

CHAPTER 4 -- CRITERIA FOR SURFACE WATER MANAGEMENT SYSTEMS

4.1 INTRODUCTION

The objective of this Chapter is to identify the procedures and information used by the District to review the Work Plan.

4.2 DEFINITIONS

4.2.1 Appropriate and Practicable: is defined as measures to offset unavoidable impacts that are appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics and effects to public safety in light of overall project purposes.

History Note: New 10-22-02

4.2.2 Buffer Zone: means an area adjacent to the wetland which protects wetland functions and minimizes adverse impacts of development on the wetland functions.

4.2.3 Class I Landfill: means landfills which receive solid waste, and which receive a monthly average of twenty (20) tons or more of solid waste per day as weighed by scale, if available, or fifty (50) cubic yards or more of solid waste per day as measured in place after covering.

4.2.4 Class II Landfill: means landfills which receive solid waste, and which receive a monthly average of twenty (20) tons or less of solid waste per day as weighted by scales, if available, or less than fifty (50) cubic yards of solid waste per day as measured in place after covering.

4.2.5 Control Device: means an element of a discharge structure which allows the gradual release of water under controlled conditions. This is sometimes referred to as the bleed-down mechanism, or "bleeder."

4.2.6 Control Elevation: means the lowest elevation at which water can be released through the control device.

4.2.7 Creation: The establishment of new wetlands by conversion of other land forms.

History Note: New 10-22-02

4.2.8 Detention: means the delay of storm water runoff prior to discharge into receiving waters.

4.2.9 Detention Volume: means the volume of open surface storage behind the discharge structure between the overflow elevation and control elevation.

4.2.10 Discharge Structure: means a structural device, usually of concrete, metal, timber, through which water is discharged from a project to the receiving water.

4.2.11 Ecological Value: The value of functions performed by wetlands and other environmentally sensitive areas. These functions include providing habitat for wildlife, corridors for wildlife movement, food chain support, groundwater recharge, water storage and flow attenuation, and water quality enhancement.

History Note: New 10-22-02

4.2.12 Elevation: means the height in feet above mean sea level according to National Geodetic Vertical

Datum (NGVD).

4.2.13 Endangered Species: Those animal species and plant species which are listed as endangered in 50 Code of Federal Regulations 17.12.

History Note: New 10-22-02

4.2.14 Enhancement: Improving the ecological value of wetlands, which may include associated uplands that have been degraded in comparison to their historic condition.

History Note: New 10-22-02

4.2.15 Historic Discharge: means the peak rate at which runoff leaves a parcel of land by gravity in an undisturbed/natural site condition, or the legally allowable discharge at the time of plan submission.

4.2.16 Impervious: means land surfaces which do not allow, or minimally allow, the penetration of water; included as examples are building roofs, normal concrete and asphalt pavements, and some fine grained soils such as clays.

4.2.17 Listed Species: Those animal species which are endangered, threatened or of special concern, and those plant species listed in 50 Code of Federal Regulation 17.12, when such plants are found to be located in a wetland.

History Note: New 10-22-02

4.2.18 Mitigation: Mitigation is defined as the replacement of the chemical, physical and biological functions of wetlands which are lost as a result of adverse impacts through compensation. Compensation for impacts usually consists of restoration, enhancement, creation, preservation,

or a combination thereof.

History Note: New 10-22-02

4.2.19 Mitigation Program: A Mitigation Program is defined in this case as wetland, which may include associated upland, restoration, creation, enhancement, and in exceptional circumstances preservation undertaken expressly for the purpose of compensating for unavoidable wetland losses in advance of development actions, when such compensation cannot be achieved at the development site or would not be as environmentally beneficial. It typically involves the consolidation of small, fragmented wetland mitigation projects into one large contiguous site. Units of restored, created, enhanced or preserved wetlands are expressed as "functional units per acre" which may subsequently be withdrawn to offset "debts of units" incurred at a project development site. Ideally, mitigation programs are developed and functioning in advance of development impacts.

History Note: New 10-22-02

4.2.20 Mitigation Functional Units Acreage: Represents the increase or decrease per acre of the presence of function resulting from the mitigation or impact activities.

History Note: New 10-22-02

4.2.21 Overflow Elevation: means the design elevation of a discharge structure at which, or below which, water is contained behind the structure, except for that which leaks out, or bleeds out, through a control device down to the control elevation.

4.2.22 Protected Wetland: means wetland areas that have been mitigated pursuant to the criteria established in 4.3.2.3, or set aside through project design, conservation, or specified in the Compact for preservation, to ensure continued biological and hydrologic function indicative of that wetland type. Protection of wetlands may also include mitigation necessary to fully compensate for wetland losses in a manner that contributes to the long-term ecological functioning of the Reservation within which the impact occurs.

History Note: Revised 10-22-02

4.2.23 Preservation: The protection of wetlands, which may include associated uplands, from adverse impacts by inclusion in a mitigation area to be preserved.

History Note: New 10-22-02

4.2.24 Restoration: Converting to a historic condition those wetlands, which may include associated uplands, which currently exist as a land form which differs from the historic condition.

History Note: New 10-22-02

4.2.25 Retention: means the prevention of storm runoff from direct discharge into receiving waters; included as examples are systems which discharge through percolation, exfiltration, filtered bleed-down and evaporation processes.

