



Green Infrastructure Working Group: Integration of Topics

June 26, 2015

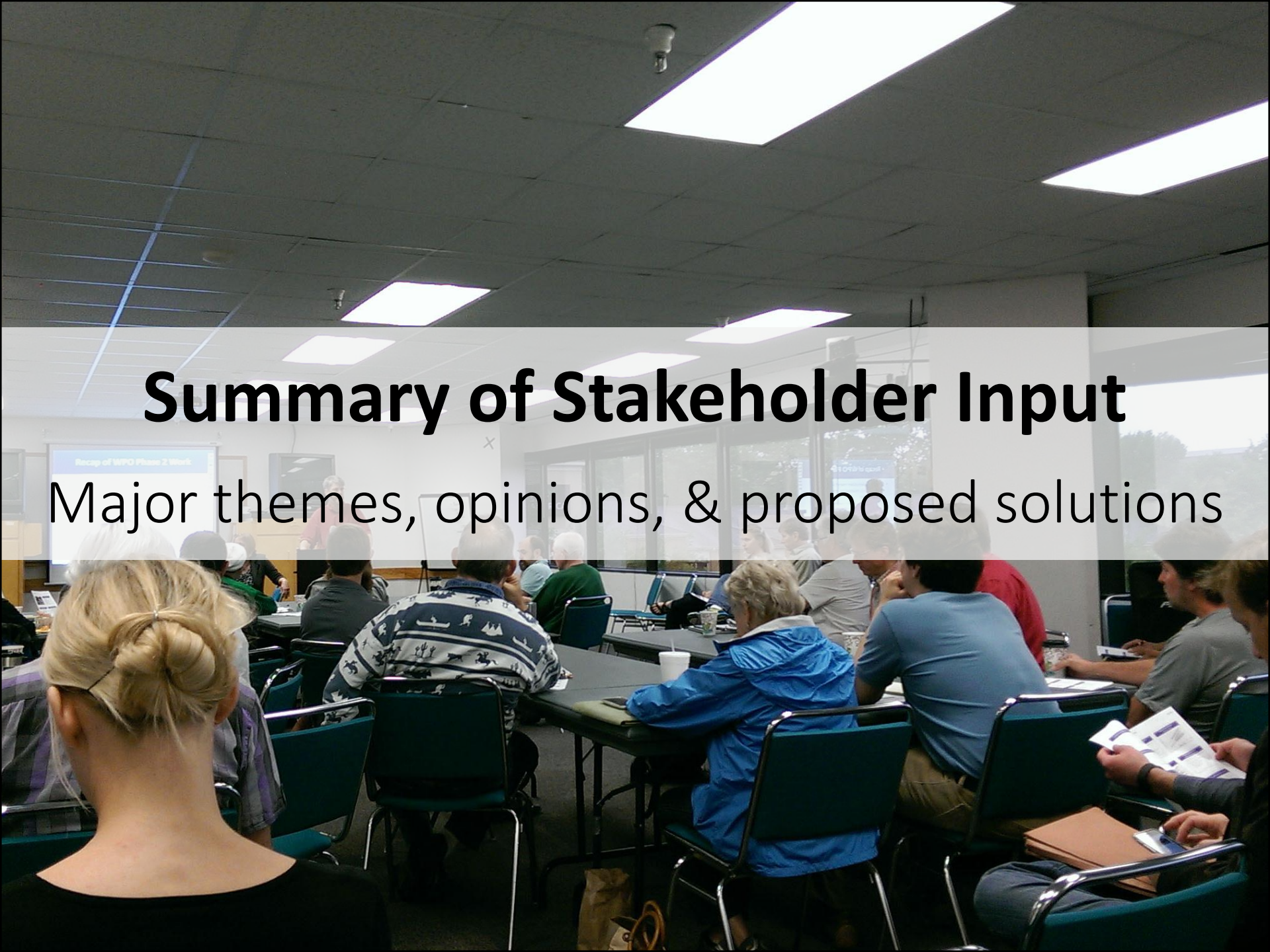
Rainwater harvesting at Twin Oaks Library

Agenda

Arrivals & Introductions	11:00
Staff presentation	11:15
Summary of stakeholder input	
Case study: Burnet Marketplace & others	
Dot exercise/break	1:15
Large group summary & recap	1:30

