CITY OF HOUSTON
Public Works and Engineering Department

Capital Improvement Plan Process Manual for Infrastructure Programs

REBUILD HOUSTON

Revision Date:
March 29, 2011

Acknowledgements:

Authors:	Ross M. Gordon, P.E.	AECOM USA Group, Inc.
	Carol Ellinger Haddock, P.E.	City of Houston, Public Works & Engineering
Reviewers:	Eric K. Dargan	City of Houston, Public Works & Engineering
	Daniel W. Krueger, P.E.	City of Houston, Public Works & Engineering
	Mark L. Loethen, P.E.	City of Houston, Public Works & Engineering
	M.R. McCrary, P.E.	AECOM USA Group, Inc.
	Daniel R. Mendendez, P.E.	City of Houston, Public Works & Engineering
	Gary Struzick, P.E.	Klotz and Associates, Inc.
	Jeffrey Weatherford, P.E.	City of Houston, Public Works & Engineering

TABLE OF CONTENTS

OVERVIEW

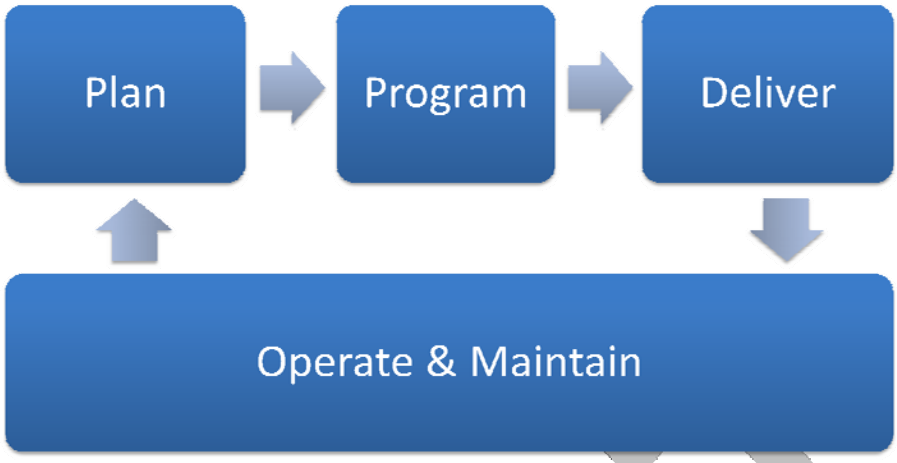
Introduction

A healthy infrastructure is a necessary ingredient for a robust economy. The growth and development of the City requires the provision of extensive capital improvements to provide this infrastructure. Infrastructure includes streets, bridges, traffic signals, drainage systems, drinking water systems and wastewater systems. These systems must work both independently and in a coordinated manner with other systems to support the needs of the residents and businesses in the City. These systems are designed as individual capital projects which can cost millions of dollars, require acquisition of land and take years to construct.

The purpose of publishing this manual is to formalize and communicate a transparent process for developing and prioritizing projects that will be recommended by the Department of Public Works and Engineering (PWE) for implementation of the Five-Year Capital Improvement Plan (CIP). The planning necessary to program and deliver significantly more projects in the 8 to 10 year time frame that ReBuild Houston will begin to generate significant additional funds over today's levels must be initiated today in order to deliver projects in a timely, systematic and transparent manner. This planning, and subsequent planning in future years, will be performed in accordance with this manual.

In 1983 City Council established a requirement for the City of Houston to develop and annually revise a CIP (Resolution 83-91). This resolution recognized that providing needed capital improvements in the most efficient and effective manner requires a systematic planning, financial and management process. Subsequently, the Mayor published Administrative Procedure 4-5 (formerly Adminstration Procedure 2-7) establishing a continuous CIP. With the passage of Proposition One in November 2010, a heightened focus has been placed on transparency in project identification, selection and development of specific projects. When the ReBuild Houston implementation plan was presented to City Council and the public in December, 2010, one of the key steps was to revise the capital improvement planning and programming methodology, with a target date set for February, 2011. This document and the inclusion of this document on the *www.ReBuildHouston.org* website are intended to fulfll that key step and commitment to progress made in the December, 2010, report.

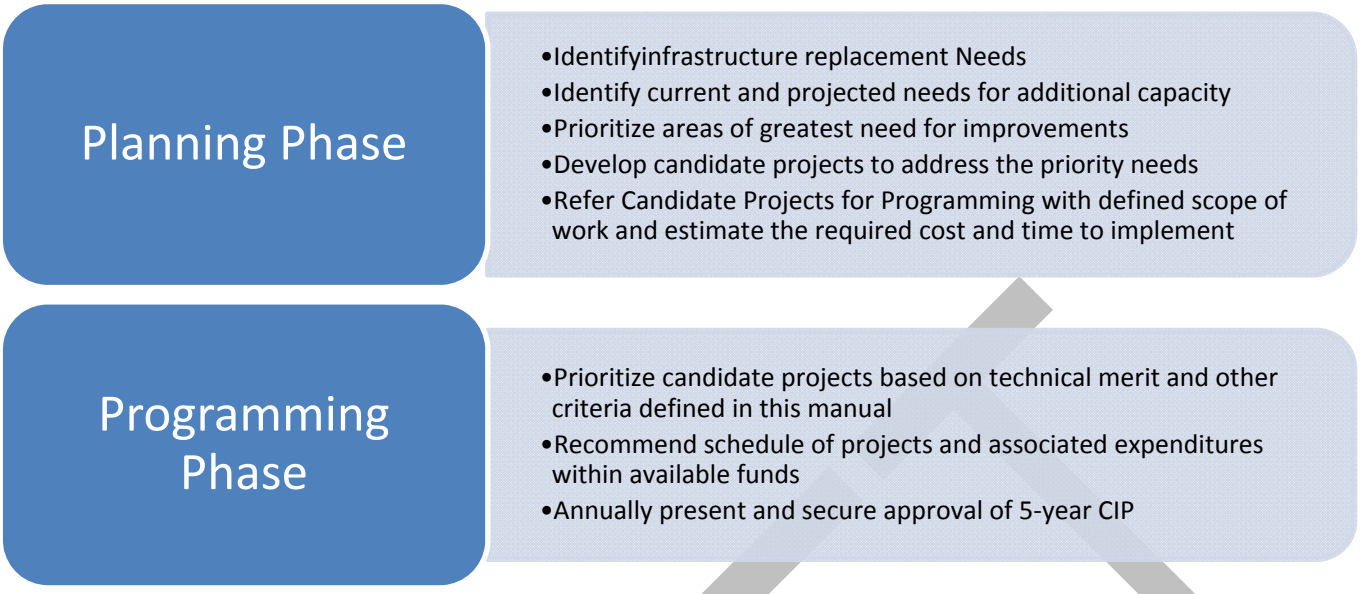
The CIP schedules specific projects and investments by phase over the upcoming five-year period to address the City's greatest needs for infrastructure. PWE follows a straightforward process by which planning efforts lead to the programming of specific projects followed by delivery (design and construction) of the selected projects. Once constructed, the department manages the operation and maintenance of the City's infrastructure, which is continually assessed through the planning process for needed improvements or upgrades. PWE has existing formalized procedures for the delivery of infrastructure projects through the design and construction process. This manual is the formalization of processes and procedures for the identification and development of projects through the planning and programming process.



Each year, City Council faces the challenge of selecting which projects merit the highest citywide priority for allocation of limited funding in the CIP. A thorough planning and programming process will look at needs over short term (1-5 years), near term (5-20 years) and long term (20-50 years) time frames and identify and select projects which address the worst problems first in the short term or the CIP. As part of the CIP update process, each spring PWE recommends projects for Council consideration. The recommended projects are the result of this multi-step, integrated process and based on a prioritization system that uses objective criteria to identify needs, define projects and ultimately rank projects in each infrastructure category. While balancing the needs of individual districts against city-wide needs, Council Members act on these recommendations and adopt a 5-year CIP. The 5-year window provides for continuity from year to year while still providing the ability to respond to changing conditions, development, regulations and community goals that have been identified for beyond the 5-year time frame.

Project identification and development is based on objective criteria. However, the CIP is ultimately adopted in the political world of City Council. As the need, justification and benefits of projects cannot be fully quantified by a simple equation, the transparency of planning and programming methods and tools are critical to ensure that the worst needs are recommended first. This allows Elected Officials and the Public to have valuable information on how projects technically compare to each other. The objective criteria must be transparent, allowing for independent review both by technical experts and the general public.

This document will briefly describe the various categories of infrastructure that PWE plans, programs, delivers, operates and maintains. The document will also detail the CIP process and the objective criteria which are being used to identify needs and prioritize projects for programming into future CIPs. Section 2 provides a detailed overview of the Planning phase, which addresses the near (5-20 year) and long term infrastructure needs (20-50 year) by identifying and candidate projects for the CIP. Section 3 provides a detailed overview of the Programming phase, which prioritizes and schedules candidate projects in ths short term (1-5 years). The Programming phase will culminate in the development of a recommended 5-year PWE CIP. Once the CIP is adopted by City Council, it is executed by City departments.



(NOTE: There are text changes in the exhibit, but they do not show up in mark-up).

It is important to note that this document does not present a new process. Rather it presents the compilation, formalization, refinement and evolution of steps that have been and will be performed at various levels within PWE. This document will be updated regularly to reflect lessons learned, advances in technology and tools and changes in public priorities. It defines and requires coordination between the various infrastructure categories such that projects to address separate needs (such as drinking water versus structural flooding) can be addressed in one project if possible. It also aims to provide a mechanism for projects to incorporate energy efficiency, environmental sensitivity and sustainable approaches into project planning and design. For example, long term operating costs, generally based on energy and chemical costs have not always been an important consideration in project development. This led to projects that function effectively, but are more expensive to operate in the long run. Proper planning will lead to defensible programming with design and construction that is not slowed by change orders and other unexpected expenses.

Capital Improvement Plan

Administrative Procedure 4-5 establishes standards for preparation and review of the CIP. The CIP is a plan setting forth proposed capital projects and related expenditures to be incurred in the succeeding fiscal year, and each fiscal year following, over a rolling period of five (5) years, describing each project, its source of funding and the amounts allocated to the various stages, phases or aspects of the project. It is updated annually to reflect:

- Revised annual funding limits: based on projections from revenues (both ad Valorem and charges) and bond capacity (water and wastewater Combined Utility System) supported by the City's debt models, where allowable
- New and better data: including updated cost estimates, refined project scopes and revised delivery scheduled based on available funding and other obstacles encountered during design and acquisition of right-of-way (ROW)
- Additional projects: new proposed design or construction starts, particularly within the fifth year of the CIP as years 1 through 4 continue to implement the intent of the most recently adopted CIP

This annual process includes both internal steps and external/stakeholder input from Council Members and the Public. It culminates in approval of the proposed 5-year CIP by the Mayor and City Council. The detailed CIP Flowchart can be found in Administrative Procedure 4-5, Attachment A.

