

# CITY OF CORPUS CHRISTI STORM WATER MANAGEMENT PROGRAM

## CHAPTER 1 – CITY OF CORPUS CHRISTI MANAGEMENT PROGRAM

### 1. Structural Controls

*The Municipal Separate Storm Sewer System (MS4) and any storm water structural controls shall be operated in a manner to reduce the discharge of pollutants to the Maximum Extent Practicable (MEP).*

#### A. Channel Side Slopes

Channel geometry criteria affects water quality by reducing erosion and increasing the sedimentation of pollutants and percolation at low flows which contain the highest concentration of pollutants. A channel with flat side slopes will erode less and maintain a better vegetative ground cover which filters storm water and allows percolation into the channel bottom. The proposed comprehensive drainage master plan will require 4:1 slopes, space permitting for all new channels, and major upgrades. To assess the effect of changes in the drainage criteria for channel construction, an economic analysis was performed on the cost impact of various ditch criteria.

With the change in side slope of a channel to a flatter grade, the amount of erosion decreases and the ability to maintain vegetation improves. These factors, in turn, improve the hydraulic capacity of the channel - which is its primary purpose. Thus a channel with flat side slopes, which is well maintained, can be constructed significantly smaller in width and carry the same amount of storm water runoff as a wider, poorly maintained ditch.

To analyze the actual cost of various channel side slopes, a numerical model which contained the variables of water depth, bottom width, side slope, frictional coefficients of the sides and the channel bottom, channel slope, flow quantity, and velocity, was constructed. From these variables, estimates were determined for excavation quantities, right of way requirements, vegetative treatment areas, and maintenance factors.

The model has been examined for a variety of different slopes, flow depth, and flow quantities. The optimum channel geometry to enhance water quality, considering all of the above factors, is a trapezoidal section with a flat bottom with 4:1 side slopes. The benefit to water quality is significant due to reduced erosion and improved percolation of low intensity and frequent rainfall runoff into the soil of the grassed-bottomed channels.

#### B. Vegetation Cover Requirements

Stabilizing slopes with a vegetative treatment greatly reduces the amount of soil erosion which occurs before native grasses and weeds take hold. Lower erosion reduces the amount of pollutants reaching receiving waters and also reduces re-grading maintenance of slopes. The choice of vegetative treatment compares acceptable levels of initial erosion versus the cost of the treatment. The most effective vegetative treatment is complete sodding but cost is high.

Cost effective vegetative treatment of some sort abates pollution and reduces maintenance action. The success of different treatments will depend upon the effectiveness of maintaining the slopes after application. Construction contractors are required to achieve vegetative growth on side slopes before a project is accepted as complete and usable. Treatment is a very minor portion of the total lifetime cost of a drainage channel. Therefore, the initial cost should not be the sole factor in determining the optimum method for adoption as standard construction practice on channels within the City. The City of Corpus Christi has traditionally favored vegetative cover but has utilized pervious pavers in areas with high erosion.

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## **C. Erosion Prevention in Agricultural Areas**

Reducing channel side slopes and providing vegetative treatment will greatly reduce the problems caused by soil erosion, but a problem remains in agricultural areas of the city where farming practices contribute to the erosion of channel banks. The problem is generally caused by farming practices that cultivate too closely to the top edge of the channel bank. The tilling under of the soil-retaining vegetation, several times a year, allows numerous washouts to occur when rainfall runs off the fields.

A line of vegetation along the top bank, in conjunction with a low berm which directs the runoff from the fields to a structure, will solve this problem and is the remediation method used by storm water maintenance crews. Maintenance of an undisturbed vegetation zone or other stabilization method at least 10 feet wide along the top of all channels within a drainage ditch right-of-way should be considered on channels constructed adjacent to agricultural lands. Some regulations by the U.S. Soil Conservation Service require agricultural operations to maintain and follow a plan for preventing soil erosion. The actions by the City are also limited by the Agriculture Code which "limits the circumstances under which agricultural operations may be regulated or considered to be a nuisance" for agricultural areas of the City annexed after 1981.

## **D. Drainage System Maintenance and Mowing Programs**

The goal of maintaining and mowing of drainage facilities is to ensure satisfactory operations and to preserve and enhance the quality of storm water runoff.

The City's Storm Water Department maintains drainage ditches, mows street rights-of-way and maintains storm water pump stations. Complaints related to illegal dumping into the City's storm sewer system are also investigated by Storm Water Department personnel. These activities help eliminate obstructions from the drainage system to improve flow conveyance and water quality.

Removal of excessive vegetation, sediment, obstructions, and debris from drainage ways is performed year-around.

Certain channels require grading and dredging operations after large storms have changed the characteristics and conveyance. Heavy storm damage is the major cause of maintenance and repair of the storm water drainage system.

Citizen inquiries and requests concerning the drainage system are assigned to an investigator. If a solution is determined to be feasible and appropriate, the work is assigned to a maintenance unit for action. Critical or emergency situations are dispatched by two-way radio to a maintenance unit for immediate action.

The Storm Water Maintenance & Operations Division is dedicated to operating and maintaining of the storm water system. Work Coordinators oversee a number of functions: vegetation/weed control, concrete repair, erosion repair, channel re-grading, inlet cleaning, minor drainage infrastructure repair, mowing of drainage ROW, and drainage pump station operations and maintenance.

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The City's mowing contracts require the contractor to furnish suitable machinery, equipment and labor as necessary to meet contract specifications.

The City shall set priorities for maintenance and repair activities based on the following criteria:

- a. Risk to public health and safety (including potential flooding)
- b. Water quality
- c. Complaints (usually about aesthetics)

## **E. Litter Removal**

Litter is picked up along roadways and other public areas by city staff and mowing contractors. Additionally, contract personnel collect litter and debris prior to mowing the right-of-ways.

In addition to regular curbside garbage pickup, the City of Corpus Christi Litter Control Program targets (1) litter pickup in City rights-of-way, medians and parks; (2) neighborhood cleanups of brush and bulky items on a scheduled basis; and (3) trash collection.

Heavy brush (tree limbs, shrub, clippings, etc.) is picked up by crews from the Solid Waste Services Department citywide on a scheduled basis. Although not as critical as litter in terms of leachate, excessive loose brush contributes to runoff obstruction and pollution.

The Litter Critter program of the Solid Waste Services Department allows neighbors to collectively dispose of household and yard debris. A resident may apply to have a brush truck placed in front of their home for the weekend to do a neighborhood cleanup.

In addition to the above programs, litter abatement (enforcement) is an active program within the City. The City employs Compliance Officers who cite illegal dumpers, and refer cases to Environmental Court for prosecution.

By Ordinance, the City of Corpus Christi has the right to require premises within the city limits to be free of weeds, rubbish and unhealthful matter. As litter-filled or overgrown vacant lots are identified, the owner is contacted and is notified to clean up his/her property within 10 days. If a follow-up inspection shows the owner to be in "non-compliance," the City will issue a work order to a subcontractor for remediation. Any expense incurred by the City will be billed to the property owner. If the property owner refuses to pay the City, a lien is placed on the property.

The City of Corpus Christi evaluates ordinances on a regular basis and has recently modified several which relate to litter, brush and care of premise. The City employs several code enforcement officers that actively enforce these ordinances. The City has recently added a new position called the Clean City Coordinator that will continue to seek innovative ways to improve overall litter and graffiti control. The City frequently partners with non-profit organizations such as the Beautify Corpus Christi Association, and the Coastal Bend Bays Foundation to assist in volunteer cleanups and education and outreach.

The City's two downtown storm water drainage pump stations have been retrofitted with trash rakes that capture trash and debris from the runoff, preventing it from being discharged into the receiving waters. The trash rake system captures an average of over 50 tons of trash and debris annually.

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The City has over 18,000 inlets within its storm water drainage infrastructure. Two vacuum trucks are assigned to clean each inlet on a three year cycle or when conditions demand more frequent cleaning. This best management practice prevents over 200 tons of debris from being discharged into receiving waters.

*(I.E. Measure: amount of debris removed via street sweeping, inlet cleaning and trash rakes at pump stations.)*

### **F. Bilge Water and Wastewater Collection**

The City of Corpus Christi Municipal Marina has invested in many improvements which have reduced the oil and wastewater discharges into the MS4 from the boating community. It is equipped with a bilge water reclamation system which pumps out oily bilge water for proper disposal. This system is located adjacent to the fuel station for the convenience of marina customers. The Marina also has vacuum systems along the docks for wastewater discharges. In recent months, they have been evaluating adding another bilge water reclamation system on Padre Island to accommodate the many citizens with boats in that area. As the city grows, the number and placement of these systems are anticipated to increase.

