CITY OF BOULDER

COMPREHENSIVE FLOOD AND STORMWATER MASTER PLAN

DRAFT

TECHNICAL MEMORANDUM 10

Project Prioritization Framework

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1 Introduction

The process to bring a major flood project from planning and design to approval can take over a decade, and numerous projects have had more than a 20-year span from concept to construction. While these processes afford ample time to engage stakeholders and consider various project aspects, they are a contributing factor to the extensive timeframes assocaited with implementation of capital projects that protect public safety and prevent property damage. The question then arises of which projects to tackle first. This plan seeks to establish a defensible Project Prioritization Framework that supports prioritization of projects in a way that fairly meets the community needs.

As outlined to the right (**Major Flood Project Planning and Development)**, identified projects undergo extensive assessment and refinement to determine location, function, and design alternatives and preferred approaches. Smaller, straightforward projects often go through the Project-Specific Community Process and Design which is an efficient mechanism to construct much needed storm drainage projects in a timely manner. The process for major flood project approval is, by design, more thorough due to the larger impact and costs. It is for these major flood projects that the city can benefit from a systematic approach to analyze the project portfolio against multiple criteria and prioritize projects in keeping with community values.

To guide project prioritization framework development, the project team distilled information collected from the policy review and issues identification work with the CWG into ***Stormwater and Flood Management Project Prioritization Goals****:*

Stormwater and flood management projects should…
Protect people from harm, educate the community, reduce risks, and…
Preserve, protect, and restore the natural resources associated with creeks and wetlands for the multiple benefits they provide to support a resilient community
Provide resilient infrastructure that addresses uncertainty, including climate change considerations
Provide access for emergency response and recovery efforts
Minimize property damage
Provide efficient and cost-effective solutions
… in ways that are mindful and equitable to our entire community.

Major Flood Project Planning and Development

The process for review and approval of individual projects is identified in the annual Capital Improvement Plan (CIP) and budget approval process. Currently, various processes may be required for a specific project. For example:

Concept Plan and Site Review: Concept Plans and Site Plans are reviewed by the interdepartmental staff Development Review Committee, departmental Advisory Boards, Planning Board, and City Council (call-up option).

Community and Environmental Assessment Process (CEAP): The CEAP provides a framework for balanced and thoughtful consideration of environmental and social issues in the preliminary planning and design of capital projects. It also provides a forum for public discussion of broad level project issues relative to master plans and overall community goals. It is a tool to aid in the development and refinement of project design and impact mitigation options.

Project-Specific Community Process and Design: Many projects are not required to go through concept and site review and would not benefit from a CEAP process. These typically have a project-specific design and public process to efficiently and appropriately identify community needs, concerns, and preferences. Many projects have been assessed through facility studies, area or facility planning processes, mitigation plans, or other studies. The processes are collaborative with multiple city and/or county departments.

These Goals serve as guiding principles for the Project Prioritization Framework, and a multi-criteria decision analysis tool has been developed to aid in the prioritization decision making.

Multi-Criteria Decision Analysis

Multi-criteria decision analysis (MCDA) is a general term to describe a set of methods used to support decision-making processes by considering multiple and often conflicting criteria through a structured framework. This framework can then be used for the prioritization of complex alternatives. The use of a (MCDA) tool for prioritization of the city's major flood capital projects provides numerous advantages, including:

- The ability to accommodate multiple stakeholders for enhanced public participation;
- The ability to analyze multiple alternatives with complex benefits and attributes;
- Allows for evaluation of the impact that criteria weighting have on outcomes and perform real-time sensitivity analyses; and,
- Provides a robust, defensible tool that allows fair and equitable decision making.

