Mission Integration for WPDRD Capital Projects:
Departmental Policy and Procedure

Introduction and Procedure Summary

A mission-integrated project maximizes the opportunities to reduce structure flooding, enhance the drainage system, maintain or improve channel stability, and maintain or improve the factors that affect water quality. In addition, a mission integrated project minimizes negative impacts to all missions (flooding, erosion and water quality). Because current conditions are often below target levels or design criteria, we should look for opportunities to improve conditions, including benefits beyond the driving mission's needs.

WPDRD's stated goals (Table 1 Master Plan, 2001) include more than specific mission goals. Common WPDRD common goals intend to maximize the beneficial uses of our drainage system while minimizing disturbance or irreversible damage to the extent possible. This holds for both the natural and man-made portions of the drainage system. The beneficial uses are outlined in Table 1 as objectives. All WPDRD projects affect more than just one public benefit or beneficial use, and therefore more than just one mission. Our Department has the unique opportunity to solve several problems with one project, but also the responsibility to prevent unintended problems or degradation of beneficial uses.

During the formulation of a project, one mission usually drives the project need. The lead mission typically supplies the Project Sponsor (PS), who is responsible for appropriation, spending plan goals, project scope, and oversight of design services and construction. The PS seeks to achieve benefits for as many missions as possible, including common goals, and in consultation with existing Neighborhood Plan information. We implement projects for the Department, not solely for the Division in which we reside, or the Mission we represent.

The project sponsor therefore explicitly states in the project definition that one of the project goals is to identify alternatives that maximize multi-mission objectives to the extent practicable, not just the driving mission's goals. Stating integration up-front as a project goal will facilitate early buy-in and inform the designers in preparation of the scope of work. To facilitate the integration of projects the following procedure is now being implemented by the WPDRD. In order to document the procedure, the project sponsor will produce a short report and locate it in the G:/MIP folder, as described herein.

In summary, the WPDRD project integration process established in this document will consist of the following eleven steps, which are explained in detail later in this document:

Step 1 **Project sponsor for lead mission identifies problem area/project for their mission.**

Step 2 **Project sponsor defines geographic ZONE OF INFLUENCE for the problem area/project, and develops GIS base map.**

Step 3 **Project sponsor and mission representatives identify specific problems based on available data and establish potential mission and common goals and objectives for the zone of influence.**

Step 4 **Project sponsor assembles Project Team and schedules site visit.**

Step 5 **Project sponsor compiles field notes and possible solutions summaries and objectives for goal achievement from each mission representative.**

Step 6 **Project sponsor outlines scope for preliminary engineering (or design if no preliminary engineering is to be done), and includes cost estimate. MIP team reviews and approves outline of scope.**

Step 7 **Project sponsor finalizes scope. Project sponsor executes Scope of Services contract.**

Step 8 **Project sponsor distributes preliminary engineering report to mission representatives for review and comment. MIP team signs off on preliminary engineering report recommendations so priority projects can proceed to design.**

Step 9 **Project goes to design phase. MIP team reviews and approves design at 60% completion. MIP team identifies whether or not review of final design is needed.**

Step 10 **Complete final design and implement project.**

Step 11 **Monitoring staff conducts project performance assessments.**

Table 1 from the Master Plan Report (2001)

