

Prioritization Methodology Report

For Watershed Master Planning Projects



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Contact: Lalit Jha, PE/CFM

650 'J' St., Suite 215 ♦ Lincoln, NE 68508

PH: (402) 435-3080 ♦ Fax: (402) 435-4110 ♦ www.jeo.com

E-mail: ljha@jeo.com

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PRIORITIZATION METHODOLOGY REPORT FOR WATERSHED MASTER PLANNING PROJECTS

WATERSHED MANAGEMENT DIVISION CITY OF LINCOLN, NEBRASKA

Introduction

A prioritization methodology was developed for the City of Lincoln to set priorities and implement Capital Improvement Programs (CIP) for watershed master planning each year. The City and its consultants assembled an engineering peer review committee to assist with the development of this ranking methodology. The committee consisted of local consultants, city, state and NRD staff, and provided input and suggestions regarding the prioritization criteria and appropriate weighting of these criteria. The committee participated in two meetings, facilitated by the Schemmer Associates. The prioritization methodology designed as a result of the committee's work is intended to be a flexible tool that could be used as a screening mechanism for City staff. This ranking system was specifically developed for CIP projects proposed as part of the on-going watershed master planning efforts. Refer to Appendix A for the report summarizing the process used to develop the prioritization methodology.

Definitions of Key Terms

- **Structure:** Residential, commercial or industrial buildings (excludes sheds, outbuildings, etc.)
- **Structural Flooding:** Flooding which causes structures to be encroached with floodwater
- **Major Structural Flooding Damage:** Flooding damage to ten or more structures OR depth of flooding is one foot or more in residential, industrial or commercial areas. This is a general criterion; exceptions can be made for high-value infrastructure or other special circumstances.
- **Structural Flooding Damage:** Structural flooding damage that does not meet the criteria defined for 'Major Structural' flooding damage
- **Non-Structural Flooding:** Flooding of streets, public or private property, parking lots, public utilities or other infrastructure without encroaching upon any structures
- **Conservation / Prevention Flooding Benefit:** Prevention of future damage through easements and/or acquisitions only
- **Frequent Flooding:** Flooding that occurs during a storm event that has a 10% chance of being equaled or exceeded in any given year (10-year storm event). According to the City's Drainage Criteria Manual, up to a 10-year storm event is defined as a minor storm event.
- **Infrequent Flooding:** Flooding that does not meet the criteria defined for 'Frequent Flooding'
- **Channel Erosion Threatening to Structures:** Channel erosion having the potential to endanger one or more structures

- **Channel Erosion Threatening to Public Infrastructure:** Channel erosion having the potential to endanger public property, parking lots, streets, public utilities or other public infrastructure
- **Channel Erosion Threatening to Natural Resources:** Channel erosion that has the potential to endanger streams, wetlands, lakes, conservation easements, buffer zones or other natural resources
- **Conservation / Prevention Stream Stability Benefit:** Prevention of future stream stability damage through easements and/or acquisitions only
- **Secondary Stream Stability Benefit due to Flood Control or Water Quality Project:** Stream stability benefits resulting from projects primarily intended for flood control or water quality benefits
- **Aggressive Channel Erosion:** Rapid upstream migration of channel downcutting or incision
- **Non-Aggressive Channel Erosion:** Gradual channel widening or downcutting
- **Enhance / Preserve Natural Resource Areas:** Preservation or enhancement of existing streams, wetlands, lakes, conservation easements, buffer zones or other natural resources
- **Regulatory Compliance / Stormwater Permit / NPDES:** Projects providing water quality benefits that are required for regulatory compliance
- **Create New Natural Resource Areas:** Water quality benefits due to the creation of new wetlands, lakes or other natural resources
- **Conservation / Prevention Water Quality Benefits:** Prevention of future water quality damage through easements and/or acquisitions only
- **Secondary Water Quality Benefit due to Flood Control or Stream Stability Project:** Water quality benefits resulting from projects primarily intended for flood control or stream stability benefits
- **Major Water Quality Benefit:** Broad-based impacts, providing water quality benefits to reaches along the main stem channel(s) within the watershed OR major wetlands, lakes or other natural resources are located immediately downstream
- **Water Quality Benefit:** Water quality benefits to tributaries of the main stem channel(s) within the watershed
- **High Risk:** High risk to public health and safety due to the potential for loss of life or bodily injury
- **Low Risk:** Low risk to public health and safety, public nuisance

Prioritization Categories

The following prioritization categories were developed for project ranking:

1. **Flooding Impacts:** This category identifies the impact of floodwater encroachment on structures, public or private property, parking lots, public utilities or other infrastructure. The flooding potential can be identified through hydrologic and hydraulic analysis, study of topographic maps, field investigation and recorded historic problems. This category is further divided according to the frequency of the flooding; flooding that occurs at a more or less frequent rate than the 10-year storm event. Projects primarily intended to address

structural or non-structural flooding will usually incorporate a high or low risk safety factor and may, if applicable, incorporate stream stability or water quality benefits.

