

**NEW MEXICO DEPARTMENT
OF TRANSPORTATION**

REQUEST FOR PROPOSALS

FOR

PROFESSIONAL SERVICES

RFP 09-03

**VILLAGE OF COLUMBUS/POE MASTER
DRAINAGE PLANS**

**CONTROL NUMBER: C7S779
PROJECT NUMBER: ST-7529(212)**

**Submit Proposals no later than
September 23, 2008 @ 2:00 pm
local prevailing time**

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Request For Proposal

Control Number (CN): C7S779

Project Number: ST-7529(212)

Type of Work: Village of Columbus /POE Master Drainage Plans

Posted Routes: NM 9 and NM 11

Project Limits: Refer to Attached Project Area Map

NMDOT District: District 1

County: Luna

Terrain Type: Mountainous, hilly and flat

Construction Programmed Year: To be determined

Anticipated Letting Date: To be determined

Project Development Engineer: Guillermo Martinez, P.E.

Urban or Rural: Rural

I. Project Narrative:

A. Project Location

The project area is located in Luna County, New Mexico near the Village of Columbus. Refer to attached Project Area Map.

B. Description:

The scope of work for this project shall consist of preparing a Master Drainage Plan (MDP) for the Village of Columbus, New Mexico with focus on the Columbus Port of Entry (POE). The purpose of the MDP shall be:

- 1) To propose solutions to alleviate the flooding at the Village of Columbus and surrounding areas.
- 2) To propose solutions to alleviate the flooding at the Columbus POE and the areas adjacent to the POE including the area of Puerto Palomas.

Recent history has proven that the Village of Columbus, the POE and adjacent areas flood during high volume rainfall events. Since several government agencies will be constructing major projects near the area of the Village of Columbus over the next couple of years, the MDP shall also take into consideration the planning or construction of these particular projects as follows:

- 1) Office of Border Patrol improvements to Tactical Infrastructure located along the International Boundary Line between the U.S. and Mexico,
- 2) GSA expansion of the POE for the U.S. Customs and Border Protection
- 3) Luna County construction of a Highway 11 By-Pass Road.

The intent of the NMDOT is to negotiate a lump sum fee for activities outlined in this Request for Proposal.

C. Scope of Services

This document is a DRAFT Scope of Work for completing the project. The FINAL Scope of Work will be developed in conjunction with the successful respondent, and will be the basis of the Consultant Services Agreement.

The Consultant shall complete a MDP for the areas of concern depicted in the attached Project Area Map. The Plan shall identify, quantify, document and propose solutions to:

- 1) flooding problems experienced and affecting the areas of concern
- 2) localized drainage problems

The MDP shall be developed in phases under the direction of the NMDOT and with input from the Village of Columbus, New Mexico Border Authority, International Boundary and Water Commission, U.S. General Service Administration, Luna County and the NMDOT. The MDP shall consider both existing and future conditions flood hazards.

D. Study Area

The area covered by this study is shown approximately on the attached Project Area Map. The study area shall focus on the areas of concern depicted on the attached Project Area Map and shall include all drainage areas/watersheds and hydraulics structures affecting these particular areas of concern.

E. Approach

The MDP shall be developed with the following phased approach:

Phase 1: investigate, quantify and document drainage & flooding problems

Phase 2: design drainage measures, develop alternatives and recommendations to address the identified drainage and flooding problems

Phase 3: develop preliminary and final design/construction plans, cost estimates and recommendations for the selected alternatives

NMDOT approval shall be required before Consultant proceeds from one phase to the next.

II. Project Activities

A. Phase 1 – Preliminary Drainage Report

a. Data Collection

The NMDOT has information that will be available to the consultant to use for this project (refer to The Drainage Manuals/Criteria). The consultant shall be responsible for using this information, and for acquiring all additional data (to include but not limited to previous drainage studies, maps, aerials, digital elevation models/triangular irregular networks, soil maps, drainage complaint logs, flood related newspaper articles including Mexican newspaper articles, internet articles etc. in order to accomplish the objectives of this project. The MDP shall include a discussion of the data collection effort and any special conditions or problems encountered.

b. Identification of Local Drainage Problems

For the purpose of this study, local drainage problems shall be defined as areas of flooding within the study area. The Consultant shall research, acquire, review and asses all available drainage and flooding information (to include: newspaper articles, internet articles and Mexican newspaper articles) for the Village of Columbus, Columbus POE and adjacent areas in order to identify the local drainage and flooding problems that will be addressed in the study.