Goals	Objectives	MIP Team Identified Problem & Objectives
Protect lives and property by reducing the impact of flood events.	FC1. Reduce the depth and frequency of flooding for all structures in the 100-year floodplain. FC2. Reduce the depth and frequency of flooding on all roads in the 100-year floodplain. FC3. Reduce the danger at road crossings subject to any flooding by the 100-year flood (includes the provision of adequate warning). FC4. Provide mitigation for flood damage. FC5. Prevent the creation of future flood hazards to human life and property. FC6. Reduce the depth and frequency of localized flooding for buildings. FC7. Reduce the depth and frequency of localized flooding for yards. FC8. Reduce the danger of street flooding associated with old storm drains. FC9. Reduce standing water in public rights-of-way and drainage easements outside the100-year floodplain.	
Protect channel integrity and prevent property damage resulting from erosion.	EC1. Repair current erosion that threatens habitable structures and roadways (Type 1 sites). EC2. Repair current erosion that threatens properties, trees, fences, drainage infrastructure, parks, hike and bike trails (Type 2 sites). EC3. Minimize the future enlargement of channels that would threaten public and private property (Type 3 sites). EC4. Achieve stable stream systems.	
Protect and improve Austin's waterways and aquifers for citizen use and the support of aquatic life.	WQ1. In local creeks, achieve or exceed Good Environmental Integrity Index (EII) scores. WQ2. In Urban creeks, restore baseflow quantity and quality to the maximum extent possible. WQ3. In Non-Urban creeks, preserve the existing baseflow quantity and quality to the maximum extent possible. WQ4. In all creeks, reduce existing and future pollutant loads to the maximum extent possible. WQ5. In the Edward's Aquifer, maintain or enhance the existing rate of recharge to the maximum extent possible. WQ6. Maintain or enhance high quality environmental features (springs, seeps, wetlands, swimming holes, threatened or endangered species habitat) to the maximum extent possible.	

Goals	Objectives	MIP Team Identified Problem & Objectives
Improve the urban environment by fostering additional beneficial uses of waterways and drainage facilities.	CG1. Maximize the use of waterways and drainage facilities for public recreation. CG2. Maximize areas for public use within floodplains. CG3. Maintain natural and traditional character of floodplains to the maximum extent possible.	
Meet or exceed all local, state, and federal permit and regulatory requirements.	CG4. For all state designated stream segments, including Lake Travis, Lake Austin, Town Lake, the Colorado River below Austin, Barton and Onion creeks, maintain or improve the Designated Use Support status. CG5. Comply with Storm water NPDES permit requirements & Endangered Species 10 (a) permit. CG6. Minimize the risk to structures in the 100-year floodplain as required by the National Flood Insurance program.	
Maintain the integrity and function of Utility Assets.	CG7. Provide for adequate maintenance of the watershed protection infrastructure system and minimize maintenance requirements for system improvements.	
Optimize City resources by integrating erosion, flood and water quality control measures.	CG8. Maximize flood control, pollution removal and stream bank protection for all solutions including CIP projects.	
Related Neighborhood Plan Action Items	Relationship to Master Plan Goals and Objectives	Feasible to incorporate into project?

FC = Flood Control; EC = Erosion Control; WQ = Water Quality; CG = Common Goal

Step 1. Project sponsor for lead mission identifies problem area/project for their mission.

High severity problem areas are based on Phase I Master Plan scores, known problems areas in the Phase II watersheds, and other mission specific information. This includes but is not limited to updated FC scores or identification of previously unknown flood problem areas, updated LF complaint database and prioritization information, EC updated list of type I problems and citizen complaints, updated Phase I and new Phase II WQ scores. In addition there may be an opportunity for cost participation with developers or available funding from RSMP or the Urban Structural Control fund for specific watersheds. Each mission has prepared a 10-year plan based on these prioritization methods and factors.

Step 2. Project sponsor defines geographic ZONE OF INFLUENCE for the problem area/project, and develops GIS base map.

Project sponsor is responsible for development of a GIS file for the zone of influence using the baseline application created and maintained by the Planning and GIS section in ERM (contact Matt Hollon) as a starting point located in G:/MIP/basemap. This is the first step in helping to determine geographic proximity of individual mission projects and opportunities for multi-objective projects. The GIS basemap for all projects should be stored on G:/MIP/project maps, and saved with the project name.

This section seeks to identify reasonable geographic limits within which a project sponsor should investigate the potential opportunities for multi-mission benefits and potential impacts on other missions.

WPDRD projects typically fall under the following five broad categories:

- Pond;
- In-Channel (primary and secondary drainage system);
- Channel Crossing (bridge/culvert);
- Pipe systems; and
- Property Acquisition.