### **G. Municipal Marina Operations**

Municipal Marina Operations include minimal vegetation management, by contract, with no pesticide application. Sanitation activities include changing out trash cans/liners, collecting ground litter and skimming flotsam from adjacent waters. Marina employees remove trash from piers and park areas 24 hours, 7 days per week which helps reduce debris from entering into the bay and waterways. Collected trash is removed from the premise by a licensed contractor. Bilge water and engine lubricants are collected, separated and removed from site by licensed contractor.

The City of Corpus Christi Parks & Recreation Department - Marina Division maintains a Storm Water Pollution Prevention Plan (SWP3).

The Corpus Christi Marina is also a member of the Clean Marina program which is a voluntary program that encourages environmental stewardship through guidance and incentives. Clean Marina Programs (which vary from state to state) offer marina operators and boater's guidance and technical assistance in fulfilling best management practices that can be used to reduce or prevent pollution.

The Corpus Christi Marina has voluntarily taken many measures to reduce pollution. The Marina offers free contaminated bilge water pump outs to interested boaters, regardless of whether they are personal boats, commercial fishing boats, or even patrol boats from the Coast Guard or FBI. The marina provides training on how to use the free pump out facilities and provides demonstrations when needed. The Corpus Christi Marina also provides details and printed information on environmental practices in the marina.

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## 2. Areas of New Development & Redevelopment

*A description of planning procedures including a comprehensive master plan to develop, implement and enforce controls to reduce the discharge of pollutants from municipal separate storm sewers which receive discharges from areas of new development and significant redevelopment.*

### A. Comprehensive Land Use Plan

The City of Corpus Christi's Comprehensive Plan identifies the management objectives for receiving waters. In 1987, the City Council adopted a policy statement concerning storm water, which has been incorporated into the Comprehensive Plan. One of the most important goals of the policy statement is to protect the natural amenities of the Corpus Christi area. The natural amenities of the area such as the bay front, the aquatic recreation areas, and the topography all play an important role in making Corpus Christi a desirable place to live. These amenities provide a direct and inherent economic advantage over other communities. For these reasons, it is critical that these natural amenities be protected from pollution and the area preserved for the future.

Area Development Plans included in this management plan address issues such as protecting environmentally sensitive lands, protecting water quality, and ensuring the best use of private and public open spaces. The Comprehensive Plan indicates future growth areas of the community are included in the Future Land Use and Area Development Plans.

The Comprehensive Plan also includes a Master Plan for Storm Water Drainage which provides detailed information on topography and proposed drainage channels.

### B. Platting Ordinance

The City of Corpus Christi Platting Ordinance, Chapter 42, Sec. 42-1, No. 4168 details requirements for establishing criteria for design and construction of subdivision improvements including minimum design flows for drainage, acceptable limits of street flood, and gutter and inlet construction standards. The City of Corpus Christi passed an ordinance authorizing the enforcement of a Flood Hazard Prevention Code in compliance with FEMA requirements. The ordinance also includes provisions for development permits for construction within the City.

### C. Storm Water Quality Management Plans

Chapter 14, Article X, Sec. 14-1003, Code of Ordinance ---Storm Water Quality Management Plans---requires a site specific storm water quality management plan for all residential, commercial, and industrial development of one (1) acre or more be submitted with a preliminary/final plat. As a minimum the plan must include the location of ultimate outfall, receiving waters, and any environmentally sensitive areas. Moreover, the storm water quality management plan must be sealed by a registered professional engineer licensed to practice engineering in Texas.

*(2.C. Measure: number of accepted and approved Storm Water Quality Management Plans with total acreage encompassed.)*

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## **D. Guidance Document – Post Construction**

The City adopted a handbook, “*GUIDANCE DOCUMENT FOR DEVELOPMENTAL PLANNING & CONSTRUCTION ACTIVITIES*”. This handbook has been prepared to provide technical guidance related to erosion and sediment controls and other measures to reduce pollutants from developing sites. The document is to be used as a guidance manual to implement a local storm water quality management program for new residential, commercial, and industrial developments and significant redevelopments. It is to be used as a general guidance manual in preparing individual storm water permit applications for construction activities or in preparing and implementing SWP3s required under provisions of the general permits for construction activities. It is also to be used as a guidance manual to implement a local storm water management program for construction activities.

The technical guidance and best management practices (BMPs) described in this handbook will provide information to owners, engineers, architects, and contractors to facilitate compliance with storm water permit requirements and with local regulations. The handbook discusses the preparation of erosion and sediment and other source control plans, the incorporation of BMPs in the design phase of improvements, and their implementation during construction. Development Services Department will establish a library or City document area for the public regarding technical construction standards and guidance documents related to erosion and sediment controls on development sites. In addition, handouts are provided to the customers at the time of permit issuance.

## **E. Pollution Control Plans**

Chapter 14, Article X, Sec. 14-1005, Code of Ordinance---Site Development During Construction. Consistent with EPA and TCEQ regulations, NPDES/TPDES storm water pollution plan is required for all construction projects where one (1) or more acres will be disturbed during development. Pollution Control Plans are required for development sites less than one (1) acre and more than one-quarter (1/4) acre. A site-specific pollution control plan is not required for the development of sites which are one-quarter ( 1/4) acre in size or less, nor for single-lot, single-family residential construction. However, the responsible party of any construction site within the city shall implement measures necessary to control erosion, sedimentation, debris, and storm water pollution. The responsible party is responsible for the maintenance and performance of the temporary pollution control measures until permanent measures are in place.

## **F. Development Along Nueces River**

Portions of the Nueces River are in the city limits and other portions lie within the extraterritorial jurisdiction (ETJ). These areas must comply with all conditions set forth by the City’s Platting Ordinance, such as- the establishment of minimum requirements for lot sizes, road right-of-way widths, and ditch slope design. Drainage plans must be prepared and submitted by a registered engineer to the Development Services Department to determine compliance with the platting ordinance.

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## 3. Roadways

*A description of practices for operating and maintaining public streets, roads and highways in a manner to minimize discharge of pollutants.*

### A. City Street Department Activities

The City will assess the need for inlet protection on individual street projects depending on the size of the repair and the proximity of a storm water inlet. Inlet barriers will be placed in front of an inlet as needed to prevent the discharge of street repair materials and removed following the completion of the repair.

As needed, following street overlays or seal coating, street sweepers are contracted to remove excess rock from the streets, and curbs and gutters.

### B. Animal Control Operations

Chapter 21, Article II, Sec. 21-17, Code of Ordinance, references dead animal pickup by Animal Control Officers. Solid Waste Services collects and disposes of dead animals within the city limits. Citizens are encouraged to contact the City's Customer Call Center when a dead animal is sighted. Dead animals are properly disposed of at the City's landfill.

### C. Street Sweeping

The City currently performs street sweeping operations in the downtown area, North Beach area and on selected arterial streets. The Storm Water Department is responsible for management and operation of this program which targets the cleaning of City streets to remove trash, litter and dirt which have collected in the streets and gutters. This program addresses health, safety, aesthetic, and water quality concerns. The City contracts this service to a private company.

As needed, following street overlays or seal coating, street sweepers are contracted to remove excess rock from the streets, curbs and gutters.

*(3.C. Measure: number of curb miles of streets swept in a year.)*

### D. Litter Control

Litter is picked up along roadways and other public areas by city crews and mowing contractors. Contractor personnel collect litter and debris prior to mowing the right-of-ways.

### E. Deicing

The City of Corpus Christi coordinates activities associated with icy roads with the Texas Department of Transportation. On the rare occasions that icy conditions may cause hazards, the City Street personnel apply trap rock to roads and bridges and have it removed when conditions allow.

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## **F. Municipal Maintenance Yard Activities**

The City's fueling station consists of four underground storage tanks. Each tank has EPA approved spill and overfill devices. All piping is cathodically protected. Logs are kept of fuel tank inspections. The Maintenance Facility is subject to the EPA's Spill Prevention, Control and Countermeasure (SPCC) rule, and as such, operates under a SPCC Plan.

The City's fueling station, covered by a canopy, has automatic shutoff nozzles and is located on a concrete area. Fuel material spills are cleaned using absorbent materials.

The cleaning of vehicle parts is performed inside a building, using a solvent bath. The solvent and residue collected within the bath/vat are collected by an outside vendor for recycling. Oil/fluids removed from vehicles being serviced are collected in drain-pans and disposed of in an above ground holding tank which is spill protected. The oil/fluids are recycled and disposed of by an outside vendor. Oil filters are drained and mechanically crushed by a hydraulic press and placed in closed drums for later disposal. Batteries detained for disposal are placed in an enclosed shed until picked up by an outside vendor for recycling or disposal. A vendor also removes tires from the repair facility on a periodic basis.

The Maintenance Yard has a Spill Prevention Control and Countermeasures Plan (SPCC) in which personnel receive training annually.

