANVIA DE CAROLINA LIGHT RAIL TRANSIT PROJECT, CAROLINA, PUERTO RICO.

Washington, D.C.

- ❖ Pico, R, 1950. The geographic regions of Puerto Rico, University of Puerto Rico Press, Rio Piedras Puerto Rico, 256p, illustrations.
- ❖ Reed, P.B., Jr., 1988, National List of Plant Species that Occur in Wetlands: Caribbean (Region C).
- ❖ U.S. Army Corps of Engineers, 1987, Corps of Engineers Wetland Delineation Manual. Department of the Army US Army Corps of Engineers, Washington D.C.
- ❖ U.S. Fish and Wildlife Service, 1988, National List of Plant Species that occur in Wetlands: Caribbean (Region C). U.S. Department of the Interior, Fish and Wildlife Service Biological Report 88 (26.12).
- ❖ U.S. Soil Conservation Service, 1992, Hydric Soils. Of the Caribbean Area. U.S. Soil Conservation Service/Washington D.C.
- ❖ U.S. Soil Conservation Service, 1987, Hydric Soils of the United States: U.S. Department of Agriculture, Soil Conservation Service in Cooperation the National Technical Committee for Hydric Soils.
- ❖ Zack, A, and A. Roman-Mas, 1988. Hydrology of the Caribbean Island Wetlands. Pages 65-73 in Acta Cientifica. Vol. 2 Num. 2-3. U.S. Geological Survey, Caribbean District, San Juan, Puerto Rico.
- ❖ Anderson, D.R. et al. "Guidelines for Line Transect Sampling of Biological Populations". Journal of Wildlife Management. Vol.43. No.1. 1979.
- ❖ San Juan Quadrangle. Geologic Map, Puerto Rico. USGS 1994 Revised Digital Version
- ❖ San Juan Quadrangle. Topographic Map. USGS N 18066-D2-TM-020. Photo Revised 1982.
- ❖ Bonham, Charles D., Measurements for Terrestrial Vegetation. Wiley. Interscience Publication. 1989.
- ❖ Departamento de Recursos Naturales. Oficina de Patrimonio Natural. Listado de Elementos Críticos. Plantas. 1995.
- ❖ Little, E.L. and F.H. Wadsworth. Common Trees of Puerto Rico and the Virgin Islands. USDA Publication. Forest Service Handbooks #249 and #449.
- ❖ Otis, D.L., L.L. McDonald. "Parameter Estimation in Encounter Sampling Survey". Journal of Wildlife Management. Vol. 57. No. 3. 1993.
- ❖ Soil Conservation Service, USDA. Soil Survey of San Juan Area. 1978.
- ❖ US Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants. 50 CFR 17.11 and 17.12. October 31, 1997.

SOILS

Map Unit Name (Series and Phase):		Soils from mixed origin, Paved		Drainage Class:	_____
Taxonomy (Subgroup):		_____		Field Observations	_____
				Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

<p>Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Check)</p> <p>Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p>(Check)</p> <p>Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>Remarks</p>	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvia de Carolina</u>	Date: <u>Jan 2007</u>
Applicant/Owner: <u>AFI, Municipio Carolina</u>	County: <u>Carolina</u>
Investigator: <u>RiveraLugo, PJ</u>	State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>92</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>c</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Bambusa vulgaris</u>	<u>T</u>	<u>FACU</u>	9. _____	_____	_____
2. <u>Trema micrantha</u>	<u>T</u>	<u>FACU</u>	10. _____	_____	_____
3. <u>Eucalyptus deglupta</u>	<u>T</u>	<u>NI</u>	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: _____	

SOILS

Map Unit Name (Series and Phase):		Soils from mixed origin, Paved		Drainage Class:	_____
Taxonomy (Subgroup):		_____		Field Observations	_____
				Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions:	Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvia de Carolina</u>	Date: <u>Jan 2007</u>
Applicant/Owner: <u>AFI, Municipio Carolina</u>	County: <u>Carolina</u>
Investigator: <u>RiveraLugo,PJ</u>	State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>92</u>
Is the area a potential Problem Area? (If needed, explain on reverse.) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Plot ID: <u>b</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Bambusa vulgaris</u>	<u>T</u>	<u>FACU</u>	9. _____	_____	_____
2. <u>Trema micrantha</u>	<u>T</u>	<u>FACU</u>	10. _____	_____	_____
3. <u>Eucalyptus deglupta</u>	<u>T</u>	<u>NI</u>	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: _____	

SOILS

Map Unit Name (Series and Phase):		Soils from mixed origin, Paved		Drainage Class:	_____
Taxonomy (Subgroup):		_____		Field Observations	_____
				Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions:	Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

<p>Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Check)</p> <p>Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p style="text-align: right;">(Check)</p> <p>Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>Remarks</p>	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvia de Carolina</u>	Date: <u>Jan 2007</u>
Applicant/Owner: <u>AFI, Municipio Carolina</u>	County: <u>Carolina</u>
Investigator: <u>RiveraLugo, PJ</u>	State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>92</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>a</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Bambusa vulgaris</u>	<u>T</u>	<u>FACU</u>	9. _____	_____	_____
2. <u>Trema micrantha</u>	<u>T</u>	<u>FACU</u>	10. _____	_____	_____
3. <u>Eucalyptus deglupta</u>	<u>T</u>	<u>NI</u>	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: _____	