2 Project Prioritization Framework

The purpose of the project prioritization framework is to aid in good decision making, build projects that align with community values and meet the Utility's goals and objectives. Characteristics of an effective framework include:

- A clear and defensible framework
- Incorporation of community values identified through stakeholder engagement and constructive dialog
- Ability to rank major capital projects that have been developed from multiple studies, CEAP and master plan outcomes

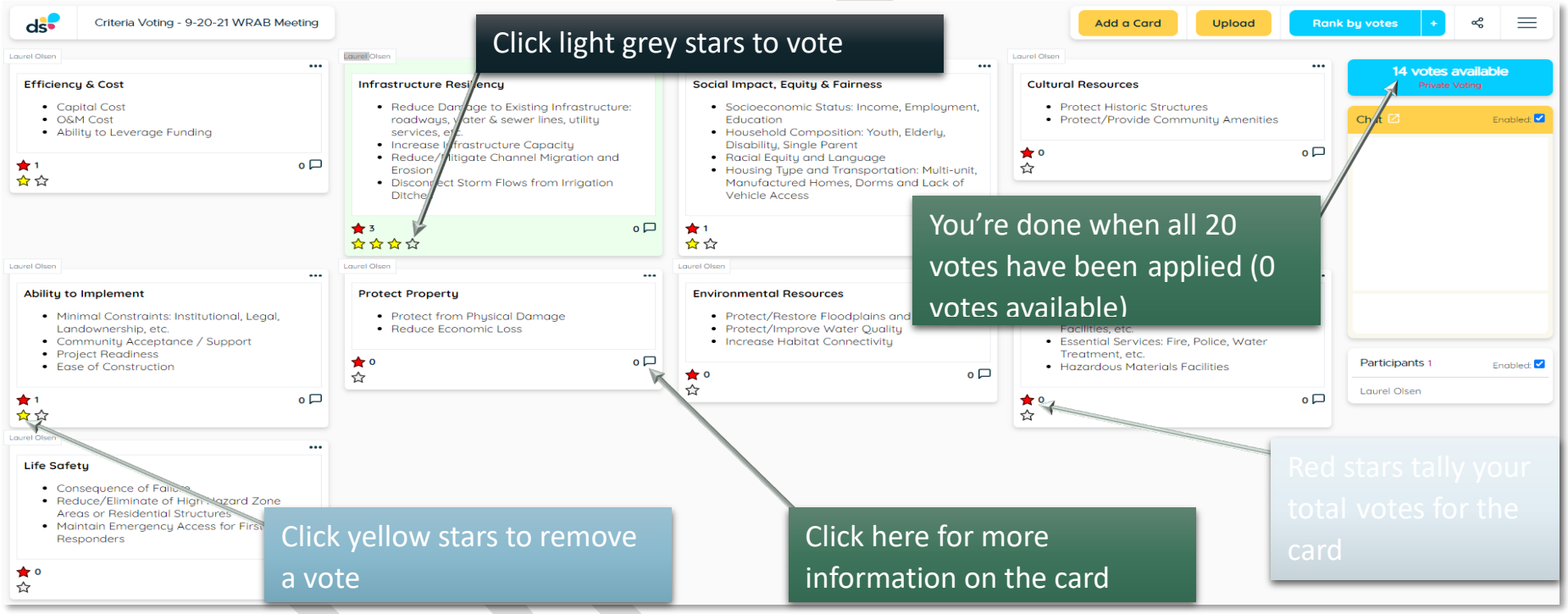
Public input was sought by inviting residents to participate through Be Heard Boulder, six basin-specific meetings and several in-person meetings (e.g., National Night Out, Duck Race, Hometown Festival, Farmer's Market), as well as input from the Community Working Group and WRAB members, to confirm the criteria of greatest import. In total, about 90 persons participated in a ranking exercise to provide input on the criteria: this included 18 Spanish-speaking public; 55 English-speaking public, four WRAB members, and 12 CWG members.

Project prioritization criteria are shown in **Figure 10-1**. The addition of racial equity considerations, as described in Boulder's Racial Equity Plan, to project prioritization metrics is one of the primary objectives of this master plan update. The methodologies of the past used a "losses avoided" approach to calculate project benefits resulting in Benefit/Cost ratios that typically favor projects in areas with the highest property values as opposed to where the life safety risk and community needs are the highest.