Infrastructure Categories

PWE has primary responsibility for planning, programming, delivering, operating and maintaining the following infrastructure categories, as defined by Administrative Procedure 2-7:

- Code M – Storm Drainage
- Code N – Street and Traffic (also includes bridges, bicycle and pedestrian facilities)
- Code R – Wastewater
- Code S – Water

PWE also supports planning and programming within the Code T - Tax Increment Reinvestment Zones.

The Storm Drainage category is divided into the following components:

- Major storm drainage, including regional detention,
- Neighborhood/area storm drainage, and
- Local drainage projects.

The Street and Traffic category is divided into the following components:

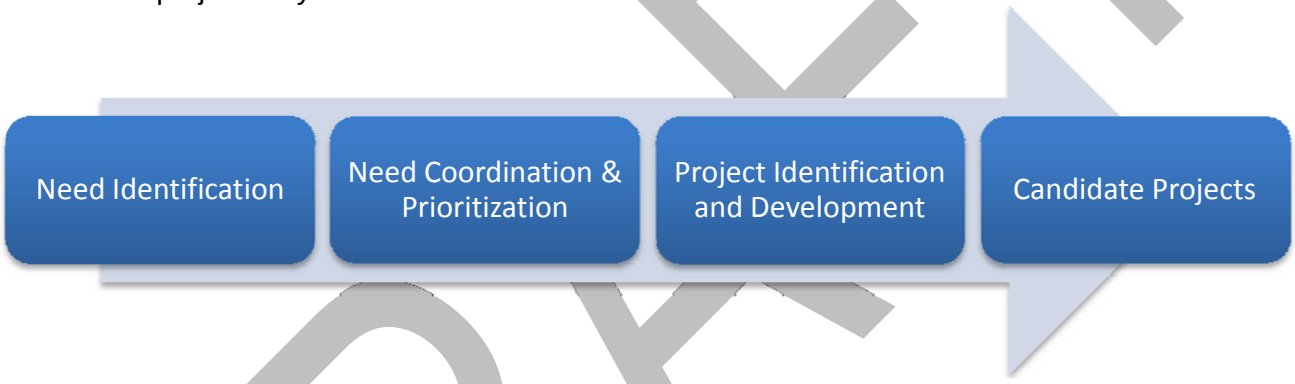
- Major thoroughfare and collector,
- Local non-residential street,
- Local residential street, and
- Single purpose projects, including:
    - Intersections
    - Pedestrian/bicycle
    - Access management
    - Neighborhood traffic management
    - Railroad safety and quiet zones.

INFRASTRUCTURE PLANNING

Infrastructure planning plays a critical role in the CIP process by:

- Identifying areas of greatest need for infrastructure improvements,
- Prioritizing which areas to assess first, and
- Identifying and developing projects to address the infrastructure deficiencies in the selected areas of greatest need.

The Planning process separates need identification from project identification, focusing first on identifying areas with the greatest need for infrastructure improvements. Areas of need are prioritized based on objective criteria. Areas at the top of the prioritization list are passed into the project identification and development step. In this step, project feasibility assessments are performed to identify and develop candidate projects for future inclusion in the CIP. Candidate projects identified and developed during the planning phase are not automatically added to the CIP. During the programming phase, candidate projects are evaluated and recommended for addition to the CIP based on available funding and comparison with other candidate projects city-wide.



The objective of the Planning process is to ensure available monies are being spent in the most cost effective manner and result in the greatest benefit to the City of Houston and its residents. Thorough planning, through objective need identification, project development, coordination and technical review, is essential in maximizing benefit, streamlining project delivery and minimizing future conflicts or bottlenecks during the design and construction phases. Emphasis during the Planning phase is placed on:

- Addressing areas of greatest need first,
- Accommodating future needs for additional capacity,
- Adopting a proactive and integrated approach to storm drainage and mobility,
- Tailoring project purpose to address integrated needs,
- Coordinating across infrastructure categories and with other entities,
- Developing feasible projects which can meet the City's level of service standards, and
- Determining estimates of project schedule, cost, and benefit, among other criteria.

The ultimate goal of the Planning process is to develop projects which can be evaluated and scheduled to the CIP during the Programming phase. Needs which are identified but not prioritized for initiation of feasibility assessments become 'candidate needs' and are catalogued and reconsidered during future year's need coordination and prioritization steps. Projects which have completed feasibility assessments but which were not added to the CIP, remain 'candidate projects' and are cataloged and reconsidered during future year's CIP Programming phase. The Planning process is a closed loop which recycles candidate needs and candidate projects until they are programmed to the CIP. Funding for the Planning phase is programmed into the CIP; however, this funding is not allocated to individual projects but rather to each infrastructure category.

Level of Service

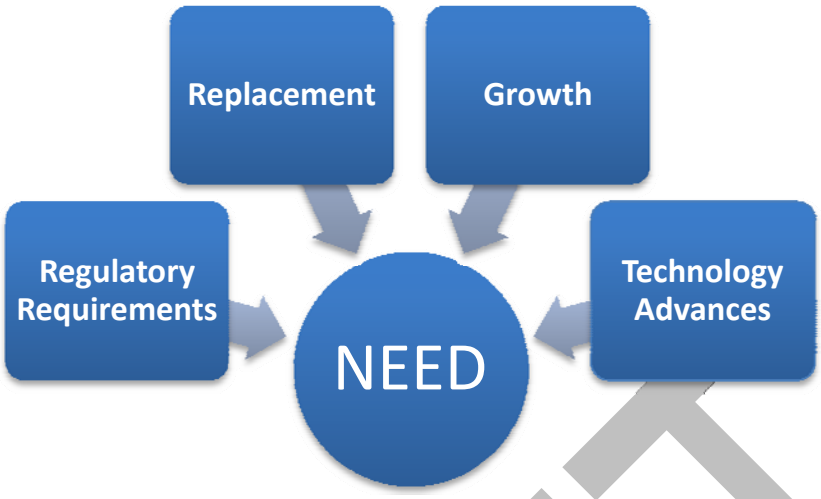
Need for infrastructure improvements and candidate project design are both driven by the City of Houston standards for level of service. Each infrastructure category has defined criteria establishing the level of service goal. All areas of the City shall be assessed based on the same level of service standards and all projects, regardless of location, should be designed to meet the same level of service standards. This ensures that all areas in Houston are treated equitably and are provided with the same quality of infrastructure. In unique circumstances, however, deviation from the level of service goals for new projects may be allowed.

The level of service standards stated below apply to all categories of CIP projects. Priority will be given to areas which deviate most from the established level of service standards, thereby addressing areas of greatest need first. Other criteria may also be developed to assist in the assessment of need for infrastructure improvements.

- Storm drainage level of service standards:
    - Curb and gutter: 2 year hydraulic grade line (HGL) below gutter line
    - Roadside ditch: 2 year HGL 6" below edge of pavement
    - 100 year water surface elevation (WSE) below the maximum ponding elevation (MPE)
        - MPE is established to prevent structural flooding and is the lowest of:
            - Natural ground at the right-of-way line
            - Curb and gutter: 6" above top-of-curb at pavement high points
            - Curb and gutter:18" above top-of-curb at pavement low points
            - Roadside ditch: 12" above pavement high points
            - Roadside ditch: 24" above pavement low points
    - Spread less than 1 lane, or roadway centerline for residential streets, during 2 year storm
- Street and traffic level of service standards:
    - Pavement condition rating (PCR) of 50 or higher
    - Traffic signs and marking per standards of the Manual on Uniform Traffic Control Devices (MUTCD)
    - Capacity level of service "D" during peak hours and "C" during all other conditions

Need Identification

Need identification is the first step of the Planning phase and starts with a comprehensive assessment of existing conditions compared to predefined acceptable level of service standards. A need is identified for areas where existing infrastructure does not meet the desired or acceptable level of service. The need identification step uses existing data to identify areas with the greatest need for infrastructure improvements. Objective assessment of need determines which areas are prioritized for project identification and development. Need for infrastructure improvement is primarily driven by two factors – *replacement* because existing infrastructure no longer performs and *growth* in demand. Additionally, regulatory requirements and technological advances can drive infrastructure needs. Once these needs are identified and quantified, various solutions can be developed including an estimate of schedule, benefit and costs for consideration in CIP Programming.



Advances in technology and the use of Geographic Information Services (GIS) has made it possible to perform needs identification proactively across large areas as opposed to responding to individual requests addressed individually in a reactive manner. When feasible and appropriate, need identification shall be performed through a GIS need identification tool to allow for comprehensive assessment of the entire City and the rapid city-wide evaluation, and routine re-evaluation of need based on a variety of criteria.

The Storm Water Enhanced Evaluation Tool (SWEET) currently in use and being further developed by PWE serves as the need identification tool for all major street and traffic and storm drainage projects. Originally developed for prioritization of storm drainage needs, this tool is being expanded to include street and traffic considerations as well. Customized criteria for each infrastructure component have been determined and are included in the sections below. The SWEET, based on the determined criteria for each infrastructure component, develops a ranked list of the areas of greatest need for each infrastructure component across the city. The infrastructure components which use the SWEET need identification tool to identify and prioritize need for infrastructure improvements include:

SWEET Need Identification Tool

- Major thoroughfares and collectors
- Local non-residential streets
- Local residential streets
- Intersection upgrades and replacement
- Major storm drainage
- Neighborhood/area storm drainage