## **4. Flood Control Projects**

*A description of procedures to assure that flood management projects assess the impacts on the water quality of receiving water bodies and that existing structural flood control devices have been evaluated to determine if retrofitting the device to provide additional pollutant removal from storm water is feasible.*

### **A. Federal Emergency Management Agency (FEMA)**

The City of Corpus Christi is authorized by local, state and federal regulations to provide floodplain management to reduce flood damages and minimize the risk and danger of flooding. The floodplain management practices employed by the City of Corpus Christi are endorsed by the Federal Emergency Management Agency (FEMA) because of their assigned reduction in risk and federal government floodplain insurance obligations.

The Federal Emergency Management Agency (FEMA) has studied the major creeks and drainage ways within the Corpus Christi area. As a result FEMA has established floodplain elevations and floodplain widths for various design storms. Additionally FEMA has specified floodways which comprise the minimum areas of the main stream channel which must remain open and free from future land development improvement in order to pass the 100-year storm with no greater than a one foot rise in flood waters. This effectively prevents the placement of any fills or structures within this area along the main channel. In order to participate in the Federal Flood Insurance Program, the City and County are required to maintain FEMA's criteria for construction within the designated flood hazard areas. To establish flood hazard areas, the City Council has adopted a flood hazard map and supporting data. The flood hazard map includes, at a minimum, areas of special flood hazard as identified by the Federal Emergency Management Agency in an engineering report entitled "The Flood Insurance Study for Nueces County, Texas, unincorporated areas," dated September 27, 1972, as amended or revised, with the accompanying Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM) and related supporting data. The criterion requires structures to be elevated above the 100-year flood elevation (or flood proofed), and to be located outside of the floodway.

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## **B. Flood Hazard Prevention Code**

It is the purpose of the Flood Hazard Prevention Code to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas.

Whenever necessary to make an inspection to enforce any of the provisions of the Code, or whenever the Floodplain Administrator, or duly authorized representative, has reasonable cause to believe that there exists in any building or upon any premises any condition of code violation which makes such building or premises unsafe, dangerous or hazardous, the Floodplain Administrator may enter such building or premises at all reasonable times to inspect the same or to perform any duty imposed upon the Floodplain Administrator by this Code, provided that if such building or premises is occupied, he shall first present proper credentials and request entry.

Upon notice from the Floodplain Administrator that work on any building, structure, dike, bridge or any improvement which would affect water drainage, is being done contrary to the provisions of this Code or in a dangerous or unsafe manner, such work shall be immediately stopped.

The Code lists provisions for flood hazard reduction that relate to drainage ways, new development, and significant redevelopment. The procedures for obtaining permits within flood hazard areas, and additional rules relating to the construction of structures within flood hazard areas, are published in the City of Corpus Christi Flood Hazard Prevention Code, Article V, Chapter 14, Code of Ordinances. Development within floodways located in special flood hazard areas where velocity of waters which carry debris, potential projectiles, and erosion potential are addressed.

The Flood Hazard Prevention Code was amended and codified as Article V, Flood Hazard Prevention Code of Chapter 14, Buildings; Construction and Related Operations Housing and Housing Premise Standards of the City Code of Ordinances, to read in its entirety as amended.

The Floodplain Administrator is assisted by the Floodplain Review Committee consisting of three positions, as follows:

- (1) Engineering Services staff member knowledgeable in subdivision development and hydrology.
- (2) Planning Department staff member knowledgeable in subdivision planning, and platting.
- (3) Community Development staff member knowledgeable in construction practices.

## **C. Guidance Document for Flood Control**

The City of Corpus Christi adopted a guidance document *“ASSESSMENT OF WATER QUALITY IMPACTS FROM NEW FLOOD CONTROL PROJECTS”*

The document was prepared to provide technical guidance related to erosion and sediment controls and other measures to reduce pollutants from new flood control projects. This document is to be used as a guidance manual to implement a local storm water quality management program for new flood control projects such as excavated ditches, lined channels, or major drainage mains. In addition, this document was also adopted to ensure storm water entering the navigable waters of the United States from the City's municipal separate storm sewer system does not violate the terms of the City's storm water Texas Pollution Discharge Elimination System permit. The purpose of the document is:

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- To provide best management practices for the reduction of pollutants from flood control projects.
- To provide criteria for assessing the water quality impacts of flood control projects.
- To provide necessary revisions to City of Corpus Christi's Comprehensive Plan Policies that will include the assessment criteria to minimize water quality impacts from new flood control projects and result in the implementation of the appropriate best management practices for flood control projects for the reduction of pollutants in storm water.

The City of Corpus Christi will evaluate existing flood control structures to determine if retrofitting them would benefit the quality of storm water being discharged and to determine if retrofitting is feasible. Flood management projects will be assessed to determine storm water quality impacts on receiving waters.

*(4.C. Measure: number of flood control projects reviewed and assessed for water quality impacts)*

### **5. Pesticide, Herbicide, & Fertilizer Application**

*A description of a program to reduce pollutants in discharges from the MS4 associated with the application of pesticides, herbicides and fertilizer which will include, as appropriate, controls such as educational activities, permits, certifications and other measures for commercial applicators and distributors, and controls for application in public right-of-ways and at municipal facilities.*

The Texas Department of Agriculture is the lead agency for pesticide use, regulation, applications and licensing. Commercial, non-commercial and private applicators of pesticides, herbicides and insecticides are required to obtain training and licensing under the Texas Pesticide Control Act (Texas Agricultural Code Chapter 76). There are various mandatory continuing education credits that must be earned for re-certification purposes.

The Texas AgriLife Extension Service, and other entities, provides training materials for testing and re-certification purposes. Minimum continuing education credit units must be earned toward re-certification purposes.

Currently, the City acquires its certification for municipal applicators from the Texas Department of Health and the Texas Structural Pest Control Board. All municipal applicators in the Vector Control Division of the Health Department are currently certified or are presently training for non-commercial certification. Training is being provided in-house by a licensed municipal applicator. Course curriculum is being provided by the Texas AgriLife Extension Service, a division of the Texas A&M University System. Applicators are licensed according to the type of application used. For example, Texas Department of Health certifies those applicators of health-related pest control and sanitation control, (i.e. mosquitoes, fleas, rodents and ticks). Applicators licensed under the Structural Pest Control Board concentrate mostly on pesticides and rodenticides.

The City of Corpus Christi educates the public on the proper use, application, and disposal of pesticides, herbicides and fertilizers by public, commercial, and private applicators and distributors through programs more fully described in the Storm Water Public Education and Outreach Plan (SWPEOP), as amended.

*(5. Measure: amount of resources expended in furtherance of the goals and objectives described in the SWPEOP, as amended.)*

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## **A. Landscape Ordinance**

The City Council recently amended Chapter 27B, Article I, requiring new and existing public/private development to establish minimum landscape standards between the front of the building and the public street. The Landscape Ordinance emphasizes the use of Xeriscape type landscape which is a source of reducing non-point source pollution due to the reduced use of fertilizers and pesticides that may drain into the storm sewer drainage system.

The Landscape Ordinance requires three basic elements: 1) minimum landscape area, 2) minimum landscape material, and 3) minimum parking area screening. The three elements are not separated from each other, but overlap and interact in a landscape development. For example, plants used to satisfy screening requirements also apply to satisfying landscape materials requirements, or the number of landscape material in excess of the minimum requirement can be used to reduce the landscape area requirement.

The landscape requirements are applicable in all zoning districts within the Corpus Christi city limits at the time a building permit or modification of an existing permit is requested. Single family or two family dwelling units in any zoning district are exempt from the ordinance.

The Landscape Ordinance utilizes a landscape area and point requirement based on the total street yard area. The percentage of area and number of points required for each property varies according to the zoning of the property. In the case of public and semi-public uses, required landscape area and points are calculated based on the number of parking spaces located in the street yard.

## **B. Xeriscape Landscape Program**

Xeriscape Corpus Christi, formerly known as the Xeriscape Coalition, has dedicated its effort to build the City's first demonstration garden to feature the seven principles of Xeriscape landscaping. In 1991, the Xeriscape Corpus Christi Steering Committee sought a suitable location for the garden to provide high visibility, vehicular and pedestrian accessibility, guarantee long term maintenance, and display educational literature, and offer environmental and conservation opportunities. The free community garden now serves to educate South Texans and visitors on our critical water supply resources and underscores the benefits of water conservation and energy.

The garden is utilized to educate and motivate people to conserve water by modifying their landscaping using Xeriscape principles that beautify and enhance landscaping at their own homes. Attention is given to wise pesticide and herbicide use. The Xeriscape Corpus Christi Steering Committee has representatives from various government and civic organizations.

This organization formed a Xeriscape Coalition to oversee the development of a Xeriscape Design Garden and Learning Center at the Corpus Christi Museum of Science and History.

The City's first Xeriscape demonstration garden serves as an outdoor exhibit where visitors can enjoy visual and audio interpretive exhibits. A six foot topographic map of the Nueces River Basin, with an insert of the state of Texas, is featured using fiber optic lighting and push button audio. The interpretive exhibit takes visitors through a journey of our regional water supply. In addition, the garden features interpretive exhibits on the seven principles of Xeriscape gardening to provide visitors with the primary knowledge of how to develop efficient landscaping.