Figure 10.1 | Initial Project Prioritization Criteria

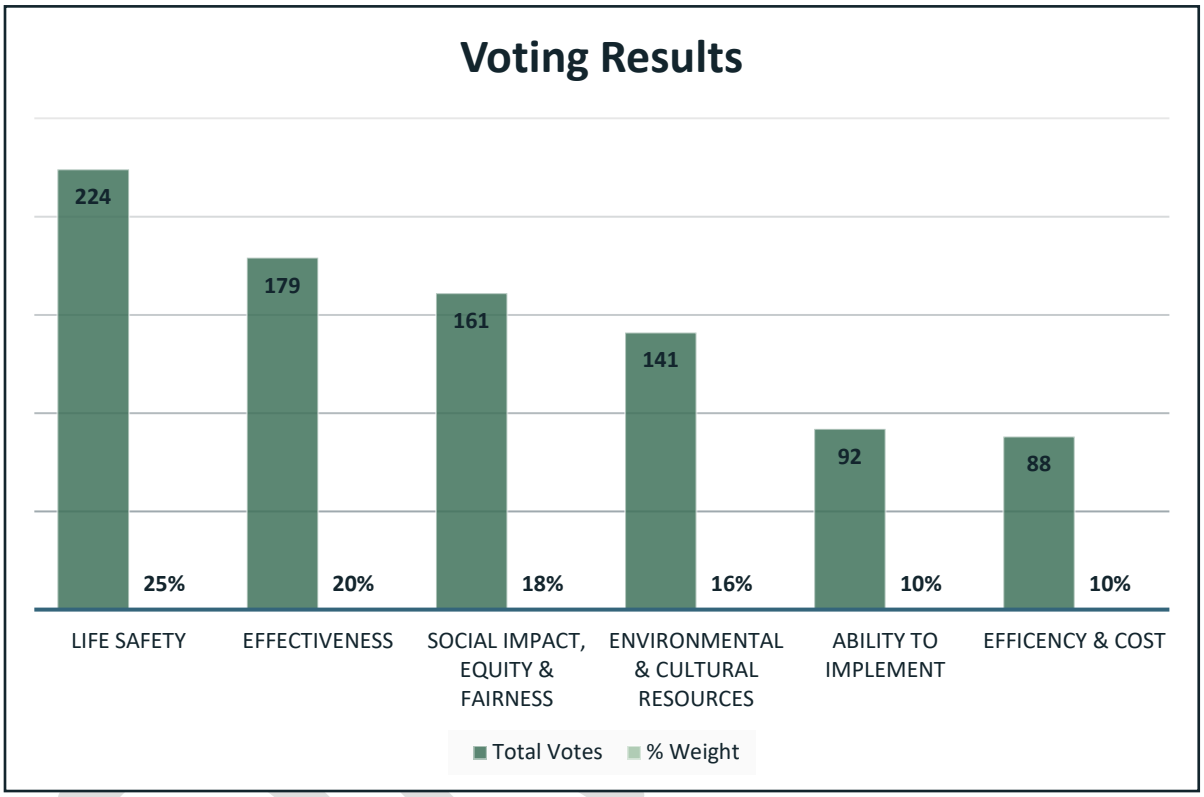
Criteria weighting was done using a "dotstorming exercise" where community members were asked to rank project prioritization criteria with respect to their importance (reference **Figure 10-2**).

Figure 10-2 | Project Prioritization Criteria Voting using the Dotstorming Tool



The results of the Dotstorming exercise provided weighted values for each attribute are shown in **Figure 10-3**. To simplify the model outputs, "protection of critical facilities" was tucked under the Life Safety category; "infrastructure resiliency" and "protect property" were combined under an Effectiveness category; and "environmental" and "cultural" resources were combined into one category. In each case the highest score was applied to the results (results were not added together and, for example Infrastructure Resiliency received 179 votes, which was applied to the Effectiveness category).

Figure 10-3 | Voting results from stakeholder engagement meetings (n = 89, total votes = 1240)



Criteria Selection and Weighting

The city reviewed the weighting criteria to ensure strategic alignment with the overall mission of the Utility. Acknowledging that public health, safety and welfare are fundamental project goals, as well as the highest ranking attribute from the community, the city embarked on building the multi-criteria decision analysis (MCDA) tool to provide a project prioritization framework. The framework will enable sound decision-making around the effectiveness and efficiency, equity, environmental/cultural aspects of each project along with the ability to implement — attributes that are also critical to the success of the Utility and the community.