Summary of Stakeholder Input

Major themes, opinions, & proposed solutions



Land Cover & Natural Function

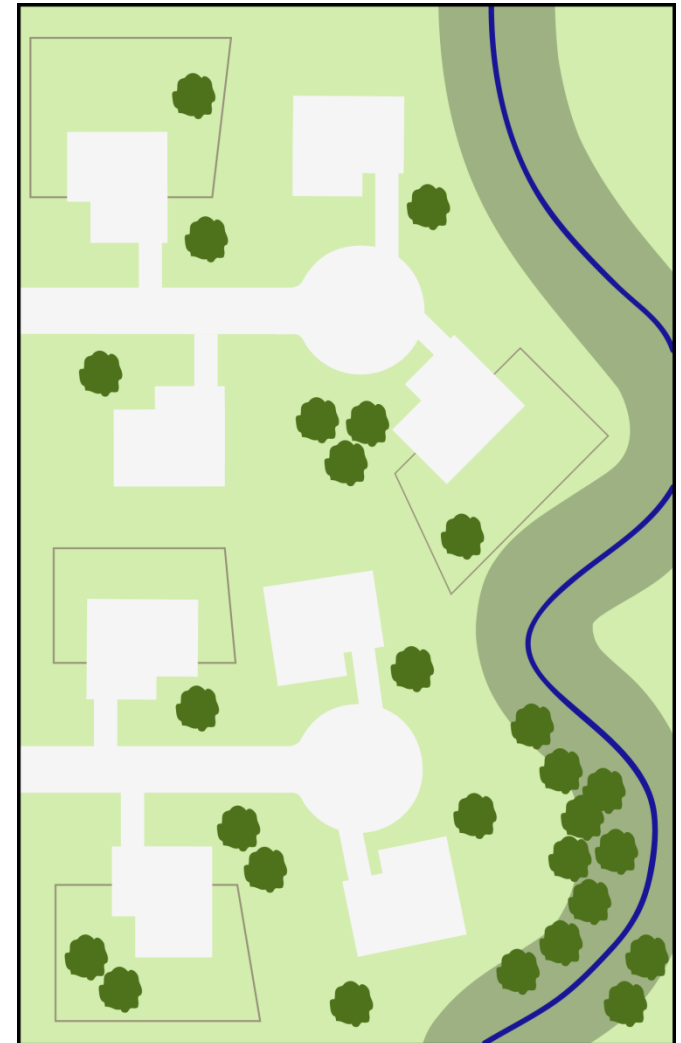
Goals

- Ensure adequate natural function for all sites
 - Protect greenfield sites
 - Restore redevelopment and infill sites
- Promote desirable, purposeful open spaces & connectivity
- Want the design and care of our built environment to take advantage of strengths of both pervious and impervious cover

Land Cover & Natural Function

Challenges

- Low natural function on medium to high impervious sites
- Pervious areas don't necessarily function as intended (e.g., due to soil compaction)
- Impervious cover limits can produce fragmented landscapes of unconnected, private green spaces
- Application to centers & corridors



Land Cover & Natural Function

Major Themes from Stakeholders

1. Functional pervious areas
2. Publicly-accessible open space

Land Cover & Natural Function

Functional pervious areas

- Preserve/protect open space, key natural assets
- Protect/restore trees, soil, vegetation, natural function
- Prefer flexible & incentive-based systems (FL model)
- Facilitate use of porous pavement
- Use metrics to ensure function, e.g., for infiltration/compaction, soil organic content, etc.
- Protect or restore all pervious areas during construction
- Remove incentives to “scrape” sites during construction

Land Cover & Natural Function

Publicly-accessible open space

- Open space and green connections are vital
 - Colorado model of required public open space & connectivity
- Need for parkland within walking distance to mitigate for higher density in development centers & corridors
- Provide open space onsite wherever possible; use payment-in-lieu offsite as a last resort
- Big pct. of required open space should be pervious
- Use open space/green stormwater infrastructure (GSI) to act as buffers between differing land uses

Integrate Nature into the City

Goals

- Functional landscapes with multiple benefits (e.g., urban heat island, water conservation, habitat, enhanced public realm)
- Urban forest preservation and replenishment
- Climate resilience and adaptation to drought
- Green transitions between different land uses
- Practical to implement and maintain the ordinance

Integrate Nature into the City

Challenges

- Landscaping code does not apply to dense urban areas (e.g. CBD) or parking lots for remodels
- “Street yard” concept does not work in all contexts
- Inadequate provisions for shade trees & existing trees
- Missed opportunities for onsite infiltration of stormwater and use of non-potable water
- Transitions between land uses (e.g., centers & corridors and adjacent residential) need refining

Integrate Nature into the City

Major Themes from Stakeholders

1. Integrate landscaping into all contexts
2. Landscaping in right-of-way & site setbacks
3. Adequate provisions for shade trees

Integrate Nature into the City

Integrate landscaping into all contexts

- All sites should have some form of onsite landscaping
- Incentivize larger offsite areas and smaller, onsite green elements
- Design for multi-purpose landscapes that serve hydrologic, wildlife, and human purposes
- Use green elements to soften increased density
- Allow for flexible site designs to preserve existing natural areas
- Use flexible, menu-based approach (per Green Area Ratio & Green Factor*), esp. in denser areas with fewer onsite options

* Washington, D.C. & Seattle, WA systems used to require and quantify green elements for new development.

Integrate Nature into the City

Integrate landscaping into all contexts (continued)

- Integrate green stormwater controls in landscapes/open spaces
- Green roofs, green walls, awnings, lattices, and other plants in areas where shade trees are infeasible
- Use landscaped green transitions between different land use intensities to address compatibility concerns
- Require landscaping for remodels (not just new/re-development)
- Add green space to subdivision requirements
- Use regenerative designs to restore function
- Include landscape architect/designers early in process

Integrate Nature into the City

Landscaping in right-of-way & site setbacks

- Strong support for Green Street designs, elements
- Provide more trees for walkable, shaded corridors
 - But green elements/trees solely in the ROW not sufficient
- Ensure building setbacks sufficient to provide landscape on both sides of sidewalk (10 - 15 ft)

Integrate Nature into the City

Adequate provisions for shade trees

- Trees & shade are critical to mitigation urban heat island and promote walkability
- Preserve & protect mature, healthy trees: essential to maintaining walkability and natural/Austin character
- Use porous pavement, structural soils, grated pavers, & continuous planting beds to accommodate trees
- Protect smaller caliper trees