The garden promotes public awareness for South Texas water users. The Xeriscape Steering Committee has sought the involvement of the green and irrigation industry in the development of the garden/learning center.

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The following elements were incorporated into the garden.

- Periodic weekend lectures at the garden,
- A display of various types of organic and inorganic mulches that may be used to reduce evaporation and soil erosion,
- Illustrate the benefits of limited turf areas whereby less fertilizer and herbicides are used,
- Illustrate the benefits of rainwater harvesting by collecting rainwater from the museum roof or air conditioning condenser to irrigate the garden,
- Display the clay, sandy loam and sand soils found in the Coastal Bend and provide a summary of the soil amendments needed to improve soil conditions,
- Display native and drought tolerant plant material suitable to the region.

The Xeriscape Garden has been actively maintained since its inception in 1993. One or more Xeriscape Symposiums are presented annually. These are free to the public and have increased awareness about conservation, integrated pest management, minimizing pesticide, herbicide and fertilizers and overall water quality issues.

Funds from the City of Corpus Christi Water Department Public Education and Communications Activity are utilized to oversee the continued maintenance and development of public awareness programs.

## **6. Illicit Discharges & Improper Disposal**

### **A. Illicit non-storm water discharges**

*A description of a program to detect and remove illicit discharges and improper disposal into the storm sewer. This program includes inspections, to implement and enforce an ordinance, orders or similar means to prevent illicit discharges to the MS4; this program description shall address all types of illicit discharges.*

The Storm Water Department Environmental Services Division maintains the database of facilities subject to inspection in accordance with the Illicit and Improper Disposal Program. The database is reviewed regularly and the checklists and forms continue to be improved.

The City will inspect for illicit discharges during customer compliance calls and through visual observations. To eliminate or reduce pollutants to the *maximum extent practical*, the City will identify and inspect industries and other commercial facilities (citywide) which have the potential to discharge pollutants into the MS4.

#### **1. Discharges Authorized by Separate NPDES or TPDES Permit**

Facilities which apply for NPDES/TPDES Permits are required to submit a copy of the Notice of Intent to the MS4 operator. They are entered into a database for future inspections.

Discharges authorized by a separate NPDES or TPDES permit, subject to the approval by an authorized permittee, and discharges for which NPDES or TPDES permit application has been submitted, need not be addressed as illicit discharges.

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### 2. Non-Storm Water Discharge Ordinance

Chapter 55, Article XVI, Sec 55-203, Code of Ordinance prohibits pollution of the Municipal Separate Storm Sewer System (MS4).

The ordinance regulates the discharge of certain materials into the City of Corpus Christi MS4, providing a penalty for the violation of such provisions and directing publication of subject ordinance.

Allowable non- stormwater discharges include the following: a discharge under a valid National/Texas Pollutant Discharge Elimination System (NPDES/TPDES) permit, a discharge resulting from firefighting activities, a discharge resulting from washing an automobile at a residence or at a charitable car wash, a discharge of potable water, a discharge of any surface waters (including water from diverted stream flows, uncontaminated rising ground water, water from foundation drains, crawl space pumps and footing drains, water from springs, and flows from riparian habitats and wetlands), a discharge resulting from flushing a water supply line, a discharge of street wash water, a nonpoint source discharge from agricultural activities (including return flows from irrigated agriculture), or condensate from cooling systems; uncontaminated pumped ground water, landscape irrigation, irrigation water, lawn watering, wash waters using only potable water, and which are similar in quality and character to street wash water or individual residential vehicle washing but without the use of detergents or surfactants; other allowable non-storm water discharges as listed in the TPDES Construction General Permit No. TXR150000 and TPDES Multi-Sector General Permit No. TXR050000, additional sources of non-storm water that may be listed in 40 CFR Section 122.26(d)(2)(iv)(B)(1); as well as other similar occasional incidental non-storm water discharges, unless the TCEQ develops permits or regulations addressing these discharges

*(6.A. Measure: number of inspections performed and number of locations with violations.)*

### B. Overflows and Infiltration

*A description of controls to limit infiltration of seepage from municipal sanitary sewers to municipal separate storm sewer systems where necessary;*

#### 1. Wastewater Pipelines

The City of Corpus Christi's Wastewater collection system includes approximately 1,274 miles of gravity and force mains and 97 lift stations. The Wastewater Department has the responsibility to maintain, inspect, and operate this publicly-owned system, as well as respond to all customer calls and complaints concerning wastewater collection and treatment. The collection system's primary goals are to ensure public health, continuously transfer wastewater from the private property through the collection system to the treatment plants, and to provide customers with uninterrupted sewer service.

The Plumbing Inspections Activity of the Development Services Department oversees and enforces the appropriate provisions of Codes and the City's Ordinances related to wastewater service connections at the private property line.

The Wastewater Collection Activity is funded through the Wastewater Department, an Enterprise Fund (revenues are generated by collecting of monthly utility bills). Inspection, maintenance and many recurring repairs are performed by in-house forces. Larger rehab/replacement/rerouting projects are funded through the City's Capital Improvement Program. Renovation of existing or installation of new collection lines, lift stations and/or force mains are inspected by the City Engineering Services Construction Inspection Activity.

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The Wastewater Collection Activity maintains the system's integrity through dye testing, high-pressure cleaning, root killing/removal, televising, smoke testing, manhole rehabilitation and affecting City-owned collection line repairs. These methods identify problem areas with defective facilities, infiltration, and exfiltration. In addition, when in the field, crews make visual inspections at and around the job site when doing maintenance or repairs, and these additional inspections may generate reports of irregularities which are evaluated for subsequent maintenance or repair.

The Wastewater Collection Activity's main line televising crew is primarily used to identify and mark defective pipe locations for repair crews, and to identify and report locations of infiltration into collection lines. If requested, the Wastewater Collection televising crew follows up on third party line inspections, confirming that lines are to grade and new sewer manholes are acceptable, to ensure the City is accepting good, long-lived collection facilities.

Smoke testing is focused on isolated areas that are selected and investigated to check for deficiencies, based on reports of odors, suspected infiltration, or cross connections to storm water lines. Small areas in the City are also selected for manhole condition inspection. This includes a detailed inspection of each manhole; noting any defects, repairs needed, and assessing the need for inflow inhibitors.

Combination Units and high -pressure cleaning units are the City's most active and thus far most effective means of identifying locations of defective pipe, thereby controlling exfiltration and preventing overflows into the storm water system. Units operate 7 days per week, performing both preventive maintenance cleaning of lines, and responding to customer reports of line obstructions by washing out and vacuuming settled debris.

Locations with extensive inflow and infiltration (I&I) or exfiltration are evaluated and prioritized for repair, replacement, rehabilitation, or rerouting. Cross-connections between sanitary sewers and storm sewers are remedied upon detection.

Within the City's Capital Improvement Program, there continues to be a consistent record of cleaning and televising of the collection system components by contract, to identify severe problems with structure and/or capacity of lines. Through Sanitary Sewer Evaluation Surveys, I & I and exfiltration in six individual treatment plant service areas are assessed. As with in-house forces noted above, this is an excellent avenue to locate cross-connections with the storm water system, and to remove sources of exfiltration of wastewater into storm water facilities.

The Wastewater Department has developed and continuously updates the Geographic Information System infrastructure base map layers for the Wastewater collection system. Through overlaying these digital layers over other department layers, the proximity of wastewater lines to storm water facilities can be assessed during repair work planning, and help minimize opportunities for damage. This, along with the use of a line locating service, helps to preclude exfiltration of wastewater into storm water lines.

## **2. Wastewater Pretreatment Program**

The City of Corpus Christi has a Pretreatment Program which was established by the Clean Water Act and is implemented through the General Pretreatment Regulations and Categorical Pretreatment Standards in 40 CFR. It involves a joint effort with the State and Federal government to control pollutants from non-domestic (i.e. industrial and commercial) wastewater sources and prevent toxic pollutant pass through, interference, and sludge contamination at Wastewater Treatment Plants and the sanitary sewer collection system.

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Some industrial dischargers are required to pretreat their wastewaters, prior to discharge to the sanitary sewer collection system, in accord with national pretreatment standards (consisting of Federal prohibited discharge standards, technology-based categorical standards, and technically based local discharge limits). In addition, industrial users must meet other obligations such as monitoring, reporting, and spill prevention. The City also monitors the users to insure compliance.

The City of Corpus Christi Wastewater Department is the principal developer and enforcer of the Pretreatment Program. The EPA approved Program consists of narrative enforcement methodology including an Ordinance, Article XI. Commercial and Industrial Waste Disposal and Pretreatment Sec. 55-140 through 55-149, and an Enforcement Response Plan (ERP). The ERP contains procedures for the enforcement of pollution control measures and establishes who will be involved in enforcement actions.

