# REQUEST FOR PROPOSALS:

# *TOWNS*

## Technologies and Operational Innovations for Urban Watershed Networks

## I. General Information

This is a request for proposals in response to a restructuring effort within the Flood and Storm Damage Reduction area of the GI R&D program. The HQUSACE manager for that area wants to consolidate the Innovative Technologies for Flood Damage Reduction (Innovative Flood) program with other dispersed R&D activities to form a single focused thrust. This effort, called TOWNS, will start in FY03 and is proposed to continue through FY09. TOWNS will merge some areas of ongoing research with the recent start of an initiative called Urban Flood and Storm Damage Reduction (Urban Flood), which addresses the unique challenges posed by densely populated areas.

TOWNS is proposed to start at $2M in FY03 with a total budget of $23.5M over the 7-year program life. It is anticipated that program funding will be supplemented via association with separately funded demonstrations. Teaming across ERDC and with Corps Districts and Divisions is encouraged.

At the request of HQUSACE, a small Field Advisory/Program Development Group (FA/PDG) representing Corps Divisions, HQUSACE, IWR, and ERDC, was formed to develop a direction and strategy for TOWNS. The FA/PDG used the Future Operating Capabilities (FOC's) that had been developed for the Innovative Flood program and summaries from previous Field Review Group meetings and workshops as the foundation for the TOWNS FOC's.

Proposals should address the FOC's and Focus Areas described below. Additional background information is available at: http://chl.wes.army.mil/townsrfp/. Ongoing and approved upcoming work units in the Innovative Flood program and ongoing Urban Flood work units will be considered relative to other proposals received in respond to this RFP in this process, but only in their present form and in comparison to other proposals received in response to this RFP. It is strongly suggested that current work units interested in being funded through TOWN's, submit an appropriate proposal reflecting the guidance contained in this RFP. To facilitate the review process and to provide consistency, proposals must be formatted as specified and submitted by the date shown in this RFP (26 April 02).

## II. Future Operating Capabilities (FOC's)

1. **Integrated Decision Methods**. Integrated decision support tools and improved forecasting methodologies for use in flood damage reduction that incorporate changing urban settings, climate changes, and extreme events.
2. **Sustainable Urban Flood Damage Reduction.** Methods and technologies for sustainable urban flood damage reduction (structural and non-structural).
3. **System Monitoring.** Real-time surveys and system monitoring for improved condition assessment of flood damage reduction elements (i.e., levees, walls, dikes, channels, structures, etc.)

4. **Expedient Emergency Operations.** Expedient and cost-effective flood fighting and related emergency operations.

## III. Focus Areas

### 1. Integrated Decision Methods.

The research designed to achieve FOC #1 will involve review and identification of existing methods and techniques that can be used as-is or modified to meet the needs of TOWNS, as well as the development of new methods and techniques. Products developed within this task area will consist of software, technical documentation and instruction reports, technical reports, technical notes, workshops, training, and online help/tutorials within software. Independent, peer-reviewed journal publications documenting model developments and their validation will be used to gain acceptance of methods outside the Corps of Engineers. Four Subtasks under this focus area have been identified:

**1a. Improved real & near-real time modeling, simulation, and mapping, including hydrologic, geophysical, water quality, and structural failure.** Innovative approaches are required to address the need for real-time and near-real time modeling, forecasting, and mapping of urban flood events in order to optimize planning, design, and emergency operations. Storm water management, surface runoff, and water quality modeling capabilities must be included in hydrologic/hydraulic models. Guidance on roughness and storage conditions unique to urban areas is needed. Better prediction of the extent and timing of inland flooding and wave damage is necessary. Better prediction of water quality runoff in urban areas is needed due to encroachment into environmentally sensitive areas. A 3-D storm surge and coastal surge/wave set-up model that predicts flooding and shore protection performance (including beach fill performance) will be critical as populations increase in urban coastal communities. Urban growth models should be used to estimate future flood impact associated with climate change as well as to estimate future loadings affecting the water quality of the streams. The use of high-resolution mapping and GIS will be critical to planning, design, regulatory, and emergency operations in urban areas. Coordination with FEMA, USGS, EPA, and NWS will allow synergistic development of products that meet Corps and stakeholder needs.