Beneficial Use of Stormwater

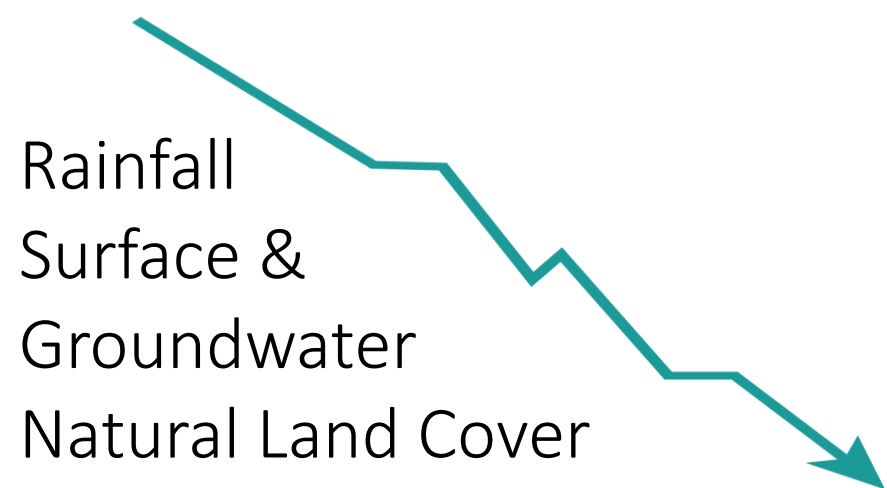
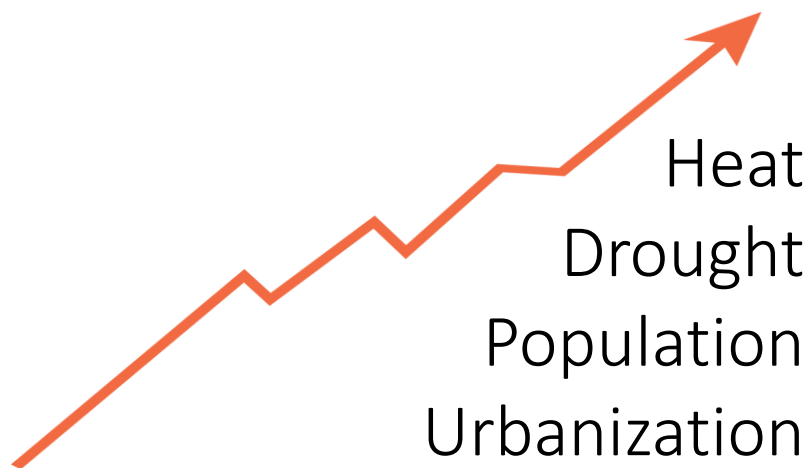
Goals

- Address drought & climate change impacts on watershed health and water supply
- Incorporate natural systems & rainwater storage in designs to offset water use, preserve quality of life
- Final Report of the Austin Water Resource Planning Task Force recommended “Tapping into the Cityscape as a Water Supply Source”
- Practical methods & models have already been implemented in other cities

Beneficial Use of Stormwater

Challenges

- Current code addresses water quality treatment, but not the on-site beneficial use of stormwater
- How to handle redevelopment and high levels of impervious cover



Beneficial Use of Stormwater

Major Themes from Stakeholders

1. Onsite infiltration/retention
2. Re-use/conservation
3. Special considerations for redevelopment

Beneficial Use of Stormwater

Onsite infiltration/retention

- Require onsite infiltration/retention per other US models
- Use decentralized green options like rain gardens, porous pavement, rainwater harvesting, disconnected IC
- Provide a menu of re-use alternatives to reach requirements if cannot infiltrate due to site constraints
- Maintain/restore predevelopment hydrology; use to guide design
- Reduce barriers to speed approval of innovative controls & rainwater capture systems
- Work to address maintenance questions

Beneficial Use of Stormwater

Re-use/conservation

- Water conservation essential, must incorporate into designs
- Work towards goal of no potable water for irrigation
 - Others: Still need a potable irrigation system as backup
- Use regionally-appropriate plant list; ensure supply exists
- Require potable water budget; use non-potable to exceed
- Limit use of grass/turf

Beneficial Use of Stormwater

Special considerations for redevelopment

- Some like TN & WV model to reduce (but not eliminate) retention requirements to encourage other redevelopment benefits
- Others: do not support special considerations for redevelopment—should be held to greenfield standards
- Offsite mitigation should occur within same watershed
 - Consider additional offsite mitigation options such as the provision of open space and tree plantings

Stormwater Options for Redevelopment & Infill

Goals

- Address longstanding problems due to development without sufficient flood controls and/or drainage conveyance
- Provide additional flexibility and options to enhance water quality for redevelopment and infill

Del Curto Rd and Bluebonnet Ln

Stormwater Options for Redevelopment & Infill

Challenges

- Code does not require flood mitigation if impervious cover is not increased and downstream conveyance is not further impaired (S. Lamar case study)
- Payment-in-lieu for water quality only allowed within Urban Watersheds; new role of green controls

Burnet Road Corridor

Stormwater Options for Redevelopment & Infill

Major Themes from Stakeholders

1. Redevelopment should be required to mitigate a share of downstream flooding problems proportionate to site impacts
2. Stormwater (and other) infrastructure needs to be adequate to keep pace with new growth

Stormwater Options for Redevelopment & Infill

- Redevelopment should help mitigate flooding
- Manage 2- & 10- year storms onsite; pay-in-lieu for City to mitigate 25- & 100-year storms offsite
- Reverse (degraded) hydrology in incremental fashion
 - Focus on smaller areas with smaller mitigation projects: neighborhood scale
- Offer density bonuses to incentivize onsite detention (where none existed previously)

Big Picture Comments

- Write the code to enable site-specific differences: honor different contexts
- Use watershed/existing infrastructure data to help inform land use planning decisions— “Watershed Growth Plan”
- Continue to benchmark other jurisdictions as well as the Sustainable Sites Initiative/Living Building Challenge
- Account for Austin’s unique climate & geography as we consider solutions from other jurisdictions
- Want performance-based, not prescriptive, requirements
- Build G.I. requirements into Form-Based Code

Big Picture Comments

(continued)

- Consider affordability impacts of new requirements
- Re-establish intent language in new code
- Integrated systems need to have an integrated plan review process
- Don't want to (too easily) allow variances
- Make innovation and desired outcomes the easy path —not the prohibitive, alternative path
- Consider extending these policies to single-family subdivisions and individual building permits

