

TASK ORDER 2-11 STM

**ENGINEERING SERVICES FOR THE CITY OF KEY WEST STORMWATER
MASTER PLAN AND GPS INVENTORY OF EXISTING CITY UTILITIES**

This TASK ORDER 2-11 STM is issued under the terms and conditions of the MASTER AGREEMENT TO FURNISH GENERAL ENGINEERING SERVICES TO THE CITY OF KEY WEST ("AGREEMENT") between the City of Key West ("CITY") and CH2M HILL, Inc. ("ENGINEER") executed on September 18, 2007, which is incorporated herein by this reference.

A. SCOPE OF SERVICES

Specific services which the ENGINEER agrees to furnish are summarized on the attached TASK ORDER NO. 2-11 STM "SCOPE OF SERVICES." The "Scope of Services" defines the work effort anticipated for the Task Order. This Task Order, when executed, shall be incorporated in and shall become an integral part of the September 18, 2007, Master Agreement.

B. TIME OF COMPLETION

Work under this Task Order will begin immediately following acceptance and completed expeditiously subject to coordination with the City of Key West staff. Work may be performed at any time as requested by the CITY within 12 months after the date of execution of this Task Order, at which time the Task Order will expire.

C. COMPENSATION

Compensation for TASK ORDER NO. 2-11 STM, Tasks A through D will be on a lump sum fee basis as stipulated in Article 2, Paragraph 2.1 of the AGREEMENT. Compensation for all expenses will be on a Cost Reimbursable-Per Diem basis as stipulated in Article 2, Paragraph 2.2 of the AGREEMENT. The estimated compensation is shown on the attached statement entitled TASK ORDER NO. 2-11 STM COMPENSATION.

D. ACCEPTANCE

By signature, the parties each accept the provisions of this TASK ORDER NO. 2-11 STM, and authorize the ENGINEER to proceed at the direction of the CITY's representative in accordance with the "SCOPE OF SERVICES." Start date for this project will be no later than ten (10) days after execution of this authorization.

For CH2M HILL, INC.

For CITY OF KEY WEST

By: _____
Matthew Alvarez, P.E.
Vice President

By: _____
Jim Scholl
City Manager

Andrew H. Smyth, P.E.
Key West Office Manager

Dated the ____ day of _____, 2010

ATTEST: _____

TASK ORDER 2-11 STM

ENGINEERING SERVICES FOR THE CITY OF KEY WEST STORMWATER MASTER PLAN AND GPS INVENTORY OF EXISTING CITY UTILITIES

SCOPE OF SERVICES

Project Background

The City of Key West has conducted planning and designs for their stormwater infrastructure over a number of years. In 1994 a Stormwater Runoff Study was prepared by Kissinger, Campo, and Associates (KCA). Out of this study came a Long Range Stormwater Utility Plan that recommended using Key West's unique hydrogeologic conditions to dispose of stormwater through drainage wells. Specifically, gravity wells can be used at higher locations and pressurized wells at lower elevations. CH2M HILL noted that elevation 5.0 (NGVD29) is an approximate threshold elevation between the two. CH2M HILL designed four pressurized well systems, two of which were constructed in 2003 and a third currently under construction. In 2006, the City retained Perez Engineering and Parsons to develop a draft design memorandum for 50 gravity wells, followed by final design of 20 gravity wells in 2009 (10 each by Perez and CH2M HILL). An additional pressurized well system is under design for George Street. Other gravity wells and stormwater projects have been installed by the City, FDOT, and the County.

During the design activities for assorted projects, a need has been identified to update the City's inventory and stormwater master plan (SWMP) so better comprehensive solutions can be evaluated to continue moving the CITY's Stormwater Program forward in an efficient manner. Updated information is needed for new facilities and the elevations of the existing stormwater pipes need to be verified. Given the work that has been done since 1994, a new list of prioritized projects needs to be developed to update the Long Range Stormwater Utility Plan.