Products associated with this subtask will include improved conceptual and simulation models, algorithms, and geospatial tools describing critical processes in the movement and storage of floodwaters and contaminants in the urban environment. Guidance in the form of workshops, training, and user manuals will accompany these products. Products from this subtask will feed into the Sustainable Urban Flood Damage Reduction and Expedient Emergency Operations focus areas.

**1b. Improved tools for evaluating sediment transport and contaminant transport in urban channels.** Unique physical, social, environmental, and economic constraints are imposed on the movement and control of sediment and contaminants in urban areas due to their highly developed nature. Conceptual and simulation models of the sediment and contaminant processes in these complex environments will be required. Innovative stream

restoration techniques for urban areas that meet these constraints are not considered under existing R&D programs and must be developed. Products developed in this program to address urban sedimentation may be utilized in the Regional Sediment Management (RSM) and System-Wide Modeling and Assessment of Restoration Technologies (SMART) research programs, which address regional, watershed-scale sediment and contaminant issues.

Products associated with this subtask will include improved models, algorithms, and geospatial tools describing sedimentation and contaminant processes in the urban environment as well as manuals and other design guidance necessary for efficient planning and design of urban stream channel restoration projects. Guidance in the form of workshops, training, and user manuals will accompany these products. Products from this subtask will feed into the Sustainable Urban Flood Damage Reduction focus area.

**1c. Improved visualization, decision support, and data fusion tools.** Data fusion, decision support, and visualization are increasingly important tools in flood damage reduction projects, as tools for modeling and simulation purposes and as tools that allow for effective communication with stakeholders. Seamless flow of data with different temporal and spatial scales between models will be necessary for efficient modeling and simulation of urban flooding. Tools developed under this effort will be compatible with the Corps' Common Delivery Framework as well as similar efforts in RSM and SMART.

Products associated with this subtask will include improved visualization tools for describing flooding and the effects of potential flood damage reduction techniques in the urban environment. Analysis tools that integrate various models and databases, model integration protocols, decision support systems, and integration of model I/O with database tools will be provided. Guidance in the form of workshops, training, and user manuals will accompany these products.

**1d. Improved risk and uncertainty assessment methodologies, including those for coincident/combined events.** Knowledge gaps exist in probabilistic and statistical analyses required to support projects associated with urban flooding. These include the development of improved urban flood frequency estimates that account for non-stationary effects due to the changing urban environment; study of the problems posed by the use of coincident frequencies in combining storm surge and inland flooding during hurricane events; sampling techniques for short, interrupted, or seasonally-affected records; and methods that allow for more careful description of the risk and uncertainty associated with urban flood events. Better analytical tools are needed for all-seasons stage-frequency curve development, including flash floods, ice jams, and debris flows. Also need improved analytical procedures for assessing the performance of the flood damage reduction infrastructure under future conditions and multiple event loadings.

Products associated with this task area will include guidance and methods, including reports, user documentation, or software, or combinations of the three, that provide the user necessary information to perform required probabilistic and statistical analyses of urban flood events. Products from this subtask will feed into the first subtask in this focus area as well as the Sustainable Urban Flood Damage Reduction focus area.

## 2. Sustainable Urban Flood Damage Reduction.

The research designed to achieve FOC #2 is intended to provide an integrating strategy and a comprehensive set of tools for implementing flood damage reduction schemes. The research is intended to provide a framework for strengthening floodplain communities' long-term resilience in coping with their flooding problems. The many communities with serious flooding problems have continued to look for Federal assistance with long-range solutions that will enable the communities to reduce flood risk to achieve and maintain public safety, a healthy environment, a vibrant economy, and fiscally sound local government. Work under this FOC will aid in the systematic formulation and evaluation of alternative flood damage reduction activities. This R&D program is to develop tools for the Field to use in the design and evaluation of plans to assist in reducing flood damages in flood-prone communities and urbanized watersheds. The research designed will involve identification and review of existing methods and techniques for sustainable urban flood damage reduction, both structural and nonstructural, which can be used as-is or modified to meet the needs of TOWNS, as well as the development of new methods and techniques. By sustainable, we mean environmentally, economically, politically, and structurally. Work performed to meet the needs of this focus area will address NED/NER (National Economic Development and National Ecosystems Restoration) and integrate flood damage reduction planning with emergency management, considering the important role played by the human element. There are 4 Subtasks in this Focus Area.