Case Studies

Burnet Marketplace – All Topics

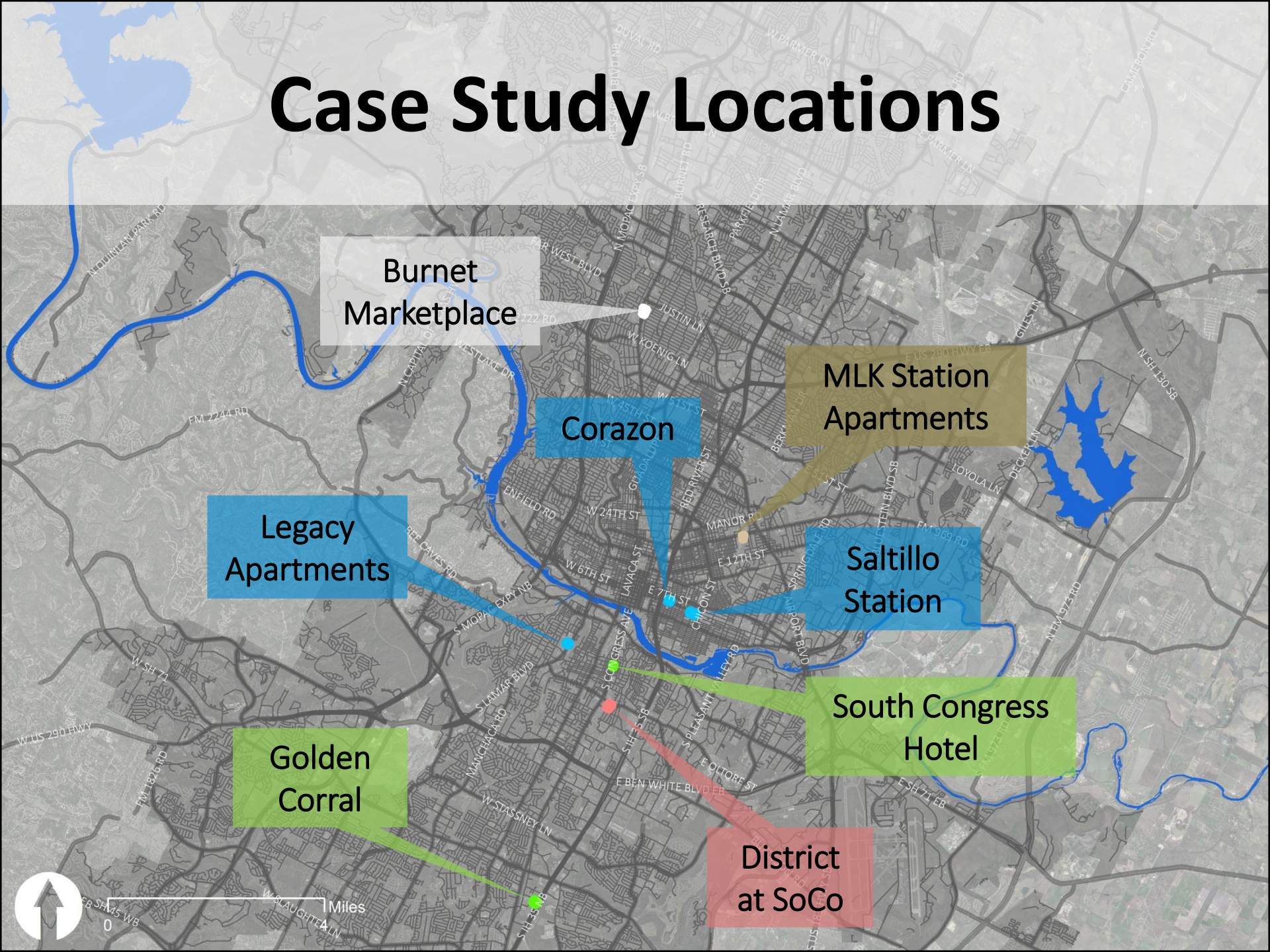
Land Cover & Natural Function

Integrate Nature into the City

Beneficial Use of Stormwater

Flood Mitigation for Redevelopment

Case Study Locations



Burnet
Marketplace

Corazon

Legacy
Apartments

MLK Station
Apartments

Saltillo
Station

South Congress
Hotel

Golden
Corral

District
at SoCo

Case Studies

Given the goals, challenges, and potential solutions we've discussed as a group:

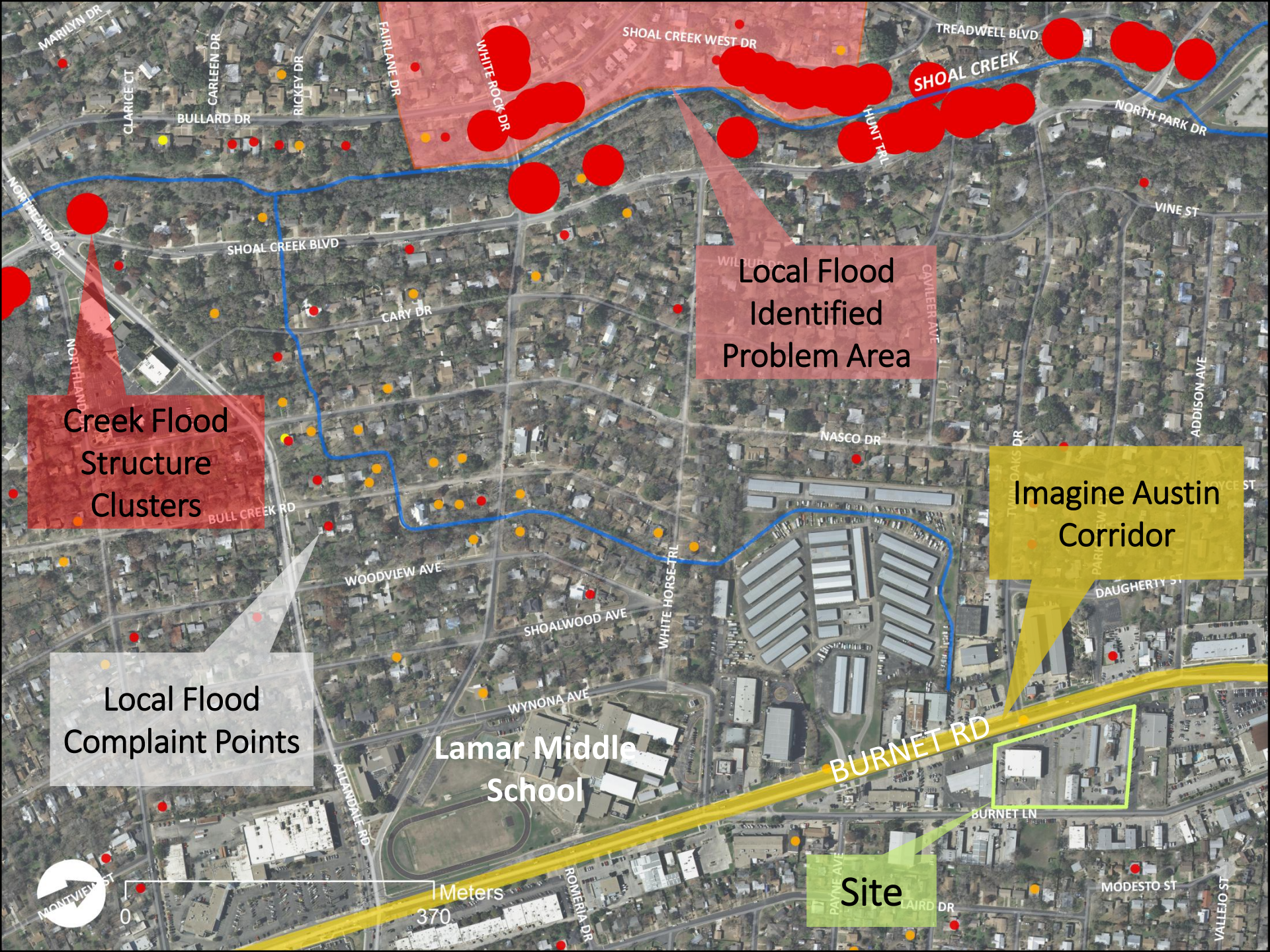
- How were green elements and practices successfully incorporated into these sites?
- How could these sites integrate additional green elements and practices?
- What are the potential barriers and trade-offs?
- How do we best achieve our goals of green infrastructure & sustainable water management?