Purpose

The objectives of this task are as follows:

- Develop a SWMP that updates the City's inventory of facilities
- Consolidate and include currently proposed projects and then identify new projects to reduce flooding generated by rainfall (not storm surge)
- Develop conceptual cost estimates
- Prioritize the projects

Project Description

The SWMP consists of the following steps:

- Background Investigation – Collect existing reports and data, field reconnaissance, supplemental field survey, and inventory of drainage facilities.
- Hydrologic/Hydraulic Simulation – Build ICPR models of the drainage basins.
- Alternative Analysis – Develop projects that would address flooding and water quality concerns and estimate planning-level costs of each proposed project.
- Planning Report Preparation – Prepare final report and executive summary (handouts), and present recommendations to the City commission.

Scope of Services

Task A Information Collection

The ENGINEER will obtain from the CITY (as needed) and review the previous reports by Kissinger, Campo, and Associates (1994); Perez Engineering and Development (2006); and any other stormwater evaluations on the main island of Key West. These documents will also include design documents recently completed or developed for the CITY. As-built and record drawings are the most beneficial as they should have surveyed elevation data. Information will be gathered directly from the CITY and OMI on some possible in-house ad hoc drainage improvements that may have been implemented and not captured in the 2006 study. The sanitary sewer system mapping will be obtained from the CITY and OMI. Available Geographic Information System (GIS) data from Monroe County, such as, the streets and parcel data will be requested and used in the general GIS database.

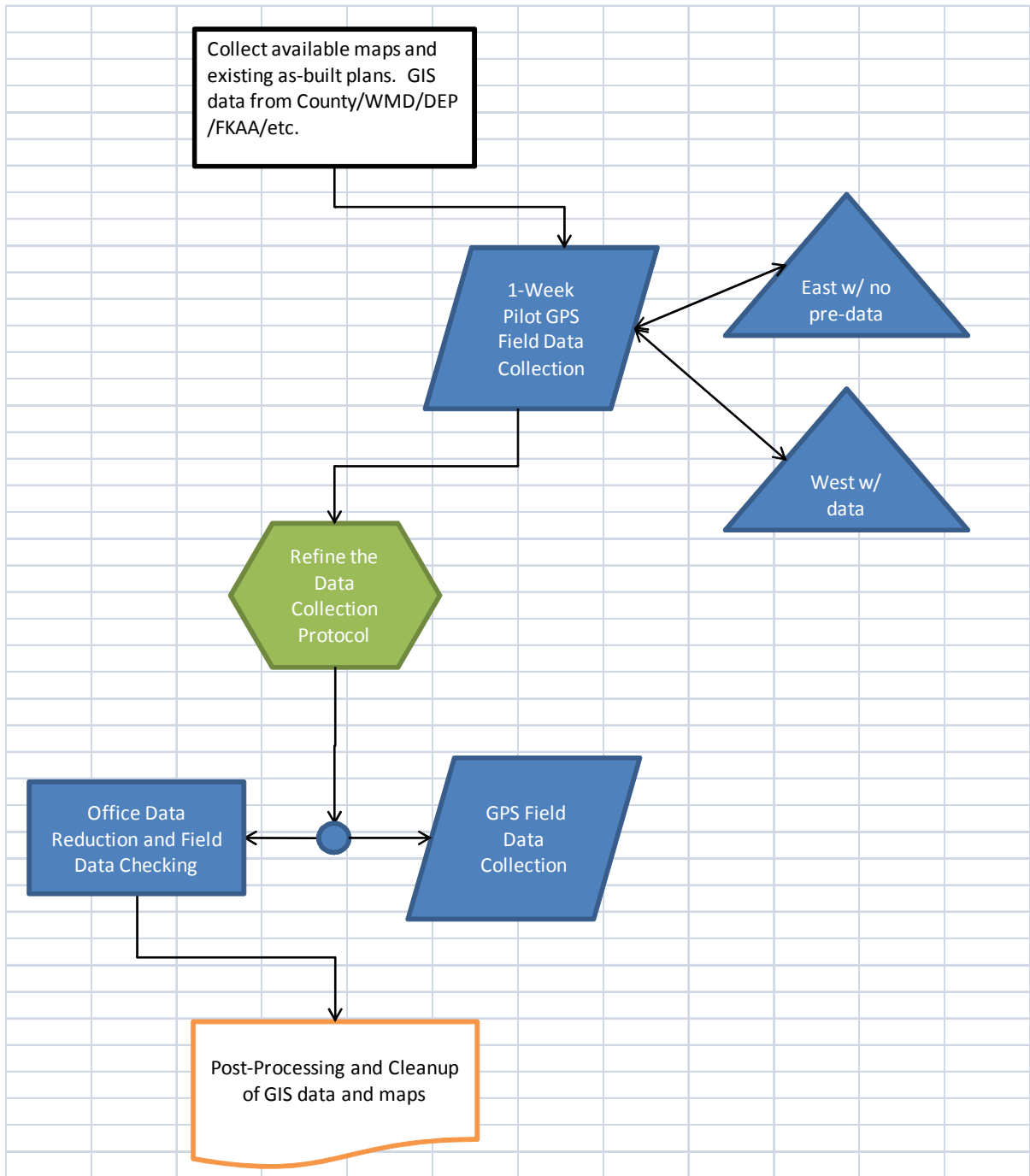
Existing data available in CADD format, design drawings, and field inventories will be loaded into a draft GIS database. A template will be developed to store the information based on other similar projects that the ENGINEER has experience with and the available information. New data forms will be developed for gravity wells. A series of maps will be developed for the field team to use. A field safety program will be prepared. Protocols to collect data will be developed into a procedures memorandum for the field crew training and use.

