

Contract No. CM1711
Bid No.: NC10-030

**PROFESSIONAL ENGINEERING SERVICES
STORMWATER MASTER PLAN, PHASE II & III
FOR NASSAU COUNTY, FLORIDA**

THIS AGREEMENT made and entered into this 28th day of February 2011, by and between the Board of County Commissioners of Nassau County, a political subdivision of the State of Florida, hereinafter referred to as "County", and Camp Dresser & McKee Inc. (CDM), a Florida Foreign Profit Corporation, whose principle office address is One Cambridge Place 50 Hampshire Street, Cambridge, MA 02139 and whose local office is located at 8381 Dix Ellis Trail, Suite 400, Jacksonville, FL 32256, hereinafter referred to as "Consultant":

WHEREAS, the County desires to obtain professional engineering services needed to prepare a Storm Water Master Plan, Phase II & III; and

WHEREAS, said services are more fully described in the Scope of Services, Attachment "A", which is attached hereto and made a part hereof; and

WHEREAS, the Consultant desires to render certain professional engineering services as described in the Scope of Services, and has the qualifications, experience, staff and resources to perform those services; and

WHEREAS, the County, through a competitive selection process conducted in accordance with the requirements of law and County policy has determined that it would be in the best interest of the County to award a contract to Consultant for the rendering of those services described in the Scope of Services.

NOW THEREFORE, in consideration of the mutual covenants and agreements hereinafter contained, the parties hereto agree as follows:

ARTICLE 1 - EMPLOYMENT OF CONSULTANT

The County hereby agrees to engage Consultant, and Consultant hereby agrees to perform the services set forth in the Scope of Services.

ARTICLE 2 - SCOPE OF SERVICES

2.1 Consultant shall provide professional engineering services in accordance with the Scope of Services set forth in Attachment "A", attached hereto and incorporated by reference, and any additional services as may be specifically designated and additionally authorized by the parties.

ARTICLE 3 - THE COUNTY'S RESPONSIBILITY

Except as provided in the Scope of Service, the County's responsibilities are to furnish required information, services, render approvals and decisions as necessary for the orderly progress of Consultant's services. The County hereby designates Engineering Services to act on the County's behalf with respect to the Scope of Services. The Director of Engineering Services, under the supervision of the County Manager shall have complete authority to transmit instructions, receive information, interpret and define County's policies and decisions with respect to materials, elements and systems pertinent to Consultant's services.

ARTICLE 4 - TERM OF AGREEMENT

4.1 The term of this Agreement shall be for a one (1) year period beginning on the date of its complete execution. The performance period of this

Agreement may be extended upon mutual agreement between both parties. Any extension of performance period under this provision shall be in one (1) year increments. Total contract length and individual one (1) year extensions shall be in the County's best interest and sole discretion. Any Agreement or amendment to the Agreement shall be subject to fund availability and mutual written agreement between the County and Consultant.

ARTICLE 5 - COMPENSATION

5.1 The County shall pay Consultant \$299,897.00 for the completion of Tasks 1 through 6 as part of a lump sum amount shown in Table 2 of Attachment "A".

5.2 Consultant shall prepare and submit to the Director of Engineering Services, for approval, a monthly invoice for the services rendered under this Agreement. Invoices for services shall be paid in accordance with the Florida Prompt Payment Act. All invoices shall be accompanied by a report identifying the nature and progress of the work performed. The statement shall show a summary of fees with an accrual of the total fees billed and credits for portions paid previously. The County reserves the right to withhold payment to Consultant for failure to perform the work in accordance with the provisions of this Agreement, and the County shall promptly notify Consultant if any invoice or report is found to be unacceptable and will specify the reasons therefor.

5.3 All representation, indemnifications, warranties and guaranties made in, required by or given in accordance with this Agreement, as well as all

continuing obligations indicated in this Agreement, will survive final payment and termination or completion of this Agreement.

5.4 Final Invoice per Work Authorization: In order for both parties herein to close their books and records, the Consultant will clearly state "Final Invoice" on the Consultant's final/last billing to the County. This indicates that all services have been performed and all charges and costs have been invoiced to the County and that there is no further work to be performed on the specific project.

5.5 Labor Unit rates shall be established at the beginning of this Agreement and may be adjusted annually upon written agreement of the parties beginning with the next assigned project issued after the anniversary date of the Agreement. The labor unit rates are set forth in Attachment "B".

ARTICLE 6 - STANDARD OF CARE

Consultant shall exercise the same degree of care, skill, and diligence in the performance of the Services as is ordinarily provided by a professional under similar circumstances and Consultant shall, at no additional cost to the County, re-perform services which fail to satisfy the foregoing standard of care.

ARTICLE 7 - DOCUMENTS

The documents which comprise this Agreement between the County and the Consultant are attached hereto and made a part hereof and consist of the following:

7.1 This Agreement;

- 7.2 The Scope of Services attached hereto Attachment "A";
- 7.3 Cost Proposal identified in Table 2 of Attachment "A";
- 7.4 Request for Qualifications for Nassau County Storm Water Master Plan, Phase II & III, Bid No. NC10-030;
- 7.5 Proposal submitted by Consultant in response to the Request for Qualifications for Nassau County Storm Water Master Plan, Bid No. NC10-030;
- 7.6 Any work authorizations, written amendments, modifications or addenda to this Agreement.

ARTICLE 8 - EQUAL OPPORTUNITY EMPLOYMENT

In connection with the work to be performed under this Agreement, Consultant agrees to comply with the applicable provisions of State and Federal Equal Employment Opportunity statutes and regulations.

ARTICLE 9 - TRUTH-IN-NEGOTIATION/PUBLIC ENTITY CRIMES AFFIDAVIT

Consultant certifies that wage rates and other factual unit costs supporting the compensation are accurate, complete, and current at the time of contracting. The original contract price and any additions thereto shall be adjusted to exclude any significant sums by which the county determines the contract price was increased due to inaccurate, incomplete, or non-current wage rates and other factual unit costs. Consultant represents that it has furnished a Public Entity Crimes Affidavit pursuant to Section 287.133, Florida Statutes.

ARTICLE 10 - INDEMNIFICATION

10.1 Consultant shall indemnify and hold harmless the County and its officers and employees from liabilities, damages, losses, and costs, including but not limited to, reasonable attorneys' fees, to the extent caused by the negligence, recklessness, or intentionally wrongful conduct of the Consultant and other persons employed or utilized by the consultant, in the performance of the contract.