An architectural rendering of a modern multi-story building complex at dusk. The building features a mix of light-colored facades, dark-framed windows, and balconies with metal railings. A central section of the building has a distinctive perforated metal screen. The ground floor is active with commercial spaces: 'ORGANIC FOODS' on the left with orange awnings, and 'BOOKS & MORE' on the right. The street is populated with various vehicles including a silver Volkswagen Beetle, a white sedan, a small white car, a silver SUV, and a person on a red scooter. Pedestrians are also visible. The sky is a deep blue with wispy clouds, and the building's interior and exterior lights are on, creating a warm glow.

Burnet Marketplace

Photo credit: Good Fulton & Farrell Architects





Creek Flood
Structure
Clusters

Local Flood
Identified
Problem Area

Imagine Austin
Corridor

Local Flood
Complaint Points

Lamar Middle
School

Site



1 Meters
370



Imagine Austin Corridor

TWIN OAKS DR

PARK VIEW DR

DAUGHERTY ST

ADDISON AVE

BURNET RD

BURNET LN

PAYNE AVE

MODESTO ST

VALLEJO ST

0.1 Miles





Imagine Austin Corridor

BURNET RD

TWIN OAKS DR

Redevelopment of 3.94 acres
Urban watershed (Shoal Creek)
91% to 88% impervious cover

1 Meters

- Drains directly to ROW
- No water quality controls or flood detention
- “Parkland deficient” area



Existing Conditions

- [illegible]