Each project category can have impacts and opportunities that should be considered during planning, preliminary engineering and design phase. The following are proposed zones of influence by project type. A zone of influence should be stated in the project scope as geographic areas to include in the solution development process.

Ponds

- Immediate basin topography up to an elevation that is sufficient to include twice the volume for the lead mission. This is a rough estimate of the geographic area that would include detention for flood, water quality and erosion detention, plus associated freeboard and LOC.

- A rough estimate as to whether or not an on-line pond will create "hungry water syndrome" is to evaluate the channel for a length that shall include but may extend beyond 60 channel widths upstream and downstream of the proposed pond site.
- Width of 100 year floodplain/Critical Water Quality Zone/Erosion Hazard Zone (defined as the point where a 5H:1V slope from the existing channel toe intersects the natural ground adjacent to the channel).
- Adjacent contributing drainage areas where known flooding problem, drainage system deficiency and erosion and water quality problems exist.

In-Channel Modifications

- Width of 100-year floodplain, Critical Water Quality Zone or Erosion Hazard Zone, whichever is larger (looking for impacts to/opportunities to benefit floodplain, natural and traditional character, priority woodlands, CEFs, public land).
- Length of zone of influence shall be proposed limits of construction plus 60 channel widths upstream and downstream of proposed LOC to identify channel instability indicators (head cuts, widening, and meander migration), limits on sediment continuity and potential maintenance activities that could impact channel stability.
- Adjacent contributing drainage areas where known flooding problem, drainage system deficiency and erosion and water quality problems exist.

Channel Crossings (Bridges, culverts, pipelines)

- Width of 100 year floodplain, Critical Water Quality Zone or Erosion Hazard Zone, whichever is greater.
- Zone of influence shall include proposed structure width (including LOC), plus 60 channel widths upstream and downstream of project to identify channel instability indicators (head cuts, widening, and meander migration) that may impact the stability of the project as the stream enlarges.

Storm Drain Systems

- Zone of influence to include contributing drainage area to the inlets in question. May allow for opportunities for small scale detention/water quality pond for peak reduction, potential buyout of affected residents.
- Areas in ROW or adjacent open space that would allow for retrofit of small-scale stormwater treatment devices
- Pipe outfall plus 10 channel widths upstream and downstream to account for appropriate outfall stabilization/energy dissipation and to identify channel instability indicators (head cuts, widening, meander migration) that may impact the stability of the project as the stream enlarges.

- Limits of construction along length of pipe from inlet to discharge point (looking for CEF's, springs, etc.
- Width of 100 year floodplain, Critical Water Quality Zone, Erosion Hazard Zone, whichever is greater.

Property Acquisition

- Boundary of tract under consideration
- Overland contributing drainage area (including storm drain system)
- 12 channel widths upstream and downstream

Step 3. Project sponsor and mission representatives identify specific problems based on available data and establish potential mission and common goals and objectives for the zone of influence.

Project sponsor focuses on Zone of Influence to identify opportunities and impacts. PS relies on MIP representatives or their designees to supply information on specific goals and objectives for each mission within the zone of influence. Project Manager reviews Master Plan Goals and Objectives. If the PS has questions about Master Plan goals or other mission objectives, PS researches project area (e.g. locate and review Master Plan reports, previous engineering/environmental studies; talks with MIP team members or other staff). The PS and MIP team complete Table 1, such that PM checks each mission-specific objective that applies to the project. PS states driving mission-specific goals/objectives for project. PS reviews neighborhood plans (http://www.ci.austin.tx.us/zoning/planning_areas.htm) and WPDRD summary of neighborhood plans (G:/WPDRD/MIP/CIP Selection Process/Neighborhood Plan WPDRD Action Items) to determine if there are any related action items that could be incorporated into the project. Any such items are to be noted at the bottom of Table 1.

Step 4. Project sponsor assembles Project Team and schedules site visit.