The City's Pretreatment Program was first approved in 1984 and subsequently amended in 1992 and 2005. It has been very effective in regulating discharges from industrial and commercial users.

### **3. Private On-Site Wastewater Systems**

As a Texas Commission on Environmental Quality (TCEQ) Authorized Agent, the Corpus Christi-Nueces County Public Health District is responsible for the proper implementation of Texas Health and Safety Code, Chapter 366, and 30 TAC Chapter 285 which regulate On Site Sewage Facilities (OSSF). As the authorized agent, the Corpus Christi Nueces County Public Health District administers the OSSF program within Nueces County and Corpus Christi as approved by the Executive Director of the TCEQ.

### **C. Floatables**

*Program to reduce the discharge of floatables into the MS4.*

The City will collect and estimate the volume and weight of debris collected at both the Kinney Street Pump Station and Power Street Pump Station. A log will be kept which includes pertinent information such as: the date of the debris disposal, weight of disposed debris, and any unusual items which may provide information about the source. Monitoring the quantity of floatables at two fixed locations may provide useful information on the effectiveness of education and awareness activities and/or controls through an eventual reduction in floatable debris.

The City of Corpus Christi has established a hot line number for reporting improper disposal of materials including floatables. This phone number is included on all items, brochures, PSA's, and billboards distributed by the City and is included on the City's website.

### **D. Household Hazardous Waste & Used Motor Vehicle Fluids**

*A description of a program to ensure that discharge or disposal of used motor vehicle fluids, household hazardous wastes, and the intentional disposal of grass clippings, leaf litter, and animal wastes into the MS4 is minimized.*

#### **1. Household Hazardous Waste Program**

The City of Corpus Christi has developed a disposal program for Household Hazardous Waste (HHW) from area residents. This program emphasizes the importance of proper disposal of such products that may be harmful to human health, the environment and groundwater. Program objectives are:

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- To make the public aware of consumer products classified as household hazardous wastes, and educate them on the proper method of disposal.
- To explain the environmental danger associated with the improper disposal of household hazardous waste and how the public can correct the situation.
- To establish a permanent collection site to facilitate the disposal of household hazardous waste.

Used motor vehicle fluids are accepted at the household hazardous waste collection facility daily during normal business hours at the J. C. Elliot Citizen Collection Center. The following items are currently being accepted at the facility:

### **Automotive:**

Anti-freeze  
Solvents  
Oil  
Brake fluid  
Batteries  
Transmission fluids

### **Cleaning Supplies**

Drain Cleaners  
Cleaner Concentrates (powders, liquids)  
De-greasers, Oven cleaners  
Moth Balls  
Cleaning Solvents, Spot removers, Polishes  
Pool chemicals and household batteries

### **Paint**

Spray paint  
Paint thinners  
Paint strippers  
Wood preservatives  
Brush cleaners

### **Gardening**

Pesticides  
Any sprays or dusts  
Weed Killers  
Rat Poison  
Insecticides

All collections are monitored by the site trained employees. The collection site includes the following components:

- office building
- equipment storage building
- above-ground waste oil tanks
- hazardous material storage building
- permanent canopy area over a treated concrete foundation
- security gates and fencing

The program operates under the jurisdiction of the City of Corpus Christi Solid Waste Department. A contract has been awarded with a solid waste disposal firm for material identification, sorting, packaging, transportation and ultimate disposal of materials collected. The contractor is required to reuse paints and recycle materials as much as possible.

The J.C. Elliott Transfer Station and Citizen Collection Center is convenient to all sectors of the community for household hazardous waste drop-off. In order to provide a higher service to the community, household hazardous waste collection is available six days per week from 8:00am to 5:00pm instead of utilizing the well-publicized quarterly events.

The City of Corpus Christi educates the public on the proper management and disposal of used oil and household hazardous waste through programs more fully described in the Storm Water Public Education and Outreach Plan.

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## **2. Prohibition of Pollution Ordinance**

Chapter 55, Article XVI, Sec 55-203, Code of Ordinance prohibits pollution of the Municipal Separate Storm Sewer System (MS4).

The ordinance regulates the discharge of certain materials into the City of Corpus Christi Municipal Separate Storm Sewer system providing a penalty for the violation of such provisions and directing publication of subject ordinance.

## **E. MS4 Screening & Illicit Discharge Inspections**

*A description of procedures to conduct on-going field screening activities during the life of the permit, including areas or locations that will be evaluated by such field screens; and a description of procedures to be followed to investigate portions of the MS4 that, based on the results of the field screen, or other appropriate information, indicate a reasonable potential of containing illicit discharges or other sources of non-storm water.*

### **Dry Weather Screening Program**

#### **1. Field Screening Program**

The City of Corpus Christi used a ¼ mile grid of 250 random screening locations to identify illicit discharges for the duration of the NPDES permit. However, it was found to be a very ineffective method to finding illicit connections due to arbitrary irregular random nature. The screening program was subsequently expanded by using two methods:

##### **a. Source Tracking Following Compliance Investigations**

Storm Water inspectors are required to investigate every citizen complaint. Several of these complaints are associated with foul smells in the storm system. If evidence of an illicit discharge is present, the smell will be tracked upstream to locate the source. If the source can be determined, then standard procedures for remediation are initiated.

##### **b. Methodical Assessments of Drainage System**

Storm Water inspectors are assigned territories so that they become familiar with an area. They are required to patrol for signs of illicit discharges or illicit connections routinely. Also, based on the GIS mapping system, they conduct dry weather inspections in their territories as close to the ultimate outfalls as physically possible. If no flows or evidence of illicit discharges are observed, then they move upstream to complete a full assessment of a particular drainage line. When that line is complete, they move to another major drainage line and repeat the process.

#### **2. Source Identification**

Traversing the drainage basin is the conventional technique for tracking pollutants in above ground, open channel, storm drain systems. Visual observations are commonly sufficient to trace most above ground flows to their source; however, for pollutants that do not exhibit visual characteristics, an in-field chemical analysis should be performed at intervals upstream. While moving upstream, a field data sheet should be filled out and a screening analysis should be performed wherever pipe outfalls or storm water tributaries enter the channel. The search for the pollutant source continues upstream until the presence of the target parameter(s) either decreases or is no longer detectable. Theoretically, the pollutant source should then be isolated to an area at, or directly up gradient from, the outfall or tributary that represents the highest concentration of the pollutant(s) of interest.

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The manhole to manhole method is a technique that sequentially moves upstream by evaluating pipe junctions and sub-basin watersheds in order to identify pollutant sources. Investigators track pollutants in underground pipes by using the same procedures as for source identification in stream ways. The storm system is walked, and manhole covers are removed to allow for visual inspection and grab sampling. Search and detection of pollutant sources will methodically move up gradient as long as visual or field analysis indicates that the target parameter(s) are increasing in presence and concentration. Investigation will continue until the presence and concentration of the target parameter(s) either decreases or is no longer detectable. The pollutant source should be located either at, or directly up gradient, of the manhole with the highest concentration of pollution.

If the preceding screening procedures fail to identify the pollutant source, then the source may be tracked with the assistance of fluorometric dye, smoke testing, or portable cameras. Fluorometric dye testing is a proven technique used in the positive identification of suspected pollutant sources. Fluorometric dye testing requires accessibility, or right-of-entry by ordinance, to potentially questionable facilities as the dye must be poured directly into source drains and monitored downstream. Visual use of dye as a tracer is effective in pipes for distances of approximately 1000 feet or less. Smoke testing is also an established method used to locate improper connections to the storm sewer system. Typically, smoke from zinc chloride is used for testing. The smoke is introduced into the storm sewer system via manholes. If improper connections are present in the system, smoke will escape from the source drain(s). However, effective use of smoke testing will depend on cooperation from suspect facilities for monitoring the smoke test. Cameras are useful in areas where no visual access is available.

The most expeditious and cost effective approach to deal with correction of pollution at its source is through a program of site specific source testing. A program such as this would require facility cooperation or right-of-entry by ordinance, to inspect and test for improper connection to the storm water system.

The City adopted an ordinance prohibiting the discharge of certain materials into the MS4. The ordinance allows storm water inspectors to issue a Notice of Violation to potentially responsible parties when an illicit discharge is discovered. The inspector will remain on the premises where the violation is occurring until all imminent danger is removed or require the responsible party to provide a plan for eliminating the discharge. Inspectors will again visit the site within 24 hours to determine if the illicit discharge has been corrected. Parties responsible for illicit discharges will be required to demonstrate to the City an acceptable corrective procedure for removing or containing the discharge.

Testing could be done using fluorometric dye testing, smoke testing, or a combination of both. Voluntary compliance is encouraged for facilities that lie within suspect outfall watersheds. Mandatory suspect source testing may have to be initiated if, by process of elimination, a facility appears to be the source of pollution. If entry is refused, then state and federal regulatory agencies will be notified, and notice of violation of City Ordinance will be served.