2. Stream Stability: This category identifies the impacts of channel erosion, the transport and undermining of soil by stream flow or overland flow. Channel erosion can threaten structures, public property, parking lots, public utilities or other public infrastructure. Channel erosion can also endanger streams, wetlands, lakes, conservation easements, buffer zones or other natural resources. The stream stability and erosion threat may be identified through visual observation, not strictly fluvial geomorphic assessment. This category is further divided according to the nature of the erosion, aggressive channel downcutting as compared to gradual channel widening. Projects primarily intended for stream stability typically will not incorporate flooding impact benefits; though will incorporate water quality benefits.

3. Water Quality: This category identifies the impacts of water quality. A number of geomorphic mechanisms can adversely affect water quality through increased pollutant loading. The water quality benefits broken down in this category reflect the types of projects developed during watershed master planning efforts. This category is further divided according to the perceived scope of the project benefits, with greater emphasis place upon projects with broad-based impacts. Projects primarily intended for water quality typically will not incorporate flooding impact benefits; though may incorporate stream stability benefits.

4. Safety Factor: This category identifies benefits to the potential threat to public health and safety. The potential for loss of life or bodily injury may include individuals trapped in structures during flooding or vehicles being swept away by floodwater. A safety factor is generally associated with projects addressing structural or non-structural flooding, though may be associated with stream stability or water quality projects.

5. Miscellaneous Factors: This category identifies various other miscellaneous factors and additional considerations that have not been addressed in the previous four categories. Examples of other factors include but are not limited to: project location, development status, adjacent projects, complaints and outside funding opportunities.

Prioritization Ranking Worksheet

A prioritization ranking worksheet was used to prioritize each proposed watershed master plan project. Figures 1 and 2 on pages 4 and 5 illustrate the example ranking worksheet.

Figure 1, Example Watershed Master Plan Prioritization Ranking Worksheet

Prioritization Ranking for Watershed Master Plan Projects City of Lincoln, Nebraska			
Prepared By: LEO Consulting Group, Inc.		Date: _____	Issues Addressed:
Project ID:	_____	Watershed: _____	
Project Location:	_____		
Project Description:	_____		
Flooding Impacts			
Projects primarily intended to address structural or non-structural flooding will usually incorporate a high or low risk safety factor and may, if applicable, incorporate stream stability or water quality benefits.			
Flooding Benefits		Points, P_{FP}	
Major Structural Flooding Damage		30	
Structural Flooding Damage		20	
Non-Structural Flooding	Streets / ROW, Other	15	
Conservation / Prevention	Easements / Acquisitions	10	
None		0	
		P_{FP}^n	0
Flooding Frequency		Multiplier, C_{FF}	
Frequent Flooding	More frequent than 10-year storm	4	
Infrequent Flooding	Less frequent than 10-year storm	2	
None		0	
		C_{FF}^n	0
			A = $P_{FP}^n \times C_{FF}^n$
0			
Stream Stability			
Projects primarily intended for stream stability typically will not incorporate flooding impact benefits, though may incorporate water quality benefits.			
Stream Stability Benefit		Points, P_{ST}	
Channel Erosion Threatening to Structures		50	
Channel Erosion Threatening to Public Infrastructure		40	
Channel Erosion Threatening to Natural Resources		35	
Conservation / Prevention		10	
Secondary Stream Stability benefit due to Flood Control or Water Quality Project		10	
None		0	
		P_{ST}^n	0
Erosion Activity / Systemic Threat		Multiplier, C_{SA}	
Aggressive Channel Erosion		3	
Non-Aggressive Channel Erosion		2	
None		0	
		C_{SA}^n	0
			B = $P_{ST}^n \times C_{SA}^n$
0			
Water Quality			
Projects primarily intended for water quality typically will not incorporate flooding impact benefits, though may incorporate stream stability benefits.			
Water Quality Benefits		Points, P_{WQ}	
Enhance / Preserve Natural Resource Areas (Lakes, Wetlands, etc.)		60	
Regulatory Compliance / Stormwater Permit / NPDES		60	
Create New Natural Resource Areas (Lakes, Wetlands, etc.)		50	
Conservation / Prevention		30	
Secondary Water Quality benefit due to Flood Control or Stream Stability Project		20	
None		0	
		P_{WQ}^n	0
Project Benefit		Multiplier, C_{WB}	
Major Water Quality Benefit	Broad-Based Impacts	4	
Water Quality Benefit	Localized Impacts	3	
None		0	
		C_{WB}^n	0
			C = $P_{WQ}^n \times C_{WB}^n$
0			
Safety Factor			
Public Health and Safety		Points, P_{PS}	
High Risk	Potential Loss of Life or Bodily Injury	160	
Low Risk	Public Nuisance	60	
No Risk		0	
		P_{PS}^n	0
			D = P_{PS}^n
0			
Prioritization Ranking Summary			
			X = A + B + C + D
0			
Miscellaneous Factors may be used to adjust scoring:			
P_{MFC} (See attached worksheet for description of miscellaneous items)			0
May Include: Project Location, Coincident Projects, Development Status, etc.			0
P_{AC} , Additional Considerations (may be used to add or subtract up to 60 points)			0
May Include: Legal Issues, Jurisdictional Coordination, Complaints, Outside Funding Sources, Wildlife Benefits, etc.			0
			TOTAL = X + P_{MFC} + P_{AC}
			0
			TOTAL for PROJECT XXXX-XX
0			
Comments or Description of Additional Considerations:			