ARTICLE 11 - INDEPENDENT CONTRACTOR

Consultant undertakes performance of the services as an independent contractor under this Agreement, and shall be wholly responsible for the methods of performance. The County shall have no right to supervise the methods used, but the County shall have the right to observe such performance. Consultant shall work closely with the County in performing services under this Agreement.

ARTICLE 12 – EXTENT OF AGREEMENT

12.1 This Agreement represents the entire and integrated agreement between the County and Consultant and supersedes all prior negotiations, representations, or agreement, either written or oral.

12.2 This Agreement may only be amended, supplemented, modified, changed or canceled by a duly executed written instrument.

ARTICLE 13 - COMPLIANCE WITH LAWS

In performance of the services, Consultant will comply with applicable regulatory requirements including federal, state, and local laws, rules regulations, orders, codes, criteria and standards.

ARTICLE 14 - INSURANCE

14.1 The Consultant shall purchase and maintain such commercial (occurrence form) or comprehensive general liability, workers compensation, professional liability, and other insurance as is appropriate for the services being performed hereunder by Consultant, its employees or agents. The amounts and types of insurance shall conform to the following minimum requirements.

14.1.1 Worker's Compensation: Coverage must apply for all employees and statutory limits in compliance with the applicable state and federal laws. In addition, the policy must include the following:

- a. Employer's Liability with a minimum limit per accident in accordance with statutory requirements.
- b. Notice of Cancellation and/or Restriction. The policy must be endorsed to provide County with ten (10) days' written notice of cancellation and/or restriction.

14.1.2 Comprehensive General Liability: Coverage must include:

- a. \$1,000,000.00 combined limit per occurrence for bodily injury, personal injury and property damage; \$2,000,000 general aggregate.
- b. Contractual coverage applicable to this specific contract, including any hold harmless and/or indemnification agreement.
- c. Additional Insured. County is to be specifically included as an additional insured.
- d. Notice of Cancellation and/or Restriction. The policy must be endorsed to provide County with ten (10) days' written notice of cancellation and/or restriction.

14.1.3 Professional Liability:

- a. Consultant agrees to maintain Professional Liability with limits of not less than \$1,000,000 for professional services rendered in accordance with this Agreement.
- b. Consultant shall maintain such insurance for at least two (2) years from the termination of this Agreement and during this two (2) year period the Consultant shall use his best efforts to ensure that there is no change of the retroactive date on this insurance coverage.

- c. If there is a change that reduces or restricts the coverage carried during the Agreement, the Consultant shall notify the County within thirty (30) days of the change.

14.1.4 Comprehensive Automobile Liability: Coverage must be afforded on a form no more restricted than the latest edition of the Comprehensive Automobile Liability Policy filed by the Insurance Services Office and must include:

- a. \$1,000,000 combined single limit per accident for bodily injury and property damage.
- b. Owned Vehicles
- c. Hired and Non-Owned Vehicles
- d. Employee Non-Ownership
- e. Additional Insured. County is to be specifically included as an additional insured.
- f. Notice of Cancellation and/or Restriction. The policy must be endorsed to provide County with ten (10) days' written notice of cancellation and/or restriction.

14.1.5 Umbrella policy: Coverage must be afforded on a form no more restricted than the latest Umbrella Policy filed by Insurance Services Offices and must include:

- a. \$1,000,000 per occurrence

- b. General Liability underlying coverage: \$1,000,000 for bodily injury, personal injury and property damage. General Aggregate of \$2,000,000.
- c. Auto liability: Underlying Combined single limit of \$1,000,000.
- d. Employers' Liability: Underlying limit \$500,000/\$500,000/\$500,000.

14.1.6 Additional Insured. County is to be specifically included as an additional insured.

14.1.7 Notice of Cancellation and/or Restriction. The policy must be endorsed to provide County with ten (10) day's written notice of cancellation and/or restriction.

14.2 Certificates of Insurance evidencing the insurance coverage specified in this Section shall be filed with the County. The Certificates of Insurance shall be filed with County before this Agreement is deemed approved by the County. The required Certificates of Insurance not only shall name types of policies provided, but also shall refer specifically to this Agreement. All the policies of insurance so required of Consultant except workers compensation and professional liability insurance shall be endorsed to include as additional insured the County, its officers, employees, and agents to the extent of the County's interest arising from any contract agreement between County and Consultant. If the initial insurance expires prior to completion of the work, renewal Certificates

of Insurance shall be furnished thirty (30) days prior to the date of their expiration.

14.3 Insurance coverage shall be placed with insurers or self-insurance funds, satisfactory to the County, licensed to do business in the State of Florida and with a resident agent designated for the service of process. All insurers shall have an "A" policyholder's rating and a financial rating of at least Class IX in accordance with the most current Best's rating. Consultant shall provide the County with financial information concerning any self insurance fund insuring Consultant. At the County's option, a Best's rating or Self-Insurance Fund financial information may be waived.

ARTICLE 15 – ACCESS TO PREMISES

The County shall be responsible for providing access to all project sites, and for providing project-specific information.

ARTICLE 16 - TERMINATION OF AGREEMENT

16.1 Termination for Convenience: This Agreement may be terminated by the County for convenience, upon written notice to Consultant. In such event, the Consultant shall be paid its compensation for services performed prior to the termination date. In the event that the Consultant abandons this Agreement or causes it to be terminated, Consultant is liable to the County for any and all loss pertaining to this termination.

16.2 Default by Consultant: In addition to all other remedies available to the County, the County may terminate this Agreement for cause should the

Consultant neglect, fail to perform, or observe any of the terms, provisions, conditions, or requirements herein contained. Prior to termination the County shall provide written notice of the specific conditions warranting default, and the County shall allow thirty (30) days for Consultant to cure.

ARTICLE 17 - NONDISCLOSURE OF PROPRIETARY INFORMATION

Consultant shall consider all information provided by County and all reports, studies, calculations, and other documentation resulting from the Consultant's performance of the Services to be proprietary unless such information is available from public sources. Consultant shall not publish or disclose proprietary information for any purpose other than the performance of the services without the prior written authorization of County or in response to legal process.

ARTICLE 18 - UNCONTROLLABLE FORCES

18.1 Neither the County nor Consultant shall be considered to be in default of this Agreement if delays in or failure of performance shall be due to Uncontrollable Forces, the effect of which, by the exercise of reasonable diligence, the non-performing party could not avoid. The term "Uncontrollable Forces" shall mean any event which results in the prevention or delay of performance by a party of its obligations under this Agreement and which is beyond the reasonable control of the nonperforming party. It includes, but is not limited to fire, flood, earthquakes, storms, lightning, epidemic, war, riot, civil disturbance, sabotage, and governmental actions.