### **3. Characterization Procedure**

Many locations in the city have been identified as points where flow or standing water is observed regularly. In cases where it is a new source a characterization will be performed at each screening point where flow or standing water is observed. A grab sample will be collected and field testing of the sample will include pH, total chlorine, total copper, total phenol, detergent, and ammonia. A description of the flow/standing water (color, odor, turbidity, oil sheen, surface scum, rate of flow) shall also be included. Any indication of the presence of pollutants will result in further investigation of the pollutant source. Samples may be collected and submitted to a laboratory for further analysis. Global Positioning System (GPS) coordinates will be recorded for each screening location.

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## 4. Outfall Prioritization

A comprehensive evaluation was conducted to prioritize outfalls. Questionable outfalls identified in the dry weather survey were subdivided into two categories: Tier 1 (flowing outfalls) and Tier 2 (standing water outfalls). Tier 1 outfalls are considered to have the highest potential for illicit connections. Tier 2 will contain outfalls identified as being partially or fully submerged by the receiving water. Evaluation of in-field analysis will be determined by threshold limits for each monitoring constituent based on the sensitivity of the field analysis techniques and ambient water quality criteria. Threshold values to be utilized are listed below.

pH	<6.5 or >9	Phenol	>0.3 mg/L
Chlorine	> 0.1 mg/L	Copper	>0.2 mg/L
Detergents	> 1.0 mg/L		

### \* Ammonia:

0-1.0 ppm	may indicate trace amounts of wastewater effluent
1.5-3.0 ppm	may indicate diluted wastewater presence
3.0-8.0 ppm	<u>usually</u> means that diluted wastewater is present
8.0- > 8.0 ppm	<u>high probability</u> that wastewater is present

\* Note: Colors other than the yellows used to indicate ammonia concentration or precipitates indicate presence of materials other than ammonia and should be noted. Any positive reaction is considered undesirable.

The listed ammonia concentrations are only qualitative guidelines and, therefore, are not intended to be interpreted as quantitative values. The usefulness of the ammonia concentrations is in their ability to trace and locate sources of wastewater inflows. However, the presence of ammonia could also be caused by fertilizers or decomposed organic matter.

The information acquired through field screening will allow the City of Corpus Christi to detect areas which are appropriate for management programs and to develop a strong investigation, identification, and disconnection program to control non-storm water (illicit) discharges for the term of the permit.

## F. Elimination of Illicit Discharges & Improper Disposal

*Program to require the elimination of illicit discharges and improper disposal as expeditiously as possible.*

The Wastewater, Storm Water and Development Services Departments are the most involved in identifying and eliminating sanitary sewer illicit connections within the City of Corpus Christi. Several factors could trigger the investigation of a possible illicit connection: odors emanating from storm sewer pipes, inlets, manholes, etc., flows in storm sewer pipes during dry weather, excessive flows in sanitary sewer pipes and manholes during wet weather, wastes such as fecal matter and toilet tissue in storm sewer facilities and outfalls, and citizen complaints.

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When the City becomes aware of a possible illicit connection, the divisions will work as a team to locate and disconnect it. The investigation of a possible illicit connection will usually involve one of more of the following procedures:

- a) Review of records to determine possible source of illicit connection.
- b) Visual or olfactory inspection of manholes and inlets to determine the exact or approximate location of the source of the illicit connection.
- c) Sample collection and laboratory analysis to determine the identity of illicit discharge and possible source.
- d) Televising and / or smoke testing pipe to determine the location of the illicit connection.
- e) Excavation and removal of the illicit connection.
- f) Consultation with person responsible for illicit connection informing them of proper disposal method and possible enforcement action for future non-compliance.

## **G. List of Discharges Issued an NPDES or TPDES Permit**

The Storm Water Department maintains the database of facilities subject to inspection in accordance with the Illicit and Improper Disposal Program. The database is reviewed regularly and the checklists and forms continue to be improved and updated.

## **7. Spill Prevention & Response**

*A description of procedures to prevent, contain, and respond to spills that may discharge into the municipal separate storm sewer;*

### **A. Hazardous Material Spill Response Team**

The City of Corpus Christi has the potential for hazardous material spills that threaten the safety, health and welfare of its citizens and the environment. The potential is realistic considering Corpus Christi's location and the many industrial facilities located in the area.

In order to properly respond to hazardous and non-hazardous material emergencies, the City's Fire Department created the Hazardous Material Response Team (HMRT) in 1987. The goal of the HMRT is to provide specialized response techniques and services that minimize damages that may occur from such spills to humans or the environment, either through direct contact or through contamination of soil, water or air. This is accomplished through training, pre-planning, acquisition of equipment, etc.

The City of Corpus Christi Fire Department has taken significant steps toward obtaining specialized equipment and tools to assist with improving citizen safety. The use of technology such as the E-Plan Tools is becoming increasingly important.

The City of Corpus Christi has mutual aid agreements with the local Refinery Terminal Fire Control (RTFC) and Williams Fire Control in Houston, Texas in case of an emergency beyond the control of the municipal fire department. In addition, the City is a member of the Corpus Christi Area Oil Spill Association which provides assistance in spill containment.

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The Fire Department coordinates its activities with all governmental regulatory agencies, including: Texas Commission on Environmental Quality; Texas Railroad Commission; Texas General Land Office; Texas Department of Public Safety; US Environmental Protection Agency; and the US Coast Guard. The Department also coordinates with other city departments, depending on the type and magnitude of a given incident, as outlined the City's Emergency Management Plan.

Personnel at Fire Station No. 12 perform the primary HMRT duties along with normal assignments. Several departments invest in training a portion of their employees in HAZWOPER beginning at "Awareness" through "Technician" depending upon their duties.

The City of Corpus Christi passed an ordinance requiring reimbursement from responsible parties for expenses incurred related to a hazardous material incident emergency response.

When the HMRT responds to a hazardous material spill, the responsible party is assessed a fee, under City Ordinance Chapter 18, Article 1, Sec. 18-3, of not less than \$100.00 and up to the actual cost of cleanup, whichever is greater. If a responsible party is not identified, the Department may attempt to recover costs from the U.S. Environmental Protection Agency under Title 40 Code of Federal Regulations, Part 310 [Reimbursement to Local Governments for Emergency Response to Hazardous Substance Releases].

*(7.A. Measure: Annual expenditures for the Hazardous Materials Response Team)*

## **B. Airport Activities**

The Corpus Christi International Airport (CCIA) currently maintains a TPDES Multi-Sector General Permit (MSGP) Storm Water Pollution Prevention Plan (SWP3) as well as a Spill Prevention Control and Countermeasure (SPCC) Plan. A training program has been implemented that addresses elements of each plan as well as procedures to be followed to prevent and control spills. Facility inspections are performed regularly and copies of inspection forms are maintained onsite. CCIA performs quarterly wet and dry inspections of the designated outfalls on Airport property in accordance with the SWP3. In addition, quarterly meetings with CCIA and tenant personnel are conducted along with yearly training. CCIA also conducts yearly inspections of all the CCIA and tenant facilities and materials on airport property.

Spill response equipment maintained on site consists of absorbent pads, granular absorbent material, waste containers, shovels and brooms. The City of Corpus Christi Fire Department (CCFD) will provide additional resources when necessary.

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## 8. Industrial & High Risk Runoff

*A description of a program to monitor and control pollutants in storm water discharges to municipal systems from municipal landfills, hazardous waste treatment, disposal and recovery facilities, industrial facilities that are subject to section 313 of title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), and industrial facilities that the municipal storm sewer system.*

### A. Industrial & High Risk Runoff Program

This program includes the following parts: 1.) *Identification*; 2.) *Inspections*; 3.) *Monitoring*; and 4.) *Compliance and Enforcement*.

#### 1. *Identification:*

Facility inspections will be performed on all facilities identified to have one or more of the following characteristics:

- Municipal landfills,
- Other treatment, storage, or disposal facilities from municipal waste,
- Hazardous waste treatment, storage, disposal, and recovery facilities,
- EPCRA Title III, section 313 facilities,
- Any other commercial or industrial facility of the City of Corpus Christi determines is contributing a substantial pollutant loading to the MS4,
- Facilities choosing the NO Exposure certification rather than monitoring their storm water runoff.

These businesses shall be identified using the following mean:

- Casual observation.
- Target industry type through the use of the phone book, business publications, etc.
- Complaint/Accident investigations.
- Specific industrial lists (EPCRA or SARA).

Facility inspections may be performed on any facility identified to have one or more of the following parameters:

- The business has or needs a TPDES storm water runoff permit.
- Complaints are received regarding that facility.