A basic MCDA tool was used to compare projects by taking the relative weight of multiple criteria (including quantitative, qualitative and semi-quantitative information). The community scoring was used to assign the relative weight of each criteria in terms of importance to the community, and the overall "score" of a project is derived from totaling the weighted sums for all of the criteria. The ordering of a project's benefit is taken to be the project ranking by preference. The following sections further describe the criteria, the metrics used to compare each project, and the scoring framework. Criteria shown in the table are described in more detail below.

Table 10-1 outlines the units used in the MCDA model.

Table 10-1 | Ranking Criteria by Attribute and Inputs to Decision Model

Attributes Placed in Model for Assessment	Associated Units (Quantitative, Qualitative or Semi-Quantitative)
COST	
Capital Costs	$
O&M Costs	$
EFFECTIVENESS	
Protect Property	
Reduction in Physical Damage Potential	# of Structures removed from 100-yr floodplain
Reduction in Damage to Structures (from Hazus[1])	$
Level of Service	% Increase
ENVIRONMENTAL/CULTURAL RESOURCES	
Protection/Restoration of Environmental Resources	
Protect Existing Natural Features & Habitat	Acres
Restore/Reclaim Natural Features	Acres
Protection of Cultural Resources	1 to 5 ranking (5 is important)
SOCIAL IMPACT, EQUITY AND FAIRNESS	
Social Vulnerability (from Social Vulnerability Index[2])	0 to 1 ranking (1 is vulnerable)
ABILITY TO IMPLEMENT	
Constraints	Easy / Neutral / Difficult
Community Acceptance & Support	1 to 5 ranking (5 is full support)
LIFE SAFETY	
Protect Critical Facilities	
Critical Facilities removed from HHZ	# of Structures removed
Critical Facilities removed from 500-yr floodplain	# of Structures removed
Remove Residential Units from HHZ	# of Structures removed
Road Level of Service	Average Annual Daily Traffic (AADT)
MULTIPLE BENEFITS	
Protect Critical Facilities	1 to 5 ranking (5 is important)

[1] Hazus, a nationally standardized risk modeling methodology managed by FEMA's Natural Hazards Risk Assessment Program, is a GIS-based desktop software with a collection of inventory databases across the U.S. Hazus identifies areas with high risk for natural hazards and estimates physical, economic, and social impacts of floods. What is Hazus? | FEMA.gov

[2] The Social Vulnerability Index (SVI) uses 15 U.S. census variables to help local officials identify communities that may need support before, during, or after disasters. Social vulnerability refers to the potential negative effects on communities caused by external stresses on human health. Such stresses include natural or human-caused disasters, or disease outbreaks. CDC/ATSDR's Social Vulnerability Index (SVI)

Cost

Evaluation of a project's cost includes all costs incurred by the Utility through the duration of the life of the project.

Capital Cost

Capital cost represents estimated cost of construction incurred by the Utility. To determine this, the proposed cost, including contingency factors, of a project is obtained from the most recent planning or design document. Typically, this information will be found in the mitigation plan for the proposed alternative. Any anticipated or secured funding through grants, federal, regional, or city partners will be deducted from the proposed cost of construction.

Ranking Factor	**Capital Cost ($)**
Quantitative Metric	Capital cost to the Utility in present year dollars

Operations & Maintenance (O&M) Cost

Operations and maintenance costs represent a significant portion of the Utility's annual budget. The O&M costs for a project are estimated costs to occur annually, with the annual O&M cost calculated as 0.5% of the constructed cost. The present worth of a uniform recurring annual O&M cost is:

PW = O&M cost x UPW (uniform present worth, conversion factor)

$$\text{UPW} = \frac{(1+r)^n - 1}{r*(1+r)^n}$$

Where: r = 2.7% discount rate (based on the annualized ENR Construction Cost Index from 2010 to 2020)

n= 50 years (average useful life of major flood projects)

Ranking Factor	**Estimated Present Worth ($)**
Semi-Quantitative Metric	Present worth of annualized O&M cost to the Utility

Effectiveness

Flood mitigation studies typically use a cost-benefit ratio to determine the effectiveness of a project. These 'benefits' are often calculated by determining the present-day dollar value of losses avoided. Therefore, flood mitigation projects constructed in areas with high property values score very well. Often, these are the same areas that possess the greatest means for recovery in the event of flood losses. To distribute this benefit more equitably, the value of losses mitigated was separated from the number of structures protected. Additionally, the city strives to provide conveyance of the 100-year flood event through all its major drainageways. Projects are encouraged to make the greatest toward this benchmark as is feasible.