4.2.26 Retention/Detention Area (Dry): means a water storage area with a bottom elevation at least one foot above the control elevation of the area. Included sumps, mosquito control swales and other minor features may be at a lower elevation.

4.2.27 Retention/Detention Area (Wet): means a water

storage area with a bottom elevation lower than one foot above the control elevation of the area.

4.2.28 Threatened Species: Those animal species and plant species which are listed as threatened in 50 Code of Federal Regulations 17.12.

History Note: New 10-22-02

4.2.29 Water Management Areas: means areas to be utilized for the conveyance or storage of storm water or environmental preservation.

4.2.30 Wetlands: means areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances do or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, wet prairies, river overflows, mud flats, and natural ponds.

4.2.31 Wetland Assessment Methodology: The assessment methodology for determining the functional value of a wetland. An example of an assessment methodology is the Wetland Rapid Assessment Procedure (WRAP), September 1997, Technical Publication REG 001 and the Numeric Functional Assessment (NFA) based on the joint State/Federal Mitigation Bank Review Team Process for Florida, Operational Draft, October, 1998.

History Note: New 10-22-02

4.2.32 Wetland Delineation: A determination

of the landward extent of wetlands, including isolated wetlands, pursuant to the United States Army Corps of Engineers Wetlands Delineation annual Technical Report Y-87-1. Nothing herein is intended to expand or reduce the determination of the landward extent of wetlands on the Reservations.

History Note: New 10-22-02

4.3 CRITERIA

4.3.1 General: The administrative procedures used to determine environmental impacts are included in Chapter 1 of this Manual. Part 4.4 gives design information generally used by the District for review of surface water management systems which may be utilized by the Tribe to meet the criteria of this Chapter.

4.3.2 Technical

4.3.2.1 Water Quantity

A. General: This subsection refers to flood and drought frequency impacts interchangeably with rainfall frequency. However, additional calculations may be necessary to identify other combinations of site conditions and rainfall frequencies which might result in impacts of the specified frequency. Examples include designs affected by spring tides, fluctuating tides and fluctuating receiving water stages.

B. Discharge: Off-site discharge is limited to amounts which will not cause additional adverse off-site impacts. These amounts are:

1. Historic discharges. Or:

2. Amounts determined in previous District permit actions. Or:

3. Amounts specified in District criteria and set forth as follows:

<u>Canal</u>	<u>Allowable Runoff</u>	<u>Design</u>
<u>Frequency</u>		
C-40, C-41	35.4 Cubic Feet per second per square mile (CSM)	10 Year
L-28	11.8 CSM)	25 Year
Unless otherwise specified by previous District permits or District criteria, a storm event of three (3) day duration and twenty-five (25) year return frequency shall be used in computing off-site discharge. Allowable discharges will be designated by the District on a case-by-case basis upon request.		

C. Flood Plain Encroachment: There shall be no net encroachment into that floodplain which is encompassed by the one hundred (100) year event, and which will adversely affect the existing rights of others. Storage volumes for purposes of compensation shall be calculated based upon the loss of storage between the level of the one hundred (100) year event and the average wet season water table level.

D. Overdrainage and Water Conservation

Systems shall be designed to attempt to:

1. Maintain water table in existing District permitted Public Water Supply wellfield cones of depression. And:

2. Preserve site environmental values (see section 1.2.3 and subsection 4.3.2.3 of this Manual). And:

3. Maintain water tables no more than six (6) feet below natural ground. And:

4. Not waste freshwater. And:

5. Not lower water tables which would adversely affect the rights of others as protected under the Compact. And:

6. Preserve site ground water recharge characteristics.

E. Historic Basin Storage: Provision must be made to replace or otherwise mitigate the loss of historic basin storage provided by the project site.

F. Off-Site Lands: On-site diversion swales, dikes, may be necessary to allow the passage of drainage from off-site upland areas to downstream areas. Diking of project development areas may be necessary to contain water at or above stages identified in the project discharge computations.

4.3.2.2 Water Quality

A. Standards: Projects shall be designed so that discharges will meet State water quality standards.

B. Retention/Detention Criteria

1. Retention and/or detention in the overall system, including swales, lakes, canals, greenways, shall be provided for by satisfying one of the three (3) following criteria or equivalent combinations thereof (Note: Figure 4-1 can be utilized where the conditions can be met):

a. Wet detention volume shall be provided for the first inch of runoff from the developed project, or the total runoff of 2.5 inches times the percentage of imperviousness, whichever is greater.

b. Dry detention volume shall be provided equal to seventy-five percent (75%) of the above amounts computed for wet detention.

c. Retention volume shall be provided equal to fifty percent (50%) of the above amounts computed for wet detention. Retention volume included in flood protection calculations requires a demonstration of guarantees of long term operation and maintenance of system bleed-down ability.

2. Commercial or industrial areas shall provide at least one-half (1/2) inch of dry detention or retention pre-treatment as part of the required retention/detention, unless reasonable assurances can be offered that hazardous materials will not enter the project's surface water management system. Such assurances may include deed restrictions on sale property occupancy, recorded lease agreements, ordinances, licenses, engineered containment systems.

3. Systems with inlets in grassed areas will be credited with up to 0.2 inches of the required wet detention amount for the contributing areas. Full credit will be based on a ratio of 10:1 impervious area runoff to pervious area with proportional credit granted for greater ratios.