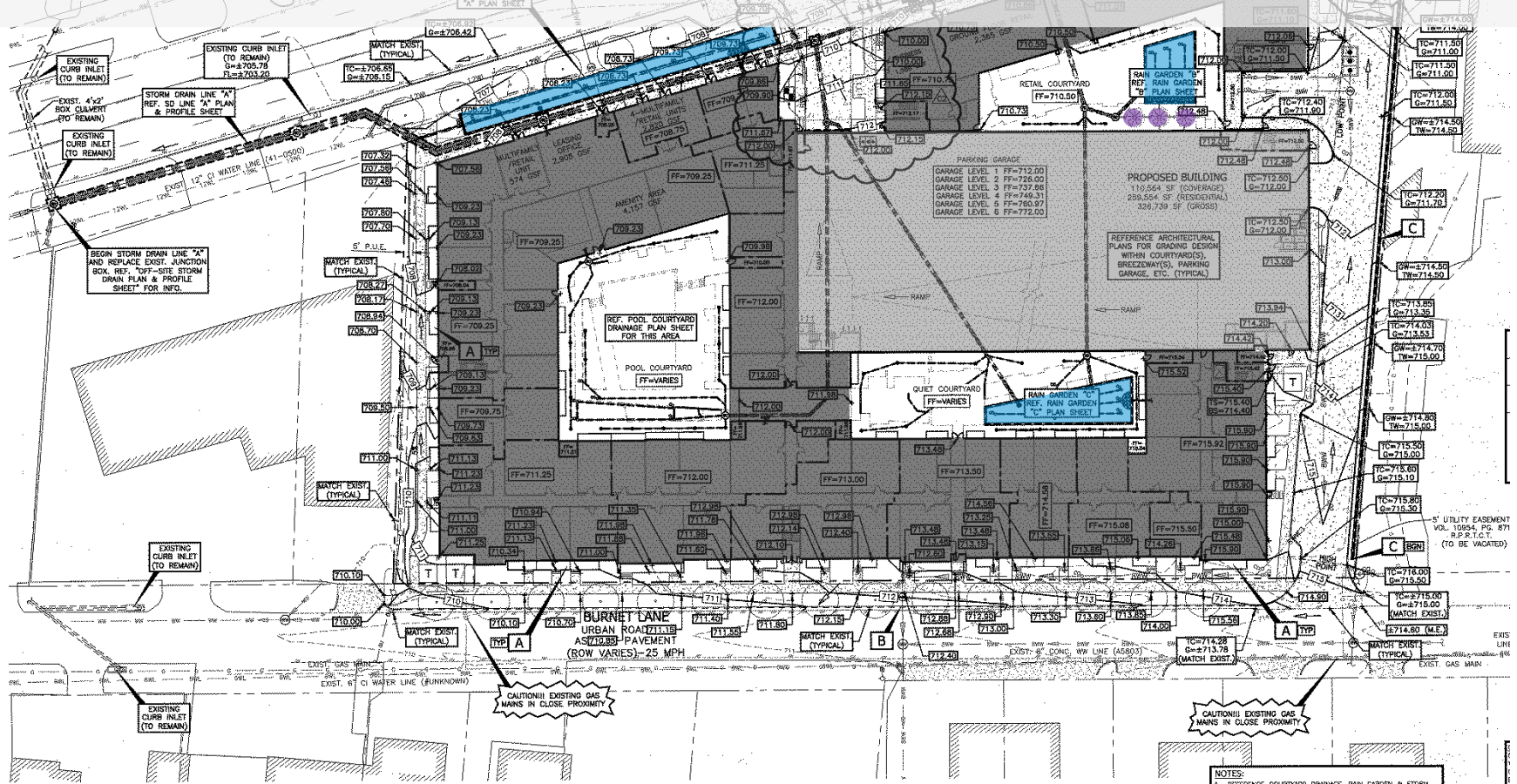
Heritage Pecan

Landscape

Shade Tree

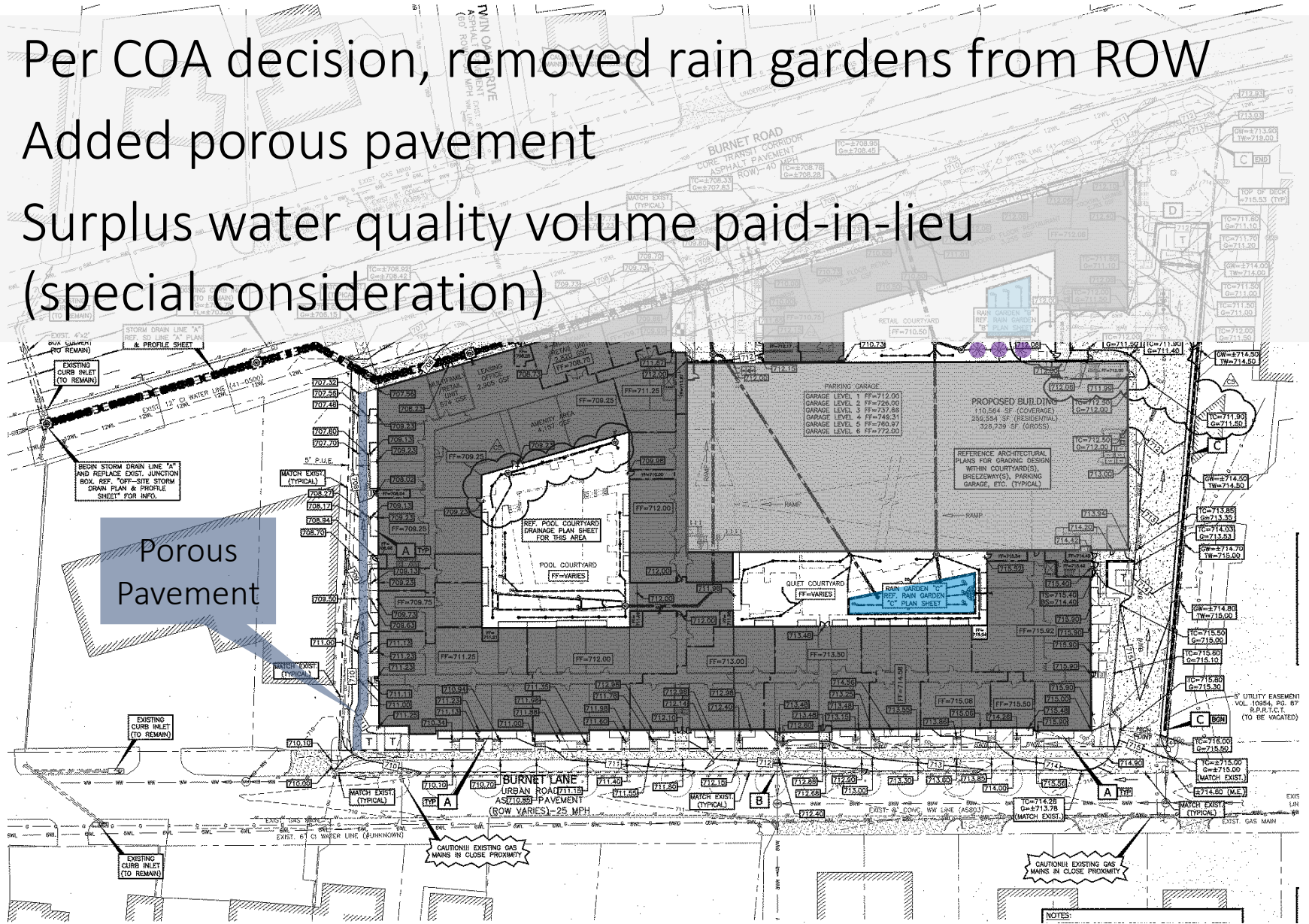
Ornamental Tree

- Commercial design standards encouraged to build to lot line
- Placed rain gardens in right-of-way (ROW)
- Coordinated with ATD and CAMPO; no plans to expand