18.2 Neither party shall, however, be excused from performance if nonperformance is due to forces, which are preventable, removable, or remediable, and which the nonperforming party could have, with the exercise of reasonable diligence, prevented, removed, or remedied with reasonable dispatch. The nonperforming party shall, within a reasonable time of being prevented or delayed from performance by an uncontrollable force, give written notice to the other party describing the circumstances and uncontrollable forces preventing continued performance of the obligations of this Agreement.

ARTICLE 19 - GOVERNING LAW AND VENUE

This Agreement shall be governed by the laws of the State of Florida. Any and all legal action necessary to enforce the Agreement will be held in Nassau County.

ARTICLE 20 - MISCELLANEOUS

20.1 Non-waiver: A waiver by either County or Consultant of any breach of this Agreement shall not be binding upon the waiving party unless such waiver is in writing. In the event of a written waiver, such a waiver shall not affect the waiving party's rights with respect to any other or further breach. The making or acceptance of a payment by either party with knowledge of the existence of a default or breach shall not operate or be construed to operate as a waiver of any subsequent default or breach.

20.2 Severability: Any provision in this Agreement that is prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective to the

extent of such prohibition or unenforceability without invalidating the remaining provisions hereof or affecting the validity or enforceability of such provisions in any other jurisdiction. The non-enforcement of any provision by either party shall not constitute a waiver of that provision nor shall it affect the enforceability of that provision or of the remainder of this Agreement.

20.3 The provisions of this section shall not prevent the entire Agreement from being void should a provision, which is of the essence of the Agreement, be determined to be void.

ARTICLE 21 - SUCCESSORS AND ASSIGNS

The County and Consultant each binds itself and its director, officers, partners, successors, executors, administrators, assigns and legal representatives to the other party to this Agreement and to the partners, successors, executors, administrators, assigns, and legal representatives.

ARTICLE 22 - CONTINGENT FEES

The Consultant warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for the Consultant to solicit or secure this Agreement and that it has not paid or agreed to pay any person, company, corporation, individual or firm, other than a bona fide employee working solely for the Consultant, any fee, commission, percentage, gift or any other consideration contingent upon or resulting from the award or making of this Agreement.

ARTICLE 23 - OWNERSHIP OF DOCUMENTS

Consultant shall be required to work in harmony with other consultants relative to providing information requested in a timely manner and in the specified form. Any and all documents, records, disks, original drawings, or other information shall become the property of the County upon completion for its use and distribution as may be deemed appropriate by the County. Notwithstanding any other provision of this Agreement or any provision of the scope of work, or any amendment issued hereunder, all of the Consultant's pre-existing or proprietary information, outside of this Agreement shall remain the exclusive property of Consultant. The parties agree that the county has a license to use proprietary materials contained in the documents, records, disks and original drawings provided to the County for the purposes of implementing this project. The parties agree that nothing contained in or on the documents, records, disks and original drawings to be provided to the County contains any of the items or materials (i.e., proprietary materials) described in the immediately preceding sentence.

ARTICLE 24 - FUNDING

This agreement shall remain in full force and effect only as long as the expenditures provided for in the Agreement have been appropriated by the County Commission of the County of Nassau in the annual budget for each fiscal year of this Agreement, and is subject to termination based on lack of funding.

ARTICLE 25 - NOTICE

25.1 Whenever either party desires or is required under this Agreement to give notice to any other party, it must be given by written notice either delivered in person, sent by U.S. Certified Mail, U.S. Express Mail, air or ground courier services, or by messenger service, as follows:

COUNTY

Nassau County Contract Management
96135 Nassau Place, Suite 6
Yulee, Florida 32097
904-491-7377
Fax: 904-321-2658
cyoung@nassaucountyfl.com

With a copy to the County Attorney at the same address.

CONSULTANT:

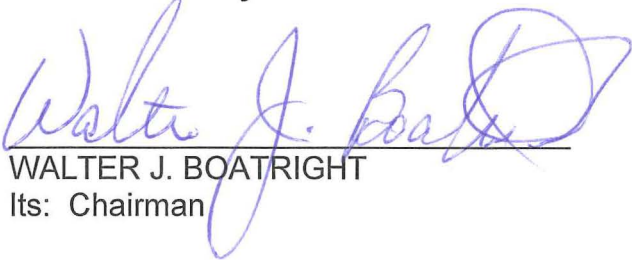
Patrick R. Victor, P.E.
Camp Dresser & McKee Inc.
8381 Dix Ellis Trail, Suite 400
Jacksonville, Florida 32256
904-731-7109
Fax: 904-519-7090
victorpr@cdm.com

25.2 Notices shall be effective when received at the address specified above. Changes in the respective addresses to which such notice may be directed may be made from time to time by any party by written notice to the other party. Email and facsimile are acceptable notice effective when received, however, notices received (i.e.; printed) after 5:00 p.m. or on weekends or holidays, will be deemed received on the next business day. The original of the notice must additionally be mailed as required herein.

25.3 Nothing contained in this Article shall be construed to restrict the transmission of routine communications between representatives of Consultant and County.

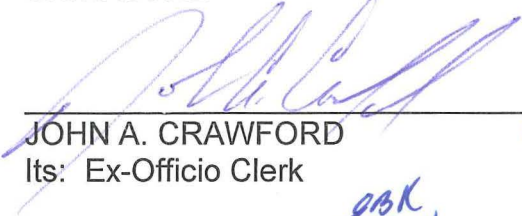
IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first written above.

**Nassau County,
Board of County Commissioners**


WALTER J. BOATRIGHT
Its: Chairman

Date: 2-28-11

ATTEST TO CHAIR
SIGNATURE


JOHN A. CRAWFORD
Its: Ex-Officio Clerk

Approved as to form and legal
sufficiency:


DAVID A. HALLMAN

*EBK
2/28/11
JS
3/1/11*

[Consultant signature on next page]



Stormwater Master Plan Parts II/III

Scope of Work

December 29 2010

Background

Nassau County developed a Part I Stormwater evaluation in 2008 to assess data availability and explore the data gaps that need to be addressed in order to gain an overall understanding of the flood and stormwater quality issues. The County has recently experienced house flooding along Thomas Creek and developed a verification of the models developed by the USACE in 2009, using specific parameters related to Tropical Storm Fay (2008).

The objectives of this scope are to perform engineering analysis of the existing stormwater system and the identification of problem areas (Part II), and to create a roadmap for county staff to efficiently use limited funds in addressing the most suitable projects to maximize the benefit to the community (Part III). The outcome of Parts II and III will drive future development and will provide equitable criteria to fund capital projects.