4. Projects having greater than forty percent (40%) impervious area and which discharge directly to sensitive receiving water shall provide at least one-half (1/2) inch of dry detention or retention pre-treatment as part of the required retention/detention. Sensitive receiving waters are defined in 1.2.4.3(A) of this Manual.

And:

Water bodies within a District permitted public water supply wellfield cone-of-depression, which are not separated from the aquifer by strata at least ten (10) feet thick, having an average saturated hydraulic conductivity of less than 0.1 foot per day; where the cone-of-depression is defined by one of the following:

a. In those areas of the District where no local wellfield protection ordinance has been adopted by the local governing body, the one (1) foot drawdown line, as expressed in the water table aquifer under conditions of no rainfall and one hundred (100) days of pumpage at the permitted average daily pumpage rate (where significant canal recharge is indicated, canal recharge representative of a once in a one hundred (100) year drought will be considered).

b. Broward County Wellfield Protection Ordinance contour for Zone

5. Water surface and roofed areas can be

deducted from site areas for water quality pervious/impervious calculations.

6. Different standards may be applied to urban public highway projects.

C. High Density Projects: Projects which have more than forty percent (40%) impervious area may be required to use retention rather than detention, depending on such variables as:

1. Sensitivity of receiving water.
2. Soils.
3. Arrangement of on-site facilities.

D. Projects Located Within Cones of Depression: Retention/detention area locations shall not reduce hydraulic recharge distances to public water supply wells in excess of two percent (2%), nor shall wet retention/detention areas be closer to public water supply wells than three hundred (300) feet.

E. Solid Waste Facilities

1. Surface water management systems shall be so designed and constructed as to maintain the integrity of the landfill at all times (during construction, operation, closure and post closure). Assurances must be provided that:

- a. All flows will be conveyed at

non-erosive velocities.

b. The project is designed to minimize erosion.

2. Design features in support of this requirement may include, but not be limited to:

a. Slopes adequate to promote runoff but not affect slope stability.

b. Intermediate benches or swales which reduce runoff velocities and limit erosion.

c. Vegetation of closed portion of landfill.

3. Class I and II landfill projects shall provide adequate assurance that leachate will not enter the surface water management system. This assurance may be provided through affirmative demonstration that all applicable State standards for design and emplacement of liners, leachate collection systems, and treatment and disposal of leachate will be met.

4. Borrow pits shall not be included in the surface water management system unless the Tribe can affirmatively demonstrate that leachate will not enter the borrow pit, and that State water quality standards will be met.

5. Dewatering operations at active, unlined landfills will not be permitted.

6. For Class I and II landfills the District

may require one or more of the following additional Best Management Practices:

a. Detention in excess of the quantities stated in 4.3.2.2(B).

b. Dry detention areas.

c. Dry conveyance swales with adequate dimensions to permit maintenance.

d. Filter mechanisms for additional water quality enhancement prior to discharge.

e. Skimmers in front of discharge structures to restrict discharge of floatable materials.

f. Screw gates on water control structures capable of restricting discharge of poor quality surface water.

g. Vegetation of appropriate portions of the water management system including, but not limited to, conveyance swales.

7. To provide information for assessing the need for Best Management Practices at a specific site, the District will require a hydrogeologic investigation that should, at a minimum, provide information on:

a. The hydrogeologic properties of the formations underlying the landfill, including aquifer characteristics, groundwater elevations and direction, and rate of groundwater flow.

b. Location of existing wells within one-half mile of the site perimeter.

c. Locations and specifications of existing or proposed monitor wells.

8. The Tribe should consult with the District during the design of the project to determine the requirements which will apply for a particular project.

F. Use of Natural Areas and Existing Water Bodies

Natural areas and existing water bodies may be used for retention/detention purposes on some occasions, when not in conflict with environmental or public use considerations (see 1.2.3 and 4.3.2.3 of this Manual). Candidate areas for such purposes might include:

1. Previously degraded areas.
2. Man-made areas (such as borrow pits).
3. Extensive areas which have the ability to absorb impacts easily.
4. Areas incorporated into a system with mitigation features.

G. Underground Exfiltration Systems

1. Systems shall be designed for the retention volumes specified in paragraph 4.3.2.2(B) for retention systems, exfiltrated over one (1) hour for retention purposes prior to overflow, and based on test data for the site. (Note: Such systems should not be proposed for projects to be operated by entities other than single owners or entities with full time maintenance staff.)

2. A safety factor of two or more shall be applied to the design to allow for geological uncertainties.

3. A dry system is one with the pipe invert at or above the average wet season water table.

H. Sewage Treatment Percolation Ponds: Above ground pond dikes shall not be within two hundred (200) feet of water bodies or one hundred (100) feet of dry retention/detention areas. Additional calculations may be necessary in unusual cases, requiring deviations from these dimensions.

4.3.2.3 Environmental

A. References to wetlands in this subsection are those wetlands designated for protection under Part V.D. of the Compact. Wetlands and appropriate buffer areas shall be protected except as otherwise outlined in Part V.D. of the Compact.

B. Wetlands (in on-site uplands and/or impacted wetlands) may be created to replace natural wetlands as provided in Part V.D.4. of the Compact. To the extent appropriate and practicable, wetlands on-site shall be

incorporated into the surface water management system in a manner that protects their hydroperiod and fish and wildlife values.