Figure 2, Example Watershed Master Plan Prioritization Ranking Worksheet

MISCELLANEOUS FACTORS

		Points Available	Points Assigned
Location	Public Property or willing owner of Private Property	up to 20	
Coincident with Adjacent Projects	Public Projects (water, sanitary, roads, etc.)	up to 20	
	Private Projects	up to 10	
Development Status (Points available are fixed, and are not flexible)	Tier I, Priority A	20	
	Tier I, Priority B	15	
	Tier I, Priority C	10	
	Existing City Limits	10	
	Tier II (development 25 - 50 years)	5	
	Tier III (development > 50 years)	0	
<p>Tier I, Priority A - Areas designated for near term development are generally contiguous to existing development and should be provided first with basic infrastructure within six years of the adoption of the Plan. Some of the infrastructure required for development may already be in place. This area includes some land already annexed, with City commitments to fund infrastructure improvements, but the land is still undeveloped and without significant infrastructure in place yet. Some infrastructure improvements may be done in the near term while others, such as road improvements that are generally more costly, may take longer to complete.</p> <p>Tier I, Priority B - The next areas for development, beyond Priority A, are those which currently lack almost all of the infrastructure required to support development. In areas with this designation, the community will maintain present uses until urban development can commence. Infrastructure improvements to serve this area will not initially be included in the City's CIP, but will be actively planned for in the longer term capital improvement planning of the various city and county departments.</p> <p>Tier I, Priority C - This is the later phase of development areas and is intended to be served after Priority A and B. Given current growth rates and infrastructure financing, development would not begin in this area until after 2020 or 2025.</p>			
Total Miscellaneous Points, P_{MISC} =			0

APPENDIX A

CAPITAL IMPROVEMENT PROGRAM
PRIORITIZATION METHODOLOGY OF
WATERSHED MASTER PLAN PROJECTS

PEER REVIEW COMMITTEE SUMMARY

PREPARED FOR
THE CITY OF LINCOLN
PUBLIC WORKS AND UTILITIES DEPARTMENT
WATERSHED MANAGEMENT DIVISION

BY
THE SCHEMMER ASSOCIATES
NOVEMBER 2006

Peer Review Meeting #1 Summary CIP Prioritization Methodology

Open Drainage Systems

June 1, 2006

9:30-11:30 a.m.

Lower Platte south NRD

Reggi Carlson of the Schemmer Associates opened the meeting, asked for self introductions from participants and reviewed the purpose and agenda.

Devin Biesecker then provided background information about the project at hand. Watershed Management had conducted a similar effort to develop a prioritization methodology for urban closed-pipe stormwater drainage systems, and is moving forward on creating a similar ranking process for open drainage systems in developing the Master Plan CIP. The prioritization project is a joint effort between the Lower Platte South Natural Resources District and the City of Lincoln Watershed Management Department, and the resulting methodology will be used by both.