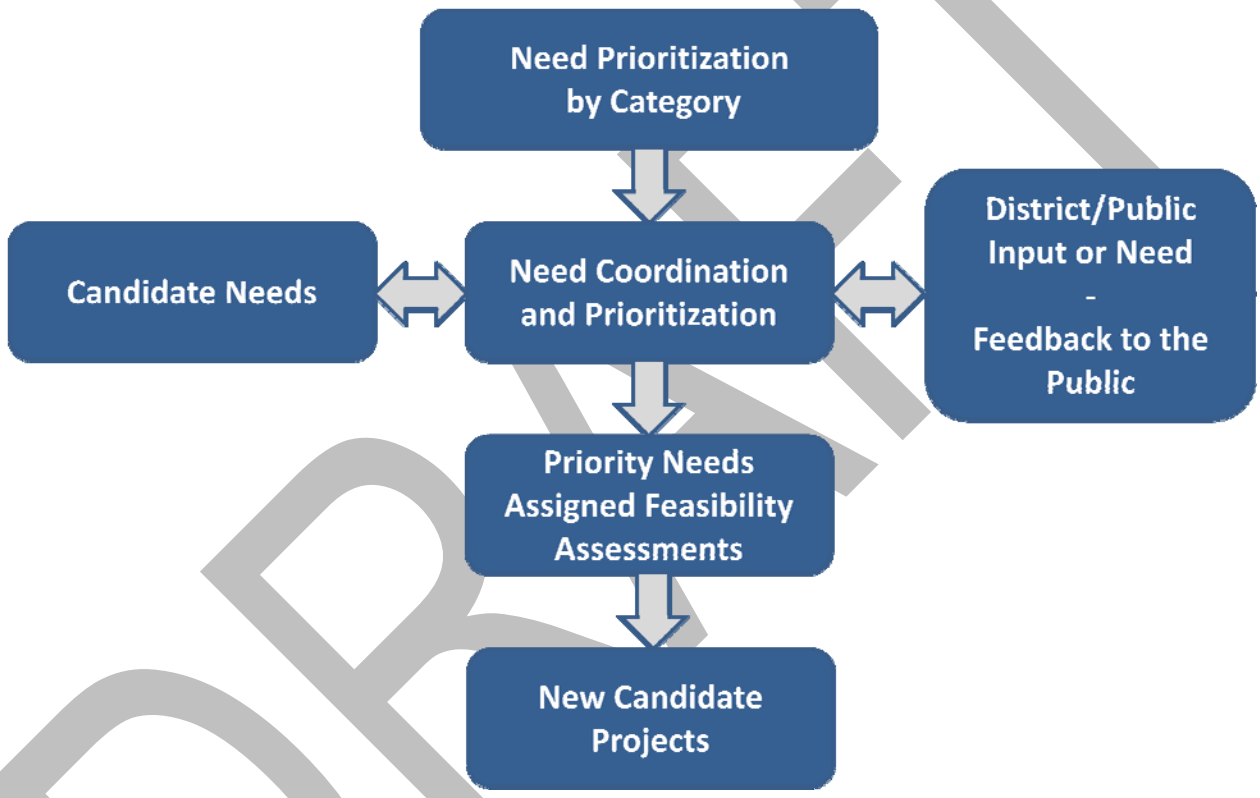
Some types of projects, which are more tailored to specific citizen requests or operational issues, will be handled through a traditional request system. These types of projects will typically be evaluated on a first in – first out basis, when merited and as funding allows. These processes may also include consideration of city-wide master plans to determine areas of need and prioritization of need. The infrastructure components which use request based processes to identify and prioritize need for infrastructure improvements include:

Request Based

- Local drainage projects
- Railroad safety and quiet zones
- Neighborhood traffic management
- Access management
- Sidewalks / Bikeways

Need Coordination and Prioritization

Initial need identification is followed by an intensive need coordination and prioritization step which analyzes the prioritization lists for all infrastructure components to see if there is overlap or chances for synergy between the different components. During this step, areas of greatest need in each component are selected for initiation of feasibility assessments. The ratio of feasibility assessments assigned to each infrastructure component will mirror the desired program allocation discussed in Section 3. Budget for feasibility assessments is determined based on the planned CIP expenditures for that year of the CIP cycle. The goal is to produce approximately 125 to 150% of the feasibility assessments required for year five of the upcoming CIP cycle. By initiating more feasibility assessments than required, an 'on-deck' group of feasible candidate projects will be developed so that an increase in programmed projects can be accommodated as funding levels increase. In addition, alternate projects are available in the event unforeseen issues cause a delay in one or more programmed projects. All CIP projects are required to pass through the feasibility assessment phase before they can become candidate projects.

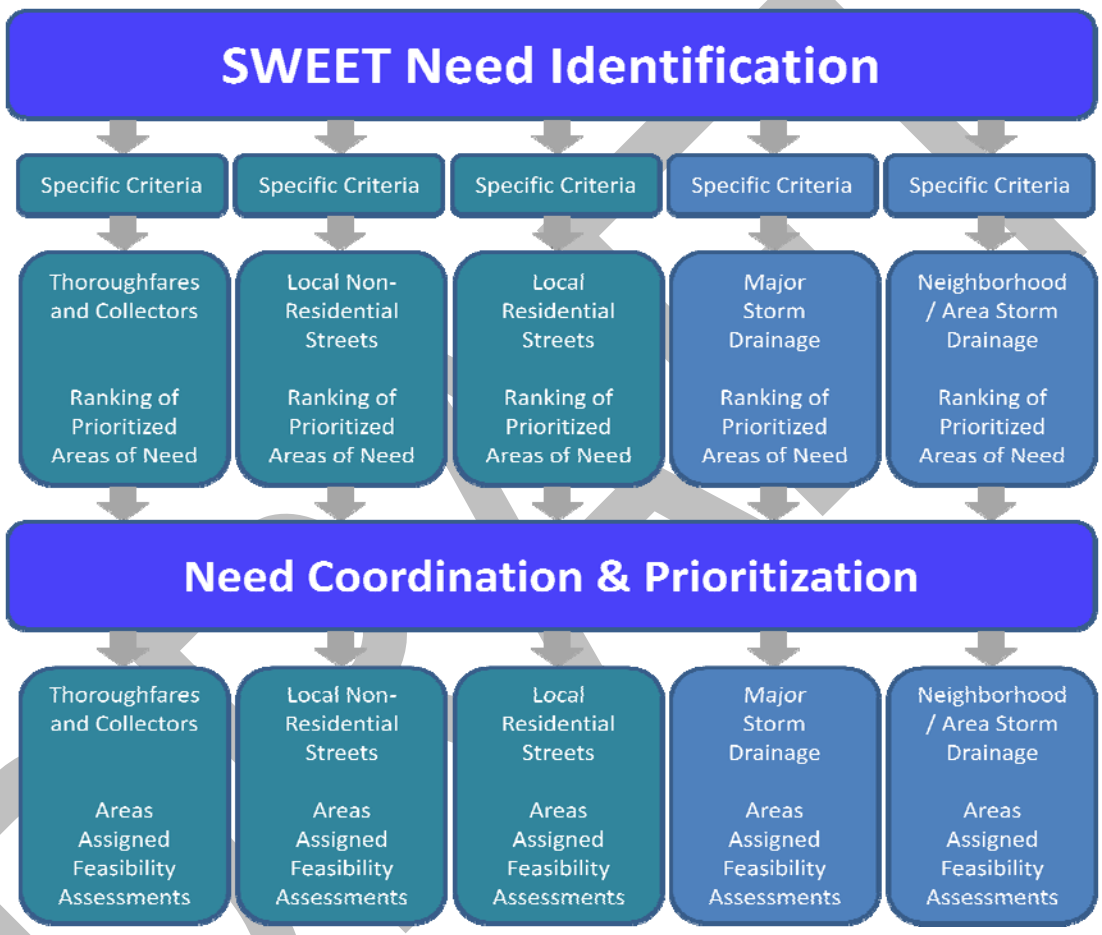


Areas of need, including those identified through citizen or Council Member input, which are not selected for initiation of feasibility assessments, become 'candidate needs'. These areas of need will be cataloged and reconsidered during future years' need coordination and prioritization step. This process ensures that all requests are considered fairly and are not removed from the Planning process if they are not able to be addressed in the current year's CIP Programming.

The need prioritization process is based on objective criteria, but allows for consideration of other factors to maximize the reach of the program funding, accommodate non-standard projects or address emergency concerns. For example, areas which are high priority for more than one type of need may be prioritized ahead of areas which only address one type of need. Or areas which have the potential for outside or add-on funding may also be prioritized ahead of others to maximize the reach of the CIP program. In addition, Council Member or Public input may also drive the inclusion of areas of need in order to accommodate emergency projects, regional projects of priority, critical economic development activities, or additional public concerns.

During the need coordination step, priority areas of need for street and drainage improvements will be compared to priority areas of need for water and wastewater upgrades. In addition, coordination with entities such as Harris County, Harris County Flood Control District (HCFCD), Texas Department of Transportation (TxDOT), and METRO will be required to coordinate regional planning efforts and to give priority and/or scheduling consideration for infrastructure improvements which meet the needs of or support critical regional transportation or flood control efforts.

An overview of the need identification and need coordination and prioritization steps for the infrastructure components which use the SWEET need identification tool is shown in the figure below. It is important to note that each infrastructure component has specific need identification criteria which are used to assess the need for infrastructure improvements.



For each infrastructure component described in the section below, the ReBuild Houston Oversight committee will have the opportunity to provide input on or suggestions for improving criteria for identifying and prioritizing areas in greatest need for infrastructure improvements.

Need Prioritization by Infrastructure Category

PWE is responsible for the planning, programming, delivery, operation, and maintenance of street and traffic, storm drainage, water and wastewater infrastructure. Need is assessed for each infrastructure component as the first step in identifying areas in need of infrastructure improvement. Need is determined based on the defined or acceptable level of service established for each component. Areas which do not meet the defined level of service standards have a need for infrastructure improvement. The following sections describe criteria used to assess need for each component. When the SWEET is used, these parameters are included in the tool to allow for automated need identification and prioritization inside each component. Resultant prioritization of need inside each infrastructure component will be input to the need coordination and prioritization step for additional evaluation prior to assignment of feasibility assessments.

Major Thoroughfares and Collectors

Major thoroughfares and collectors support and promote general mobility throughout the City. These projects are commonly the city's major roads and connect employment and commercial centers.

- There are approximately 4,700 lane miles of major thoroughfares and collectors citywide
- Major thoroughfares and collectors can be expected to have a 40-year service life
- Approximately 120 lane miles should be replaced annually as a reasonable replacement rate
- This would represent an annual investment of $200 million and could be addressed through major thoroughfare and collector or major storm drainage projects

Thoroughfares include the functional classifications of Principal Thoroughfare, Thoroughfare and Collector. These streets are identified in the City's Major Thoroughfare and Freeway Plan (MTFP), adopted originally in 1942 and updated annually to reflect current needs and development. The MTFP is a graphic illustration of a network of various types of streets and highways which are designated to provide maximum accessibility to all parts of the urban area and facilitate a high level of mobility for our citizens.

PWE is responsible for recommending the streets with highest need for replacement/reconstruction (primarily due to condition) and expansion (primarily due to traffic congestion). Consideration will also be given for drainage, water and wastewater needs.

Needs will be identified using the following criteria.

	Criteria	Percent Weighting
Replacement	Pavement Condition	30%
Growth/Capacity	Conformance with MTFP	10%
	Current Level of Service	15%
	Design Year Level of Service	5%
Drainage System	SWEET Drainage Score	20%
Water	Age	10%
Wastewater	Age	10%

Replacement due to existing condition is determined using the p*avement condition.* Currently this is a score based on a field assessment (Pavement Condition Rating – PCR) of the existing street. This is currently performed by the Street Surface Assessment Vehicle. The PCR describes the condition of the existing street as follows:

Score	Condition	Description
1-35	Very Poor	Impacts ability to drive at posted speeds (severe cracking or rutting, numerous potholes, base failure)
36-50	Poor	Requires significant maintenance and should be replaced
51-80	Average	Shows signs of wear and maintenance requirements continue to increase
81 or greater	Good	Street has few problems and requires little to no maintenance

Pavement Condition (30% of ranking) is a score based on a field assessment (Pavement Condition Rating – PCR) of the existing street. Since the higher the PCR the better condition the street, the Pavement Condition score ranges from 0 to 30 and is determined as:

$$(100 - PCR)*0.3$$

Growth/Capacity is addressed by constructing additional travel lanes and is driven primarily by comparing the measurement of traffic volumes compared to the ability of the road to carry that volume.