C. Habitat Diversity Systems: Natural systems composed of distinct upland/wetland systems shall be preserved where it is evident that the two are interdependent. Proposed Work Plan activities shall not impact the values of wetland functions so as to cause adverse impacts to:

1. the abundance and diversity of fish, wildlife and listed species; and
2. the habitat of fish, wildlife and listed species;

De minimis effects shall not be considered adverse impacts for the purposes of this subparagraph. The assessment of impacts expected as a result of proposed activities on the values and functions that any wetland provides to fish, wildlife, and listed species will be based on the best scientific judgment or some other mutually acceptable assessment procedure.

History Note: Revised 10-22-02

D. Lake/Canals - Wetland Separation: Lakes/canals which may adversely affect wetland areas shall be separated from the wetlands protected under the Compact by a minimum distance of two hundred (200) feet unless tests, calculations or other information demonstrate deviation from this dimension is appropriate.

E. Water Levels: Water tables shall not be altered such that off-site wetlands, or wetlands protected under the Compact, are adversely affected. Control elevations shall be established which maintain or improve pre-development

hydroperiods in wetlands made part of a surface water management system. In areas to be developed, water shall be routed to preserved wetlands not made part of the surface water management system, so as to approximate pre-development hydroperiods.

F. Zones: Buffer zones shall be provided around all wetlands that are to be protected or incorporated into a surface water management system. Actual delineation of the buffer zone may vary according to site specific conditions, provided it extends at least fifteen (15) feet landward from the edge of the wetland in all places and averages twenty-five (25) feet from the landward edge of the wetland.

Proposed buffer zones shall be delineated on the Work Plan.

Buffer zones may consist of natural features suitable for the particular site, such as undisturbed uplands, open water bodies, wildlife corridors, or other appropriate natural or structural features.

Upland areas or wildlife corridors adjacent to buffer zones may be incorporated in areas set aside in satisfaction of Part V.D.4. of the Compact, provided they are in excess of the minimum buffer zone.

G. Mitigation:
History Note: New 10-22-02

Intent: Wetlands greater than forty (40) contiguous acres as described in Part V.D.2. of the Compact, may be

protected through the provision of a mitigation proposal which satisfies the following requirements. Protection of wetlands may also include mitigation necessary to fully compensate for unavoidable adverse impacts to wetlands in a manner that contributes to the long-term ecological functioning of the Reservation within which the impact occurs. In undertaking such mitigation, the Tribe's and District's mutual, overall goal is to avoid adverse impacts to wetlands and offset unavoidable adverse impacts to wetlands to achieve no overall net loss of wetland values and functions.

H. Sequencing: In evaluating Work Plan and Work Plan amendment submittals, as a practical matter, information on all facets of a project, including potential mitigation, is ideally gathered and reviewed at the same time. First, the District makes a determination that potential impacts have been avoided to the maximum extent practicable. Second, the remaining unavoidable impacts are minimized to the extent appropriate and practicable. Finally, compensatory mitigation for unavoidable adverse impacts to wetland resource values and functions is required.

1. Avoidance allows Work Plan approval for only the least environmentally damaging practicable alternative. The thrust of this section on alternatives is avoidance of impacts. Compensatory mitigation may not be used as a method to reduce environmental impacts in the evaluation of the least environmentally damaging practicable alternatives.

2. Minimization. Appropriate and practicable steps to minimize the adverse impacts will be required through project design modifications and Work Plan conditions. The term "modification" shall not be construed as including the alternative of not implementing the system in some form, nor

shall it be construed as requiring a project that is significantly different in type or function. A proposed modification which is not technically capable of being made is not economically viable, or which adversely affects public safety through the endangerment of lives or property is not considered "practicable". A proposed modification need not remove all economic value of the property in order to be considered not "appropriate and practicable". Conversely, a modification need not provide the highest and best use of the property to be "appropriate and practicable". The District will give full consideration to the views of the Tribe and the resources available to the Tribe when making this practicability determination.

3. Compensatory Mitigation. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain after all appropriate and practicable minimization has been required. Compensatory actions (e.g., restoration, enhancement, preservation, restoration of existing degraded wetlands or creation of man-made wetlands) should be undertaken, when practicable, in areas adjacent or contiguous to the discharge site (onsite compensatory mitigation). If on-site compensatory mitigation is not practicable, off-site compensatory mitigation should be undertaken in the same geographic area if practicable (i.e., in close physical proximity and, to the extent possible, the same reservation). In determining the compensatory mitigation required, the values and functions lost by the resource to be impacted must be considered.

I. Mitigation Guidelines:

History Note: New 10-22-02

1. General Provisions: Compensatory mitigation for impacts to wetlands greater than 40 contiguous acres in size shall be determined on a case-by-case basis and reflect a no-net loss of wetland Functional Value Units (Units) on the Reservation(s). Units shall be determined using the Wetland Rapid Assessment Procedure (WRAP) and Numeric Functional Assessment (NFA). The below-listed ratios are proposed as guidelines to be used by the Tribe and the District to ensure that there is not an overall loss of wetland function. For impacts to wetlands that are less than 40 contiguous acres in size, the Tribe will have the option of using the multiplier (1), regardless of WRAP score.