PS organizes Stream Team Site visit similar to WMA process. Each mission shall designate staff member(s) who can share workload in Site visits. PS creates one page summary utilizing the template located at (G:/WPDRD/MIP/CIP SelectionProcess/ExampleSummary) that describes problem area for the site visit team. Include in the summary at a minimum the WMA in which the project is located and note other mission problem areas or potential projects within the zone of influence identified in step 3. PS will email this completed summary to the MIP team prior to the creek walk. PS is responsible for providing work maps for site visit, Planning GIS Section will help create maps for zone of influence. PS is responsible for reserving vehicles, and establishing the meeting places/times etc.

Hard Copy Deliverables to be provided to MIP Team prior to site visit:

- 1 page summary (based on example)
- Zone of Influence Map

- Completed Table 1
- Work Map for site visit (may be same map as the ZOI depending on the scale of project)

Team walks project site to verify work maps and summary sheet. The intent of the site visit is to evaluate existing and potential future conditions and come to a conceptual consensus on potential alternatives, opportunities for integration and ways to minimize impacts as described below.

Step 5. Project sponsor compiles field notes and possible solutions summaries and objectives for goal achievement from each mission representative.

MIP team members provide a summary of existing and potential future conditions and potential solutions based on information from the site visit within an agreed upon timeframe. In addition, using existing information, the mission reps help to identify target conditions to achieve goals. Project sponsor creates a document that summarizes the site visit based on documents provided by MIP team members. Individual mission members assist in providing cost estimates to be used in CIP appropriations requests.

MIPT and Project sponsors brainstorm solution types including the following:

- Bed and banks channel stability—balance sediment transport capacity with sediment supply (i.e. ensure sediment continuity). Improve bed and bank stability using grade control, resistive and redirective methods.
- Improve WQ—includes: upland or online ponds to enhance the water chemistry/baseflow; in channel restoration that improves aquatic habitat; removal or relocation of sanitary pipes from channel.
- Aesthetics, habitat—preserve/improve natural character through riparian/aquatic habitat acquisition/restoration projects.
- Identify solutions for creek flooding problems (to include buyouts or channel improvements); culvert and bridge analyses and upgrades; regional detention facilities, etc.
- Identify solution for local flood hazards by improving secondary (storm drain) drainage system.
- Consider competing project goals—increased channel capacity vs. channel stability, TSS reduction vs. decreased sediment supply, structural vs. natural channel, increased and/or concentrated storm drain system discharge vs. increased local and systemic channel erosion and floodplain elevation impact.

Projects should consider opportunities to mitigate adverse conditions from fully developed contributing drainage areas.

The following multi-mission components should be considered for all project types.

Ponds:

- Provide storage and appropriate outlet structures for multiple detention capabilities- flood detention, erosion detention, water quality treatment.
- Provide treatment, extended detention, or if possible, infiltration of runoff, using filtration or infiltration BMPs, wet ponds or other stormwater BMPs.
- Vegetate using native plants and grasses.

In-Channel:

- Use natural materials in stream channel reconstruction (e.g. rock, soil, vegetation, appropriate erosion control materials).
- Create stable channel geometry (plan, profile and section); includes creating hydraulic conditions that allow for use of more natural materials.
- Restore features lost by channel degradation (riffles/pools, native riparian vegetation, pilot channel).
- Increase in-channel conveyance in incised channels by creating benched channel-inset channel and over bank floodplain.
- Use over bank areas to treat storm drain discharge or overland runoff using swale blocks, vegetative filter strips, etc.
- Relocate wastewater lines out of channel.
- Increase EII Aquatic Life Scores and Habitat Quality scores by increasing baseflow, riffle/pool sequences, bank stability and riparian vegetation.
- Consider mitigation measures to offset concentrated/increased discharge at storm drain outfall.

Channel Crossings (bridges, culverts, pipelines):

- Allow for low-flow channel under bridges; for culverts, use multi-level culverts such that there is a low-flow culvert with added conveyance boxes set at a higher elevation in the over bank areas.
- Create constructed riffles/grade controls at pipeline crossings.
- Create stabilized plunge pools downstream of culvert for stability and habitat.
- Consider need for downstream and upstream erosion controls in unstable systems.