Task 1: Existing Data, Program Review and Survey Acquisition

The 2008 Part I Report discusses the data availability as well as the sources of information available to the County to start gathering the necessary data to develop Part II. CDM will gather and review the available data and prepare a memorandum outlining the results of this review.

Task 1.1 Watershed, Stream, and Wetland Data Collection and Assessment

CDM will review the Part I SWMP as a starting point to identify the datasets completed to date by the County, and evaluate the most critical elements identified during such study. The assessment will be discussed with County staff to ensure that other potential sources of data are considered, and that the quality and reliability of the data is understood and discussed in greater detail. Some updates might be available from state agencies that can be retrieved by CDM in order to update the datasets. The data will serve as the structure for the database that will be created for the model development task; therefore it will compile attributes of rainfall, soils, land use, topography, streams, culverts, pipes, existing BMPs. Some attribute fields that might be used in the future for flood map modernization, or map

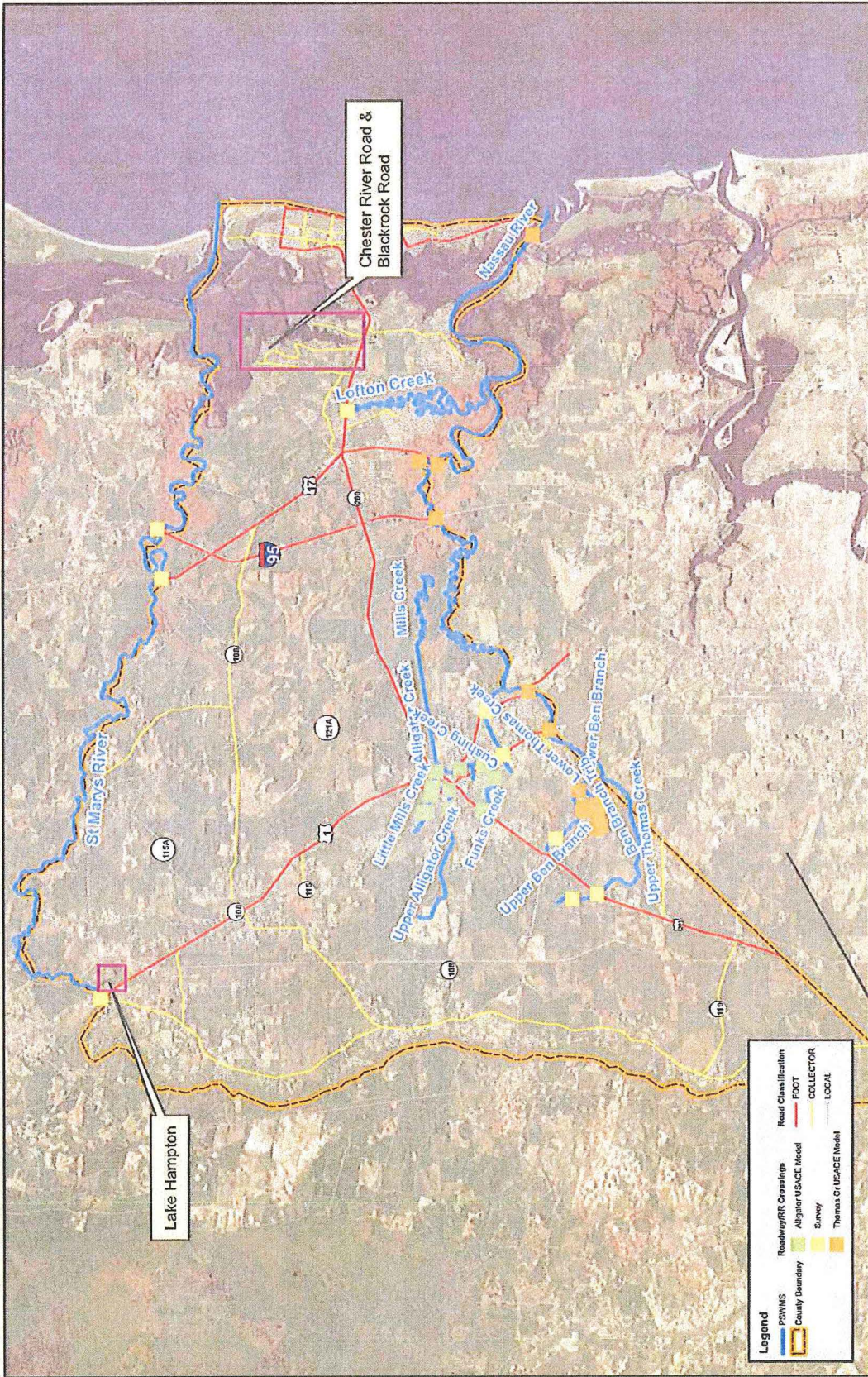
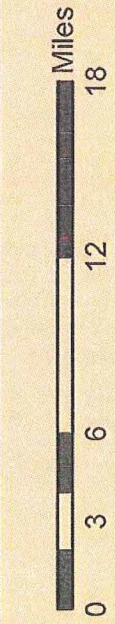


Figure 1.
Stormwater Master Plan
Nassau County, Florida
December 2010



modifications will be added to the database in compliance with basemap FEMA criteria. By structuring the database according to current standards and specifications, the County can better communicate changes and comments to FEMA through the current RiskMap program.

CDM will review the LiDAR topographic coverage developed in 2009 to determine if it is properly processed to generate a county wide contour coverage that meets engineering and FEMA specifications. Common vertical accuracy levels acceptable for stormwater master plan purposes in our area are 1-2 feet, which allows for the delineation of tributary areas in flat terrain, wetlands, and marshes.

CDM will develop a draft report section summarizing data gaps.

Task 1.2 Field Reconnaissance and Survey Data Acquisition

CDM shall conduct a field reconnaissance of up to 15 locations within the study area to determine conditions along the floodplain(s), types and numbers of hydraulic and/or flood-control structures, apparent maintenance or lack thereof of existing hydraulic structures, locations of cross sections to be surveyed, and other parameters needed for the hydrologic and hydraulic analyses. This will include a summary log of locations, photos and notes will be prepared as an appendix to the final project reporting.

In addition to the initial field reconnaissance, CDM shall perform field surveys, including obtaining channel and floodplain cross sections, identifying or establishing temporary bench marks, and obtaining the physical dimensions of hydraulic and flood-control structures. The lump sum amount included in this task includes the necessary survey activities to complete the data collected by the County through other efforts such as the NPDES dataset, and survey from recent roadway projects.