#### 2. *Inspections:*

The inspection process will consist of:

- A site visit.
- Completion of an Industrial / Commercial Facility Pollution Prevention Inspection Report.
- Filing of inspection report.
- Data entry into list of industrial storm water sources discharging to the City of Corpus Christi's MS4.

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### 3. *Monitoring:*

The City of Corpus Christi will accept the monitoring data of municipal landfills, hazardous waste treatment facilities, disposal and recovery facilities, and industrial facilities that are subject to section 313 of title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), as required by the limits set by the TPDES Multi-Sector General Permit (MSGP) in effect at that time. The City reserves the right to not accept any Conditional No Exposure Certification based on an inspection determination.

The City shall review monitoring data submitted by facilities and establish an inspection schedule based on these reviews.

The City shall retain authority by ordinance to impose the full spectrum of inspection, surveillance, and monitoring requirements on any otherwise exempt or non-exempt industry when such monitoring would become necessary to protect the integrity of the MS4.

Inspection frequency for these facilities shall be at a minimum, once per permit term.

### 4. *Compliance and Enforcement:*

The City of Corpus Christi adopted Ordinance No. 022881 which allows site access for any enforcement actions required. Enforcement actions may include but are not limited to issuance of compliance orders and fines. Follow-up inspections will be performed to ensure and assist with implementation of corrective actions. Actions taken by the City of Corpus Christi will be documented with copies sent to the violator and to the respective file. Each inspection will be used as an opportunity to educate the facility operator(s) on ways to reduce pollutants in their storm water runoff.

*(8.A. Measure: number of inspections performed and number of locations with violations.)*

## **B. Municipal Waste Facilities**

### **1. Landfill Storm Water Discharge Monitoring Program**

The City of Corpus Christi has converted the J.C. Elliott Municipal Landfill, located at 7001 Ayers Street, approximately  $\frac{3}{4}$  mile south of Saratoga Boulevard on Texas Highway 286, to a Transfer station and is no longer accepting waste for permanent disposal. The J.C. Elliot Transfer Station and Citizen Collection Center has developed a Storm Water Pollution Prevention Plan (SWP3) and has applied for a TDPEs Multi-Sector General Permit (MSGP.) All monitoring will be conducted in accordance with this plan.

The new landfill, Cefe Valenzuela, is located outside the city limits in Nueces County, 14 miles southwest of Corpus Christi's City Hall, at the intersection of Farm to Market 2444 and County Road 20. The Cefe Valenzuela Landfill opened in October 2007, under MSGP, TXR050002.

This Landfill is classified as a Type K Municipal Solid Waste Management Facility, which allows for the disposal of Municipal Solid Waste, class 1 Non-hazardous Industrial Waste, Class 2 Industrial Waste, Class 3 Industrial Waste, and Special Waste. The landfill property covers 2,273.59 acres.

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A site specific Storm Water Pollution Prevention Plan (SWP3) has been developed for the Cefe Valenzuela Landfill and the City has applied for a TPDES Multi-Sector General Permit. All monitoring will be conducted in accordance with this plan.

### 2. J. C. Elliot Transfer Station and Citizen Collection Center

The J.C. Elliott Landfill was a 258 acre permitted site for the disposal of municipal solid waste. It no longer accepts waste but programs managed at this site include:

- **Leachate & condensate management and disposal.** Leachate and condensate are periodically released for direct disposal to the Greenwood Wastewater Treatment Plant. Records of releases are maintained onsite.
- **Storm water runoff management.** Storm water management is implemented per the Landfill's Site Operating Plan (SOP) and Storm Water Pollution Prevention Plan requirements. The Landfill uses hay bales at each storm water letdown to act as a natural filter media for the control of suspended solids.
- **Used Oil Disposal Program.** The household hazardous waste collection facility, located at the J. C. Elliott Transfer Station, is open six days a week to the public as a convenient drop-off location for both lead acid batteries and used motor vehicle oil.
- **Recycling Collection.** The City of Corpus Christi collects recyclables on a daily basis except on Sundays and City Holidays. An outside vendor is used for the recycle drop offs located at several sites within the City. Heavy appliances may be dropped off at J. C. Elliot Transfer Station.

### C. Wastewater Treatment Plants

EPA, under the Clean Water Act published final regulation on November 16, 1990, requires permits for storm water discharges from industrial activities. The industrial activities include wastewater treatment facilities with design capacity of 1.0 MGD or greater. The City of Corpus Christi has six wastewater treatment plants (WWTP), which each have a design capacity exceeding 1.0 MGD.

Each WWTP has its own unique SWP3 in accordance with its facility's' TPDES MSGP.

Current procedures are reviewed in order to monitor and reduce any potential storm water discharges/runoff from these facilities. An inventory to identify potential sources of storm water contamination areas was conducted.

#### **Best Management Practices (BMPs)**

- A concrete pad with berm has been installed around the manholes where the liquid waste haulers discharge to the plant. These manholes with pads and berms, which drain to the plant lift station, will contain any spills resulting from liquid waste discharges.
- The pollution prevention team checks the mechanical bar screens regularly and will make certain that all debris is properly disposed. A bar screen high level alarm alerts plant operators when this equipment is not operating properly.
- The corbels of manholes have been raised to alleviate the problem of spills.
- All problem areas where spills had occurred in the past or where potential spills can occur have been modified either by berming or by draining the area back to the head works.
- The walls of aeration tanks have been raised to alleviate the problem of spills.

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## **Maintenance and Storage Yards for Waste Transportation Fleets and Equipment**

Sludge, grit and screenings from the treatment plants are transported to the landfill either by containerized trucks or by dump trucks. The containers are made out of sheet metal and do not have any drains; hence, the chance of discharging contaminated liquid from them is minimized. The dump trucks are parked at designated areas in the plants, under chutes on concrete pads which drain to the head works.

## **Site for Treating Sludge**

Each plant has its own sludge treatment facility. All plants are furnished with belt filter presses which are installed indoors and the sludge dewatering equipment does not come in contact with precipitation or storm water runoff. Sludge from the wastewater treatment plants is taken to the Cefe Valenzuela Landfill.

## **Chemical Storage**

Each plant, except one, has outdoor storage tanks for disinfection chemicals. All disinfection chemical storage tanks are furnished with secondary containment facilities which prevent chemical spills due to tank or feed equipment failures from becoming exposed to storm water runoff.

## **D. Water Treatment Plant**

The City of Corpus Christi operates the O.N. Stevens Filtration Plant and two river pump stations. The City has developed a site-specific Storm Water Pollution Prevention Plan (SWP3) for the O. N. Stevens Plant, although it is not required to be covered under the TPDES Multi-Sector General Permit. It will be changed on an as-needed basis. All storm water monitoring and training will conform to that SWP3.

Current procedures are reviewed in order to monitor and reduce any potential storm water discharges/runoff from these facilities. An inventory to identify potential sources of storm water contamination areas was conducted. The inventory identified the following Best Management Practices already in place.

### **BMPs for Loading and Unloading of Materials:**

- Drum handling is conducted with approved equipment such as dollies, grapplers, pallets, and drum containments.
- All chemical solution machines and rail car bulk storage are labeled with approved EPA NFAP/DOT placards.

### **BMPs for Liquid Storage in Above Ground Tanks:**

- All liquid chemical storage tanks are contained within concrete containment facilities. Drainage of containment facilities is routed to an internal plant drainage and recycling system.
- Oil absorbent socks/pads are stocked at all pump locations and at the plant's warehouse.
- Chemical absorbent socks/pads are stocked at potassium permanganate solution machine location and at the plant's warehouse.
- Chlorine leak detection systems are located in the chlorine railcar unloading facility and in the chlorine evaporation and gas measurement building.

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- The chlorine railcar unloading facility is equipped with a water deluge system that sprays water on top of the railcars and also forms water curtain walls at each end of the facility. The spent deluge water is routed to the Pre-Sedimentation Pond.
- Used oil is stored in barrels in a plastic lined containment area.
- Diesel fuel for the water treatment plant's auxiliary power is stored in double walled steel tanks. O.N. Stevens is subject to the EPA's Spill Prevention Control and Countermeasure (SPCC) rule, and as such operates under a SPCC Plan.

The plant's storm water run-off will be sampled, tested and analyzed semi-annually to determine its pollutant parameters. Pollution prevention measures will be assessed based on sampling results.

The pollution prevention program will be operated by the City of Corpus Christi Water Department. All runoff sampling will be tested for pollutants by the plant's laboratory personnel. Hazardous waste operations training classes and updates are provided to essential protection personnel.

## **9. Construction Site Runoff**

*A description of a program to implement and maintain structural and non-structural best management practices to reduce pollutants in storm water runoff from construction sites to the municipal storm sewer system.*

### **A. Construction Site Runoff Program**

Erosion during the construction phase of both public and private projects is a major cause of siltation of drainage channels and storm sewer conduits. The eroded soil not only clogs the drainage system and reduces its capacity, but also transports organic debris and chemical nutrients to the receiving waters. This leads to increased biological activity and reduced water quality.