Storm Drain Systems:

- Include stormwater treatment devices within storm drain zone of influence (vaults, filters, ponds, vegetative filter strips).
- Repair local scour at outlets.
- Disconnect storm drains from creek by allowing overland flow between outlets and receiving water.

- Reduce in-channel tail water to prevent storm drain surcharge.
- Consider mitigation measures to offset down stream flooding and erosion impacts due to increased runoff, concentrated discharge and reduced Tc on an entire watershed scale.

Property Acquisition:

- Native revegetation.
- Construct water quality treatment on site if Contributing Drainage Area >10 acres.
- Streambank Stabilization.

Step 6. Project sponsor outlines scope for preliminary engineering (or design if no preliminary engineering is to be done), and includes cost estimate. MIP team reviews and approves outline of scope.

This is the point at which a cost estimate is established for the proposed project(s) funding. Reasonable project cost and service delivery time will be a goal in the project integration and formulation process. A reasonable budget needs to be considered given limited funding available for each fiscal year. The level of effort of analysis should match the complexity of the solution. Minimize major study needed. Cost estimates will later be refined after preliminary engineering and design.

Project sponsor will complete an outline of the scope for the preliminary engineering report. PS should include in scope a request for consultant to make a presentation of findings of the preliminary engineering report to the PS and MIP team. MIP team will review outline of preliminary engineering scope as checkpoint for integration. MIP team members to sign off after review of the scope outline. MIP team members signoff or provide comments to PS within a mutually agreed upon timeframe. If there is a conflict without resolution then the conflict will go to the Division Managers and Assistant Director to decide on a solution.

A. Preliminary Engineering Report should include the following elements:

- Introduction and Statements of Need.
- Executive Summary
- Existing Information and Analysis.
- Hydrologic and Hydraulic Studies.
    - Creek Flood Mitigation
    - Local Storm Drain Systems
    - Channel Stability Analysis
    - Opportunities for stormwater treatment and riparian area enhancement
- Analysis and Alternatives.
- Comparison of Alternatives.

- Environmental and Cultural Analysis.
- Permitting and Regulatory Compliance Requirements.
- Project Schedule Analysis.
- Total Project Costs.
- Recommendations for Design and Construction.
- Monitoring, Operation and Maintenance Plan.
- Appendices and Reference Information.
- Upon completion of the Preliminary Engineering Report, a presentation to WPDRD MIP team and Project Manager and Sponsor shall be provided.

B. Preliminary Engineering Report shall identify and base alternatives on the following impacts to other missions:

- Presence of CEFs.
- Presence of Priority Woodlands or Protected Trees.
- Presence of channel morphologic features and natural conditions, such as pilot channels, baseflow, riffles/pools, etc.
- Long and short term impacts due to earth disturbance during construction and maintenance.
- Channel (in)stability—identify conditions which may lead to channel degradation within project reach, upstream/downstream (increased velocity due to reduction in tail water, decreased velocity due to flatter slopes, over widened section). Consider sediment continuity to ensure that channel is not designed to degrade or deposit excess sediment that may decrease channel conveyance.
- Long-term scour effects downstream of pond outlet structures. Evaluate scour potential and propose adequate armor for a length that is 4 times the width of the outlet structure.
- Local scour—at crossings, storm drain outfalls, channel expansion/contractions or transitions from constructed channels to natural channels.
- Channel improvements shall not increase the 2-, 10-, 25- and 100-year WSEL or expand the horizontal limits of the floodplain if is not contained within a defined drainage way, easement or park area that would not pose a risk to public safety.
- Assess adverse impacts of selected solutions/plan.

C. Identify data collection and modeling needs

- Geology/landform/sediment supply.
- Infrastructure (utilities, rail roads) Identify utility crossings.
- Watershed impervious cover.