The goal of the research shall be to identify those isolated problems that can be solved with immediate improvements, and those that may require more extensive improvements to the storm drain infrastructure. The local drainage and flooding problems addressed in the study shall be agreed upon by the NMDOT and the Consultant before any analyses occurs.

c. Hydrologic Modeling for Major Watercourses

The Consultant shall develop a HEC-HMS model that covers the study area and existing conditions. The model shall be used as the basis for developing more detailed hydrologic models and analyses that reflect the future condition of the watersheds (based on anticipated levels of development within the watersheds, as specified by the Village of Columbus, New Mexico Border Authority, International Boundary and Water Commission/ Comision Internacional de Limites y Aguas, Luna County and the NMDOT). The Consultant shall use the hydrologic methods specified in the documents listed in “The Drainage Manuals/Criteria” (under references).

d. Hydrologic Modeling for Local Drainage Problems

Contributing watersheds shall be identified and discharges shall be calculated for all local drainage problems. In developing these discharges, the Consultant may refine the HEC-HMS model or use other acceptable methods as specified in the documents listed in "The Drainage Manuals/Criteria" (under references).

e. Hydraulic Modeling for Major Watercourses and Structures

The consultant shall use recent aerial photography, surveyed cross-sections and 1- foot contour interval mapping to develop all HEC-RAS models for all identified critical watercourses and structures affecting the areas of concern depicted in the attached Project Area Map. All identified critical watercourses and structures shall be modeled for two scenarios, each scenario consisting of a 50-year and 100-year storm event, as follows:

- 1) existing / current conditions
- 2) possible / projected future conditions

The peak discharges necessary for the scenarios shall be developed as specified under the "Hydrologic Modeling" section of this Scope of Work. The Consultant shall ensure that the hydraulic modeling and mapping done for this study meets the methods specified in the documents listed in The Drainage Manuals/Criteria.

The purpose of the modeling shall be to:

- i. Identify all existing/future drainage problems and any inadequately sized infrastructure affecting the areas of concern depicted in the attached Project Area Map.
- ii. Assess the possibility of using future conditions mapping when permitting new development.

The structures or critical watercourses addressed in the study shall be agreed upon by the NMDOT and the Consultant before any analyses occurs. The consultant shall also assist the NMDOT in determining if the hydraulic modeling is required to meet FEMA standards.

f. Hydraulic Modeling for Local Drainage Problems

Local drainage problems may be analyzed using methods other than HEC-RAS modeling, as specified in the documents listed in "The Drainage Manuals/Criteria" or as agreed by the Consultant and the NMDOT.

g. Coordination

The Consultant will be responsible for all coordination required to accomplish the work required. This responsibility shall include coordination with all property

owners and federal, state, city, county and all other agencies having jurisdiction or interest in the project. This shall also include obtaining approvals and/or concurrence on all work that is to be completed by the Consultant including work completed by sub-contractors working under this contract.

This responsibility shall also include obtaining all initial informal (oral approvals). For any required formal (written) approvals, the Consultant shall provide the NMDOT with all required data and draft letters of transmittal. In the event the Consultant is not successful in obtaining approvals, the consultant shall promptly notify the NMDOT in writing, and the NMDOT will assist in resolving the matter. The Consultant is responsible for all other information, maps, and data that may be required.

h. Report

The Consultant shall prepare a written report at the end of Phase 1 that documents all work done in "Tasks a through g". The report shall also include, but not limited to, all hydrologic & hydraulic modeling calculations. A detailed hydraulic analysis such as: backwater profiles, flow velocities, scour calculations, design of erosion protection and other hydraulic design data shall be required for all major water courses and structures. Calculations for detention/retention ponds shall also be included.

In preparing the report, the Consultant shall perform on all major water courses or structures, a hydraulic analysis using the HEC-RAS computer model to develop water surface profiles or culvert analysis/design for the existing and proposed conditions. An approved Phase 1 Drainage Report shall also include all drainage maps, inventory of existing drainage structures or water courses, detailed structure recommendations including drainage areas, design discharges, head water depths; and a Water Surface Profile Structure Layout Sheet for any major structures.

The report shall also include the storm drain design data at each drop inlet and manhole. The design data shall include, but not limited to design discharges, carry over discharges, intercept discharges and other hydraulics data as requested by the NMDOT. All preliminary drainage plans (drainage area maps, channel designs, culvert designs, storm drain designs, etc.) shall be documented on 11 X 17 sheets and shall include analysis/design data such as hydraulic grade line for a 50-year & 100-year discharge, invert elevations, slopes, velocities and discharges.

The Engineer shall use the methodologies specified in the documents listed in "The Drainage Manuals/Criteria" (under references) in order to prepare the report.