**2a. Guidance for Coastal/Fluvial Geomorphic Assessments and Stream Corridor and Shore Restoration in Urban Watersheds.** This area will include the development of methodologies for coastal and stream corridor restoration and to encourage flood and coastal damage reduction measures that are consistent with and durable under natural processes. This area will be integrated with monitoring and assessment procedures for making decisions about suitability, efficiency, and reliability of alternative measures. Research might include analysis of combined flood relocation and environmental restoration, post-implementation of corridor restoration, and tools for insuring the long-term structural integrity of flood control projects.

> Products developed within this task area will consist of software, technical documentation and instruction reports, technical reports, technical notes, workshops, training, and online help/tutorials within software. Independent, peer-reviewed journal publications documenting model developments and their validation will be used to gain acceptance and use of methods outside the Corps of Engineers.

**2b. Improved Social-Political, Economic, and Environmental Assessment Techniques.** There will be work on techniques for allowing communities to become aware of and manage flood risks with and without a damage reduction project. This area will focus on methodologies for comprehensive evaluation of economic, environmental, and social concerns by integrating NED/NER, and risk analyses. The full range of project impact analyses will be considered including techniques for evaluating the costs of flooding to flood victims and communities, assessment of potential adverse impacts from project implementation, and institutional concerns in project implementation.

> Products developed within this task area will consist of software, technical documentation and instruction reports, technical reports, technical notes, workshops,

training, and online help/tutorials within software. Independent, peer-reviewed journal publications documenting model developments and their validation will be used to gain acceptance and use of methods outside the Corps of Engineers.

**2c. Hazard Mitigation Planning Activities.** This area includes research on collaborative planning at the watershed and community level. It will focus on lifecycle project analysis. Research might include methods of integrating implementation of structural and nonstructural techniques, community strategies for post relocation activities, establishing comprehensive planning strategies for continuing authority planning, and creating tools for facilitating project accomplishment reports. One goal is to implement the conceptual model of taking into account emergency response within flood damage reduction evaluations.

Products developed within this task area will consist of software, technical documentation and instruction reports, technical reports, technical notes, workshops, training, and online help/tutorials within software. Independent, peer-reviewed journal publications documenting model developments and their validation will be used to gain acceptance and use of methods outside the Corps of Engineers.

**2d. Innovations in Structural and Non-Structural Technologies.** Projects under this area will be partnered with Corps of Engineers field offices to develop, document, and demonstrate innovative structural and nonstructural strategies in flood damage reduction. Research might include flood preparedness planning, decision models for flood warning and real time flood preparedness planning, decisions on real-time operation of emergency flood measures, innovative flood proofing measures, comprehensive planning for reducing loss of life, and post-flood recovery.

Products developed within this task area will consist of software, technical documentation and instruction reports, technical reports, technical notes, workshops, training, and online help/tutorials within software. Independent, peer-reviewed journal publications documenting model developments and their validation will be used to gain acceptance and use of methods outside the Corps of Engineers.

## 3. System Monitoring.

Research in this focus area should address FOC #3 and have the goal of developing enhanced rapid assessment and condition monitoring capability and tools for urban watershed networks (including flood water proofing, retaining, transporting, routing, and storage facilities). Given the estimated 20,000 miles of levees constructed along the nation's navigable waterways, it is not surprising that a major thrust of Corps of Engineers research has been in the application of surface and airborne geophysical/geotechnical methods and remote sensing capabilities to ensure the safety and reliability of these structures. Emphasis is now being placed on pre-emptive processes that will allow identification of poor performing flood damage reduction structures so remedial action can be taken before failure. This program will continue the research in this vital area. In addition, new research will be conducted in sensor technology to improve real-time monitoring of hydrologic and hydraulic processes in regional and urban watersheds and coastal settings. Robust data communication networks and interfaces are needed for rapid data fusion with GIS. The development of GIS tools operating in near real-time and dynamic Geospatial

Management Systems (GMS) are integral to this research. Products developed under this work package will be in the form of tools, guidance, engineering manuals, software packages, and demonstration projects that offer new or improved qualitative and quantitative flood mitigation technologies.