WRAP SCORE	MULTIPLIER
≤ .50 =	1:1
.51 to .59 =	1.5:1
.60 to .69 =	2:1
.70 to .74 =	3:1
.75 to .84 =	4.5:1
≥ .85 =	5:1

2. a. Wetland Assessment: Appropriate wetland assessment procedures for determining the values and functions of a wetland will be used to qualitatively assess the wetlands to be impacted, as well as the mitigation proposed. Factors including wetland size, temporal loss, risks associated with mitigation success and other special circumstances which warrant weighting, for example the regional setting of the wetland and the effect of the Central and Southern Florida Flood Control Project, will be taken into consideration in the assessment of any proposed impacts and mitigation. See the Wetland Rapid Assessment Procedure (WRAP), September 1997, Technical Publication REG 001 and the Numeric Functional Assessment based on the joint State/Federal Mitigation Bank Review Team Process for Florida, Operational Draft, October, 1998 for examples of how to perform this assessment. Multipliers shall be used to determine the required compensatory mitigation for impacts to wetlands of forty (40) contiguous acres in size or more as follows:

Example 1: The Tribe proposes to impact (fill) wetland X (45 acres) for residential development. Wetland X is greater than forty (40) contiguous acres in size so the ratios will need to be used. The completed WRAP/NFA analysis for that wetland provides a score of 0.65. This equates to a proposed impact of 45 acres X .65 (WRAP Score) X 2 (Multiplier), or 58.5 units of impact that require compensation. To offset this impact, an equal amount of units would be deducted from the advanced mitigation program ledger, or a mitigation project would be required that would produce an equal number of units.

Example 2: The Tribe proposes to impact (fill) wetland X (20 acres) for industrial development. This wetland is less than forty (40) contiguous acres in size. The completed WRAP/NFA analysis for the wetland provides a score of 0.73. However, since this wetland is less than forty (40) contiguous acres in size, the Tribe has the option of using either a multiplier of (1) or the same acreage of mitigation, regardless of the WRAP/NFA score. This equates to a choice between the following mitigation options: (20 acres X .73 WRAP/NFA score) X 1 (Multiplier) = 14.6 Units required; or in the alternative 20 acres of mitigation for the 20 acres of impacts). 2. b. Alternative

Wetland Assessment: Alternative wetland assessment methodologies may be considered that are mutually acceptable to the Tribe and the District.

3. Proposed Mitigation (including Advanced Mitigation): WRAP/NFA scores will be conducted for each proposed mitigation site in order to determine the mitigation potential/objective and an average or overall score will be developed. Upon acceptance of a suitable mitigation plan, a post-WRAP/NFA score will be designated. The difference between the two WRAP/NFA scores (known as mitigation lift) will determine the amount of Functional Value Units (Units) available for each respective site. For example, if the average WRAP/NFA score of an advanced mitigation site is 0.4 and the post-WRAP/NFA score is determined to be 0.9, then the "lift" will be 0.5. This number multiplied by the advanced mitigation acreage will provide the total number of units available. Accordingly, a 524 acre melaleuca-dominated area proposed for enhancement for mitigation would result in 262 Units ($524 \times .5 \text{ (lift)} = 262 \text{ Units}$).

4. Melaleuca Dominated Wetlands

When the District evaluates mitigation proposals to offset impacts to Melaleuca dominated wetlands, the following factors will be considered to determine the appropriate mitigation. However, the following factors shall only be considered for impacts to those wetlands that are less than forty (40) contiguous acres in size no matter what the WRAP score and to those wetlands that are greater than forty (40) contiguous acres in size that have a WRAP score of .51 or higher:

Unavoidable impacts to wetland areas that contain 50% or greater coverage of melaleuca shall require less mitigation than that which is normally required under Section 4.3.2.3.I. The amount of required mitigation, as calculated under Section 4.3.2.3.I shall be reduced by 25% when mitigating for impacts to wetlands containing greater than 50% coverage of melaleuca.

Melaleuca within the wetland to be impacted shall be mapped in units not larger than 1/2 acre which differentiate coverages of 50%-75% and 76%-100%. The Tribe may elect to measure coverage in more detail. The District shall allow the use of larger mapping units when the Tribe can demonstrate that:

a. 1/2 acre mapping units will impose an economic hardship due to the large size of the wetland impact areas; and

b. Mapping in larger units will not result in additional acreage qualifying for the ratios in this subsection. The coverage of melaleuca shall be defined as the absolute percentage of the area in question that lies under the crown of a melaleuca tree with a one inch or greater trunk diameter at breast height. The crown of each melaleuca tree shall be considered a solid shape without regard for holes or openings among the leaves and branches. Any valid vegetative sampling method shall be acceptable for estimating melaleuca coverage, including visual observation, use of random sample points, a grid of points, or line or belt transects. (See Bonham, C.D. 1989, Measurements for Terrestrial Vegetation for guidance in estimating coverage.)

Aerial photography may be used to complement on-the-ground estimates of melaleuca coverage for large tracts.