Devin then reviewed the handout, “Criteria that Provide Points for Implementation of Watershed Projects,” that listed initial draft criteria and their definitions.

Ben Higgins said the methodology that is developed by City and LSPNRD staff with input from the peer review committee will result in a screening process to further formulate and prioritize projects. The methodology won’t necessarily set projects “in stone.”

Reggi asked the group to contribute thoughts regarding the criteria and methodology process.

Group members volunteered additional criteria: regulatory compliance; jurisdictional coordination, cost; and fish and wildlife habitat.

Other comments included:

The University of Nebraska-Lincoln and the Nebraska State Fair Board should be considered for jurisdictional coordination because these two entities have their own jurisdiction over storm water management.

Concern that people will believe the methodology is an objective way to determine an outcome, when much of it is subjective.

After general comments, participants were instructed to complete a worksheet on which each individual assigned points to each of the eight criteria. They could also supplement the list by adding their own suggested criteria. A total of 100 points were assigned, with the highest points determining the most significant criteria.

Peer Review Meeting #1 Summary

After individuals completed the worksheets, members of table groups compared their rankings, and worked to come to general agreement on a point-assigned value for each criterion. The table groups recorded their table rankings on flip charts.

Finally, the five table group rankings were compared with one another, which resulted in the following prioritized list. (A list of each table group member is attached to this report.)

Criterion	Group 1	Group 2	Group 3**	Group 4	Group 5	Total
4) Safety Factor	20	13	20	25	17	95
1) Flood Damage	25	15	15	20	12	87
2) Water Quality Benefits	20	14	15	12	11	72
3) Prevention of Future Damage/Pollution	0	10	15	15	15	55
8) Coincidental Project	0	10	7	10	12	39
5) Development Status	0	8	5	10	14	37
7) Private/Public Location of Project	0	10	7	8	8	33
Other -Misc. (5-8)	20					20
Other -Lifecycle/Maintenance	15					15
Other -Four from group discussion *		14				14
6) Revised Standards Impact	0	6	0	0	4	10
Other -Misc. Cost					7	7
Other -Fish/Wildlife Habitat			6			6
Other -Source Reduction			5			5
Other -Misc.			5			5

*Regulatory Compliance, Jurisdictional Coordination, Cost and Habitat-Wildlife

**Group 3 made several suggestions:

- 1) Flood Damage Issues: Prevention, major vs. minor, protecting established vs. new.
 - 2) Water Quality Benefits: Issues: Add c) Regulatory. Change "Revised Standards" to "Source Reduction." Fish & Wildlife Habitat should address a) Regulatory and b) Intrinsic benefit.
- Discussion following the group reporting and sorting of results.

There was some discussion on how the issues people considered "Miscellaneous" should be combined and weighed as a criterion. The points for this category were fairly significant, and the numbers should not be used blindly to make decisions. Another person wondered if Criteria 5-8 should "float" within the first four.

Peer Review Meeting #1 Summary

One group member said there should be better definitions of the criteria. Safety, for example, should mention public health. The “Revised Standards Impact” criterion might be too narrow, and should include what’s happening on the national level.

Another group member said there should be a factor in the methodology for negative considerations, such as possible lawsuits.

Reggi said the next steps for the City will be to explore these issues, reflect on the input from today, and formulate a draft methodology form to present at the next meeting.

Ben said the goal is to have a robust methodology that is also flexible and fair, according to what’s best for the community.

Meeting Participants:

Devin Biesecker, City of Lincoln Ben Higgins, City of Lincoln Paul Zillig, LPSNRD Ed Ubben, LPSNRD Nicole Fleck-Tooze, Lincoln PW/U Andrew Appleget, The Flatwater Group Lalit Jha, JEO Consulting Group, Inc. John Cambridge, HDR Engineering Paul Gonzales, The Schemmer Associates Mark Bauer, EA Engineering Joan Darling, Olsson Associates Ken Almquist, Parsons Brinckerhoff Elbert Traylor, NDEQ Selma Kessler, Kircham Michael Dan Bigbee, EA Engineering Ted LaGrange, NGPC Jeff Wagner, Mainelli Wagner & Assc., J.D. Johnson, JEO Consulting Group Doug Holle, The Schemmer Associates Reule Anderson, HWS Consulting Group Bud Curtis, Parsons Brinckerhoff Brandon Garrett, Engineering Design Consultants Bob Wolf, Olsson Associates John Bender, NDEQ Reggi Carlson, The Schemmer Associates-Facilitator Andrea Bopp, The Schemmer Associates-Facilitator

Peer Review Meeting #2 Summary CIP Prioritization Methodology

Open Drainage Systems
June 27, 2006
9:30-11:30 a.m.
Lower Platte south NRD

Reggi Carlson of the Schemmer Associates opened the meeting, asked for self introductions from participants and reviewed the purpose and agenda. Participant handouts included a meeting agenda, summary of the first meeting, a draft of the Prioritization Ranking for Watershed Master Plan Projects tool, Miscellaneous Factors, and Definitions, and individual worksheets to accomplish the meeting's purpose: To provide feedback on the ranking methodology tools.