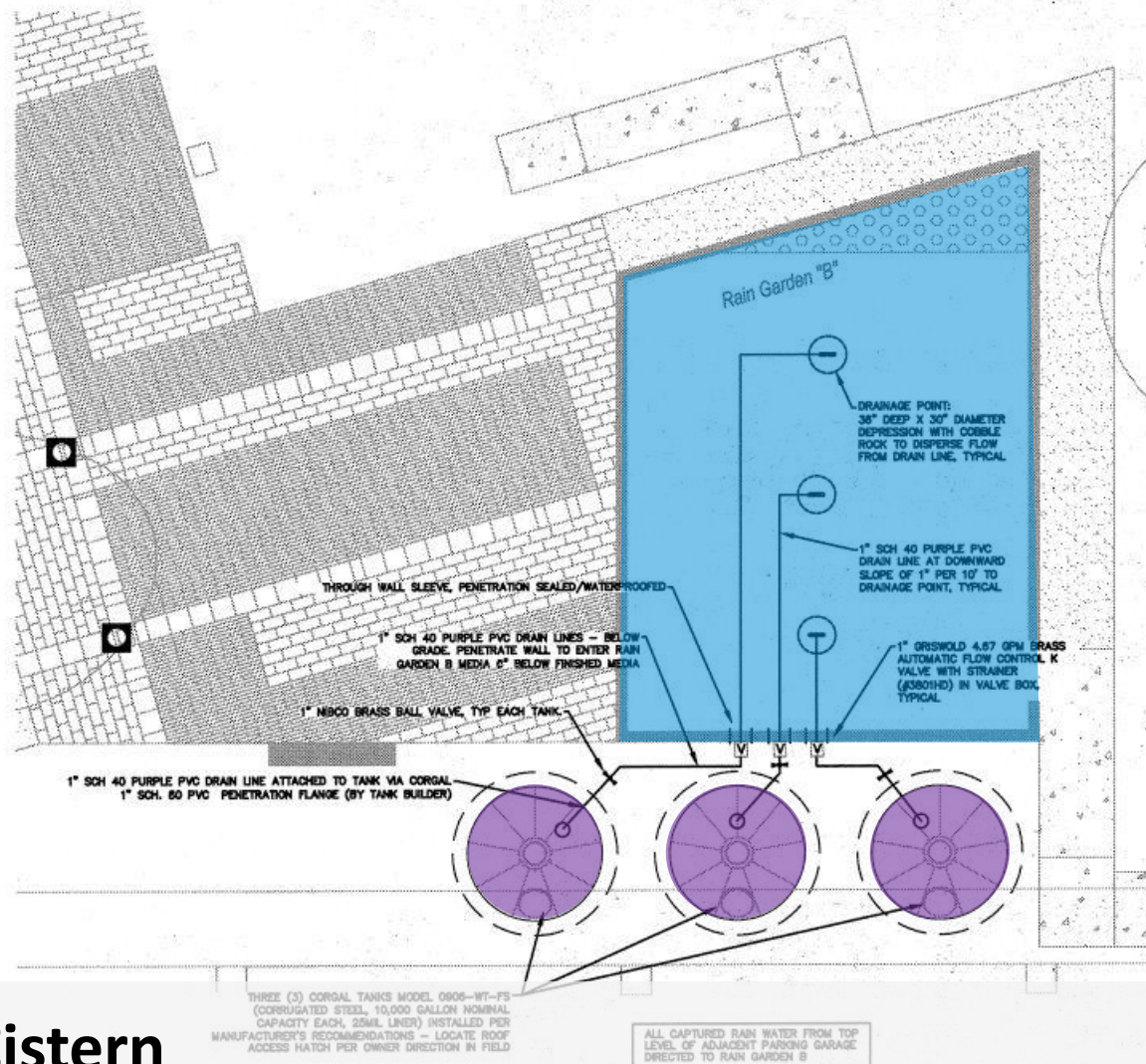


Original Design – Rain gardens in ROW

- Per COA decision, removed rain gardens from ROW
- Added porous pavement
- Surplus water quality volume paid-in-lieu (special consideration)