5. Mitigation Proposals: The Tribe shall provide reasonable assurances that proposed mitigation will: offset adverse impacts due to regulated activities; and achieve mitigation success by providing viable and sustainable ecological and hydrological functions. The Tribe shall submit detailed plans describing proposed construction, establishment, and management of mitigation areas. These plans should include the following information, as appropriate for the type of mitigation proposed:

- a. An aerial or satellite imagery of mitigation area and region.
- b. A soils map of the mitigation area and other soils information pertinent to the specific mitigation actions proposed.
- c. A hydrologic features map of the mitigation area and adjacent hydrologic contributing and receiving areas.
- d. A map of vegetation communities within the mitigation area.
- e. Construction drawings detailing proposed hydrological alterations and all structural components associated with proposed activities.
- f. Proposed construction activities, including a detailed schedule for implementation.

g. A vegetation planting scheme if planting is proposed, and schedule for implementation.

h. Sources of plants and soils used in wetland creation.

i. Measures to be implemented during and after construction to avoid adverse impacts related to proposed activities.

j. A management plan comprising all aspects of operation and maintenance, including water management practices, vegetation establishment, exotic and nuisance species control, fire management, and control of access.

k. A description of the activities proposed to control exotic and nuisance species should these become established in the mitigation area.

l. A description of anticipated site conditions within the mitigation area after the mitigation plan is successfully implemented.

m. A topographic map of the mitigation area and adjacent hydrologic contributing and receiving areas.

n. A description of current hydrologic conditions affecting the mitigation area.

o. A proposed monitoring plan to demonstrate mitigation.

p. A mitigation ledger. The ledger listing of the number and type of mitigation acres in the Mitigation Program.

q. GIS vector overlays of mitigation areas and areas debited from the mitigation areas.

6. Innovative Mitigation Proposals: Innovative mitigation proposals proposed by the Tribe which deviate from the practices described above shall be considered on a case-by-case basis.

7. Monitoring: Proposed mitigation for wetland impacts on a reservation shall include the submittal of a proposed monitoring plan, if the proposed mitigation involves creation, restoration or enhancement of wetlands. This plan shall be reviewed and mutually agreed upon prior to any associated impacts occurring. The plan shall be designed in such a manner as to demonstrate the level of mitigation success. The Tribe shall monitor the progress of mitigation areas until success can be demonstrated. Monitoring parameters, methods, schedules, and reporting requirements will be specified by the District in Work Plan conditions.

8. Preservation of Mitigation Areas: The Tribe shall propose and be responsible for implementing methods that assure that mitigation areas will not be adversely impacted unless such impacts are subsequently concurred with through future Work Plans or Work Plan amendments. The Tribe's commitment to preserve the mitigation areas shall be

specifically described in any Work Plan proposed under Part VII, Section A. of the Compact.

9. Mitigation Success: Due to the wide range of types of projects which may be proposed for mitigation, specific success criteria will be determined on a case-by-case basis (which may include but not be limited to wetland assessment procedures). The success criteria to be included in the Work Plan conditions will specify the minimum requirements necessary to attain a determination of success. The mitigation shall be deemed successful by the District when the mitigation area has achieved viable and sustainable ecological and hydrological functions and the specific success criteria in the Work Plan are met. If success is not achieved within the timeframe specified within the Work Plan, remedial measures shall be required. Monitoring and maintenance requirements shall remain in effect until success is achieved.

J. Cumulative Impacts:

History Note: New 10-22-02

The Tribe shall provide reasonable assurances that a proposed Work Plan activity will not cause unacceptable cumulative impacts upon wetlands within the same Reservation as the proposed activity.

1. The impact on wetlands and other surface waters shall be reviewed by evaluating the impacts to water quality as set forth in subsection 4.3.2.2 and by evaluating the impacts to values and functions identified in - 4.3.2.3.

2. The Tribe must provide reasonable assurance that the proposed system, when considered with

other projects which are existing or activities regulated under the Compact which are under construction, or projects for which Work Plan approval has been sought, will not result in unacceptable cumulative impacts to water quality or the functions of wetlands and other surface waters within the same Reservation. If the Tribe proposes to mitigate adverse impacts within the same Reservation as the impacts, and if the mitigation fully offsets the impacts, the District will consider the Work Plan activity to have no unacceptable cumulative impacts upon wetlands and other surface waters.

3. The cumulative impact evaluation is conducted using an assumption that reasonably expected future Work Plan approvals with like impacts will be sought, thus necessitating equitable distribution of acceptable impacts among future activities.

4. Cumulative impacts are considered unacceptable when the proposed system, considered in conjunction with the past, present, and future activities as described in 4.3.2.3.J.2. would result in a violation of applicable water quality standards or significant adverse impacts to values and functions of wetlands identified in 4.3.2.3. within the same Reservation. However, if there are no cumulative impacts when considering the Reservation's location within the watershed as a whole then the District will consider the Work Plan activity to have no unacceptable cumulative impacts on wetlands or other surface waters.

5. The Tribe may propose measures such as preservation to prevent cumulative impacts. Such preservation shall comply with subparagraph 4.3.2.3.I.8. If unacceptable cumulative impacts are expected to occur, the

Tribe may propose mitigation measures, as provided for in paragraph 4.3.2.3.

4.3.2.4 Construction

A. Discharge Structures:

1. All design discharges shall be made through structural discharge facilities. Earth berms shall be used only to disperse or collect sheet flows from or to ditches, swales, served by discharge structures.

2. Discharge structures shall be fixed so that discharge cannot be made below the control elevation, except that emergency devices may be installed with secure locking devices. Either the District or an acceptable governmental agency will keep the keys for any such devices.