Field notes will be reduced and checked for allowable survey tolerances and supervised by a professional surveyor licensed in the State of Florida. The survey will be in compliance with FEMA Data Capture Standards. All elevations will be tied to NAVD88 benchmarks within Nassau County. Show and site the benchmark locations and elevations for each work area. Benchmarks shall be tied to well established benchmarks set by various government agencies and verified where possible. Level runs and benchmark descriptions shall be clearly recorded.

Each structure (culvert, dam, or bridge) will include the following:

- Four color pictures of upstream/downstream channel and structure views.
- One sketch provided in the form of structure data sheets.
- One survey file in text format including the appropriate survey codes consistent with FEMA feature tables. Survey files will be an ASCII formatted file.

Each cross section will require the following:

- Two color pictures of upstream/downstream channel views.
- One sketch provided in the form of cross section data sheet provided by CDM.
- One survey file in text format including the appropriate survey codes consistent with FEMA feature tables. Survey files will be an ASCII formatted file.

A total of 5 structures and 10 channel cross sections have been estimated and included in the current fee. If additional structures and channel cross sections are required, CDM will negotiate a unit cost with the County to perform additional survey. CDM will prepare a draft report section that will be incorporated as part of the final report described in Task 6.0.

Task 1.3 Flood Complaint and BMP Database

CDM will review the current digital records for flooding complaints to identify the best way to populate the GIS shapefile prepared during the SWMP Part I study. This data conversion and merge will become the basis for the determination of flood prone areas based on historical records, which will be used to verify the stormwater models developed in Task 3.2. Following conversations with County staff, CDM will review the current method of collecting citizen's complaints, in order to record incoming complaints that can be geocoded, documented, and eventually merged with the operations and maintenance.

CDM will create a GIS dataset compiling current BMPs, based on the documentation included in the SWMP Part I, as well as County staff conversations. The documentation will provide the basis for proposing future BMPs in the area with flooding and water quality concerns.

Task 1.4 Regulation and Program Overview

CDM will review the current stormwater elements in the County code of ordinances and will provide assistance to include key elements that will ensure compliance with the level of service, as well as state and federal regulations. CDM will also consider FEMA guidance to incorporate federal elements that will allow the ordinance to be consistent with the National Flood Insurance Program, as well as future versions of flood and risk maps being developed as part of Risk Map.

Other common improvements include minimum technical criteria for stormwater projects exposed to increased salinity due to tidal influence, and criteria to ensure compatibility between upcoming projects, and the County planned infrastructure.

Task 1.5 Establishment of a Stormwater Level of Service

The ultimate goal of this project is to develop a prioritized list of capital improvement projects, evaluate the drivers and costs of maintaining an efficient stormwater system.

The objective of this task is to create a set of goals that the County will strive to achieve, in order to provide a minimum stormwater level of service (LOS) to its citizens and businesses. Common questions that are discussed in the process of determining a LOS include:

- *How much flood protection can/should the County provide to infrastructure such as evacuation routes, hospitals, fire stations, and other government buildings?*
- *How much flood protection can the County provide to private dwellings and building structures?*
- *How often can the County afford to have nuisance flooding in residential roads?*

With the establishment of the LOS, County staff will have a clear vision of what can be accomplished through the implementation of the recommended capital improvement plan. Another benefit of having the LOS will be in prioritizing projects to meet that standard, thereby properly allocating limited resources available to solve stormwater problems.

The resulting LOS shall be included in the county ordinance code to provide guidance to consultants and developers in the guiding criteria to design stormwater infrastructure in compliance with the management goals set by the County.

Task 2: Drainage System Modeling and Evaluation

Task 2.1 Basin Delineation Verification and Field Survey

CDM will review the delineations from Part I Report, and complement it with the outcome of the data reviewed and discussed in Task 1.1. In order to verify the delineations, CDM will also utilize surveying services as necessary to verify elevations of structures, basin divides, in conjunction with the survey of hydraulic structures such as culverts, pipes, and channels. A critical factor in meeting the project schedule is the field reconnaissance of the County streams, and collecting survey of streams and hydraulic structures. Many of the data requirements might be available in the data sources reviewed in Task 1, but for the remaining areas it will be critical to collect survey. In the past stormwater master plans, CDM has developed a methodology to capture survey meeting tight FEMA standards which provide several benefits to the County:

- Acceptance by FEMA of study results to be used for future flood maps
- Adequacy of survey for use in emergency planning and management
- Compatibility with asset management tools, and GIS databases
- Ease of data dissemination and access to County staff.

Task 2.2 Computer Modeling

CDM will review the current computer models that have been developed for the analysis of impacts associated with rainfall events. Some of the models are available from the 1989 FEMA FIS, and recent analysis performed by URS as part of the 2008 FEMA Map Modernization. In the past year, CDM gathered models for Thomas and Alligator Creeks, and developed a HEC-RAS preliminary model to verify the flooding occurred during Tropical Storm Fay.

CDM will use the existing HEC-RAS model developed by the USACE to optimize the use of available information. In order to delineate the hydrologic boundaries and estimate the

runoff loads to the RAS model, CDM will develop a HEC-HMS model for up to 110 tributary areas.

The quantity models will assist the County and CDM in the following activities:

- Identifying flood stages, flows and velocities in flood prone areas
- Determining conveyance bottlenecks at street culverts or channel sections
- Determining stream banks with high potential for erosion and generation of sediment
- Quantify the flood reduction benefit provided by stormwater BMPs.

CDM will review the latest sea level data and ongoing studies performed by the USACE to evaluate the most appropriate tidal boundary conditions.

CDM will consider sea level rise projections to categorize areas of concern, and to provide a long-term planning tool. By selecting the most appropriate tidal design criteria, the County will be able to extend the life of new water front construction projects. The results of this task will become the boundary conditions of the modeling task.

Subtask 2.2.1: Existing Models Verification

CDM will evaluate the data in the current USACE HEC-RAS models for Thomas Creek and Alligator Creek. A portion of the survey requests will be considered specifically to verify the current information in the models, particularly in sections of Thomas Creek that experience structural flooding.

Subtask 2.2.2: Hydrologic Analysis

CDM will setup the HEC-HMS models for the study Area (Figure 1). CDM will use available digital topography from Nassau County to identify, delineate, and refine up to 110 hydrologic units. CDM will also include consideration of County-identified serious problem areas (flooding homes, buildings, and evacuation routes), photogrammetric mapping, and field-verification as required. Nassau County's GIS will be used wherever possible.