**3a. Remote and near-field sensing technologies**. This research will address the application of remote and near-field sensing methods to rapidly access the integrity and functionality of flood damage reduction infrastructure. Focus is on development of applications for existing and forthcoming aerial and space-borne high resolution remotely sensed data sources. Both passive (multispectral and hyperspectral optical instruments, passive microwave, thermal) and active (LIDAR, multi-frequency EM, radar, and fluorescence) sensors should be investigated. Research emphasis may include sensing technology and data collection methods, improved data processing techniques, data representation/dissemination, and multi-system (multi-sensor) data fusion (Subtask 3c.) with emerging GIS data management tools. Application areas may include data inputs for short- and long-term risk analysis, various wetland monitoring initiatives, levee/channel and beach and dune condition assessments and maintenance, and urban ecosystem restoration development and monitoring. Considerable advancement has already been achieved under existing research programs and reimbursable projects relevant to this subtask. Leveraging of current and ongoing programs will enable this subtask to advance at a rapid pace.

> A significant product of this work will be the technology transfer and implementation of both existing and innovative sensing methodology to the civil works community. Products associated with this subtask will include improved application methods for remote and near-field sensing technologies as well as manuals and other guidance necessary for efficient application to the urban setting. Guidance in the form of workshops, training, and user manuals will accompany these products. Products from this subtask will feed into the Integrated Decision methods and Expedient Emergency Operations focus areas.

**3b. Rapidly deployable and project-integrated monitoring systems**. Through a combination of historical data, geological, remote sensing, and geophysical methods such as those identified in Subtask 3a, high-risk zones of vulnerability can be identified in flood control structures. Reliable, inexpensive systems that can be rapidly deployed in advance of high-water conditions are needed at these locations to enhance the pre-emptive concept. These portable systems would monitor such parameters as seepage, pore pressure, displacement, erosion, etc. using either commercial off-the-shelf (COTS) components or prototype sensors. Improved near real-time data processing, communications (telemetry/satcom) and reporting software are integral to this effort. Data output will identify areas of highest risk and prioritize needs for remediation, while providing an advanced early warning capability to emergency management personnel. Research emphasis will be directed toward development of specific packages deployable with minimal intrusion to the structure.

Existing data collection platforms typically used by the COE, USGS and NOAA sample such parameters as river stage, rain and snow fall, tide levels and waves, and occasionally water quality data, along major rivers and their tributaries and in coastal settings at various temporal

scales. Unfortunately, that technology is often decades old. Data is usually sampled hourly and up-linked to GOES satellites every four hours. While this data collection method may be effective for the regional flood forecasting, this slow response will not provide the rapid data feed necessary for coastal and urban flash-flood conditions. Development of both fixed site and rapidly deployable sensor platforms located throughout the watershed are needed to monitor hydrologic conditions, channel performance (identify choke points, debris and ice), and environmental contamination. Time-lapse digital video (conventional and IR) and WEB-based camera systems integrated with conventional sensing methods represent emerging technology for watershed management, and will be considered under this focus area. Data provided by these systems, when combined with NWS NEXRAD and interfaced through time-variable geospatial data management systems will be used to drive real and near real-time modeling and simulations (Integrated Decision Methods focus area) and provide source data for emergency management (FA #4, Expedient Emergency Operations).
`

A secondary consideration under this FA is automated condition monitoring and control of river control structures, floodgates and pumping stations. Effort will be concentrated on identifying need, risk-management and life cycle cost benefit, in addition to providing technical guidance for automated system development.