Property Protection

Reduction of flood risk to property is one of the main drivers for the construction of flood mitigation projects. Between the years of 2010 and 2018, floods have caused approximately $17 billion dollars of damage annually in the United States (Duguid, 2021). Additionally, flooding disproportionately affects individuals with lower incomes and lower levels of economic security because of more limited means to recover losses.

Physical Damage Reduction

Physical damage reduction is calculated based on the number of structures that a project removes from the 100-year floodplain. A combination of publicly available GIS data and proposed floodplain limits delineated as part of flood mitigation studies or design projects are used to calculate this value.

City of Boulder Datasets. City of Boulder maintains a Building Footprints GIS dataset that is housed on the City of Boulder's Open Data Hub. Information in this dataset includes building type, building height, building area, and a ground elevation value. This information is reduced to include only the structures located within the regulatory floodplains in question through the city's following datasets: Current High Hazard Zone, Current 100-Year Extent, and Current 500-Year Extent. This results in a number of structures identified for potential flooding impacts and damage/benefit calculations.

Ranking Factor	
Quantitative Metric	**Number of Structures Removed from 100-Year Floodplain**

Economic Loss Reduction

RECOMMENDED:

GIS-based flood modeling outputs are used to prepare HAZUS reports — a Federal Emergency Management Agency (FEMA) assessment tool that estimates losses associated with floods. HAZUS provides a quantification of the loss of essential structures as well as a total monetary loss due to structural damage and resulting effects on commerce for a given flood inundation area.

Ranking Factor	
Quantitative Metric	**Flood Damage Avoidance ($)**

A NOTE ABOUT FROM MITIGATION PLANS:

Mitigation Plans provide data for the alternatives of major flood improvements and their proposed impacts. Hydraulic floodplain models provide an estimate of existing flooding and "with project" proposed conditions that include flooding extents, inundation depths and flooding impacts to properties and buildings. The information contained in the Mitigation Plans can be used for some of the project data as described below.

Damage Assessment Approach. Damage assessments are completed for existing and proposed conditions to determine the potential benefits of implementing a flood mitigation project. This analysis is limited to calculating damages related to buildings and content value. Additional damages such as displacement costs and loss of function impacts, and non-traditional damages (landscaping and agricultural equipment, outbuildings, vehicles, traffic function and public safety or loss of life) are not included in the analysis. The approach to assessing damages typically follows FEMA Benefit-Cost-Analysis (BCA) guidance, with modifications to best consider the unique landscape within the watershed.

Annualized and Present Value Damages. Typically the mitigation plans provide the total damage to each structure for the 10-, 50-, 100- and 500-year events are annualized to estimate the expected damages per year. Expected annualized damages are used to estimate the total damages that would be expected over project lifetime. The present value (PV) of damages represents the total damage value over the life of the project in current day value. The standard FEMA discount rate of 7% and a useful life of a major drainage system of 50-years are used for these calculations.

Flood risk reduction benefits were calculated based on the number of structures as well as the value of structures. Benefit cost ratio metrics are provided in each mitigation plan, which equals the value of losses avoided divided by the mitigation

costs. A ratio of less than 1 indicates a project with costs that exceed the benefits, while a ratio greater than 1 indicates a project with costs that are less than the benefits. However, for the Project Prioritization tool it was determined that using the benefit cost ratio alone provides the greatest benefit for those who own/occupy the most expensive structures. These are also the normally the population who have the greatest means to recover. As a proxy to benefit cost, the Project Prioritization uses the number of structures removed and economic loss reduction metrics.

Level of Service

The level of service (LOS) standards discussed in the BVCP goals are for protection from a 100-year storm event. The calculation for the improvement in LOS is:

*[(Proposed LOS — Existing LOS) / Recommended LOS] * 100 = percent improvement in LOS*

This attribute is expressed as a percentage.