The summary of the first meeting reported the results of the group's ranking of various prioritization criteria. Reggi explained that the project team had incorporated the group's input from the last meeting in developing three prioritization tools: a ranking sheet, miscellaneous weighting factors and descriptions of weighting factors.

Reggi told the group that points and multipliers were intentionally left off the tool at this stage because the focus of this meeting was to analyze the tools' organization, structure and articulation as a whole. Determining detailed point allocation would be done by City and project team staff members. Once a draft is complete, the peer review committee will be invited to comment further on an individual basis, rather than in a group setting.

Reggi also explained that the group would not be considering project costs during this discussion. Cost/benefit analysis is a different decision-making process that occurs separately as specific projects move through prioritization. There were no questions or comments.

Devin Biesecker asked the group to follow along as he explained details of the draft ranking sheet. Devin asked the group to provide input and feedback on all aspects of the tool, and to help the project team develop clear definitions and descriptions of major and minor events and impacts. He asked for guidance on how weighting factors could be quantified and ordered. And he invited the committee to consider and comment on other issues and factors that are significant yet are not adequately addressed within the current draft.

As a follow-up comment to Devin's presentation, Nicole Fleck-Tooze noted that, under the "Water Quality" category, the "Regulatory Compliance/Stormwater Permit/NPDES" factor represents a legal obligation for the City.

Peer Review Meeting #2 Summary

There were no additional comments or questions. Reggi then instructed the group to use three worksheets to write their personal comments about what works well, what needs improvement and suggested changes for each of the draft ranking tools currently under development. Participants worked individually for about 35 minutes. The committee was then instructed to go from person to person around their tables and share their recorded thoughts. Staff members from LPSNRD and Watershed Management would serve as table facilitators and note on flipcharts areas of agreement on each tool. Reggi told the participants to sign each worksheet so that they could be collected and reviewed in order to glean specific details of suggested improvements.

Table groups shared their ideas for approximately 50 minutes and recorded suggestions and opinions where there was general agreement. A record of all flipchart notes is included as an attachment to this report. Not all tables were able to complete the exercise in the allotted time, however all groups did present numerous valuable points for consideration.

Table 5 members noted that much of the focus on natural processes is driven by regulatory compliance related to preservation, and that ultimately, compliance often moves projects forward. After the table reports, Devin explained the next steps involved with the development of the prioritization tools. The project team plans to take all of the input gathered at this meeting and go back to work on designing the tools. Once the structure becomes workable, a point value system will be developed. When the team determines that the tools are ready for additional feedback, the peer review committee will have the opportunity to provide input via e-mail. Devin thanked the group members for their time and effort.

Reggi Carlson told the group that she will be preparing and sending a summary of the meeting along with flipchart notes. The meeting was adjourned at 11:25 a.m.

Meeting Participants:

Devin Biesecker, City of Lincoln Dan Bigbee, EA Engineering Ben Higgins, City of Lincoln Ted LaGrange, NGPC Paul Zillig, LPSNRD Jeff Wagner, Mainelli Wagner & Assoc. Ed Ubben, LPSNRD J.D. Johnson, JEO Consulting Group Nicole Fleck-Tooze, Lincoln PW/U Doug Holle, The Schemmer Associates Tom Malmstrom, LPSNRD Bud Curtis, Parsons Brinckerhoff Lalit Jha, JEO Consulting Group, Inc. Brandon Garrett, Engineering Design John Cambridge, HDR Engineering Consultants Paul Gonzales, The Schemmer Bob Wolf, Olsson Associates John Bender, NDEQ Mark Bauer, EA Engineering Reggi Carlson, The Schemmer Joan Darling, Olsson Associates Associates-Facilitator Ken Almquist, Parsons Brinckerhoff Andrea Bopp, The Schemmer Associates Elbert Traylor, NDEQ Associates-Facilitator Selma Kessler, Kircham Michael.