SOILS

Map Unit Name (Series and Phase):		Soils from mixed origin, Paved		Drainage Class:	_____
Taxonomy (Subgroup):		_____		Field Observations	_____
				Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Check)	(Check)
Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvia de Carolina</u>	Date: <u>Jan 2007</u>
Applicant/Owner: <u>AFI, Municipio Carolina</u>	County: <u>Carolina</u>
Investigator: <u>RiveraLugo,PJ</u>	State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>91</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>c</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Tabebuia aurea</u>	<u>T</u>	<u>NI</u>	9. _____	_____	_____
2. <u>Eucalyptus deglupta</u>	<u>T</u>	<u>NI</u>	10. _____	_____	_____
3. <u>Bambusa vulgaris</u>	<u>T</u>	<u>FACU</u>	11. _____	_____	_____
4. <u>Cordia sebestana</u>	<u>T</u>	<u>NI</u>	12. _____	_____	_____
5. <u>Grevillea robusta</u>	<u>T</u>	<u>NI</u>	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: _____	

SOILS

Map Unit Name (Series and Phase):		Soils from mixed origin, Paved		Drainage Class:	_____
Taxonomy (Subgroup):		_____		Field Observations	_____
				Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions:	Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks	

Approved by HQUSACE 3/92

Forms version 1/02

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvia de Carolina</u>		Date: <u>Jan 2007</u>	
Applicant/Owner: <u>AFI, Municipio Carolina</u>		County: <u>Carolina</u>	
Investigator: <u>RiveraLugo, PJ</u>		State: <u>Puerto Rico</u>	
Do Normal Circumstances exist on the site?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____	
Is the site significantly disturbed (Atypical Situation)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>91</u>	
Is the area a potential Problem Area? (If needed, explain on reverse.)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Plot ID: <u>b</u>	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Tabebuia aurea</u>	<u>T</u>	<u>NI</u>	9. _____	_____	_____
2. <u>Eucalyptus deglupta</u>	<u>T</u>	<u>NI</u>	10. _____	_____	_____
3. <u>Bambusa vulgaris</u>	<u>T</u>	<u>FACU</u>	11. _____	_____	_____
4. <u>Cordia sebestana</u>	<u>T</u>	<u>NI</u>	12. _____	_____	_____
5. <u>Grevillea robusta</u>	<u>T</u>	<u>NI</u>	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: _____	

SOILS

Map Unit Name (Series and Phase):		<u>Soils from mixed origin, Paved</u>		Drainage Class:	_____
Taxonomy (Subgroup):		_____		Field Observations	_____
				Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvia de Carolina</u>	Date: <u>Jan 2007</u>
Applicant/Owner: <u>AFI, Municipio Carolina</u>	County: <u>Carolina</u>
Investigator: <u>RiveraLugo,PJ</u>	State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>91</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>a</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Tabebuia aurea</u>	<u>T</u>	<u>NI</u>	9. _____	_____	_____
2. <u>Eucalyptus deglupta</u>	<u>T</u>	<u>NI</u>	10. _____	_____	_____
3. <u>Bambusa vulgaris</u>	<u>T</u>	<u>FACU</u>	11. _____	_____	_____
4. <u>Cordia sebestana</u>	<u>T</u>	<u>NI</u>	12. _____	_____	_____
5. <u>Grevillea robusta</u>	<u>T</u>	<u>NI</u>	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: _____	

SOILS

Map Unit Name (Series and Phase):		Sandy Gravel	Drainage Class:		_____
Taxonomy (Subgroup):		_____	Field Observations		_____
			Confirm Mapped Type?		<input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check)	(Check)
Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Remarks: Over Rio Grande de Loiza Bridge at PR#3.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvía de Carolina</u>	Date: <u>Jan 2007</u>
Applicant/Owner: <u>AFI, Municipio Carolina</u>	County: <u>Carolina</u>
Investigator: <u>RiveraLugo,PJ</u>	State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>90</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>c</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Eriochloa punctata</u>	<u>H</u>	<u>FACW</u>	9. _____	_____	_____
2. <u>Ipomoea tiliacea</u>	<u>H</u>	<u>FACW</u>	10. _____	_____	_____
3. <u>Pennisetum purpureum</u>	<u>H</u>	<u>FAC</u>	11. _____	_____	_____
4. <u>Paspalum paniculatum</u>	<u>H</u>	<u>FAC</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: <u>Over Rio Grande de Loiza Bridge at PR#3.</u>	