> Products associated with this subtask will include improved rapidly deployable and integrated monitoring systems as well as manuals and other guidance necessary for efficient application to the urban and coastal settings. Guidance in the form of workshops, training, and user manuals will accompany these products. Products from this subtask will feed into the Integrated Decision methods and Expedient Emergency Operations focus areas.

**3c. Time-variable geospatial data management (GMS) system**. The system-monitoring GMS research and development is structured to provide an integrated capability to ingest data from a variety of sources and time-scales; then to fuse this input with monitoring, analyses and decision-making products. It is expected that the monitoring system will be built on a GIS platform in order to take advantage of the many basic capabilities inherent in GIS. GMS temporal scales will cover hours to months and include historic and contemporary data in addition to near real-time measurements, thus providing appropriate fusion of information for many applications, including long term forecasts and short term response applications developed in the other focus areas. The spatial scale will be extended to include entire watersheds or coastal storm risk regions, yet contain detailed information on multiple urban areas within a basin. The intent is to create an integrated capability that provides for all geospatial data necessary to support the needs and specialized applications created by this and other focus areas for long-term predictive modeling, risk analyses, short-term response decisions, data and result visualization, and other requirements deemed necessary for urban flood planning and fighting.

As an example, contemporary geospatial watershed or regional-scale data will be stored and available from the GMS for use in providing input for numerical long-term forecast models developed in the Integrated Decision Methods Focus Area #1. Necessary conversion routines will be developed to ensure connectivity. Model output will become an input to the GMS and available for further visualization and analyses through applications developed under this

subtask. Snow-pack models may identify at-risk channels and data contained in the GMS will be analyzed to identify remedial work needed prior to spring thaws. As the temporal scale reduces from months to hours in an actual urban flood event, near real-time measurements from stream, tide, or wave gages or rapidly deployable field measurement systems will be input and available through the GMS. The short-term geospatial data, fused with other data in the GMS, may be utilized by the Expedient Emergency Operations focus area (#4) for expedient emergency operations applications and support. As the urban flood event plays out and damages are identified and recorded, the GMS will be the repository so that information can be later used to re-evaluate risk for future events in a feedback application.

Research and development will address methods, procedures and tools to move a variety of data formats and scales into a common database, add real-time time series data to spatial data sets, fuse data of different resolutions and create appropriate metadata and header information for use by models and applications created in other focus areas of the TOWNS program.

> Where necessary, this subtask will develop applications and standards to manage information coming from and going to products of the other focus areas. Products associated with this subtask will include improved GMS/GIS tools to describing flooding for use in forecasting and flood fighting in the urban and coastal environments. Analysis tools that integrate data for various spatial and temporal scales will be provided. Guidance in the form of workshops, training, and user manuals will accompany these products.

## 4. Expedient Emergency Operations.

The goal of work conducted to meet FOC #4 is to provide improved tools and techniques to reduce damage from flooding, the natural disaster that causes the most damage each year in the United States where we spend an average of about one billion dollars per week for disasters. Efforts as part of this FOC will be aimed at all phases of flood fighting from preparedness and planning through efforts to respond to imminent flooding, through the flood fight and the recovery. Approaches may include theoretical and physical means to detect pre-failure conditions, physical means to raise or strengthen levees, hardware and software to aid the response and recovery phase, and supporting information to see that emergency managers and responders are aware of the available support.

**4a. State of the art rapidly deployable technologies will be entering the marketplace or need to be developed.** There is a need to develop, test, evaluate and demonstrate those technologies that provide an opportunity to assist with preparedness and planning activities, advanced measures, and flood fighting. These may include products, materials, or techniques including software and algorithms for planning, raising levees, identifying areas where levees are starting to seep and/or proceed toward failure, reducing the possibility of levee, dike, or wall breaching through during-event response, repairing dunes and coastal dikes, identifying areas where flood-related activities should be focused, or otherwise tracking events.

> Products designed to meet the needs of this subtask will include approaches, equipment tests and review, reports, software, and documentation that provide the end user information on the effectiveness and appropriateness of the use of the new technology.