The purpose of the field data collection is to verify the information found on the maps and drawings. Figure 1 provides an overview of the process that will be used. No professional surveying will be conducted, but the location of stormwater facilities will be verified using Global Positioning System (GPS). Sanitary manholes in the vicinity of the stormwater facilities will also be verified using GPS. The previous computer model and maps developed by Perez will be used to pre-populate the forms. The ENGINEER will prepare a generic field data collection paper form to be used with the handheld GPS data collector so a paper record can be kept.

With assistance from OMI, a field reconnaissance will be conducted of most intersections and streets in the CITY that contain stormwater facilities. This field investigation will sketch and make notes of observed infrastructure. The field crew will look for pipes and take measurements (i.e., tape measure/rod) of depths from the street to confirm pipe depths and

sizes if they are assessable. OMI will provide their field experience and knowledge of the system to the ENGINEER. No confined entry will be conducted by the ENGINEER's field team members. Many outfalls will likely be inaccessible because they are underwater, so their location at the shoreline (e.g., bulkhead) will be located based on best information and observations.

Figure 1. Process Schematic of the Information Collection Task



The ENGINEER will compile the data collected from the field into a data notebook to be used in Task B. It is anticipated that there will be a page per intersection that summarizes observations and comments. Location GPS data collected in the field will be post processed to improve its accuracy (less than 1 meter horizontal). The GIS database will consist of tables associated with the location of each infrastructure.

Deliverables

The following deliverables will be provided under this Task:

- Kickoff meeting with the CITY and OMI to review the available data found and draft data collection forms and field workplan.
- Draft examples of data collection results will be prepared to present to the CITY after about 1 week of collection to demonstrate the type of data being captured and if there are challenges found during initial data collection.
- Two (2) copies: Data notebook - The CITY may provide one of these to OMI.
- GIS files and database in ArcMap format.

Task B Hydrologic/Hydraulic Simulation

Perez Engineering and Design (2006) included simulations of stormwater flooding for existing and proposed conditions. However, projects were only proposed for up to 50 gravity wells. The Perez ICPR model will be updated with Task A information by the ENGINEER. Modeled pipe inverts will be double checked against the field data using known elevations at intersections (accuracy is assumed to vary somewhat, 0.1-ft to 0.3-ft). Additional facilities are likely required to be included in the model, and other corrections or changes made to make the model representative. It is normal practice to consolidate inlets into one "node" in the computer model. Small inlets may need to have special orifices installed in the model to account for their constriction effect.