Conformance to the MTFP (10% of ranking) is a score reflecting the number/width of existing lanes and width of the ROW in relation to current standards. This score ranges from 0 to 10 as follows:

Existing Lanes compared MTFP	Score
Meets	0
Meet ROW but not lanes	5
Does not meet	10

Level of Service (LOS) is a measure of the ability of a roadway to handle traffic or the effectiveness of a roadway in maintaining an acceptable standard of traffic flow. Roadways are assigned a "grade" of A through F based on measured or projected traffic volumes as follows:

A – Primarily free-flow operations at average travel speeds
B – Reasonably unimpeded operation at average travel speeds
C – Stable operations with some impact to maneuver or lane change actions
D – Beginning to approach unstable flow with a more profound impact to lane changes and general maneuverability.
E – Significant approach delays and average travel speeds 1/3 of free-flow
F – Intersection congestion and average travel speeds less than 1/3 of free-flow

Level of Service – Current (15% of the ranking) is a score based on current traffic counts performed by COH staff or consultants. Only traffic counts performed within the last three years result in a computed LOS.

Level of Service – Design Year (5% of the ranking) is a score based on projected traffic counts estimated by the Houston-Galveston Area Council and the City for the current Design Year using the current roadway configuration.

The level of service score ranges from 0 to 20 depending on the determined level of service for current traffic counts and projected traffic counts as follows:

Level of Service	LOS-Current	LOS-Design Year
A	0	0
B	0	0
C	3	1
D	7	2
E	11	3
F	15	5

Drainage System (20% of ranking)

Drainage is the ability of a drainage system (either storm sewer or roadside ditches) to handle both routine rainfall events and severe rainfall events. Routine events should be conveyed with minimal impact to mobility and result in no structural flooding. Severe events should be conveyed through both the primary drainage system and overland road system, but should result in no structural flooding. Drainage is scored based on SWEET drainage score results and is applied as follows:

(SWEET drainage score)*0.2

Water (10% of the ranking)
Water system needs are identified through the age of the existing water mains. Mains have an average service life of 40 years. This score is based on age as follows:

Age (years)	Score
Less than 30	0
31 to 40	5
More than 40	10

Wastewater (10% of the ranking)
Wastewater system needs are identified through the age of the existing sewers. This is currently evaluated for the implementation of the Agreed Order with the Texas Commission on Environmental Quality and also age of the sewer system. Sewers also have an average service life of 35 to 40 years. This score is based on age as follows:

Age (years)	Score
Less than 30	0
31 to 40	5
More than 40	10
Agreed Order	10

Scores determined for Pavement Condition, Conformance to the MTFP, Current Level of Service, Design Year Level of Service, Drainage System, Water and Wastewater are summed. This score, ranging between 0 and 100, indicates the need for infrastructure improvements to major thoroughfares or collectors. Higher scores indicate increased need for infrastructure improvements.

Local Non-Residential Streets
Local non-residential streets serve multi-family facilities, small commercial centers and in some cases light industry. These projects historically have received limited funding compared to major thoroughfares, collectors and neighborhood/area streets.

- There are approximately 2,100 lane miles of local non-residential streets
- Local non-residential streets can be expected to have a service life of 50 years
- Approximately 42 lane-miles should be replaced annually as a reasonable replacement rate
- This would represent an annual investment of $50 million

Needs will be identified using the following criteria.

	Criteria	Percent Weighting
Replacement	Pavement Condition	50%
Drainage System	SWEET Drainage Score	30%
Water	WIRP Rank	10%
Wastewater	Age	10%

Replacement due to existing condition is determined using the p*avement condition.* Currently this is a score based on a field assessment (Pavement Condition Rating – PCR) of the existing street. This is currently performed by the Street Surface Assessment Vehicle.

Pavement Condition (50% of ranking) is a score based on a field assessment (Pavement Condition Rating – PCR) of the existing street. Since the higher the PCR the better condition the street, the Pavement Condition score ranges from 0 to 100 and is determined as:

$$(100 - PCR)*0.5$$

Growth in local streets is typically associated with new development and becomes the responsibility of the developer, and is therefore not included in the need assessment.

Drainage System (30% of ranking)

Drainage is the ability of a drainage system (either storm sewer or roadside ditches) to handle both routine rainfall events and severe rainfall events. Routine events should be conveyed with minimal impact to mobility and result in no structural flooding. Severe events should be conveyed through both the primary drainage system and overland road system, but should result in no structural flooding. Drainage is scored based on SWEET drainage score results and is applied as follows:

(SWEET drainage score)*0.3

Water (10% of the ranking)

Water system needs are identified through the Water Infrastructure Replacement Prioritization (WIRP) program. This score is based on WIRP Rank:

(WIRP Rank / Total WIRP areas)*0.1

Wastewater (10% of the ranking)

Wastewater system needs are identified through the age of the existing condition of sewers. This is currently evaluated for the implementation of the Agreed Order with the Texas Commission on Environmental Quality and also age of the sewer system. Sewers also have an average service life of 35 to 40 years. This score is based on age as follows:

Age (years)	Score
Less than 30	0
31 to 40	5
More than 40	10
Agreed Order	10

Scores determined for Pavement Condition, Drainage System, Water and Wastewater are summed. This score, ranging between 0 and 100, indicates the need for infrastructure improvements to local non-residential streets. Higher scores indicate increased need for infrastructure improvements.

Local Residential Streets

Local residential streets, also known as neighborhood streets, serve single family residential neighborhoods. These are low volume, low speed streets.

- There are approximately 8,000 lane miles of Neighborhood Streets
- Neighborhood Streets can be expected to have a service life of 60 years
- Approximately 135 miles should be replaced annually as a reasonable replacement rate
- This would represent an annual investment of $200 million and could be addressed through local residential street or neighborhood/area storm drainage projects.

Historically, local residential streets were reconstructed through the Neighborhood Street Reconstruction (NSR) program. Starting with planning during FY2012, needs will be identified primarily based on pavement condition and associated utility needs.

Needs will be identified using the following criteria.

	Criteria	Percent Weighting
Replacement	Pavement Condition	40%
	Pavement Width	5%
Drainage System	SWEET Drainage Score	30%
Water	WIRP Rank	10%
Wastewater	Age	10%
Age of Accepted Petition	Age	5%

Replacement due to existing condition is determined using the p*avement condition.* Currently this is a score based on a field assessment (Pavement Condition Rating – PCR) of the existing street. This is currently performed by the Street Surface Assessment Vehicle.

Pavement Condition (40% of ranking) is a score based on a field assessment (Pavement Condition Rating – PCR) of the existing street. Since the higher the PCR the better condition the street, the Pavement Condition score ranges from 0 to 100 and is determined as:

(100 – PCR)*0.4

Growth in local streets is typically associated with new development and becomes the responsibility of the developer, and is therefore not included in the need assessment.

Street Width (5% of ranking) is a score reflecting the width of the existing street in relation to current standards. This score ranges from 0 to 10 as follows:

Width (feet)	Score
28 or wider	0
22 to 27	3
Less than 22	5

Drainage System (30% of ranking)

Drainage is the ability of a drainage system (either storm sewer or roadside ditches) to handle both routine rainfall events and severe rainfall events. Routine events should be conveyed with minimal impact to mobility and result in no structural flooding. Severe events should be conveyed through both the primary drainage system and overland road system, but should result in no structural flooding. Drainage is scored based on SWEET drainage score results and is applied as follows:

(SWEET drainage score)*0.3

Water (10% of the ranking)

Water system needs are identified through the Water Infrastructure Replacement Prioritization (WIRP) program. This score is based on WIRP Rank:

(WIRP Rank / Total WIRP areas)*0.1

Wastewater (10% of the ranking)

Wastewater system needs are identified through the age of the existing condition of sewers. This is currently evaluated for the implementation of the Agreed Order with the Texas Commission on Environmental Quality and also age of the sewer system. Sewers also have an average service life of 35 to 40 years. This score is based on age as follows:

Age (years)	Score
Less than 30	0
31 to 40	5
More than 40	10
Agreed Order	10

Age of Accepted Petition (5% of ranking)

Age of the accepted petition was the primary prioritization criteria prior to the changes implemented for the 2012 Planning. Age of accepted petition continues to be a factor in the selection of neighborhood areas in need of infrastructure improvements; however it is not longer the primary criteria. The score is based as follows:

Age (years)	Score
No Petition	0
0-1	0
2-3	1
4-5	2
6-7	3
8-9	4
10 or more	5

Scores determined for Pavement Condition, Street Width, Drainage System, Water, Wastewater, and Age of Accepted Petition are summed. This score, ranging between 0 and 100, indicates the need for infrastructure improvements to local residential streets. Higher scores indicate increased need for infrastructure improvements.

Street and Traffic Single Purpose Projects

Intersections

Intersection improvements typically include upgrading equipment and supporting infrastructure to support traffic signal timing and coordination. In some cases reconfiguration of turning lanes or lane configuration can improve area-wide traffic flow.

- There are approximately 2,500 signalized intersections in the city's transportation system
- Signalized Intersections have a designed service life of 20 to 25 years
- Approximately 100 should be replaced annually as a reasonable replacement rate
- Approximately 25 intersections are replaced in conjunction with street reconstruction projects
- This would represent an annual investment of $50 million

Need for replacement of signalized intersections is driven by two factors, replacement of prior technologies or non-functioning equipment and intersection performance. The following criteria will be used to assess the need for intersection improvements:

	Criteria	Percent Weighting
Equipment	Type of Signal Controller	60%
Intersection Performance	Current Level of Service	30%
	Design Year Level of Service	10%

Equipment (60% of ranking) is a score reflecting the type of signal controller present at each intersection. This score ranges from 0 to 60 as follows:

Type of Traffic Controller	Score
Electromechanical	60
NEMA or similar	30
Other	0

Level of Service – Current (30% of the ranking) is a score based on current traffic counts performed by COH staff or consultants. Only traffic counts performed within the last three years result in a computed LOS.

Level of Service – Design Year (10% of the ranking) is a score based on projected traffic counts estimated by the Houston-Galveston Area Council and the City for the current Design Year using the current roadway configuration.

The level of service score ranges from 0 to 40 depending on the determined level of service for current traffic counts and projected traffic counts as follows:

Level of Service	LOS-Current	LOS-Design Year
A	0	0
B	0	0
C	10	3
D	20	6
E	25	8
F	30	10

Scores determined for Equipment and Intersection Performance are summed. This score, ranging between 0 and 100, indicates the need for infrastructure improvements to signalized intersections. Higher scores indicate increased need for infrastructure improvements.

Need for new intersections will be analyzed separately by the Manual on Unified Traffic Control Devices (MUTCD) signal warrant process.

Pedestrian and Bicyclist (Stand Alone projects)

Sidewalks serve pedestrian needs including access to schools and mass transit. Sidewalks are typically constructed in support of major thoroughfare construction or as part of the safe sidewalks program. Significant effort is also taken to pedestrian accessibility issues for people with disabilities. Sidewalks are also planned around future Metro light rail stations.