3. Non-operable discharge structures shall be constructed so that they are just that. Flashboard risers should not be used for urban construction.

4. Discharge structures should include gratings for safety and maintenance purposes. The use of trash collection screens is desirable.

5. Discharge structures shall include a "baffle" system to encourage discharge from the center of the water column rather than the top or bottom. Discharge structures from areas with greater than fifty percent (50%) impervious area, or from systems with inlets in paved areas, shall include a baffle, skimmer, or other mechanism suitable

for preventing oil and grease from discharging to and/or from retention/detention areas.

6. Direct discharges, such as through culverts, storm drains, weir structures, to receiving waters will normally be allowed which, by virtue of their large capacity, and configuration, are easily able to absorb concentrated discharges. Such receiving waters might include existing storm sewer systems and man-made ditches, canals and lakes.

7. Indirect discharges, such as overflow and spreader swales, are required where the receiving water or its adjacent supporting ecosystem might be degraded by a direct discharge. The discharge structure would therefore discharge into the overflow, spreader swale, which in turn would release the water to the actual receiving water. Such receiving waters might include natural streams, lakes and marshes and land naturally receiving overland sheetflow.

8. Pumped systems will only be allowed where the Tribe accepts responsibility for perpetual operation.

B. Control Devices/Bleed-Down Mechanisms for Detention Systems:

1. Gravity control devices shall normally be sized based on a design discharge of one-half (1/2) inch of the detention volume during the first day. The devices should incorporate dimensions no smaller than six (6) square inches of cross sectional area, two (2) inches minimum dimension, and twenty degrees (20°) for V notches.

2. Gravity control devices shall be of a V or

circular shaped configuration to increase detention time during minor events.

3. Pumped control devices shall normally be sized based on a design discharge of twenty percent (20%) of the detention volume in one (1) day.

C. Dry Retention/Detention Areas: (not applicable to natural or mitigation wetland areas):

1. Dry retention/detention areas shall have mechanisms for returning the groundwater level in the area to the control elevation.

2. Mosquito control ditches or other appropriate features for such purpose, shall be incorporated into the design of dry retention/detention areas.

3. The design of dry retention/detention areas shall incorporate considerations for regular maintenance and vegetation harvesting procedures.

D. Wet Retention/Detention Areas:

1. Dimensional Criteria: (as measured at or from the control elevation)

a. Area: 0.5 acre minimum.

b. Width: One hundred (100) feet minimum for linear areas in excess of two hundred (200) feet length. Irregular shaped areas may have narrower reaches but should average at least one hundred (100) feet. (Note: Area and width requirements may be waived for projects to

be operated by the Tribe.)

c. Depth: A minimum of twenty percent (20%) of the area shallower than six (6) feet is required up to 2.5 percent of the project waterbody and contributing area (including side slopes), and twenty five to fifty percent (25%-50%) of the area deeper than twelve (12) feet is desirable.

d. Side Slopes: For purposes of water quality enhancement and maintenance, all wet retention/detention areas should have below ground side slopes no steeper than 4:1 (horizontal:vertical) out to a depth of two (2) feet below the control elevation, or an equivalent substitute. Side slopes should be topsoiled, nurtured or planted from two (2) feet below to one (1) foot above control elevation to promote vegetative growth. Littoral zone vegetation growth survival shall be a consideration of plan approval. For above ground impoundment dikes located where failure could cause significant damage to non-Tribal property, or involve loss of human life, would create a public health hazard, or could cause irreversible environmental or water quality damage, recommended side slopes for vegetated earth should be no steeper than 2.5:1 (horizontal:vertical) for external slopes and 3:1 (horizontal:vertical) for internal slopes.

For other dikes, side slopes for vegetated earth may be increased, but should be no steeper than 2:1 (horizontal:vertical) for dikes external to the Tribe's property.

e. Bulkheads: Bulkheads may be allowed for no more than forty percent (40%) of the shoreline length, but compensating littoral

zone must be provided.

2. Support Facility Design Criteria:

a. Perimeter maintenance and operation easements of twenty (20) feet (minimum preferable) width at slopes no steeper than 4:1 (horizontal:vertical) should be provided beyond the control elevation water line.

b. Control elevations should be no higher than two (2) feet below the minimum road centerline elevation in the area served by the control device in order to protect the road subgrade.

E. Exfiltration Systems: Exfiltration systems shall be designed to meet the following criteria:

1. Minimum pipe diameter of twelve (12) inches.

2. Minimum trench width of three (3) feet.

3. Rock in trench must be enclosed in filter material, at least on the top and sides. And:

4. All inlets shall be provided with maintenance sumps.

F. Deep Water Bodies: Water bodies shall meet both of the following criteria:

1. Entrapped salt water, resulting from inland migration of salt water during hurricane tide conditions

or penetration of the freshwater/salt water interface, will not adversely impact existing legal water users as protected by the Compact.

2. The penetration of a water-bearing formation exhibiting poorer water quality, in terms of chloride concentrations, will not adversely impact existing legal water users as protected by the Compact, or result in adverse environmental impacts.

G. Impervious Areas: Runoff shall be discharged from impervious surfaces through retention areas, detention devices, filtering and cleansing devices, and/or subjected to some type of Best Management Practice prior to discharge from the project site. For projects which include substantial paved areas, such as shopping centers, large highway intersections with frequent stopped traffic, and high density developments, provisions shall be made for the removal of oil, grease and sediment from storm water discharges.