Depending on the topography, drainage patterns, and existing basin boundaries, more than one computer model domain (i.e., base files) may be constructed.

Proposed or designs pending construction will not be included in the existing conditions model(s) unless their construction is eminent (1-year or less).

Four design storms will be simulated: 5-year, 24-hour; 10-year, 24-hour; 25-year, 72-hour; and 100-year, 72-hour. No tidal surge from tropical storms will be simulated. The high tide, as reported by NOAA, will be used at the ocean outfalls. The groundwater table will be assumed based on the location of the wells with respect to the ocean.

Deliverables

- A draft Technical Memorandum will be prepared to describe the background data collection and field effort, preliminary modeling approach and set-up, and initial results. Maps of predicted flooding areas will be provided in the memorandum.
- A meeting will be held with the City to discuss the results, compare the results to known flooding problems and/or water quality issues, and to review where the Alternative Analysis will review.

Task C Alternative Analysis

Based on previously recommended projects, existing conditions, depth of flooding, and engineering judgment, projects throughout the CITY will be identified by the ENGINEER. Projects will be grouped into basins, subbasins or intersections, depending on their scope. Some Low Impact Development (LID) concepts may be included, but because of the limited available space, it is anticipated to be minor opportunity to implement these LID concepts. A meeting will be held with the CITY to preview and discuss these recommendations. The list of projects may be modified based on CITY comments.

The ENGINEER will develop the projects for inclusion into the computer model. The model elements are expected to include new inlets, pipes, gravity wells, water quality treatment boxes, and pressurized well systems. A second meeting with the CITY will be held to review the effectiveness of the projects. Minor changes to the projects may be warranted after this meeting that will require model adjustments.

The ENGINEER will prepare conceptual construction cost estimates of the projects at Class 5 accuracy as defined by the American Association of Cost Engineers. Tables will be developed to rank the projects depending on factors such as number of households affected, length of road treated, does the project improve adjacent basin flooding, and similar criteria.

Deliverables

The following deliverables will be provided under this Task:

- Two (2) meetings with CITY to review the projects and their affect. A brief draft Technical Memorandum will be prepared with tables and figures describing the proposed alternatives.

Task D Planning Report Preparation

- The ENGINEER will prepare draft report containing the SWMP for CITY review based on the previous Technical Memorandums. The report shall contain the study purpose, data collection description, project descriptions, modeling of existing and future conditions, ranking process, conceptual cost estimates, and project rankings. Appendixes will be available for review during the draft report upon request.
- The CITY and ENGINEER will meet to discuss the comments.

- The ENGINEER will address one set of CITY comments on the draft report. Prepare a Final Report with attachments.
- The ENGINEER will prepare a PowerPoint presentation (PPT) for the City to use for public meetings. The CITY will review a draft PPT and provide comments at one meeting. The PPT will be finalized and provided to the CITY.
- The ENGINEER will present PPT at one public meeting in Key West.

Deliverables

The following deliverables will be provided under this Task:

- Two (2) copies: Draft report without attachments
- Five (5) copies: Final SWMP report with attachments. Any OMI copies are included in this deliverable.
- One draft PowerPoint file (PPT) for review. One final PPT file.
- Two (2) meetings with Key West.
- One presentation of the PPT file at a public meeting.

Assumptions

The following assumptions were used in the development of this Task Order

- The geographic extent of the data inventory is limited to the main island of Key West and Stock Island around the currently permitted MS4 outfalls (around north end). The airport internal drainage will not be inventoried. The estimated level of effort is based on 415 locations to be field inventoried. No confined entry will be conducted by the ENGINEER's field team members.
- CH2M HILL will use Critigen to assist in the GIS and GPS data collection program (Task A) and some incidental mapping support for the SWMP. This subcontractor is listed as an expense in the budget. OMI services are not included in this task order as they will support this project under their existing services contract with the CITY.
- The geographic extent of the SWMP will be limited to the main island of Key West, not including Stock Island, Navy facilities, or Fleming Key. The airport internal drainage will not be studied in detail, only to the extent that it may affect CITY drainage. Stock Island is being studied separately. Results of the separate study will be summarized in this SWMP.
- The published ICPR computer model (Perez, 2006) input will be re-entered into the new models. The previous input data files to ICPR are not available.
- No detailed surveying is being performed. The accuracy of the GPS elevations may vary but will be about 1-foot or less.