- There are approximately 1,200 miles of sidewalks currently in the city
- Sidewalks have a design life of 50 years
- Approximately 50 miles should be replaced annually for best management practices
- This would represent an annual investment of $15 million

Need is determined by neighborhood request, accessibility issues, gaps serving schools and mass transit and location along major thoroughfares. Need identification and prioritization will be driven by neighborhood request and existing master plans for pedestrian facilities.

Bikeways, including on-street and off-street facilities, serve bicyclist needs. There are four types of facilities within the City of Houston that comprise the bikeway network, three are on-street, such as bike lanes, signed bike routes, signed shared roadways, while one is predominately off-street: shared-use paths. These bikeways are identified in the City's Bikeways Master Plan, adopted originally in 1993, which is being updated to reflect current needs and development. The master plan also introduces a process to prioritize various bikeway projects, with emphasis upon the function, feasibility, funding and maintenance of a proposed bikeway.

Need is primarily determined by gaps in the current network. These gaps are being identified through the current master plan update and are based on PWE's physical inventory and input from CIP Town Hall meetings and the City's Bikeways website.

Access Management
Access management projects improve operations and safety of major thoroughfares and collectors by reducing conflict points. Typical projects include consolidation of median openings and driveways. Need for access management projects is driven by operational considerations, neighborhood/business request or other forms of citizen input. Requests will be typically be analyzed for merit and assessed on a first in – first out basis as funding allows.

Neighborhood Traffic Management
Neighborhood traffic management projects address perceived cut-through traffic and speed on local streets to improve safety. These traffic calming measures are designed to improve neighborhood quality of life while enhancing the safety of pedestrians and bicyclists on residential streets. Typical projects include addition of speed humps, street closures, or other more substantial street modifications. Need for neighborhood traffic management projects is driven by neighborhood request or citizen input. Requests will be analyzed for merit and assessed on a first in – first out basis as funding allows.

Railroad Safety and Quiet Zones
Railroad safety and quiet zone projects involve the upgrade of rail crossings to improve safety and to minimize noise associated with train horns. Need for railroad safety and quiet zone projects is driven by neighborhood request or citizen input. Requests will be analyzed for merit and assessed on a first in – first out basis as funding allows.

Major Storm Drainage
Major storm drainage projects address drainage of the thoroughfares, adjoining properties, and larger drainage basins and focus on the conveyance of storm water. These can include large underground culvert systems, such as the recent construction along Kirby Drive, Hermann Drive and MacGregor Drive reducing the risk of flooding in and around the Texas Medical Center. Regional and sub-regional detention also falls within this category.

Need is driven by a combination of factors that indicate an inability of infrastructure to address storm drainage needs – primarily resulting in structural flooding. The SWEET will be used to determine need for major storm drainage projects. The SWEET is a planning tool intended to focus city storm water project planning on areas where various reports and conditions indicate that storm water infrastructure projects are needed to address existing storm water drainage or flooding problems. The base parameter for the SWEET is the City of Houston Comprehensive Drainage Plan (CDP). Need identification and prioritization computations are based on the CDP and other city-wide datasets which are regularly maintained by PWE or other entities. The SWEET is an evolution of previous storm water planning efforts, building on the CDP, and improves planning by incorporating additional factors to promote a comprehensive and multifaceted assessment of drainage infrastructure need based on the best information available.

The SWEET evaluates parameters related to need for drainage improvements that provide significant conveyance or addresses major storm drainage needs and determines prioritization rankings based on weighting factors applied to the following criteria.

- Drainage Effectiveness
    - CDP 2-year pipe adequacy determination
    - 3-1-1 drainage complaints
    - Ponding areas
- Damages from Structural Flooding
    - 3-1-1 flooding complaints
    - Federal Emergency Management Agency (FEMA) insured losses

- Mobility Impacts
    - 3-1-1 street impassable reports
    - Flooded underpass reports
- Emergency Response
    - Responder reports of need

Weighting factors for each parameter will be set each year based on input from stakeholders and evolution of drainage priorities. The SWEET calculates a score, ranging from 0 to 100, for storm drainage needs and ranks these across the City. Higher scores indicate increased need and result in assignment of feasibility assessments.

Need for regional detention is determined by the mitigation needs of street and traffic and storm drainage improvement projects or in lieu of upsizing storm drainage systems. As individual drainage projects are implemented across the city, improved conveyance may lead to increased discharges to receiving streams or bayous. To maintain the existing level of protection provided by our regional drainage system, it may be necessary to mitigate any impacts to receiving streams or bayous. While this may be accomplished on a project by project basis, this is often best and most economically accomplished through the construction of regional or sub-regional detention basins. Regional detention planning efforts help to identify potential sites for regional or sub-regional detention basins. Need identification and prioritization for regional detention will be driven by the regional detention master planning efforts, which consolidate needs of geographically related areas, and is generally performed in coordination with other infrastructure improvement projects.

Neighborhood/Area Storm Drainage

Neighborhood/area storm drainage improvement projects address primarily residential areas and focus on the collection of storm water. These include storm sewers, roadside ditches and can be combined with detention basins as described above. Overland sheet flow paths are also addressed in these projects. Many subdivisions built prior to the 1980s experience flooding from overland flow problems. Design criteria implemented in the 1980s, that continues to be updated based on advances in knowledge and technology, results in newer subdivisions that typically do not show these same overland flow concerns.

Need is driven by a combination of factors that indicate an inability of infrastructure to address storm drainage needs – primarily resulting in structural flooding. The SWEET will be used to determine need for neighborhood/area storm drainage improvements. The SWEET evaluates parameters related to need for drainage improvements in residential areas and determines prioritization rankings based on weighting factors applied to the following criteria. The factors listed below indicate various different aspects of drainage, impacts of poor drainage or need for effective drainage:

- Drainage Effectiveness
    - CDP 2-year pipe adequacy determination
    - 3-1-1 drainage complaints
    - Ponding areas
- Damages from Structural Flooding
    - 3-1-1 flooding complaints
    - FEMA insured losses
- Mobility Impacts
    - Ponding greater than 24 inches
- Emergency Response
    - Responder reports of impeded access into/out of neighborhoods

Weighting factors for each parameter will be set each year based on input from stakeholders and evolution of drainage priorities. The SWEET calculates a score, ranging from 0 to 100, for storm drainage needs and ranks these across the City. Higher scores indicate increased need and result in assignment of feasibility assessments.

Local Drainage Projects
Local drainage projects address site specific problems with drainage features such as roadside ditches, culverts, inlets and drain pipes. These projects can typically be performed in a few days to weeks, and cost less than $250,000. They address drainage problems that require a solution which exceeds maintenance or repair capability but are distinctly smaller in scope than projects developed and considered within the CIP process.

- It is estimated that approximately 30 local drainage projects will be needed annually
- An estimated $10 million annually would address this need

Need for local drainage projects is driven by neighborhood request or citizen input. Requests will be analyzed for merit and addressed on a first in – first out basis as funding allows. In addition, local drainage projects could be part of a solution identified in a major storm drainage or neighborhood/area storm drainage feasibility assessment if the analysis shows a local drainage project is the most cost effective and appropriate infrastructure improvement.

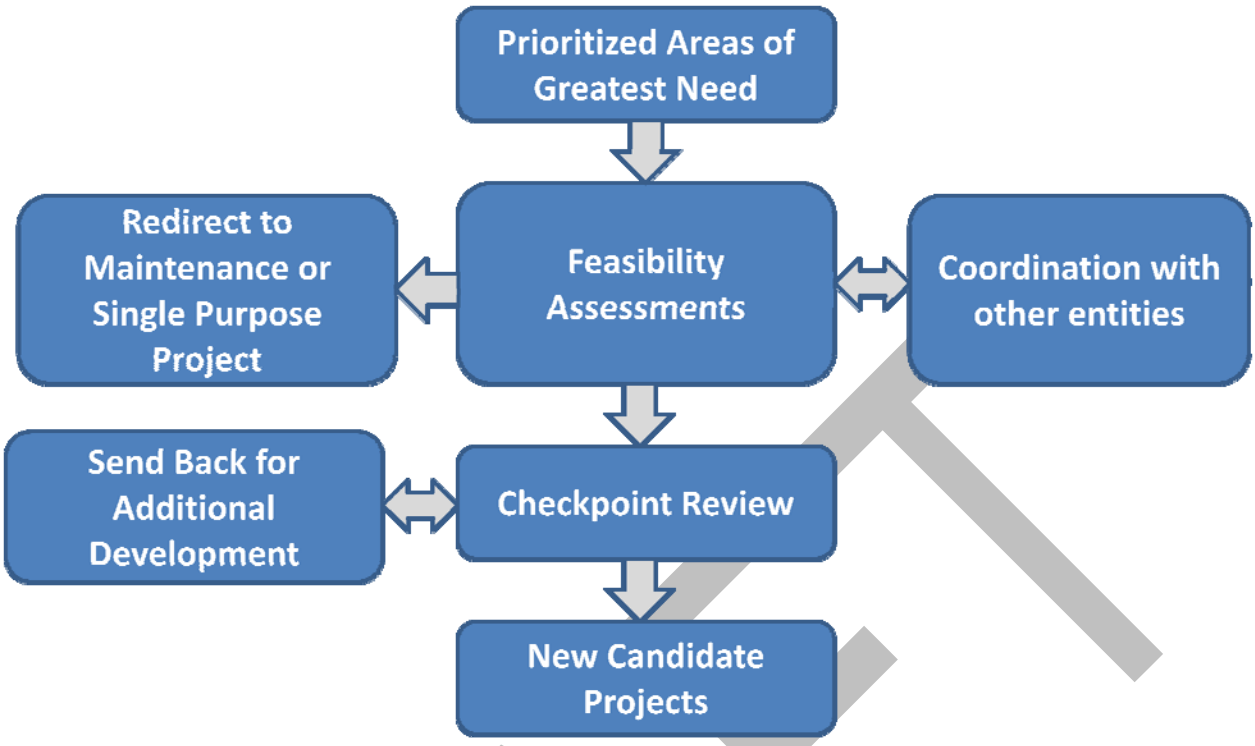
Project Identification and Development

The next step in the CIP project development and prioritization process is project identification and development. In this step, feasibility assessments are completed for each area of prioritized greatest need. Feasibility assessments are project planning and engineering exercises designed to improve project definition, promote coordination, and minimize future conflicts. This process develops and evaluates a specific CIP project, or set of projects, for each area of need. Thorough feasibility assessments streamline the project delivery (design and construction) process.

The project identification and development process results in the creation of candidate projects which will be considered for inclusion in the CIP during the Programming phase. During the Programming phase, candidate projects are ranked and prioritized based on project metrics developed as part of the feasibility assessment as described in Section 3 of this document.

Once programmed to the CIP and funded for the current year, projects will enter a streamlined design phase which combines finalization of the Preliminary Engineering Report and final design into one authorization. In the design phase, the feasibility assessment, which contains the majority of components required for a Preliminary Engineering Report, will be updated to meet the requirements for a Preliminary Engineering Report then presented to the Technical Review Committee (TRC) for approval to move into final design.