The City has adopted a Construction Guidance Manual that includes criteria and technical guidance for development projects from the planning stage through the post-construction stage. Planning guidance and criteria shall also address water quality concerns after construction. The guidance manual incorporates special requirements for development that may impact environmentally sensitive areas (i.e. wetlands, coastal zones). The manual meets local needs and includes local enforcement controls.

The City of Corpus Christi adopted Ordinance No. 022941 which requires that adequate erosion control measures are in place and maintained until final stabilization of construction projects. For construction sites greater than one acre, applicants are required to submit an executable NOI and acceptable storm water pollution prevention plan prior to receiving a permit. Development Services reviews storm water pollution prevention plans. Through the building inspection process, Development Services ensures that construction sites not only construct but verify the appropriate soil erosion control measures (BMPs) during the construction process until the final inspection.

The use and maintenance of structural and non-structural best management practices (BMPs) to reduce pollutants discharged to the City's MS4 from construction sites is achieved through inspections and enforcement. City staff is equipped with citation power to assist in enforcement.

# **CITY OF CORPUS CHRISTI STORM WATER MANAGEMENT PROGRAM**

## **B. Inspection & Enforcement**

The City of Corpus Christi Storm Water Department employs a staff of Code Enforcement Officers to investigate reports of illicit discharges into the storm sewer system. Public education programs publicize a 24 hour phone number where citizens can call to report possible illicit discharges and dumping.

Additionally the City of Corpus Christi has developed and publicized a centralized “Call Center” which allows citizens to easily report a wide variety of concerns. This phone number is included on all items, brochures, PSA’s and billboards distributed by the City and is included on the City’s website. The Storm Water Environmental Services employees are well trained on illicit discharges and have code enforcement capability to cite violators.

Engineering Services inspects construction projects, such as street improvements, for effective erosion control measures implementation and maintenance. The Storm Water Dept. staff performs inspections when there are complaints as well as when the other divisions are not able to get construction site operators to maintain compliance. The Storm Water Dept. has the authority to take enforcement action against construction site operators that do not implement or maintain adequate erosion controls at construction sites.

*(9.B. Measure: number of inspections, number of notices written and number of events referred to Environmental Court.)*

## **C. Education & Training**

The City trains construction site operators, builders and developers about sources, control, and impacts of pollutants in runoff from construction sites during scheduled inspections. Periodic updates are provided to the Builders Association and other construction associations. When the opportunities arise, Storm Water Department Staff speak at meetings, conferences etc., promoting the prevention of the discharge of pollutants from construction sites.

## **D. Notification to Building Permit Applicants**

The Development Services department will continue to educate building permit applicants of their responsibilities under the TPDES permitting program. Development Services will continue to screen proposed developments to determine the appropriate compliance requirements and the associated storm water pollution prevention plans.

The Development Services department provides the responsible party of any construction site within the city information on the implementation measures necessary to control erosion, sedimentation, debris, and storm water pollution at the time of permit. These measures include temporary pollution control measures such as: structural control of soil erosion, waste controls, dust control, hazardous material storage, concrete truck wash out, and regularly scheduled street cleaning in the immediate vicinity of the construction site. The responsible party is responsible for the maintenance and performance of the temporary pollution control measures until permanent measures are in place. The pollution controls are designed to be selected by the developer based on the most cost effective and appropriate means to provide the required controls.

# CITY OF CORPUS CHRISTI STORM WATER MANAGEMENT PROGRAM

## 10. Public Education

*Implement a public education program: to promote and publicize public reporting of illicit discharges or improper disposal of materials, including floatables, into the MS4; to promote and publicize the proper management and disposal of used oil and household hazardous wastes; and to promote and publicize the proper use, application, and disposal of pesticides, herbicides, and fertilizers by public, commercial, and private applicators and distributors.*

The City of Corpus Christi public awareness and education plan targets all segments of the community and consists of the year-round programs and special projects. The program scope has been designed to create citizen awareness on pollutants and their prevention.

### A. Reporting

The City of Corpus Christi has established a hot line number for reporting illicit discharges or improper disposal of materials. This number is included on all items, brochures, PSA's, and billboards distributed by the City and is included on the City's website.

### B. Management and Disposal of Oil & HHW

The City educates the public on the proper management and disposal of used oil and household hazardous wastes. The goals and methodology of this program are more fully described in the City's **Storm Water Public Education and Outreach Plan (SWPEOP)**, as amended.

### C. Pesticides, Herbicides & Fertilizers

The City educates the public on the proper use, application, and disposal of pesticides, herbicides, and fertilizers by public, commercial, and private applicators and distributors. The goals and methodology of this program are more fully described in the City's **Storm Water Public Education and Outreach Plan (SWPEOP)**, as amended.

*(10. Measure: amount of resources expended in furtherance of the goals and objectives described in the SWPEOP, as amended.)*

## 11. Monitoring & Screening Programs

*A program to continue on-going efforts to detect the presence of illicit connections and improper discharges into the MS4.*

### A. Dry Weather Screening Program

Program as described in Section 6E, "**MS4 Screening & Illicit Discharge Inspections**".

*(11.A. Measure: number of inspections performed and number of locations with flow.)*

# CITY OF CORPUS CHRISTI STORM WATER MANAGEMENT PROGRAM

## B. Wet Weather Screening Program

The Wet Weather Screening Program consists of sampling and non-sampling techniques to collect data on the duration and amount of rainfall and runoff, and on the types of pollutants present in the runoff.

### 1. Wet Weather Characterization

The City measures the rainfall and runoff flow rate, and collects automatic and manual representative samples of the runoff. Collected grab samples are transported to a laboratory to be analyzed for the following pollutants: E. coli; enterococci; oil and grease; total cyanide; pH; hardness; and temperature. City storm water staff prepares the equipment for sampling events between four and eight hours prior to an anticipated rain event. The City will collect composite and grab samples at three permitted locations within the City. The City utilizes ISCO automatic sampling equipment to conduct the required monitoring under the Wet Weather Characterization Program.

### 2. Inspection of the MS4

Each year following rain events, inspectors will visually examine storm water runoff within the MS4. Inspectors will be equipped with portable test kits to test obvious excessive levels of pollutants being discharged into the MS4. Sampling results will be used to trace discharges so that corrective action can be taken.

Non-sampling techniques include visual and olfactory monitoring for the following: color; turbidity; odor; and the presence of scum, algae, oil sheen, or trash. Inspectors are equipped with portable test kits to identify excessive levels of pollutants being discharged into the MS4; specifically chlorine, detergent, phenols, copper, ammonia, pH, and temperature. Test kits are used to further determine potential sources of pollutants if it appears there are extensive pollutant loads. The outfall conditions and observations are made of these outfalls and locations upstream of the outfalls in an attempt to identify the source of the pollutant(s). The information acquired through field screening will allow the City of Corpus Christi to detect areas which are appropriate for management programs and to develop a strong investigation, identification, and disconnection program to control non-storm water (illicit) discharges for the term of the permit.

## C. Industrial & High Risk Runoff Monitoring Program

The City of Corpus Christi, in accordance with the *Industrial & High Risk Runoff Monitoring Program* identified in 8.A, may require any businesses that fall into the following categories to perform industrial storm water runoff sampling:

1. Municipal landfills;
2. Other treatment, storage, or disposal facilities from municipal waste;
3. Hazardous waste treatment, storage disposal and recovery facilities,
4. EPCRA Title III, section 313 facilities,
5. Any other commercial or industrial facility of the City of Corpus Christi determines is contributing a substantial pollutant loading to the MS4.

The monitoring will occur at least once every five (5) years. In an effort to conform to the TDPES Multi-Sector General Permit No. TXR050000, the City will accept quarterly visual monitoring in lieu of analytical monitoring. The City of Corpus Christi may sample on an as needed basis to validate questionable industry sampling.

# CITY OF CORPUS CHRISTI STORM WATER MANAGEMENT PROGRAM

All storm water runoff samples must be:

1. Collected using EPA acceptable methods,
2. Analyzed in accordance with EPA acceptable methods.

Parameters include:

pH	Oil & Grease
Phosphorus (total)	Chemical Oxygen Demand
Total Kjeldahl Nitrogen	NO <sub>3</sub> +NO <sub>2</sub> -Nitrogen (total)
Total suspended Solids	BOD <sub>5</sub>

Any pollutants limited in an existing NPDES/TPDES permit for a subject facility  
Any information on discharges required under 40CFR122.21 (g) (iii) and (iv).

In place of monitoring, a business may opt for a “no exposure” certification. This certification warrants that raw or waste material, final or intermediate products, by-products, material handling equipment or activities, industrial machinery or operations, or significant materials from past industrial activity are not presently exposed to storm water and are not expected to be exposed to storm water for the certification. This certification will be renewed every five years.