**4b. Post event forensics and lessons learned.** These efforts may include procedures and methods for capture and/or analysis of critical turning points in preparedness and planning activities, advanced measures, and flood fights that may or may not have been successful in preventing flooding. These efforts will provide the basis for improving our ability to reduce or prevent both urban and non-urban flooding and may involve the use of remote sensing, in situ sensors, geospatial information systems, as well as post hoc analysis of the reasons why a flood fighting effort did or did not succeed.

> Products designed to meet the needs of this subtask will include methods (e.g., sensor suites), analysis, reports, and documentation providing the information necessary to reduce losses from high water events.

**4c. Technologies for post-storm rapid recovery.** These efforts may include techniques for more rapid permanent repair of flood walls, levees, dunes, and coastal dikes including new construction alternatives such as geotextiles or other materials, new analytical techniques that examine nonstructural alternatives, software algorithms and approaches enabling better tracking of recovery tasks and events. This subtask will build upon the findings generated under subtask 4b.

> Products supporting this subtask may include identification of means to build levees more resistant to throughflow, identification of improved levee, dike, and dune alignment based upon more detailed geomorphological understanding of floodplain and coastal processes, software and improved analytical techniques, reports, and documentation.

## 5. Technology Transfer.

The goal of the technology transfer and insertion Focus Area is to provide a seamless insertion of new technologies into field operations for all other Focus Areas. The proposed integrated steps of product life cycle planning and testing of products emerging from the TOWNS investment will provide critical processes and resources for technology transfer. This approach requires delivery of a technology product line that is consistent and predictable for all information, products, and services.

**5a. Product life cycle planning.** The most efficient investment in product life cycle planning will be to use the structure provided by ongoing efforts in the RSM Research Program and planned efforts in the SMART Research Program. This will include the formation of a life cycle advisory group to include (1) two or three investigators who are developing products to be fielded through TOWNS (preferably different types of products, such as engineering solutions and decision tools), (2) two or three District members of the TOWNS field advisory/review body, to ensure that end user considerations are effectively incorporated into the life cycle plans, (3) a Division or HQ proponent to evaluate life cycle plans from the regional/national scale and (4) a member of the TOWNS Program Management Board. Product delivery guidelines in the form of on-line guidelines and usable templates for the technical notes, reports, guide specifications and other publication outcomes, training materials, and formal training events

from TOWNS work units will be prepared. Project life cycle planning will include post-implementation evaluations and retirement plans.

> Products designed to meet the needs of this subtask will include the formation of an advisory group, the development of product delivery guidelines, and a product life-cycle plan for the TOWNS program.

**5b. Web Delivery.** Networked resources are increasingly important for providing information about, and access to, technology products and services. A design is needed to best exploit web delivery options that provide efficient pathways to tech assets. These assets will facilitate life cycle planning and fielding, and will sustain information products, methodologies, and training modules and services emerging from TOWNS and related sources. The web delivery system will facilitate teaming and collaboration across the communities of interest (e.g., USACE, partner agencies, and community sponsors) involved in urban watershed management. To be effective, this web delivery system needs to help shape, fully integrate with, and sustain, a primary pathway to provide technology to the field, supplemented by other pathways.

> The products from this subtask will be a web site that will facilitate technology transfer from TOWNS to the field.

## IV. Planned Program Schedule

| | |
|---|---|
| Call for Proposals | 1 April 02 |
| Proposals Due to CHL TD's Office | 26 Apr 02 |
| Evaluation of Proposals by Program Review Group (FA/PDG) | 15 May 02 |
| PI's notified and requested to revise if appropriate | 31 May 02 |
| Cross-program integration and coordination (FA/PDG) | June 02 |
| Program Assembled (briefed to PMB and HQUSACE Business Manager) | 17 Jul 02 |
| TOWNS Briefed to HQUSACE | 15 Aug 02 |

## V. Proposal Submittal Procedure and Format.

An electronic copy of the proposal in MS Word format shall be submitted electronically by **26 April 02** referencing this RFP to the **Technical Directors Office, Coastal and Hydraulics Laboratory.** For questions regarding this RFP, contact mailto:Joan.Pope@erdc.usace.army.mil For questions and additional discussion regarding any of the Focus Areas, we recommend you contact the Leader responsible for developing that Focus Area.