Tidal Evaluation: CDM will gather the latest available information from one tidal gage as available from the National Oceanic and Atmospheric Administration (NOAA), the USGS, or other agencies. CDM will review the data and perform statistical analysis. Based on the statistical results, CDM will prepare a summary table of parameters that will be used to determine the current mean tide, the mean high tide, and the 1-year tidal still water elevation.

Additionally, as a sensitivity analysis on potential future tidal effects, CDM will investigate the literature on sea level rise resulting from climate change including recent reports by the Corps of Engineers and the USGS, and estimate the associated boundary conditions for three scenarios of sea level rise for a 50 to 100 year projection: low, medium and high. The main objective of this evaluation is to prepare immediate suggestions to be included in the City design standards such as design head loss values that can extend the useful life of new construction projects.

Corrosion is another important element that is becoming a significant factor in the replacement program for existing pump stations; CDM proposes to include as a standard specification the use of stainless steel and other suitable materials, to be able to resist high corrosion from sea water. CDM will also consider immediate elements that could be adopted for upcoming retrofits.

Soils: CDM will use Nassau County's/National Resource Conservation Service (NRCS) hydrologic soil groups GIS data for soils data estimates, including percentages of Soil Groups A, B, C, and D per hydrologic unit. Based on this, CDM will estimate soil infiltration rates (maximum and minimum) and total soil storage values.

Land Use: CDM will catalog the present land use data into ten classifications based on hydrologic similarity. These 10 classes of Land Use will then be applied to each hydrologic unit to determine the acreage of each land used class within the hydrologic unit and larger sub-basins. Future built-out land use will be provided by the County's GIS and will be applied only in basins with expected urbanization such as Knight Creek, and Dukes Bay Canal. CDM will estimate the percentage of directly connected impervious area (DCIA) by hydrologic unit based on representative example areas.

Overland Flow Data: CDM will generate overland flow data for each hydrologic unit (overland flow length, slope, manning n roughness, and initial abstractions).

Stage-Area-Storage Data: CDM will develop stage-area-storage characteristics for significant floodplain areas, as determined by CDM, for the purposes of developing routing curves based on available topographic data.

Rainfall Data: CDM will use storm distributions approved by the St. Johns River Water Management District including the following conditions: 10-year, 25-year, and 100-year, 24-hour duration rainfall events.

Subtask 2.2.3: Hydraulic Analysis

CDM will develop HEC-RAS models of the PSWMS, which includes the main streams identified in the scoping meetings held with County staff in November 2010 which identified in Table 1.

Cross Sectional Data: CDM will use available aerial photogrammetry and survey information to develop open channel hydraulic data for up to 98 locations including channel cross-sections, lengths, roughness, and slopes. If additional open channel survey data are required, CDM will draft a survey data request to identify the data to be provided by the County.

Conduit and Control Structure Data: CDM will use field survey data provided by the County to develop the hydraulic characteristics of up to 5 PSMS control structures, bridges, and culverts including heights, widths, geometries, lengths, invert, local loss characteristics, conditions, roughness values and materials, as well as overflow elevations and materials. If additional conduit and/or control structure survey data are required to

model the PSWMS, CDM will draft a survey data request to identify the data to be provided by the County.

Stream Name	Miles
Alligator Creek	11.0
Ben Branch Creek	3.7
Boggy Creek	12.8
Cushing Creek	2.4
Funks Creek	6.9
Little Mill Creek	3.6
Little Mills Creek	0.8
Lofton Creek	26.5
Mills Creek	11.3
Plummer Creek	11.4
Spell Swamp	3.8
Thomas Creek	58.7
Upper Alligator Creek	8.2
Upper Ben Branch Creek	3.8
Upper Thomas Creek	4.1
Total Miles	169.1

Table 1. Stream Miles included in the PSWMS

Boundary Conditions: CDM will determine base flows/stages and/or design-frequency tailwater elevations for hydrologic/hydraulic routings. This will include up to two USGS stations and/or other gages located in and around Nassau County. CDM will perform a statistical analysis for both USGS gages to better determine the boundary conditions, and route the flows to estimate the yearly high water values for several locations along the stream.

Subtask 2.2.4: Water Quantity Model Results Report Section

CDM will draft a draft report which shall include data and results from the preceding tasks, including data availability and needs, problem areas, water quantity evaluations and results. CDM will provide three hard copies of the draft report and PDF format. The final report will be incorporated as part of Task 6.

CDM will include as part of the report submission, a 1 day training that will allow the County's staff to install the HEC-RAS and HMS software on their computer, and query the models.

Task 2.3 Establish Baseline Conditions

The outcome of this task will be the summary tables, listed the estimated flood elevations, flows and velocities along the County streams for different recurrence intervals such as the

10-year, 25-year, and 100-year. CDM proposes to use dynamic modeling, using 24-hour storm distributions that have been endorsed and evaluated by FEMA and the SJRWMD. It is our common approach to document significant flooding events with field observations and survey, tide and rainfall information to verify the stormwater models. The County is already familiar with this methodology, since it was the same method that allowed CDM to verify the Thomas Creek flooding occurred during Tropical Storm Fay.

Task 3: Lake Hampton Evaluation

In November 2008, the Lake Hampton levee was breached and is currently under evaluation and rehabilitation through State/Federal funding. This lake is located in between Hilliard and Folkston, and discharges to the St Marys River.

CDM will estimate the boundary conditions of the St Marys River in the vicinity of US-1 (SR 4) by using the LiDAR information. Three bridge crossings have been identified in this section that will require survey, namely: US-1, US-17, and I-95. CDM will request from the County FDOT documentation providing the required information to reduce the surveying costs. If not relevant information is available, CDM will use the available budget from Task 1.2 to perform professional surveying services.

The County will provide to CDM the documentation developed through the recent grant application to retrofit the levee. CDM will use the information to develop a model that will identify the estimated runoff collected at Hampton Lake for the 10, 25 and 100 year storms.

Task 4: Chester River Road/Blackrock Road Evaluation

The area located north East of SR-200 between Chester River Road and Blackrock road, has experienced flooding due to high tides. This area is susceptible to tidal fluctuations due to its proximity to the intracoastal waterway and the Atlantic Ocean.

The evaluation for this area consists of a series of site visits to verify the current condition of the culvert crossings to identify potential blockages, or areas of focus for maintenance to reduce hydraulic head loss. CDM will also review the LiDAR information to assess the vulnerability of this area to high tides using the recurrence intervals in the current FEMA flood insurance study.

The results of this evaluation will consist of a brief memorandum summarizing the findings of the site visits, as well as the projected flood areas for high tides of different recurrence intervals.