Overview of Process
The project identification and development step is summarized in the chart below:



Feasibility assessments are completed for all areas of need prioritized during the need coordination and prioritization step. During the beginning phase of the feasibility assessment, it will be required to complete a checklist which will confirm the project is in the correct project development pathways. If upon initial assessment of project need and potential solutions, it is determined the project is more suited for a maintenance project or a single purpose project such as a local drainage or access management project, the project can be redirected to the appropriate project development process. This step ensures the project is being completed in the most cost and schedule efficient manner to address the infrastructure needs of an area.

Throughout the feasibility assessment, coordination is expected between all geographically related infrastructure components. In addition, coordination with outside agencies is required to ensure the project is adequately addressing all known concerns. For example, a storm drainage conveyance project needs to work with:

- Street and Traffic to ensure capacity upgrades are properly addressed
- Water to ensure water system upgrades are properly addressed
- Wastewater to ensure wastewater system upgrades are properly addressed
- City Floodplain Management Office and Harris County Flood Control District to ensure impact to receiving streams is mitigated or accommodated by related projects.

Coordination is essential to ensuring limited funding is spent most cost-effectively and projects are developed that comprehensively address the varied needs of our City. Significant emphasis in both the need identification and project identification and development phases is placed on developing multi-purpose projects which address multiple infrastructure needs in one project. In addition, coordination with regional entities such as Harris County, Harris County Flood Control District, TxDOT, METRO and the Harris County Toll Road Authority will be required to promote development of projects that mesh with or support regional transportation or flood control efforts. This coordination process also helps to identify obstacles to the successful completion of the proposed project.

A Checkpoint Review, conducted by the Feasibility Review Committee, is the final review meeting for feasibility assessments. Should issues be identified during the Checkpoint Review which have not been

adequately addressed, projects can be sent back for additional development. Particular emphasis is placed on issues which could delay the construction of the candidate project, such as unidentified or poorly defined impact mitigation needs or right-of-way availability issues. At the conclusion of the Checkpoint Review, feasibility assessments are approved and the assessment's proposed solution(s) is officially designated as a candidate project(s). Only approved candidate projects can be considered for programming to the CIP.

Scope of Work
A completed feasibility assessment, regardless of infrastructure component, will include the following information:

- Project Definition – includes limits, requirements, alternatives identification, and refinement of preferred alternative
- Project Justification – includes documentation of needs and assessment of existing conditions
- Project Obstacles – includes permitting, ROW, mitigation needs and related projects that must be completed prior to or subsequent to this project
- Estimates – includes cost, benefit and schedule estimates as well as identification of potential outside funding

Project benefits determined should include:
- Reduced projected flooding damages,
- Improved mobility (level of service, etc.),
- Economic development opportunities,
- Environmental restoration/enhancement, and
- Quality of life factors

Estimated project costs should include:
- Design
- Construction
- Land acquisition
- Permitting
- Impact mitigation
- Operating and maintenance costs

Complexity and level of effort required for the feasibility assessment is dependent on the type of project. Multipurpose projects require more in-depth and multidisciplinary feasibility assessments while single purpose projects can be moved forward with streamlined feasibility assessments.

The feasibility assessment will require a proactive and integrated approach to drainage. Dynamic hydrologic and hydraulic modeling is required for projects involving modifications to the major drainage system. Emphasis will be placed on understanding both local and regional drainage issues and developing solutions that improve conveyance of storm water in both frequent and more extreme storm events. Particular attention will be paid to impact mitigation. Whether through the use of regional detention, on-site mitigation, green infrastructure, or low impact development techniques, all projects must not cause impacts to upstream or downstream neighborhoods or waterways. All street and drainage projects will be held to the same storm water level of service standards, ensuring that every project contributes to the reduction of flood risk across the City whether identified as a storm drainage project or not.

CIP PROGRAMMING

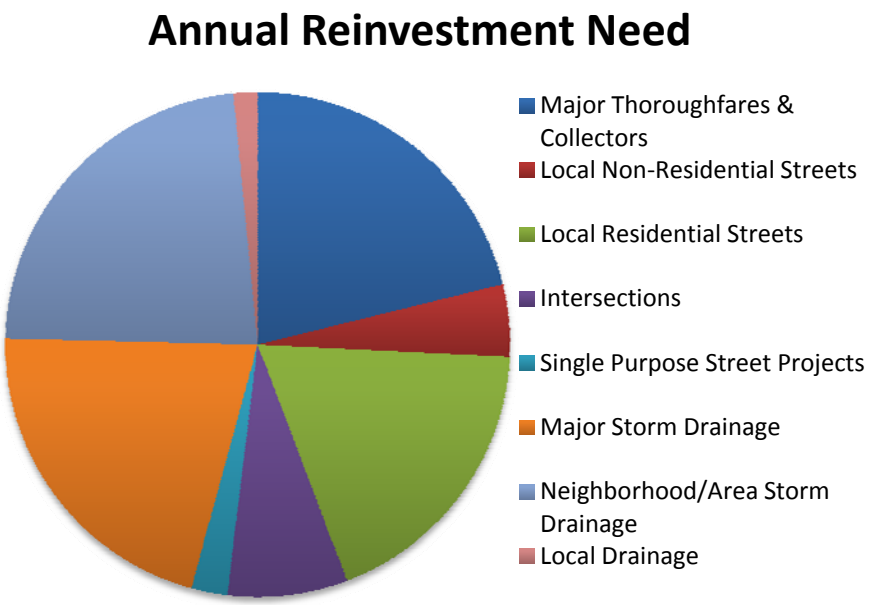
Programming is the exercise of scheduling projects within the available funds to produce the five-year CIP. The first step in programming is to determine the allocation of available funds between the various categories and types of projects. Next, candidate projects are weighed against each other using objective criteria for inclusion in the CIP.

Program Allocation

The amount of funding allocated to each category within the CIP greatly influences how well each infrastructure asset is addressed. The program allocation process aims to divide available funding among the various categories to meet the annual reinvestment needs. In the street and storm drainage categories, a combined annual need of approximately $650 million would be needed to replace infrastructure which no longer performs at the accepted standard for level of service.

Current annual funding is less than $200 million. However, with the voter approved Propostion 1 being implemented as Phase II of ReBuild Houston, annual funding levels could meet the $650 million annual level by 2035.

Category	Estimated Annual Reinvestment Need	
Major Thoroughfares & Collectors	$136 m	21%
Local Non-Residential Streets	$33 m	5%
Local Residential Streets	$117 m	18%
Intersections	$52 m	8%
Single Purpose Street Projects	$13 m	2%
Major Storm Drainage	$136 m	21%
Neighborhood/Area Storm Drainage	$150 m	23%
Local Drainage Projects	$13 m	2%
TOTAL	**$650 m**	

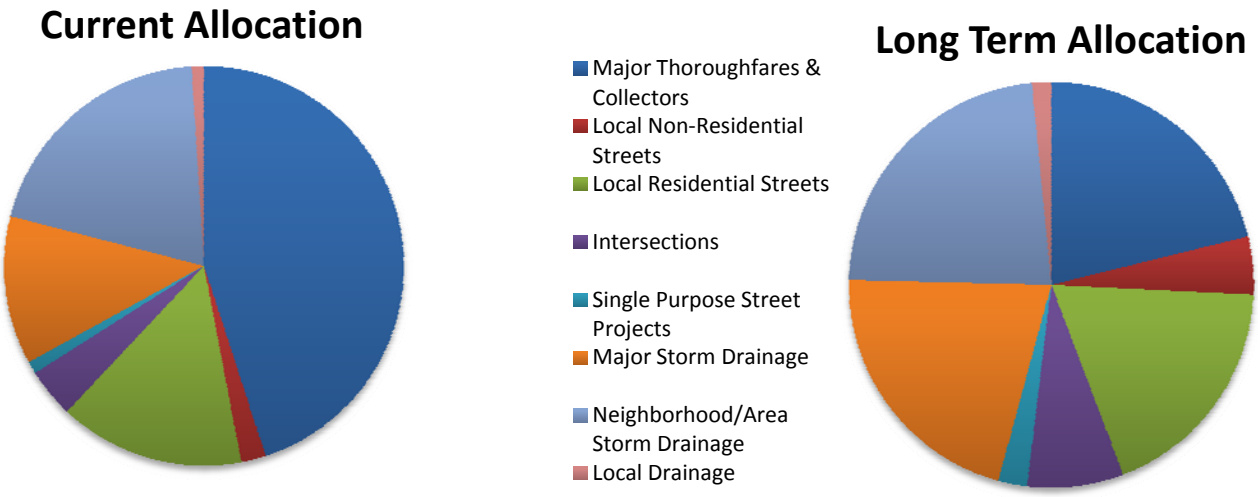


Recommended Allocation

The current 5-year CIP (FY2011-2015) is a commitment by the City of Houston to design and construct the projects programmed to the CIP. The upcoming FY2012 CIP Programming process will schedule FY2012-2016 projects. The projects included in the first four years of this range are based on the FY2011-2015 CIP. The majority of new projects recommended to the CIP will be scheduled for FY 2016. The existing funding allocation for projects scheduled for the first four years of this range is shown in the table below as the 'Current Allocation'. To gradually shift the current allocation to the desired long term allocation (which mirrors the estimate annual reinvestment need for each infrastructure component), new projects programmed to the CIP will be recommended to start evolving to the long term desired allocation.

Over the course of four years, previously programmed projects will be constructed and replaced with projects selected according to the long term desired funding distribution. In addition to shifting the funding distribution to meet our annual reinvestment needs, funding availability will also significantly increase as existing debt is paid down and the ad valorem tax associated with this debt payment is made available. As funding distribution shifts, funding amount for infrastructure components will not be reduced from current levels as the allocation is adjusted slowly to meet the long term allocation. Increases in expected funding should be considered in the annual CIP Planning and Programming steps and funding should be proportionally increased to identify and develop additional candidate projects to meet the increased level of funding available.