B. Phase 2 – Proposed Drainage Infrastructure Alternatives

a. Alternatives Assessment

The goal of developing alternatives along the Major Watercourses shall be to provide proposed drainage infrastructure that can accommodate a 100-year design frequency flood and provide solutions to mitigate major flooding problems at the Columbus POE and the Village of Columbus. The proposed drainage infrastructure may include culverts, bridge class culverts, channels, bridges, roadway crossings, storm drains, retention ponds, detention ponds and other hydraulic structures. The Consultant shall identify existing undersized infrastructure by determining the approximate existing capacity of all structures and comparing this with the 100 year discharges for both existing and future conditions. For each undersized structure identified, the Consultant shall develop improvement alternatives for the scenarios described in Phase 1, task e.

The following alternatives shall be specifically considered, with preference towards environmentally sensitive alternatives:

- 1) Improvement or replacement of the existing drainage infrastructure
- 2) Proposed drainage channels and culverts to deviate runoff away from Columbus POE & Village of Columbus
- 3) Proposed regional detention on properties owned by the State, County, Federal, Village of Columbus and private entities (this may require the hydraulic modeling of outlet structures & pipes which carry water into Puerto Palomas, Mexico). All regional detention ponds shall require approval from NMDOT and respective entity before any major design or analysis is conducted
- 4) Acquisition of flood-prone structures or properties
- 5) Proposed infiltration facilities, such as retention basins

For local drainage problems, the Consultant shall identify those problems that can be solved by single site improvements and those that may require off-site improvements to the regional storm water drainage system. Alternatives will have 100 year discharge capacities. However, this may not be possible in some areas and it may be necessary to size the improvements for the peak discharge generated from the maximum possible "design frequency flood" (refer to NMDOT Drainage Design Criteria, February 2004), considering the constraints at the site. These sites should be identified by the Consultant as soon as possible in the alternatives analysis and discussed with the NMDOT before developing any detailed analysis.

The Phase 2 investigation of alternatives is intended to determine feasibility, size and concept-level cost estimate of each alternative. These alternatives shall be presented to the Village of Columbus, New Mexico Border Authority, International Boundary and Water Commission/ Comision Internacional de Limites y Aguas, U.S. General Service Administration, Luna County and the NMDOT in order to determine which alternative will be pursued in Phase 3 of this study. The consultant shall prepare a written report documenting all tasks in Phase 2. The consultant shall also be required to attend and present their findings at public meetings.

b. Final Drainage Report

The Consultant shall prepare a written report that documents all work done in Phase 2 and incorporates all findings from the Phase 1 Preliminary Drainage Report. The report shall also include, but not limited to, all hydrologic & hydraulic modeling calculations for all alternatives. A detailed hydraulic analysis such as: backwater profiles, flow velocities, scour calculations, design of erosion protection and other hydraulic design data shall be required for all major water courses and structures. Calculations for detention/retention ponds shall also be included.

In preparing the report, the Consultant shall perform, on all major water courses or structures, a hydraulic analysis using the HEC-RAS computer model to develop water surface profiles or culvert analysis/design for the existing and proposed conditions. An approved Final Drainage Report shall also include all drainage maps, inventory of existing drainage structures or water courses, detailed structure recommendations including drainage areas, design discharges, head water depths; and a Water Surface Profile Structure Layout Sheet for any major structures.

The report shall also include the storm drain design data at each drop inlet and manhole. The design data shall include, but not limited to, design discharges, carry over discharges, intercept discharges and other hydraulics data as requested by the NMDOT. All preliminary drainage plans (drainage area maps, channel designs, culvert designs, storm drain designs, etc.) shall be documented on 11 X 17 sheets and shall include analysis/design data such as hydraulic grade line for a 50-year & 100-year discharge, invert elevations, slopes, velocities and discharges.

The Consultant shall use the methodologies specified in the documents listed in "The Drainage Manuals/Criteria" (under references) in order to prepare the report.

c. Coordination

The Consultant will be responsible for all coordination required to accomplish the work required. This responsibility shall include coordination with all property owners and federal, state, city, county and all other agencies having jurisdiction or interest in the project. This shall also include obtaining approvals and/or concurrence on all work that is to be completed by the Consultant including work completed by sub-contractors working under this contract.

This responsibility shall also include obtaining all initial informal (oral approvals). For any required formal (written) approvals, the Consultant shall provide the NMDOT with all required data and draft letters of transmittal. In the event the Consultant is not successful in obtaining approvals, the consultant shall promptly notify the NMDOT in writing, and the NMDOT will assist in resolving the matter. The Consultant is responsible for all other information, maps, and data that may be required.