Ranking Factor	**Percent Increase (%)**
Quantitative Metric	From 0 to 100

Environmental & Cultural Resources

Criteria voting showed a high interest in projects that protect and restore wetland, floodplain and riparian areas; protect and improve water quality; protect threatened and endangered (sensitive) species and increase habitat connectivity. In addition, the community values protection of cultural resources including structures listed on the National Register (includes National Landmark and Listed Historic District); centennial farms, local landmarks, and other eligible sites as defined by the Colorado Office of Archaeology and Historic Preservation.

Environmental Resources

The Utility is committed to working with local and regional partners to protect and restore environmental resources within the city. In addition to recognizing the benefits of protecting riparian, floodplain, and wetland habitat, projects will also strive to protect threatened and endangered species habitat.

Protect Existing Natural Features

Areas considered as existing natural features include wetlands, floodplains, and riparian areas based on City of Boulder GIS data; and threatened and endangered species habitat based on Boulder County GIS data. If locations of natural features were surveyed for a project, the use of project-specific survey data is preferred. Area quantities reported for protection of existing natural features must be based on net protected values. The calculation for this value is as follows:

Acres Protected = Existing natural features protected (acres) – Existing natural features disturbed or lost (acres)

Ranking Factor	**Acres Protected**
Quantitative Metric	Net area of natural features protected in acres; value may be negative if net losses are incurred

Restoration or Reclamation of Natural Features

Areas considered restored or reclaimed include natural features that were disturbed and restored during construction, as well as any additional restoration or reclamation areas included as part of a project.

Ranking Factor Quantitative Metric	Acres Restored or Reclaimed

Cultural Resources

Inundation zone maps from the mitigation plan are submitted to Colorado Office of Archaeology and Historic Preservation (OAHP) for query of their GIS cultural data (previously recorded sites and conducted surveys within each inundation area). After the OAHP provides this data, each site and survey is be queried in OAHP's COMPASS online database to obtain site forms and survey reports. From this, chronological information as well as the National Register for Historic Places status can be obtained for sites as well as the survey report information.

Each site is ranked based on three important criteria: degree of impact, the significance of the resources, and land management. Individual site ranking are on a 10 to 1 scale, 10 being the most important and 1 as the lowest importance. An explanation of the individual site ranking is provided below.

Impact

The potential impact on cultural resources ranked based on where they fall within the inundation zones. The ranking of the potential impact is as follows:

10 — "Full" impact

5 — "Partial" impact

1 — "Near" the inundation zone -- This ranking identifies important resources that are close to the inundation zone that could potentially be impacted.

Eligibility

Eligibility is a field or official assessment assigned to professionally inventoried sites. Eligibility will be extracted from the data based on the location of cultural resources relative to the inundation zones. The ranking of these assessments are as follows:

5 — Listed on the National Register; National Landmark; Listed Historic District.

4 — Listed on the State Register; Centennial Farms; Local Landmark; Supports Linear Resource; Contributing to Existing District.

3 — Eligible (Officially and Field)

2 — No assessment; Needs Data (Officially and Field)

1 — Not Eligible (Officially and Field); Does not support linear resource; Delisted

Land Management

Land management is determined by the laws and regulations that each land manager is obligated to follow to appropriately preserve and protect cultural resources. The ranking based on land management is as follows:

5 = State Parks; BLM; USFS

4 = State Wildlife Areas (SWA); State Land Board (SLB)

3 = Land Trust (Nature Conservancy); City and County

2 = Department of Defense (DoD)

1 = Private

Step-by-step project ranking procedures based on their potential benefit to protect cultural resources in the path of the current inundation zones is provided below.

1. Once sites were pulled from the GIS data, they were then grouped by current inundation zone and a calculation was performed to determine how many sites would be protected.

2. Many sites are within properties that are managed by more than one entity; as a result, some sites were duplicated during the land management analysis.

    a. The average for each duplicated individual site was calculated and the duplicates were then removed (only the average for each duplicated site was used in the following steps).

3. An average for all the cultural resources within each current inundation zone was then calculated to determine the resources that would be protected by the Project.

4. Each project was then grouped based on:

    a. The **Sum of High Priority Significant Resources** in the path of the current inundation zone and how many would be removed from the inundation area.

    b. If there was more than one project that had the same number of significant resources within each of these groups, the **Sum of Eligible (Field or Officially) Resources - Potentially Significant Sites** was then used to further sort the Projects.

    c. Similarly, if there was the same number of eligible sites within each of these groups the **Site Ranking Average for Each Project** was used for the final ranking of each capital project.