1. Integrated Decision Methods (Kate White, CRREL)
2. Sustainable Urban Flood Damage Reduction (Dave Moser, IWR)
3. System Monitoring (Bruce Barker, ITL)
4. Expedient Emergency Operations (Andy Bruzewicz, CRREL)
5. Technology Transfer (Bill Goran, CERL)

Proposals should be submitted in MS Word format, and written in a single-sided document with 12-point Times New Roman type font. Page format should have 1-in margins and each page should be numbered at the top right corner.

**Cover Page:**

- Proposal title
- Name, Laboratory, and phone number of Principal Investigator(s) submitting proposal
- List any co-PI's or collaborators
- Focus Area(s) and Subtask(s) addressed
- Total Funding requested per year

**Pages 2 to 4 (do not use more then 3 pages):**

- **Problem Statement** – Focused and brief. The customers are the MSC's and Districts

- **Research Objectives and Products** – Expected outcomes of the proposed work

- **Relevance and Benefits of Proposed Effort -** Discuss the significance of the work
  - How will this work improve the ability of Corps field offices to do their jobs?
  - How will this work help the Corps save money and time, and maintain quality of life?
  - How will this work support design and construction in an environmentally sustainable framework?
  - What is the knowledge gap this work will fill?
  - How will this work advance the current state-of-practice?
  - How long will the fruits of this work continue to benefit the Corps?
  - What is the difference between how this problem is dealt with now, and how it will be dealt with after this proposed work is completed and fielded?
  - What are the technology innovations and engineering/scientific merits?

- **Project Description** - Outline the general plan of work, including the broad design of activities to be undertaken. Describe the individual tasks, their logical sequence, and explain how they will be accomplished. Include disciplines needed for these tasks and cross-ERDC/cross-Corps participation. Briefly describe theoretical, numerical, and experimental methods and procedures to be applied.

- **Background/References –** Describe how the proposed research provides for new knowledge, or builds upon previous work. Indicate how the research will improve the product being developed. Also provide enough detail to justify an investment in your proposal.

- **Technology Transfer Plan** – Describe the technology insertion strategy for the work so it is actually used by the Districts or their contractors in the future. Include use of the developing Common Delivery Framework, Centers of Expertise, Demonstrations, guidance documents, workshops, etc.

- **PI/Team Qualifications** – Provide relevant information on the research team including the qualification and experience of the principal investigator(s) and other key personnel. Teaming across ERDC, with Centers of Expertise, and with District personnel is strongly encouraged as needed to get the best team for the job.

- **Milestones** – Describe major milestones and end products (deliverables) specified by year.

- **Project Costs** – Include a breakout of expected costs (salaries, equipment/travel, contracts) per FY and total cost.

## VI. Additional Notes, Proposal Evaluation Process, Reference Material

Proposals should be submitted to the CHL Technical Directors Office through the appropriate Technical Director's Office of each ERDC Laboratory or IWR/HEC. The proposals will be assembled and reviewed by the TOWNS Program Development Group (FA/PDG). The FA/PDG membership includes a TD or ATD from each laboratory of ERDC and from IWR and HEC, plus HQUSACE and SPD as a representative of the MSC's.

The **CW "Gang" Criteria for evaluating R&D Proposals** will be used by the FA/PDG as the basis for evaluating proposals. The "Gang" Criteria is available at the following website: http://chl.wes.army.mil/townsrfp/

Also at this website are 3 PowerPoint presentations that summarize the Research Needs assessments developed during the **Urban Flood Damage Reduction And Channel Restoration Workshop** in Las Vegas, NV held 17-19 April 2001 and during the **Navigation and Flood Damage Reduction R&D Area Review** in Dallas, TX held on 21-23 March 2001. These breakout session summaries presentations should be referenced, as background material regarding R&D needs as stated by USACE Field Representatives.

Also at this website we will be listing and periodically updating the titles and PI's in a **Proposal Status Spread Sheet.** Recommend PI's periodically check this spreadsheet to track your proposals and note potential areas for further coordination amongst researchers with common interests.