Category	Current Allocation		Long Term Desired Allocation	
Major Thoroughfares & Collectors	45%	$76 m	21%	$136 m
Local Non-Residential Streets	2%	$3 m	5%	$33 m
Local Residential Streets	15%	$26 m	18%	$117 m
Intersections	4%	$7 m	8%	$52 m
Single Purpose Street Projects	1%	$2 m	2%	$13 m
Major Storm Drainage	12%	$20 m	21%	$136 m
Neighborhood/Area Storm Drainage	20%	$34 m	23%	$150 m
Local Drainage	1%	$2 m	2%	$13 m
	TOTAL	**$170 m**	**TOTAL**	**$650 m**

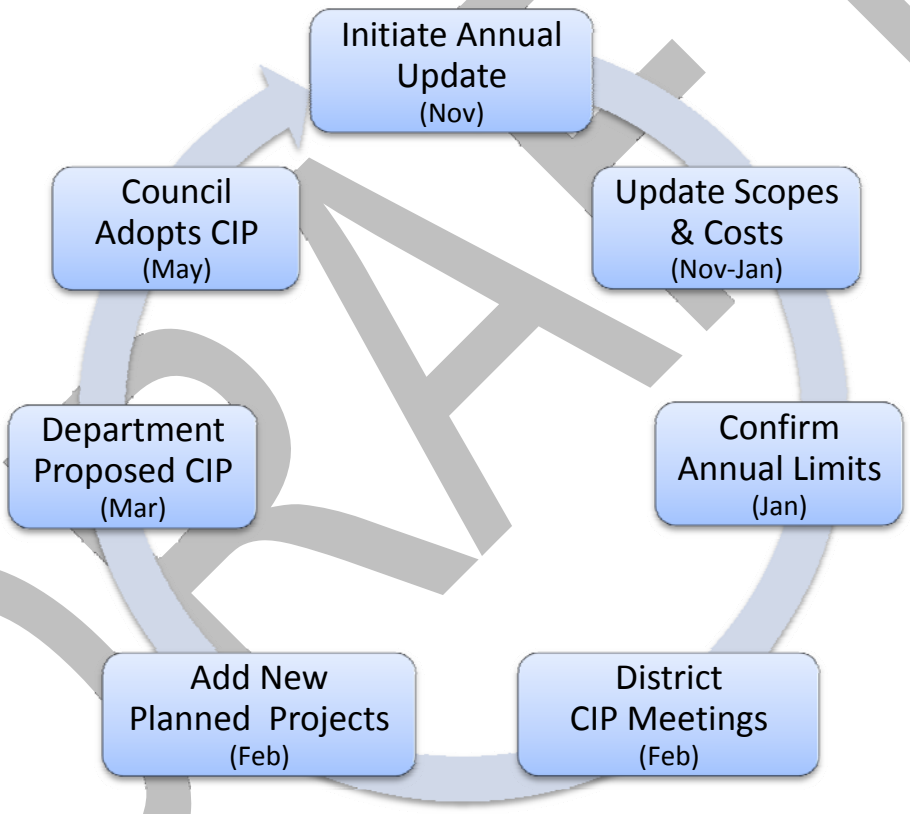


Annual CIP Update According to Administrative Procedure 2-7

It is the goal to adopt the 5-year CIP each spring to complement adoption of the City's budget. Administrative Procedure 2-7 establishes a schedule to accommodate annual adoption by the end of April. Other consideration may lead to a later adoption by City Council, but it is the responsibility of the Departments to have the recommended CIP prepared for Council Action with sufficient time for adoption prior to the end of the current Fiscal Year.

The recommended CIP starts with the previously adopted CIP as the base. The projects in the previously adopted CIP serve as the base for these annual efforts. Projects within the adopted 5-year CIP have already been through needs assessment, project development and citywide prioritization. Information gathered since the last adoption is used to refine scopes and cost estimates. Additionally, the total amount of available annual funding is reviewed against the City's debt models and, with the voter passage of Proposition 1, the projected revenue from the drainage charge.

Following are the major steps and the approximate time frames:



- Initiate Annual Update – each winter the Finance Department initiates the annual review and update of the CIP
- Update Scopes and Costs – project managers review both on-going design and construction projects and provide updates to reflect:
    - Supplements for additional design or construction management costs
    - Revised construction costs based on most current estimate
    - Update acquisition costs based on actual appraisals or current estimates
    - Update schedules based on current status and known obstacles to implementation
- Confirm Annual Limits – Annual limits based on debt capacity or revenue from charges and projected property taxes

- District CIP Meetings – each spring District Council Members host town hall meetings to gain citizen input. At these meetings, current status of projects in the CIP is presented and the needs that have been identified for evaluation in feasibility in the upcoming planning year (should) be presented.
- Add New Planned Projects – when the adjustments to cost and timing have been made based on project manager input, additional capacity should exist in the new fifth year and possibly some capacity in what becomes years 1 through 4.
- Department Proposed CIP – based on updating the projects in the adopted CIP and adding new projects from planning, a proposed CIP is compiled for presentation to City Council.
- Council Adopts CIP – City Council considers the department recommended CIP and adopts as is or with revisions.

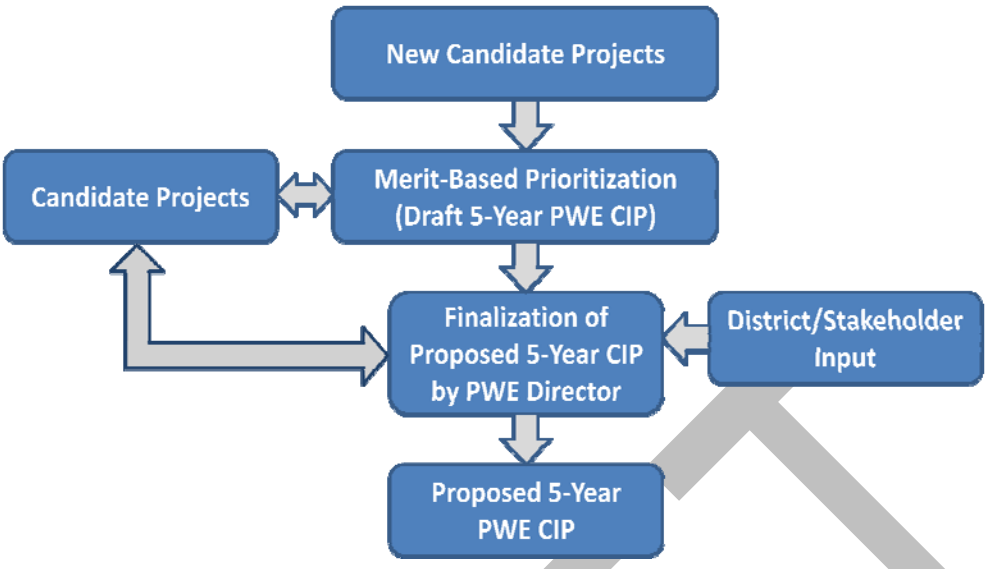
Project Prioritization and Programming

In order to prioritize projects citywide, prioritization criteria is defined for each type of project. Prioritization of projects includes both primary criteria similar to factors considered during needs identification and also additional secondary factors. The criteria considered for each type of project is detailed in the sections below. The prioritization criteria have been developed to prioritize projects which:

- Address critical needs
- Result in the greatest benefit compared to their cost
- Offer benefits to the most residents/businesses compared to their cost
- Address multiple types of need in one project
- Leverage funds to expand the reach of the Program
- Address areas of environmental or community concern.

A prioritization score will be developed for all approved candidate projects, ranging from 0 to 100, when using the SWEET Programming Tool. Candidate projects, based on their prioritization score, are ranked by the SWEET Programming Tool according to infrastructure component. Candidate projects will be compared only against projects of the same infrastructure component. All approved candidate projects will be included in this process. Based on the desired allocation of funding for each component, candidate projects will be added to the 'Draft 5-year PWE CIP' according to their prioritization ranking, until the allocated budget for each infrastructure component has been fully assigned.

The 'Draft 5-year PWE CIP' is presented to the PWE Director, who through consultation with Council Members and other key stakeholders, adjusts the initial prioritization. This process accommodates critical economic development activities, emergency projects, or other pressing public concerns. After making the necessary changes to project prioritization and scheduling, the Director finalizes the 'Proposed 5-year PWE CIP', which is then presented to the Mayor and City Council for approval. Projects which are not programmed to the 5-year CIP remain 'Candidate Projects' and will be reconsidered during the next year's CIP Programming phase.



For each infrastructure component described in the section below, the ReBuild Houston Oversight committee will have the opportunity to provide input on or suggestions for improving criteria for identifying and prioritizing projects for inclusion in the CIP.

Prioritization Criteria

The following criteria are used commonly in the prioritization of infrastructure improvement projects.

SWEET Need Score
The need identification score developed by the SWEET during the need identification phase is reused as a project prioritization criterion. Candidate projects which address issues of highest need should be given priority. The SWEET need score will range from 0 to 100 and is determined based on the criteria specified in Section 2 for each infrastructure component. The SWEET need score is calculated by multiplying the score calculated during the need identification process by the percentage weight given to the SWEET need score in project prioritization.

Benefit/Cost Ratio
In order to compare projects of differing scale and purpose, a comparison of the benefit to cost relationship creates a common factor for comparison. Projects with high benefit cost ratios achieve the greatest benefit at the lowest cost. This metric can be used very effectively to select projects which use limited resources best to achieve the greatest impact.

Project benefits quantify the identified benefits of the proposed project. These can be benefits such as:

- Reduced projected flooding damages,
- Improved mobility (level of service, etc.),
- Economic development opportunities,
- Environmental restoration/enhancement, and
- Quality of life factors

Project costs include all components necessary for implementation:

- Design
- Construction
- Land acquisition
- Permitting
- Impact mitigation
- Operating and maintenance costs

A detailed estimate of project benefit and project cost is determined during the feasibility assessment. Benefit/cost is assessed by dividing the estimated benefit by the estimated cost. All candidate projects in each infrastructure component are ranked based on their calculated benefit/cost ratio. For prioritization, candidate projects will be assigned points based on the benefit/cost quartile compared to candidate projects of the same type, as detailed in the table below:

Criteria	Score
1st Quartile	25
2nd Quartile	16
3rd Quartile	8
4th Quartile	0

Cost/ADV Ratio

The Cost to Average Daily Volume (ADV) ratio is a metric which assesses the cost per user of the project. For major thoroughfares and collectors, number of users is estimated as the ADV of the roadway, as determined by traffic counts. Projects with a low cost per user should be given priority over projects which have a high cost per user.

A detailed estimate of project cost is determined during the feasibility assessment. Cost/ADV is assessed by dividing the estimated cost by the ADV. All major thoroughfare and collector candidate projects are ranked based on their calculated Cost/ADV ratio. For prioritization, candidate projects will be assigned points based on the Cost/ADV quartile compared to candidate projects of the same type, as detailed in the table below:

Criteria	Score
1st Quartile	15
2nd Quartile	10
3rd Quartile	5
4th Quartile	0

Cost /NRBS Ratio

The Cost to Number of Residences and Businesses Served (NRBS) ratio is a metric which assesses the cost per user of the project. For local non-residential streets and major storm drainage projects, number of users is estimated as the number of residences and businesses inside the project boundary. A factor will be applied to the number of businesses in the project area to represent the number of employees and average customers. Projects with a low cost per user should be given priority over projects which have a high cost per user.

A detailed estimate of project cost is determined during the feasibility assessment. Cost/NRBS is assessed by dividing the estimated cost by the NRBS. All local non-residential streets candidate projects are ranked based on their calculated Cost/NRBS ratio. For prioritization, candidate projects will be assigned points based on the Cost/NRBS quartile compared to candidate projects of the same type, as detailed in the table below.

Criteria	Score
1st Quartile	15
2nd Quartile	10
3rd Quartile	5
4th Quartile	0

Cost/NRS Ratio

The Cost to Number of Residences Served (NRS) ratio is a metric which assesses the cost per user of the project. For local residential streets and neighborhood storm drainage projects, number of users is estimated as the number of residences inside the project boundary. Projects with a low cost per user should be given priority over projects which have a high cost per user.