Note: Field and officially not eligible, no assessment, and no data sites are *only* used during the average ranking for each site and therefore the **Site Ranking for Each Project**. It is assumed that not eligible, no assessment, and no data sites are not as significant as the Eligible sites, nor are they as significant as the **High Priority Significant Resources**, which were given a "5" or a "4" in the individual **Eligibility** site ranking. While the methods for ranking the projects are somewhat subjective, an exclusively quantitative ranking is not possible at this time.

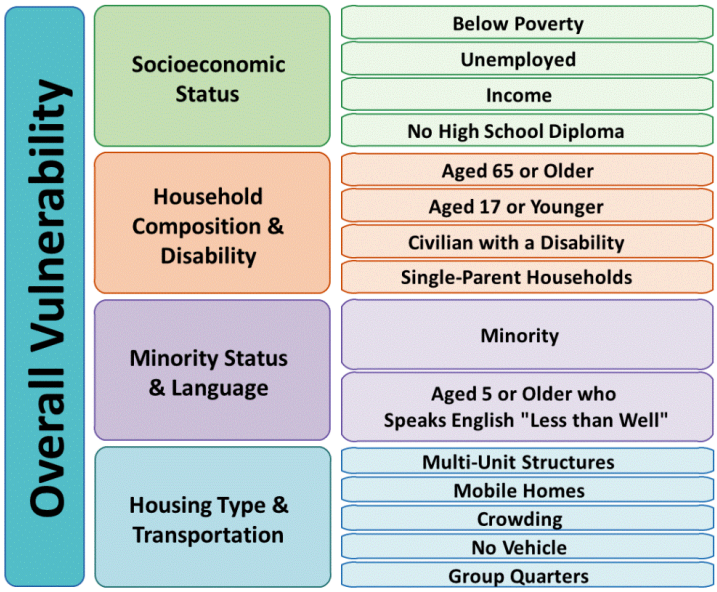
Ranking Factor	**Scale of 1 to 10**
Semi-Quantitative Metric	0 indicates slightly important; 10 indicates significantly important

Social Impact, Equity and Fairness

Flood damages have different impacts across the community and people do not have the same ability to recover when impacted. Understanding these differences will help identify the areas with the highest needs and assist in prioritizing these projects.

Social Vulnerability

Social vulnerability refers to the potential negative effects on communities caused by external stresses on human health. Such stresses include natural or human-caused disasters, or disease outbreaks. Reducing social vulnerability can decrease both human suffering and economic loss. Several factors, including poverty, lack of access to transportation, and crowded housing may weaken a community's ability to prevent human suffering and financial loss in a disaster (CDC, 2021). The Centers for Disease Control / Agency for Toxic Substances and Disease Registry Social Vulnerability Index (CDC/ATSDR SVI) uses U.S. Census data to determine the social vulnerability of every census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. The CDC/ATSDR SVI ranks each tract on 15 social factors and groups them into four related themes (shown on the next page). Each tract receives a separate ranking for each of the four themes, as well as an overall ranking.



Source: CDC/ATSDR SVI Fact Sheet | Place and Health | ATSDR

Ranking Factor	SVI Range 0 to 1
Quantitative Metric	0 indicates least vulnerability; 1 indicates greatest vulnerability

Ability to Implement

Design and construction projects can encounter many obstacles that can prevent a project from happening or greatly lengthen the time it takes to fully complete a project. This criterion identifies whether a project is expected to encounter obstacles that would hinder or prevent its design and construction, such as institutional, legal or other practical constraints; ability to permit; whether the city own the land/hold easements or rights-of-way; and if there is political will and community acceptance and support. These factors are described in more detail below.

Project Constraints

Typical project constraints that increase the difficulty of bringing a project to fruition include institutional, legal or other practical constraints; ability to permit the project or how long it may take for permitting on a local, state or federal level; whether the city owns the land/holds easements or rights-of-way; anticipated difficulty obtaining privately owned land or easements for construction; or others.