- Sanitary infrastructure will be inventoried only at locations where the CITY stormwater facilities exist. The location of stormwater facilities is available from literature and previous CITY reports.
- Meetings will be held in Key West and attended by up to two (2) ENGINEER's staff, additional ENGINEER staff may attend via conference call.
- The level-of-service for projects will be estimated on a relative basis. Projects will be ranked on relative improvements. It is assumed that there will be wide-spread flooding for storms exceeding a few inches per day. No mapping of flood extents is included in the SWMP.
- No design work or state and county agency coordination is included in this Task Order. Recommendations for project design elements are to be based on the ENGINEER's recent CITY experience and details of past work.
- Only existing land use shall be used in the hydrologic/hydraulic evaluation of the study area as it is a mature development.
- Assumptions about ponding into lots/parcels will be made on each block included in the model.
- The evaluations will be based on the federal, state and local codes and standards in effect at the start of the project. Any changes in these codes may necessitate a change in scope.
- No land costs shall be included in cost estimating for the project. It will be assumed that all projects can be located in City rights of way.
- Legal, easement, or plat survey or acquisitions will be the responsibility of CITY, it is assumed that the City will acquire an easement for proposed projects.
- No permitting or agency meeting is required.
- Florida Department of Emergency Management LiDAR maps will be used for base maps and modeling.

Obligations of the CITY

To assist meeting schedule and budget estimates contained in this proposal, the CITY will provide the following:

- Available drawings and files.
- Prompt review and comment on all deliverables.
- Facilitate access to any required facilities.
- Attendance of key personnel at meeting as requested.
- CITY will assist in obtaining reports or drawings from past designs.

Additional Services

The ENGINEER will, as directed, provide additional services that are related to the project but not included within this Scope of Services. These and other services can be provided, if desired by the CITY, as an amendment to the Task Order. Work will begin for the Additional Services after receipt of a written notice to proceed from the CITY. Additional services may include, but are not limited to, the following:

- Additional GPS data collection of the sanitary facilities not collocated with stormwater
- Additional design services if requested by the CITY
- Bid or construction phase services
- Additional permitting involving agencies other than the those listed under Task C

Compensation

The estimated compensation for TASK ORDER NO. 2-11 STM is shown on Attachment A. A draft schedule is presented in Attachment B.

Attachment A
COMPENSATION

TASK ORDER 2-11 STM - STORMWATER MASTER PLAN

ENGINEERING SERVICES FOR THE CITY OF KEY WEST STORMWATER MASTER PLAN

Task	Hours	Labor Cost	Expenses	Total Cost
Task A - Background Investigation	1339	\$162,496	\$132,008	\$294,504
Task B - Existing Model Setup	202	\$23,985	\$100	\$24,085
Task C - Alternatives Formulation	315	\$39,819	\$1,155	\$40,974
Task D - Final Reporting	291	\$37,032	\$1,405	\$38,437
Total	2147	\$263,332	\$134,668	\$398,000