A detailed estimate of project cost is determined during the feasibility assessment. Cost/NRS is assessed by dividing the estimated cost by the NRS. All local residential streets and neighborhood storm drainage projects candidate projects are ranked based on their calculated Cost/NRS ratio. For prioritization, candidate projects will be assigned points based on the Cost/NRS ratio quartile compared to candidate projects of the same type, as detailed in the table below.

Criteria	Score
1st Quartile	15
2nd Quartile	10
3rd Quartile	5
4th Quartile	0

Addresses Multiple Needs

Projects which address multiple needs are preferred over more single purpose projects. For prioritization, candidate projects will be assigned points based on the number of identified needs addressed by the project. Applicable needs include pavement replacement, sidewalk replacement, drainage system upgrade, water system upgrade, and wastewater system upgrade.

Criteria	Score
Single purpose (1 need)	0
Dual purpose (2 needs)	3
Multipurpose (3 needs)	6
Multipurpose (4 needs or more)	10

Leverages Funding

Projects which leverage funding from outside sources are preferred as they extend the reach of the City's available CIP funds. Non-city funding sources could be from federal, state, or local sources. For prioritization, candidate projects will be assigned points based on the percentage of funding provided through non-city sources, as detailed in the table below.

Criteria	Score
0% non-city participation	0
25% non-city participation	5
50% non-city participation	8
75% or greater non-city participation	10

Community or Environmental Benefit

Projects which address community or environmental concerns are preferred due to the increased secondary benefits of infrastructure upgrades. Community concerns include economic development or preservation activities. Environmental concerns include water quality and environmental restoration. For prioritization, candidate projects will be assigned points based on the location of the project and concepts incorporated into the preliminary design to address the community or environmental concern. Special emphasis is placed on projects which feature sustainable or low impact best management practices.

Criteria	Score
No identified community or environmental concerns	0
Project located in area of community or environmental concern	3
Project design addresses community or environmental concerns and meets regulatory or community based guidelines	6
Project design addresses community or environmental concerns and features sustainable / low impact best management practices	10

Project Prioritization by Infrastructure Category

The following is a discussion of prioritization criteria for the major infrastructure categories. Project information is extracted from completed feasibility studies and input into the SWEET Programming Tool. Based on the criteria and weightings detailed below, the SWEET Programming Tool ranks all projects in each infrastructure component. The output is a merit-based rank list of candidate projects of each infrastructure component.

Major Thoroughfare and Collectors

The following criteria are used to prioritize or rank major thoroughfare and collector candidate projects.

Criteria	Percent
SWEET Need Score	30%
Benefit/Cost Ratio	25%
Cost/ADV Ratio	15%
Addresses Multiple Needs	10%
Leverages Funding	10%
Community or Environmental Benefit	10%

Local Non-Residential Streets

The following criteria are used to prioritize and rank local non-residential street candidate projects.

Criteria	Percent
SWEET Need Score	*30%*
Benefit/Cost Ratio	*25%*
Cost/NRBS Ratio	*15%*
Addresses Multiple Needs	*10%*
Leverages Funding	*10%*
Community or Environmental Benefit	*10%*

Local Residential Streets

The following criteria are used to prioritize and rank local residential street candidate projects:

Criteria	Percent
SWEET Need Score	30%
Benefit/Cost Ratio	25%
Cost/NRS Ratio	15%
Addresses Multiple Needs	10%
Leverages Funding	10%
Community or Environmental Benefit	10%

Street and Traffic Single Purpose Projects

Intersections
Intersections replacement projects are prioritized based on the SWEET Need Score established in the need identification phase. The SWEET Need Score is based on type of signal control equipment and current and future level of service of each intersection. Projects with the highest SWEET Need Score will be implemented first. The number of projects completed each year is dependent on the allocated CIP budget for intersection improvement projects.

Sidewalks
Independent sidewalk projects are addressed via prioritizations determined through neighborhood/citizen request or master plans for pedestrian facilities. The SWEET Programming Tool is not used to prioritize and rank sidewalk projects. The number of projects completed each year is dependent on the allocated CIP budget for sidewalk.

Bikeways
PWE is responsible for determining the prioritization of bikeway projects that address transportation needs. Projects will be prioritized and ranked based on the following criteria. The number of projects completed each year is dependent on the allocated CIP budget for bikeways.

Criteria	Score
Function	**20**
Eliminates Gap in Network	*10*
Connection to Major Employment Center/Neighborhood	*15*
Feasibility	**20**
Existing ROW	*10*
Overcomes Barriers to Mobility	*10*
Funding	**30**
100% Federal, State or Local Funding	*30*
80% Federal, State or Local Funding	*20*
50% Federal, State or Local Funding	*10*
Maintenance and Local Partnerships, Support	**30**
Existing Agreement with PRD or local sponsor	*15*
Local Partner providing funding match	*10*
Local Support for Project	*5*

Function:
Eliminating a gap in the network (10% of ranking) is a score based on the ability of the project to complete a missing portion of bikeway that currently inhibits bicyclist transportation.

Connecting to a major employment center or neighborhood (10% of ranking) is a score based on the ability of the project to address a transportation need for bicyclists that is non-recreational in purpose and will yield significant increases in bicycle traffic to and from specific locations within the City.

Feasibility:
Existing ROW (10% of ranking) is a score based on the availability or need to acquire property to build the proposed project. The acquisition of property for bikeway projects has been difficult on certain past projects, priority should be given to projects that do not require significant legal action for acquisition.

Overcoming barriers to mobility (10% of ranking) is a score based on the ability of the project to address a transportation link that has been infeasible due to a highway, bayou or lack of bridge crossing that would be provided through the construction of the proposed bikeway.

Funding:

Federal, State or Local Funding (up to 30% of ranking) is a score based on the availability of federal, state, or local funding for the construction of the proposed project, with lower scores given to a candidate project when funding sources require increased percentages of a locally-funded match. No points would be allocated to projects that require greater than a 50% match to construct the project.

Maintenance and Partnerships, Support:

Existing agreement with Parks and Recreation Department (PRD) or local sponsor (15% of ranking) is a score based on the presence of a maintenance agreement for the proposed project. PWE maintains all on-street bikeways and has an existing agreement with PRD to maintain specific off-street bikeways. PRD has declined to assume maintenance responsibilities on new bikeway projects. Potential local sponsors of maintenance activities could include management districts, TIRZ, neighborhood groups as well as non-profit organizations.

Local Partner providing funding match (10% of ranking) is a score based on the ability of a local partner to provide financial contributions towards the construction of the proposed project. Projects that rank high in other categories should receive higher prioritization when local sponsors contribute funding to reduce PWE expenditures to construct the proposed bikeway.

Local Support for Project (5% of ranking) is a score based on the level of support for a particular project, with additional emphasis on local entities and property owners affected by, or adjacent to, the proposed bikeway. This is becoming increasingly important to the implementation of bikeways. Past project development experience has revealed that the lack of specific local support has negatively impacted the property acquisition and design stages.

Access Management

Access management projects are addressed on a first in – first out basis, as merited, through the neighborhood request process. The SWEET Programming Tool is not used to prioritize and rank local access management projects. The number of projects completed each year is dependent on the allocated CIP budget for access management projects.

Neighborhood Traffic Management

Neighborhood traffic management projects are addressed on a first in – first out basis, as merited, through the neighborhood request process. The SWEET Programming Tool is not used to prioritize and rank neighborhood traffic management projects. The number of projects completed each year is dependent on the allocated CIP budget for neighborhood traffic management projects.

Railroad Safety and Quiet Zones

Railroad safety and quiet zone projects are addressed on a first in – first out basis, as merited, through the neighborhood request process. The SWEET Programming Tool is not used to prioritize and rank railroad safety and quiet zone projects. The number of projects completed each year is dependent on the allocated CIP budget for railroad safety and quiet zone projects.

Major Storm Drainage
The following criteria are used to prioritize and rank major storm drainage projects:

Criteria	Percent
SWEET Need Score	30%
Benefit/Cost Ratio	25%
Cost/NRBS Ratio	15%
Addresses Multiple Needs	10%
Leverages Funding	10%
Community or Environmental Benefit	10%

Regional detention projects are addressed via prioritizations determined through the regional detention master planning process or in coordination with other infrastructure improvement projects. The SWEET Programming Tool is not used to prioritize and rank regional detention projects.

Neighborhood Storm Drainage
The following criteria are used to prioritize and rank neighborhood storm drainage projects:

Criteria	Percent
SWEET Need Score	30%
Benefit/Cost Ratio	25%
Cost/NRS Ratio	15%
Addresses Multiple Needs	10%
Leverages Funding	10%
Community or Environmental Benefit	10%

Local Drainage
Local drainage projects are addressed on a first in – first out basis, as merited, through the neighborhood request process. The SWEET Programming Tool is not used to prioritize and rank local drainage projects. The number of projects completed each year is dependent on the allocated CIP budget for local drainage projects.

PROCESS INVENTORY

1. Update needs database(s)
2. Receive / consider need proposals
3. Identify and prioritize needs (by infrastructure component)
4. Conduct feasibility assessments and propose candidate projects
5. Maintain and update candidate list
6. Evaluate and prioritize candidate projects (by infrastructure component)
7. Develop and report annual CIP update
8. Revise annual Program implementation based on adoption
9. Conduct monthly program review

GLOSSARY OF TERMS AND ACRONYMS

Capital Improvement Plan: The capital improvement plan is a plan setting forth proposed capital projects and related expenditures to be incurred in the succeeding fiscal year, and each fiscal year following, over a rolling period of five (5) years, describing each project, its source of funding and the amounts allocated to the various stages, phases or aspects of the project.

Level of Service: Measure used to assess the effectiveness of infrastructure. Related to the accepted or desired performance goal for a particular infrastructure component.

Need: A need is identified for areas where existing infrastructure does not meet the desired or acceptable level of service.

Candidate Project: Proposed infrastructure project which has been approved by the Feasibility Review Committee during the Checkpoint Review. Only approved Candidate Projects can be programmed to the CIP.

ADV – Average Daily Volume
CIP – Capital Improvement Plan
CDP – Comprehensive Drainage Plan
FEMA – Federal Emergency Management Agency
FY – Fiscal Year
GIS – Geographic Information Systems
HCFCD – Harris County Flood Control District
HGL – Hydraulic Grade Line
MPE – Maximum Ponding Elevation
MTFP – Major Thoroughfare and Freeway Plan
MUTCD – Manual on Uniform Traffic Control Devices
NRBS – Number of Residences and Businesses Served
NRS – Number of Residence Served
PRD – Parks and Recreation Department
PWE – Public Works and Engineering
ROW – Right-of-way
SWEET – Storm Water Enhanced Evaluation Tool
TxDOT – Texas Department of Transportation
WIRP – Water Infrastructure Replacement Prioritization
WSE – Water Surface Elevation