Ranking Factor Qualitative Metric	**Easy / Neutral / Difficult**

Community Acceptance & Support

The Utility relies on robust community engagement throughout the flood mitigation planning process to develop selected alternatives that align with community needs and values. The community acceptance & support criterion evaluates the results of these engagement efforts.

Ranking Factor Qualitative Metric	**Scale of 1 to 5** 1 indicating little community support; 5 indicating broad community acceptance

Life Safety

City of Boulder GIS building datasets include: basic information on each structure including a building type and a ground elevation value. This information is reduced to include the structures located within the 100-yr and 500-yr floodplain and results in a number of structures identified for potential flooding impacts and damage/benefit calculations.

Protect Critical Facilities

In 2014, the city enacted new floodplain regulations to provide additional flood protections for critical facilities, such as hospitals, police and fire stations, day care facilities, and utility treatment facilities located within the 500-year floodplain.

Critical Facilities Removed from the High Hazard Zone (HHZ)

The high hazard zone is defined as the area of the floodplain that has the greatest risk for loss of life. Critical facilities identified through City of Boulder GIS data will be used in conjunction with the existing and proposed HHZ boundaries to determine the number of critical facilities anticipated to be removed due to project improvements.

Ranking Factor	
Quantitative Metric	**Number of Facilities Removed from High Hazard Zone**

Critical Facilities Removed from the 500-Year Floodplain

Critical facilities identified through City of Boulder GIS data will be used in conjunction with the existing and proposed 500-year floodplain boundaries to determine the number of critical facilities anticipated to be removed due to project improvements.

Ranking Factor	
Quantitative Metric	**Number of Facilities Removed from 500-Year Floodplain**

Removal of Residential Units from the High Hazard Zone (HHZ)

The high hazard zone is defined as the area of the floodplain that has the greatest risk for loss of life. Residential units identified through City of Boulder GIS data will be used in conjunction with the existing and proposed HHZ boundaries to determine the number of residential units anticipated to be removed due to project improvements.

Ranking Factor	
Quantitative Metric	**Number of Residential Units Removed from High Hazard Zone**

Road Level of Service

Annual Average Daily Traffic (AADT) data were collected from the Colorado Department of Transportation (CDOT) Online Transportation Information System (OTIS). AADT represents the average daily traffic count for a particular highway segment, in both directions, representing an average 24-hour day in a year and was used as an indicator of road usage and quality. These data were queried against the "without project" inundation maps to characterize the effects of flooding to road closures and road loss due to flooding. AADT is entered into the decision model with values ranging from less than 10,000 to more than 75,000.

County counts are 24-hour daily volumes taken mid-week (Tues – Thurs) on county roads during the summer months. An adjustment factor is applied to each raw count based on the time of the year the count was taken (using factors from CDOT).

Additional data was collected from the City of Boulder to ascertain the AADT information within city limits.

Ranking Factor	
Quantitative Metric	**Highest AADT Value** Nearest proximal AADT value of road segment receiving benefit from project improvements

Multiple Benefits

Some projects provide multiple benefits over and above recognized attributes. Examples of multiple benefits may include:

- Incorporation of water quality or stormwater drainage project components;
- Multi-agency benefits;
- Piloting of emerging technologies or demonstration projects;
- Alternative transportation (steer residents in a particular direction such as walking/cycling instead of driving);
- Co-benefits with other proposed projects (e.g., building a project when another project will already be performing road reconstruction);
- Incorporation of recreation or education components; and,
- Enhanced permit compliance (water quality).

Ranking Factor	Range 1 to 5
Qualitative Metric	0 indicates few benefits; 5 indicates greatest high level of benefits

Multi-Decision Criteria Analysis Tool

The decision hierarchy (Figure 10-4) illustrates the structure used to support decision-making, outline the criteria and sub-criteria used to rank one project to another.

Figure XX
Decision Hierarchy

Level 1 | Goal to prioritize major flood capital improvements

Level 2 | Benefits and attribute categories — Life Safety, Cost, Equity, etc.

Level 3 | Sub-categories — Protect Property/Level of Service; Capital/O&M, Social Vulnerability

Level 4 | Sub-Subcategories — Reduce Physical Damage, Reduce Economic Loss, etc.

3 Summary

4 References

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