Task 5: Development of Capital Improvement Alternatives

This task includes the definition and evaluation of alternative solutions to existing and potential future problems. The evaluation will include using HEC-RAS for the 10-, 25-, and 100-year 24-hour storm based on the rainfall data determined in subtask 3.3. This will include up to 2 separate alternatives throughout the County.

Task 5.1: Alternative Scoping Meetings and Evaluation

CDM will meet with County staff to describe the preliminary findings and discuss additional available information for each one of the 2 potential sites identified.

CDM will work with the County to identify and select two preferred conveyance/storage management alternatives for each subbasin under both present and future land use conditions. A total of one meeting is included in this subtask.

CDM will consider problem areas, land use, soils, wetlands and water bodies, existing infrastructure, hazardous materials and other factors identified by the County or CDM based on available data.

Regional, integrated water quantity and quality management alternatives will be defined by CDM working closely with the County. Alternatives shall be directed toward solving serious problems, which will also aid/relieve some nuisance problems. The alternatives shall be based on comprehensive water quantity solutions with an associated water quality benefit, which will consist of non-structural (ordinance or regulations) and structural solutions. Examples of structural solutions include conveyance improvements (such as ditch piping) coupled with treatment/storage facilities such as wet detention, exfiltration, altered wetlands utilization/enhancement, protection of pristine wetlands, extended dry detention, gradually sloped swales, and multipurpose facilities which can serve as park, conservation (e.g. reuse), and/or recreation areas. Wherever possible or appropriate, aquifer recharge potential via retention to protect and replenish potable groundwater supplies will be identified. Conservation/reuse opportunities shall also be conceptually identified.

Water Quantity Criteria: CDM will produce flood stage, flows, and velocities summary tables for each alternative and subbasin to compare relative benefits for water quantity. The objective of this evaluation is to reduce the flood stages, duration of flooding, and high velocities in stream sections.

Subtask 5.1.1 Identify and Evaluate New/Retrofit BMPs

Using the stormwater models, CDM will conceptually identify the size and location of BMPs that will provide multiple benefits (flood reduction, erosion control, quality, and recreational value) to the County. In many cases, it is possible to enhance or retrofit existing BMPs to maximize their benefits and reduce construction costs. The proposed facilities will be evaluated in the model to estimate the anticipated flood reduction and annual load reduction for the pollutant(s) of concern. As a result of this process CDM will suggest modifications to PSWMS elements to determine improvements to enhance and increase future levels of service as well as potential improvements for water quality in terms of volume of treatment. CDM will develop concept sheets for each proposed project to allow the County to issue design and construction public bids.

Subtask 5.2 Conceptual Capital Cost Estimates

Capital, operation, and maintenance cost estimates will be prepared for one recommended alternative in each of the basins. The cost estimate will be based on regional unit costs from Florida, and the Southeast, as well as recent bids received by Nassau County. CDM will provide a list of the standard unit costs that will be used for items such as culverts, volume of excavation, wetland mitigation, control structures, erosion control measures, BMPS, sidewalks, etc. Once the County has approved the unit costs, CDM will apply them consistently for each one of the alternatives.

CDM will produce a draft report section documenting this task for incorporation into the Stormwater Management Plan.

Subtask 5.3: Comparison of Benefits and Costs

CDM will compare the cost estimates versus relative benefits provided by each alternative. CDM will meet with the County to discuss the management options. CDM will recommend a strategy for implementation in each subbasin based on flood control, water quality, wetlands management, community parks, erosion control, and potential project coordination (e.g., transportation, parks, and water and sewer) benefits versus capital, operation, and maintenance cost.

Task 6: Stormwater Master Plan Development

Task 6.1 Master Plan Report and Recommendations

CDM will outline the work conducted to identify the capital improvement projects, including the field assessments, the engineering analysis, and the evaluation of proposed projects. A draft report will be submitted to the County for review with the initial recommendations that will support the discussion between County staff, CDM, and other related parties as part of the outreach activities discussed in Task 5. The report will include the draft sections produced as deliverables of Tasks 1 through 5.

Once the County has submitted comments, and the final recommendations have been discussed CDM will submit a final report to document and file the project development. CDM suggests combining the hard copy report with PDF versions of the document that allow for easy distribution through the County's website.

The document will further discuss areas where additional evaluation and capital improvement project implementation may be required. The purpose of this document is not to be a milestone document that becomes obsolete and remains in the County files. Conversely, it will be a concise document including the technical details of the work conducted under individual tasks, and that will rely on the GIS portal to disseminate information to County's staff and citizens in an immediate manner.

Task 6.2 Stormwater Financial Study

CDM will evaluate the current staff and equipment dedicated to the operation and maintenance of the stormwater system, as well as plan review, construction inspection and sediment and erosion control. The data gathered in Tasks 1 and 5 will be used to project the

maintenance costs based on standards of frequency and intensity used in other communities.

CDM proposes to review recent County annual budgets and financial records to establish the current level of expenditures and fund allocations. The comparison of the projected costs and the current revenues will allow the County to identify potential funding gaps and opportunities to streamline dedicated funding for stormwater responsibilities.

CDM will prepare a memorandum outlining options to fund stormwater costs not limited to CIP, but also considering programmatic O&M. Some funding options include stormwater utility, MBTUs, user fees, and development taxes.

Task 6.3 Ordinance Review and Recommendations

Based on the results of the discussions and analysis performed by CDM, CDM will revisit the initial assessment performed under Task 1.3 to incorporate the results of the engineering analysis and project discussions.

The deliverable of this task will include a short memorandum outlining the proposed improvements to the County ordinance to meet the local needs, as well as agree with state and federal requirements.

Task 6.4 County Staff Training

To meet the objectives listed in the scope of services, CDM proposes to conduct staff training. During the development of the GIS datasets, CDM will coordinate closely with County staff to ensure that they are an integral part of the process.

Once there are datasets ready for delivery to the County, CDM will include an 8 hour workshop to County staff. The objective of the training is to provide staff enough confidence to use the tools, and extract information for day to day operations as needed.