- Space/ROW/easements and property ownership. Size and location of any existing easements. Necessary easements that must be obtained.
- H&H modeling; Updating or creating US Army Corps of Engineers HEC-HMS, HEC-1, HEC-2, GEO-RAS, HEC-RAS and StormCAD computer models.
- Topographic and property boundary survey.
- Applications of Geographic Information Systems (GIS) in floodplain delineation.
- On-line ponds should evaluate changes is floodplain elevation upstream and downstream as far as effects are measurable. Increased areas of inundation upstream must be contained in an easement. Reduction of floodplain downstream should be evaluated for pond benefits and in the case when a LOMR should be performed.
- Is the pond a "Dam"? If so then dam must pass the full PMF.
- For Culvert and bridge upgrades evaluate upstream and downstream as far as there are measurable changes in velocity and water surface elevation. Also, since the culvert may be acting as a detention facility will the rating table or parameters for the channel routing through the area may change. Then the hydrologic model also needs to be updated as well as the hydraulic model.
- Reassess existing and future problems based on updated existing and updated H&H models.
- Review Water quality data-Environmental Integrity Index (EII), CEFs, spills, and water quality/biological monitoring data.
- Water quality modeling analysis of receiving water conditions, hydrology and pollutant loads for current and future conditions.
- Sediment continuity analysis - on-line ponds and channel projects should evaluate potential for disruption of in-channel sediment supply.
- Soil borings and geotechnical analysis for streambank stabilization.
- Bed material gradations for sediment continuity analysis.
- Level of effort of analysis to match complexity of solution. Minimize major study needed.

Step 7. Project sponsor finalizes scope. Project sponsor executes Scope of Services contract.

Project sponsor provides copy of finalized scope to MIP team, and MIP team reviews finalized scope to verify it is in agreement with the approved outline, as a checkpoint for integration.

Step 8. Project sponsor distributes preliminary engineering report to mission representatives for review and comment. MIP team signs off on preliminary engineering report recommendations so priority projects can proceed to design.

Consultant shall provide a presentation to MIP team, Field Operations and Project sponsor, summarizing the findings of the report. MIP team shall review preliminary engineering report to verify that the preliminary engineering report follows the intent of the approved scope in consideration of the analysis of alternatives, and that recommended solutions are based on effectiveness in achieving mission goals, opportunity for integration, available opportunities, and/or policy. Field Operations should be included in input on solution selection. MIP team members will signoff or provide comments to the PS within a mutually agreed timeframe. If there is a conflict without resolution then the conflict will go to the Division Managers and Assistant Director to decide on a solution.

PS will coordinate a meeting with the neighborhood association to obtain input prior to final solution selection. In addition to the technical issues associated with project mission integration, project formulation will consider neighborhood and property owners/residents social impacts associated with land/easement acquisitions, relocation of residents, and removal of existing building structures.

Step 9. Project goes to design phase. MIP team reviews and approves design at 60% completion. MIP team identifies whether or not review of final design is needed.

Project sponsor shall develop scope for design in similar manner as scope development for preliminary engineering, summarized in step 6. Design of projects based on recommended solutions approved by the MIP team, and input by Field Operations in Step 8 above. Projects may be phased and design may be part of a larger multi-year phased project. MIP team members will signoff or provide comments to PS within a mutually agreed upon timeframe. If there is a conflict without resolution then the conflict will go to the Division Managers and Assistant Director to decide on a solution.

Project Sponsor shall coordinate a follow-up meeting with the neighborhood association between 60-80% completion, and prior to the beginning of construction.

Step 10. Complete final design and implement project.

- Obtain necessary easements through real estate.
- Develop plans, specifications and contract documents.
- Obtain applicable permits through COA development review, USACE and TCEQ.
- Set up project management for construction.
- Construction services by consultant and public works. WPDRD representative involved in design may also need to coordinate some questions during construction.

- Construction inspection/observation.
- If phasing is to occur, coordinate phasing with fiscal year budgets.

Step 11. Monitoring staff conduct project performance assessments.

- Document and summarize success measurement.
- Use information from post assessment to update problem scores when justified.
- Identify measurement of project success and include in design. (e.g. stream gauges upstream and downstream of a regional detention pond, establishing paired cross section monuments for future monitoring, observation/surveys of natural channel sections, biological/water quality monitoring stations.