C. PHASE 3 - Preliminary & Final Design and Construction Plans of Selected Alternative Projects

a. Plans

The Consultant shall prepare design plans and cost estimates for the alternatives selected in Phase 2 of the study. For larger projects, preliminary 30% plans and their respective cost estimates shall be required in order to demonstrate the feasibility of all selected alternatives, uncover any major construction issues, and obtain a cost estimate that can be used for budgeting purposes. For smaller projects, 100% final plans and their respective cost estimates shall be required for the smaller selected alternative projects.

b. Phase 3 Report

At the conclusion of this phase the Consultant shall prepare a written report documenting all tasks completed and shall attend and assist in presenting the result of this report to the Village of Columbus, New Mexico Border Authority, International Boundary and Water Commission/ Comision Internacional de Limites y Aguas, Luna County and the NMDOT

c. Coordination

The Consultant will be responsible for all coordination required to accomplish the work required. This responsibility shall include coordination with all property owners and federal, state, city, county and all other agencies having jurisdiction or interest in the project. This shall also include obtaining approvals and/or concurrence on all work that is to be completed by the Consultant including work completed by sub-contractors working under this contract.

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III. References

Project Area Map (Refer to Attached map).

Drainage Manuals / Criteria:

NOTE: In order of descending manual / criteria authority, from top to bottom. NMDOT manuals shall always be referred to first.

- a. NMDOT "Drainage Manual - Volume 1, Hydrology, 1995" or current revision, NMDOT "Drainage Manual - Volume II Hydraulics, Sedimentation and Erosion 1998" or current revision in preparation of all drainage reports (unless other methods are agreed to by the NMDOT and the Consultant).
- b. International Boundary and Water Commission, Criteria for Construction Activities Within The Limits of USIBWC Floodways, Vol.IV, Chapter 315, July 27, 2000 (including the "Permits and License Checklist").
- c. Luna County Design Criteria
- d. Village of Columbus Design Criteria

Available Data Sources:

- 1. USGS Topo Maps
- 2. INEGI Topo & Land Use Maps
- 3. 2005 Aerial Photography
- 4. NMDOT & USACE as-builts
- 5. PREVIOUS CONSULTANT STUDIES
 - a. Columbus POE, Conceptual Drainage Report by Baker for Dept. of Homeland Security/USACE, August 2007
 - b. Final Drainage Report for Deming Station-TI Improvements 1.5 Mile Border Road East of POE, Columbus, New Mexico by Baker for the Dept. of Army, Ft.Worth Dist. Corps of Engineers, Ft. Worth, TX, January 2007
 - c. Final Drainage Report for Deming Station-TI Improvements 1.5 Mile Border Road West of POE, Columbus, New Mexico by Baker for the Dept. of Army, Ft.Worth Dist. Corps of Engineers, Ft. Worth, TX, January 2007
 - d. Preliminary Scoping Report for Columbus Border Crossing Rdwy. System by Bohannon Huston for NMDOT, April 2001
 - e. Program Document / Alignment Study for Columbus POE Truck ByPass by Bohannon Huston for Luna County, USCS & GSA, December 2002
 - f. Columbus POE, Program Development Study by ASCG for GSA, June 2007
 - g. Columbus POE, Program Development Study Update by Richter Architects for GSA, March 2008

NOTE: DATA WILL BE AVAILABLE TO CONSULTANTS, BUT ALL REPRODUCTION COSTS SHALL BE THE RESPONSIBILITY OF THE CONSULTANT.

IV. CONSULTANT MAN-HOUR SCHEDULES

Village of Columbus & Columbus POE Master Drainage Plans

CONTROL NUMBER: C7S779

PROJECT NUMBER: ST-7529(212)

Section II. -Project Activities

Phase 1- Preliminary Drainage Report	Estimated Man-Hours
a. Data Collection	
b. Identification of Local Drainage Problems	
c. Hydrologic Modeling for Major Watercourses	
d. Hydrologic Modeling for Local Drainage Problems	
e. Hydraulic Modeling of Major Watercourses & Structures	
f. Hydraulic Modeling for Local Drainage Problems	
g. Coordination	
h. Report	
Phase 1 Total Man-Hours	
Phase 2-Proposed Drainage Infrastructure Alternatives	Estimated Man-Hours
a. Alternative Assessment	
b. Final Drainage Report	
c. Coordination	
Phase 2 Total Man-Hours	
Phase 3 - Preliminary & Final Design & Construction Plans of Selected Alternative Projects	Estimated Man-Hours
a. Plans	
b. Phase 3 Report	
c. Coordination	
Phase 3 Total Man-Hours	
Total Estimated Man-Hours	