Budget and Schedule

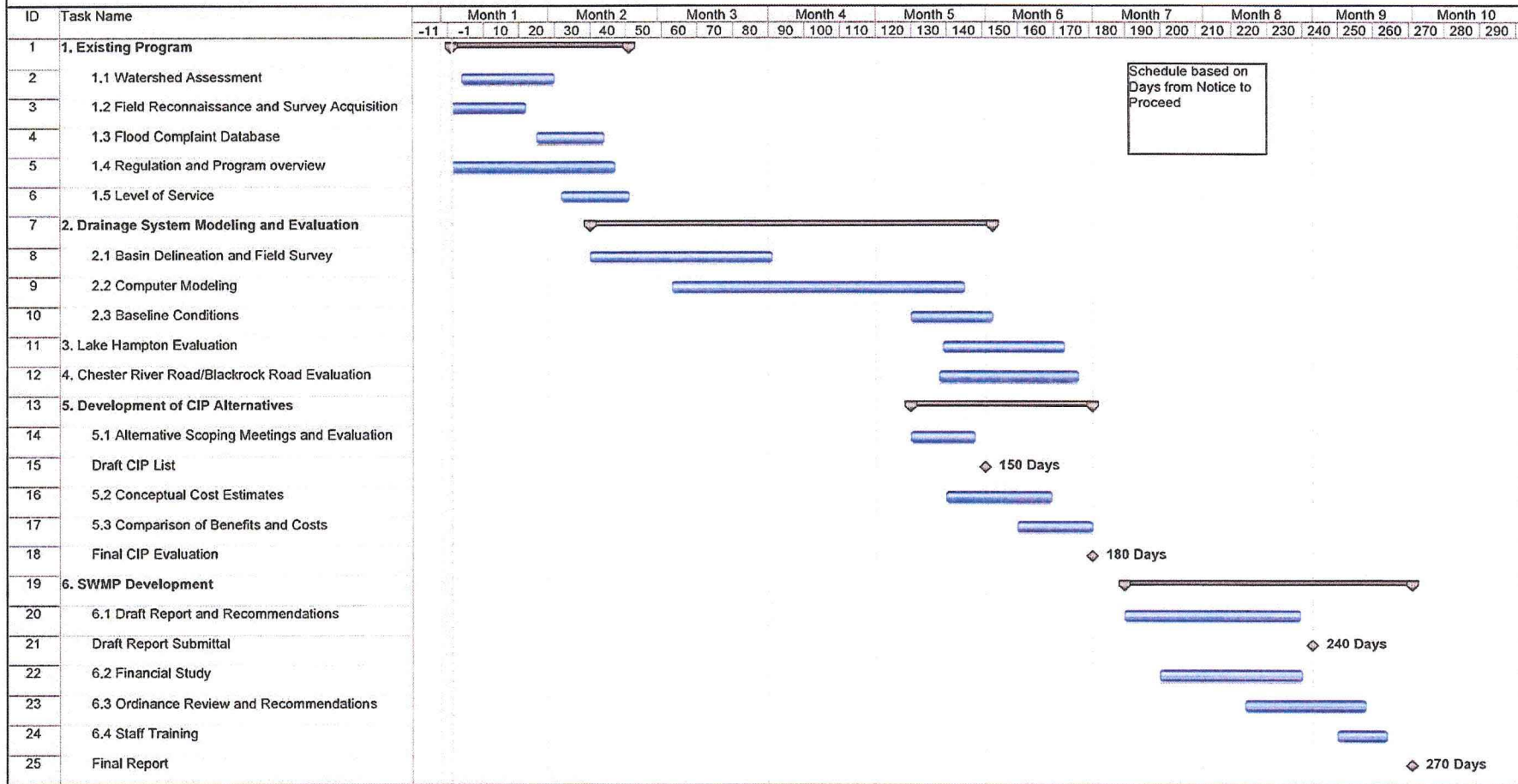
CDM will complete the work outlined in tasks 1-6 as part of a lump sum amount shown in Table 2.

Future authorizations should consider the evaluation of additional alternatives, future land use conditions, and additional survey and model verification.

**TABLE 2
NASSAU COUNTY STORMWATER MASTER PLAN - PART II/III (LUMP SUM)**

Budget Breakdown		Project Officer	Senior Engineer	Project Manager	Staff Engineer	Technician/Drafting	Clerical Support	Total Hours	Total Fee
		\$190.00	\$170.00	\$150.00	\$115.00	\$90.00	\$85.00		
CDM Labor Cost									
No.	TASKS								
1.1	Watershed, Stream, and Wetland Data Collection and Assessment	2	4	13	24	8	8	58	\$7,064
1.2	Field Reconnaissance and Survey Data Acquisition	2	8	5	0	3	8	25	\$3,298
1.3	Flood Complaint Database	2	3	6	4	4	2	21	\$2,798
1.4	Regulation and Program Overview	2	6	13	20	3	8	52	\$6,580
1.5	Establishment of a Stormwater Level of Service	8	8	14	18	3	16	66	\$8,534
2.1	Basin Delineation Verification and Field Survey	2	8	5	70	24	8	116	\$13,274
2.2	Computer Modeling								
2.2.1	Data Extraction from Existing Model	4	8	4	12	8	4	40	\$5,160
2.2.2	Hydrologic Analysis	5	26	25	116	36	6	214	\$26,138
2.2.3	Hydraulic Analysis	8	69	52	230	29	10	398	\$50,974
2.2.4	Water Quantity Report	3	18	6	52	18	10	108	\$13,028
2.3	Establish Baseline Conditions	2	14	26	52	14	2	110	\$14,124
3.0	Lake Hampton Evaluation	6	12	16	46	12	6	98	\$12,480
4.0	Chester River Road/Blackrock Road Evaluation	8	10	16	24	12	8	78	\$10,116
5.1	Alternative Scoping Meeting and Evaluation	2	5	6	6	6	2	26	\$3,460
5.1.1	Identify and Evaluate New/Retrofit BMPs	2	12	18	36	4	2	74	\$9,790
5.2	Probable Preliminary Cost	0	0	0	4	4	0	8	\$820
5.3	Comparison of Benefits and Costs	4	4	6	6	2	4	26	\$3,496
6.1	Final Report	2	8	16	32	16	60	134	\$14,360
6.2	Stormwater Financial Study	6	24	13	38	16	10	107	\$13,888
6.3	Ordinance Review and Recommendations	14	24	13	10	2	3	66	\$10,256
6.4	County Staff Training	4	14	8	20	6	6	58	\$7,659
		86	286	279	820	230	182	1883	\$237,297
OTHER DIRECT COSTS									\$11,900
Subconsultants Services									
	Survey								\$34,200
	McCranie and Associates								\$15,000
	Geomorphology								\$1,500
TOTAL LUMP SUM AMOUNT									\$299,897

Nassau County - Stormwater Master Plan Parts II and III Project Schedule



Schedule based on Days from Notice to Proceed

Project: Sched_20110117.mpp
Date: Tue 01-18-11

Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	