COMPENSATION BREAKDOWN
Task Order 2-11 STM

TASK NO.	TASK DESCRIPTION	HOURLY RATE	TOTAL HOURS	LABOR	EXPENSES	TOTAL COST
A	Background Investigation					
	Principal Project Manager	\$172.00	70	\$12,040		\$12,040
	Principal Technologist	\$172.00	80	\$13,760		\$13,760
	Senior Technologist	\$158.00	24	\$3,792		\$3,792
	Senior Professional	\$148.00		\$0		\$0
	Project Engineer	\$122.00	861	\$105,042		\$105,042
	Assoc Engineer	\$110.00	176	\$19,360		\$19,360
	Tech 5	\$ 96.00	6	\$576		\$576
	Tech 4	\$ 93.00	32	\$2,976		\$2,976
	Technical Editor	\$ 84.00	0	\$0		\$0
	Clerical	\$ 55.00	90	\$4,950		\$4,950
	Travel 2 @ 2-day Key West				\$2,260	\$2,260
	Travel 1 @ 9 weeks GPS Data Collection				\$13,100	\$13,100
	PRINTING/REPROGRAPHICS/SHIPPING				\$318	\$318
	GPS/GIS Sub consultant -- Critigen				\$116,330	\$116,330
	Background Investigation SUBTOTAL		1339	\$162,496	\$132,008	\$294,504
B	Existing Model Setup					
	Principal Project Manager	\$172.00	12	\$2,064		\$2,064
	Principal Technologist	\$172.00	18	\$3,096		\$3,096
	Senior Technologist	\$158.00	0	\$0		\$0
	Senior Professional	\$148.00		\$0		\$0
	Project Engineer	\$122.00	42	\$5,124		\$5,124
	Assoc Engineer	\$110.00	117	\$12,870		\$12,870
	Tech 5	\$ 96.00	0	\$0		\$0
	Tech 4	\$ 93.00	0	\$0		\$0
	Technical Editor	\$ 84.00	4	\$336		\$336
	Clerical	\$ 55.00	9	\$495		\$495
	Travel Key West				\$0	\$0
	PRINTING/REPRO/SHIPPING/EQUIPMENT				\$100	\$100
	Existing Model Setup SUBTOTAL		202	\$23,985	\$100	\$24,085
C	Alternatives Formulation					
	Principal Project Manager	\$172.00	24	\$4,128		\$4,128
	Principal Technologist	\$172.00	40	\$6,880		\$6,880
	Senior Technologist	\$158.00	0	\$0		\$0
	Senior Professional	\$148.00		\$0		\$0
	Project Engineer	\$122.00	150	\$18,300		\$18,300
	Assoc Engineer	\$110.00	88	\$9,680		\$9,680
	Tech 5	\$ 96.00	0	\$0		\$0
	Tech 4	\$ 93.00	0	\$0		\$0
	Technical Editor	\$ 84.00	4	\$336		\$336
	Clerical	\$ 55.00	9	\$495		\$495
	Travel 1 @ 2-Key West Mtg				\$1,130	\$1,130
	PRINTING/REPROGRAPHICS/SHIPPING				\$25	\$25
	Alternatives Formulation SUBTOTAL		315	\$39,819	\$1,155	\$40,974

D Final Reporting					
Principal Project Manager	\$172.00	48	\$8,256		\$8,256
Principal Technologist	\$172.00	66	\$11,352		\$11,352
Senior Technologist	\$158.00	0	\$0		\$0
Senior Professional	\$148.00		\$0		\$0
Project Engineer	\$122.00	72	\$8,784		\$8,784
Assoc Engineer	\$110.00	31	\$3,410		\$3,410
Tech 5	\$ 96.00	0	\$0		\$0
Tech 4	\$ 93.00	0	\$0		\$0
Technical Editor	\$ 84.00	40	\$3,360		\$3,360
Clerical	\$ 55.00	34	\$1,870		\$1,870
Travel 1 @ 2-Key West Mtg				\$1,130	\$1,130
PRINTING/REPROGRAPHICS/SHIPPING				\$275	\$275
Final Reporting SUBTOTAL		291	\$37,032	\$1,405	\$38,437
PROJECT TOTALS					
TOTAL HOURS		2,147			
TOTAL FEE ESTIMATE			\$263,332	\$134,668	\$398,000

Attachment B
SCHEDULE

Preliminary Schedule for Completing 2-11 STM

Task Description	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11
Notice to Proceed	■										
Kick off Meeting		■									
Field collection		■	■	■	■	■	■				
Hydrologic/Hydraulic Simulation							■	■			
Alternative Analysis								■	■		
Draft Report										■	
Final Report											■