SOILS

Map Unit Name (Series and Phase):	Sandy Gravel	Drainage Class:	
Taxonomy (Subgroup):		Field Observations	
		Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check)	(Check)
Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Remarks: Over Rio Grande de Loiza Bridge at PR#3.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvia de Carolina</u>	Date: <u>Jan 2007</u>
Applicant/Owner: <u>AFI, Municipio Carolina</u>	County: <u>Carolina</u>
Investigator: <u>RiveraLugo, PJ</u>	State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>90</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>b</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Eriochloa punctata</u>	<u>H</u>	<u>FACW</u>	9. _____	_____	_____
2. <u>Ipomoea tiliacea</u>	<u>H</u>	<u>FACW</u>	10. _____	_____	_____
3. <u>Pennisetum purpureum</u>	<u>H</u>	<u>FAC</u>	11. _____	_____	_____
4. <u>Paspalum paniculatum</u>	<u>H</u>	<u>FAC</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: <u>Over Rio Grande de Loiza Bridge at PR#3.</u>	

SOILS

Map Unit Name (Series and Phase):	Sandy Gravel	Drainage Class:	
Taxonomy (Subgroup):		Field Observations	
		Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check)	(Check)
Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Over Rio Grande de Loiza Bridge at PR#3.	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvia de Carolina</u>	Date: <u>Jan 2007</u>
Applicant/Owner: <u>AFI, Municipio Carolina</u>	County: <u>Carolina</u>
Investigator: <u>RiveraLugo,PJ</u>	State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>90</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>a</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Eriochloa punctata</u>	<u>H</u>	<u>FACW</u>	9. _____	_____	_____
2. <u>Ipomoea tiliacea</u>	<u>H</u>	<u>FACW</u>	10. _____	_____	_____
3. <u>Pennisetum purpureum</u>	<u>H</u>	<u>FAC</u>	11. _____	_____	_____
4. <u>Paspalum panniculatum</u>	<u>H</u>	<u>FAC</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: <u>Over Rio Grande de Loiza Bridge at PR#3.</u>	

SOILS

Map Unit Name (Series and Phase):		Sandy Gravel		Drainage Class:	_____
Taxonomy (Subgroup):		_____		Field Observations	_____
				Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Over Rio Grande de Loiza Bridge at PR#3.	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvia de Carolina</u>	Date: <u>Jan 2007</u>
Applicant/Owner: <u>AFI, Municipio Carolina</u>	County: <u>Carolina</u>
Investigator: <u>RiveraLugo, PJ</u>	State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>89</u>
Is the area a potential Problem Area? (If needed, explain on reverse.) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Plot ID: <u>c</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Eriochloa punctata</u>	<u>H</u>	<u>FACW</u>	9. _____	_____	_____
2. <u>Ipomoea tiliacea</u>	<u>H</u>	<u>FACW</u>	10. _____	_____	_____
3. <u>Pennisetum purpureum</u>	<u>H</u>	<u>FAC</u>	11. _____	_____	_____
4. <u>Paspalum paniculatum</u>	<u>H</u>	<u>FAC</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: <u>Over Rio Grande de Loiza Bridge at PR#3.</u>	

SOILS

Map Unit Name (Series and Phase):		Sandy Gravel		Drainage Class:	_____
Taxonomy (Subgroup):		_____		Field Observations	_____
				Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Over Rio Grande de Loiza Bridge at PR#3.	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvia de Carolina</u>	Date: <u>Jan 2007</u>
Applicant/Owner: <u>AFI, Municipio Carolina</u>	County: <u>Carolina</u>
Investigator: <u>RiveraLugo,PJ</u>	State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>89</u>
Is the area a potential Problem Area? (If needed, explain on reverse.) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Plot ID: <u>b</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Eriochloa punctata</u>	<u>H</u>	<u>FACW</u>	9. _____	_____	_____
2. <u>Ipomoea tiliacea</u>	<u>H</u>	<u>FACW</u>	10. _____	_____	_____
3. <u>Pennisetum purpureum</u>	<u>H</u>	<u>FAC</u>	11. _____	_____	_____
4. <u>Paspalum panniculatum</u>	<u>H</u>	<u>FAC</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: <u>Over Rio Grande de Loiza Bridge at PR#3.</u>	

SOILS

Map Unit Name (Series and Phase):		Sandy Gravel		Drainage Class:	_____
Taxonomy (Subgroup):		_____		Field Observations	_____
				Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Over Rio Grande de Loiza Bridge at PR#3.	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Tranvia de Carolina</u>	Date: <u>Jan 2007</u>
Applicant/Owner: <u>AFI, Municipio Carolina</u>	County: <u>Carolina</u>
Investigator: <u>RiveraLugo,PJ</u>	State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>89</u>
Is the area a potential Problem Area? (If needed, explain on reverse.) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Plot ID: <u>a</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Eriochloa punctata</u>	<u>H</u>	<u>FACW</u>	9. _____	_____	_____
2. <u>Ipomoea tiliacea</u>	<u>H</u>	<u>FACW</u>	10. _____	_____	_____
3. <u>Pennisetum purpureum</u>	<u>H</u>	<u>FAC</u>	11. _____	_____	_____
4. <u>Paspalum panniculatum</u>	<u>H</u>	<u>FAC</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks: <u>Over Rio Grande de Loiza Bridge at PR#3.</u>	