H. Stagnant Water Conditions: Configurations which create stagnant water conditions such as hydraulically dead end canals are to be avoided, regardless of the type of development.

4.4 DESIGN INFORMATION

4.4.1 Antecedent Conditions: Antecedent conditions for design purposes are average wet season.

4.4.2 Rainfall: Reference Sources include:

SFWMD Technical Publication No. 81-3 and the following distribution table:

Time of (hours)	Cumulative Percentage Peak One Day Rainfall
0	0
24	14.6
48	35.9
58	57.2
59	62.8
59.5	67.8
59.75	82.8
100% One Day Rainfall	60
60.5	101.5
61	108.8
62	112.6
72	117.7
	135.9

-- Actual gage data analyzed by accepted statistical methods.

-- U.S. Department of Agriculture, Soil Conservation Service, Rainfall Frequency Atlas of Alabama, Florida, Georgia and South Carolina for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 years (1973).

-- Florida Department of Transportation Drainage Manual (Second Edition, revised 1978). Revised Rainfall Intensity Curves per Directive No. 0736-01-79.

4.4.3 Evapotranspiration: Amounts can be estimated as follows:

4.4.3.1 Groundwater depth 0 to 1' - 0.3 ET/day

4.4.3.2 Groundwater depth 1' to 2.5' - 0.2 ET/day

4.4.3.3 Groundwater depth 2.5' to 4' - 0.1 ET/day

4.4.3.4 Groundwater depth below 4' - 0 ET/day

4.4.4 Storage:

4.4.4.1 Open Surface: If open surface storage is to be considered in the review, the Tribe should submit stage-storage computations. If open surface storage plus discharge is to be considered, the stage discharge computations should also be submitted. Actual rather than allowable discharges shall be used in routing. Often for the more extreme events, such as a one hundred (100) year frequency, discharge should be ignored because the high tail water stage in the receiving water effectively prevents any but a negligible discharge. In such cases a mass accounting of on-site water will suffice, if adjacent areas can safely be ignored.

4.4.4.2 Ground: The Soil Conservation Service has made the following estimate of soil storage, capability for the normal sandy soils found within the District in their average natural state:

<u>Depth to Water Table</u>	<u>Cumulative Water Storage</u>
1'	0.6
2'	2.5
3'	6.6
4'	10.9

For the same sandy soils which have been compacted intentionally or incidental to earthwork operations,

the cumulative storage should be reduced twenty-five percent (25%).

Groundwater storage beneath impervious surfaces generally appears impractical to any great degree because of the trapped air, which water cannot displace. It further appears impractical below four (4) feet depths, except in high sandy coastal ridge areas, because of the relationship between infiltration rates and runoff rates in most parts of south Florida.

4.4.5 Infiltration and Percolation

4.4.5.1 Ground Surface: Ground surface infiltration will be reviewed on the basis of commonly accepted procedures such as those of Soil Conservation Service (see U.S. Department of Agriculture, Soil Conservation Service Technical Paper No. 149 "A Method for Estimating Volume and rate of Runoff in Small Watersheds" (1973), and U.S. Department of Agriculture, Soil Conservation Service Technical Release No. 55, "Urban Hydrology for Small Watersheds" (1975); or Rational Method (see Florida State Department of Transportation, "Drainage Manual" (2nd Edition, rev. 1978); or standard Civil Engineering textbooks), unless test data are submitted to justify other procedures.

4.4.5.2 Subsurface: Subsurface exfiltration will be reviewed only on the basis of representative or actual test data submitted by the Tribe. Tests shall be consistent as to elevation, location, soils, with the system design to which the test data will be applied. The Dade County Department of Environmental Resource Management and Florida Department of Transportation are suggested as reference sources to the Tribe for test procedures and design and

maintenance performance of subsurface exfiltration systems.

4.4.6 Runoff: The usual methods of computation are as follows:

A. Rainfall minus losses and storage.

B. Soil Conservation Service (see U.S. Department of Agriculture, Soil Conservation Service, "National Engineering Handbook, Section 4, Hydrology" - 1972), with extra attention to hydrologic accounting of water table conditions.

C. Rational method, for water quality retention/detention purposes.

4.4.7 Receiving Water Stage

4.4.7.1 Regulated Systems: Design and maintained stage elevations should be available either from the local jurisdiction or the District. Stages for frequencies other than the design will be estimated by the District upon request from the Tribe.

4.4.7.2 Non-Regulated Systems: The Tribe should compute receiving water stages for such systems from the best available data and submit the results to the District for review and concurrence before utilizing such results in further computations.

4.4.7.3 Any System: Variable tailwater stages should be considered if they have a significant influence on the design.

4.4.8 Discharge

4.4.8.1 Allowable Discharges: Peak discharge, for purposes of meeting maximum allowable discharges, may normally be computed as the maximum average discharge over a time period equal to the time of concentration of the contributory area.

4.4.8.2 Non-Urban Gravity Systems: Rural gravity systems which are to be connected to District facilities are generally reviewed on the basis of the discharge culvert operating at a fixed head loss to meet the allowable discharge rate. This basis is justified by the estimate that the upstream headwater generated by rural runoff will be unable to collect at the upstream culvert and appreciably faster than the rate at which the receiving water rises.