Revised Design



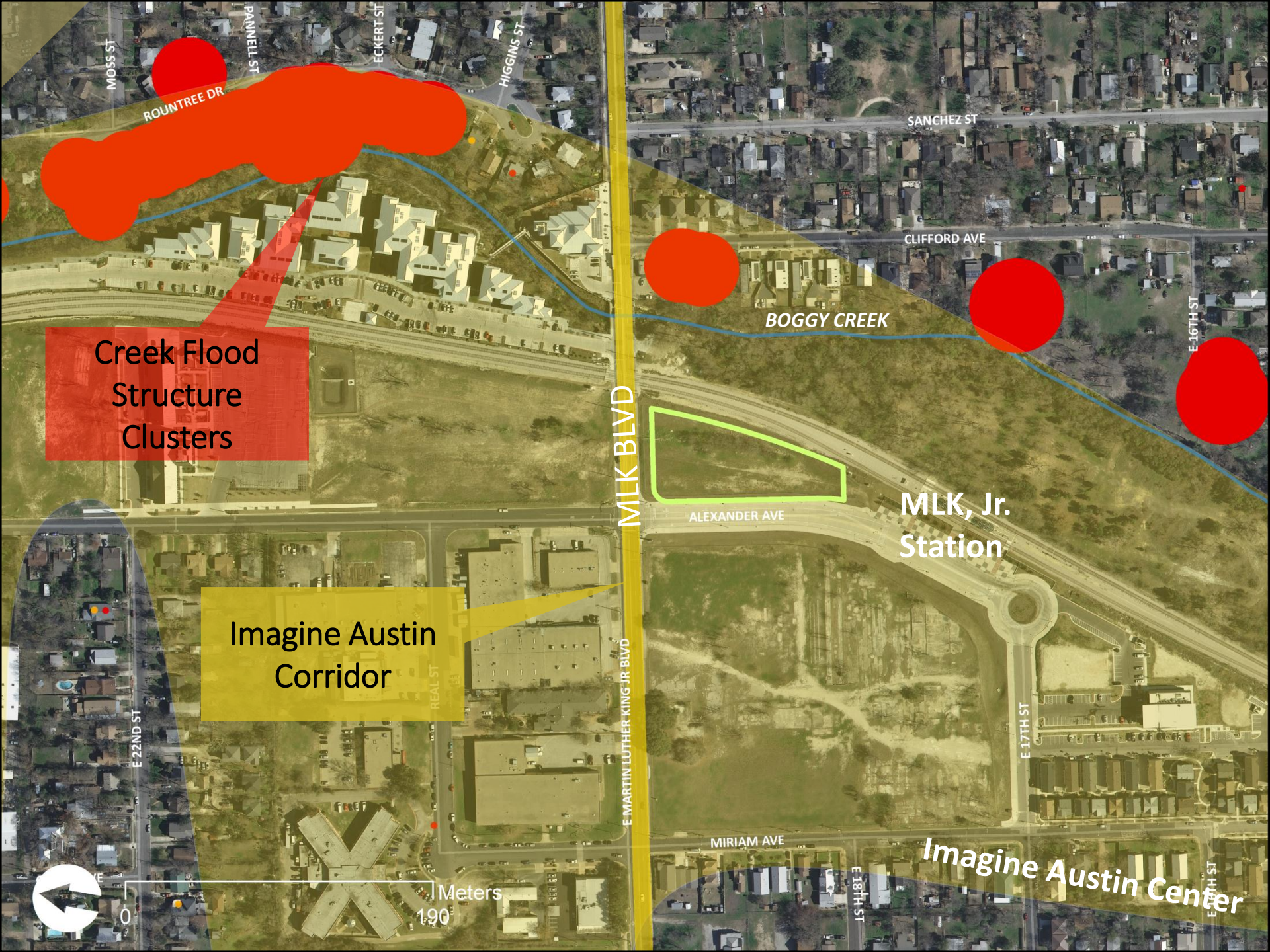
Rainwater Cistern

- 30,000 gallon capacity
- Captures rainwater from adjacent parking garage
- All tanks drain down to rain garden simultaneously in 37 hours

An aerial photograph showing a mix of land cover. At the top, there is a dense forest of green trees. Below the forest is a sandy area. A road runs vertically on the left side, with a building labeled 'E Martin Luther King Jr.' and a 'MLK Food Store' nearby. A large, semi-transparent text box is overlaid in the center of the image.

MLK Station Apartments

Land Cover & Natural Function



Creek Flood
Structure
Clusters

Imagine Austin
Corridor



MLK, Jr.
Station

Imagine Austin Center



0 190 Meters

BOGGY CREEK

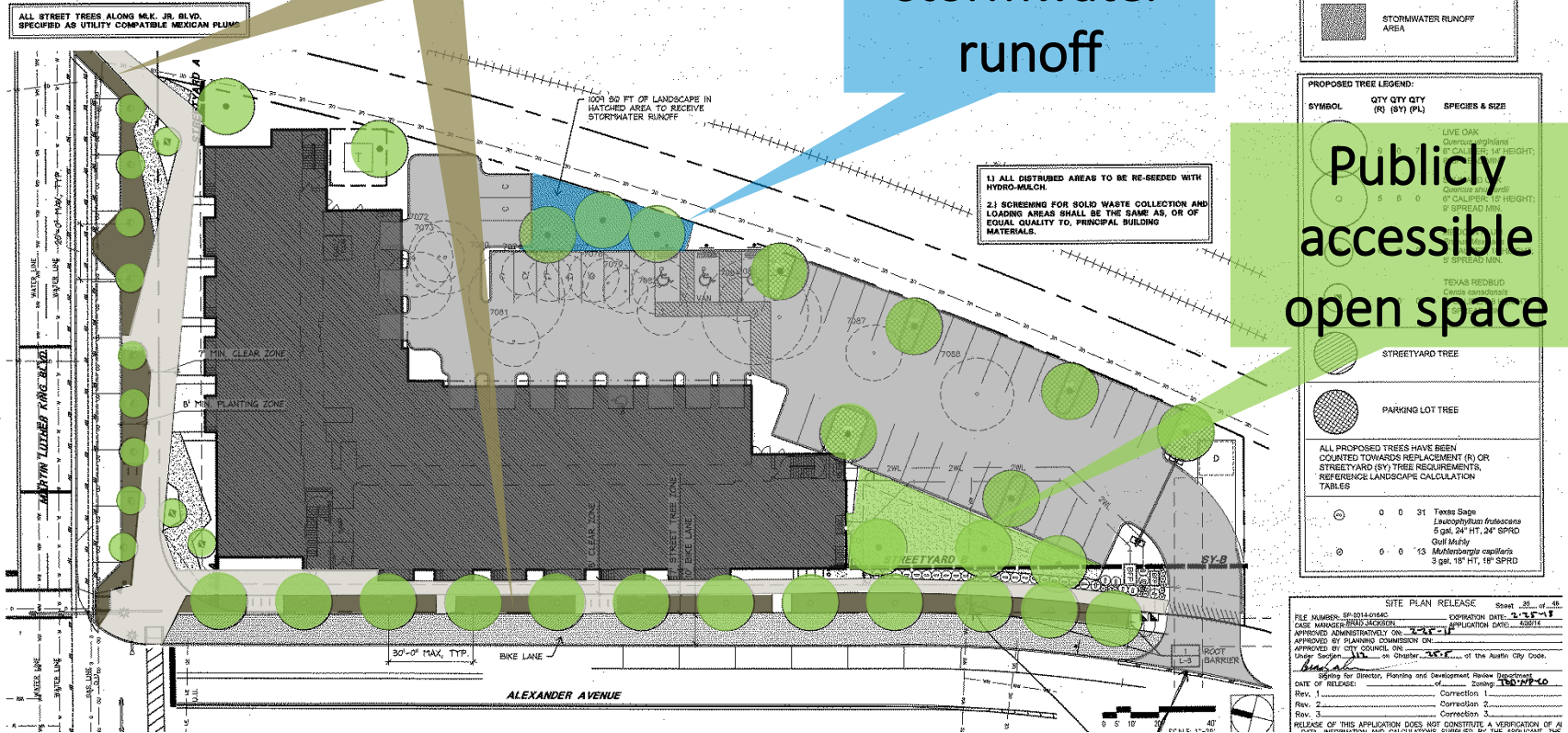
Greenfield development of 1.2 acres
Urban watershed (Boggy) – MLK TOD
76% impervious cover
Water quality and detention provided offsite

Meters

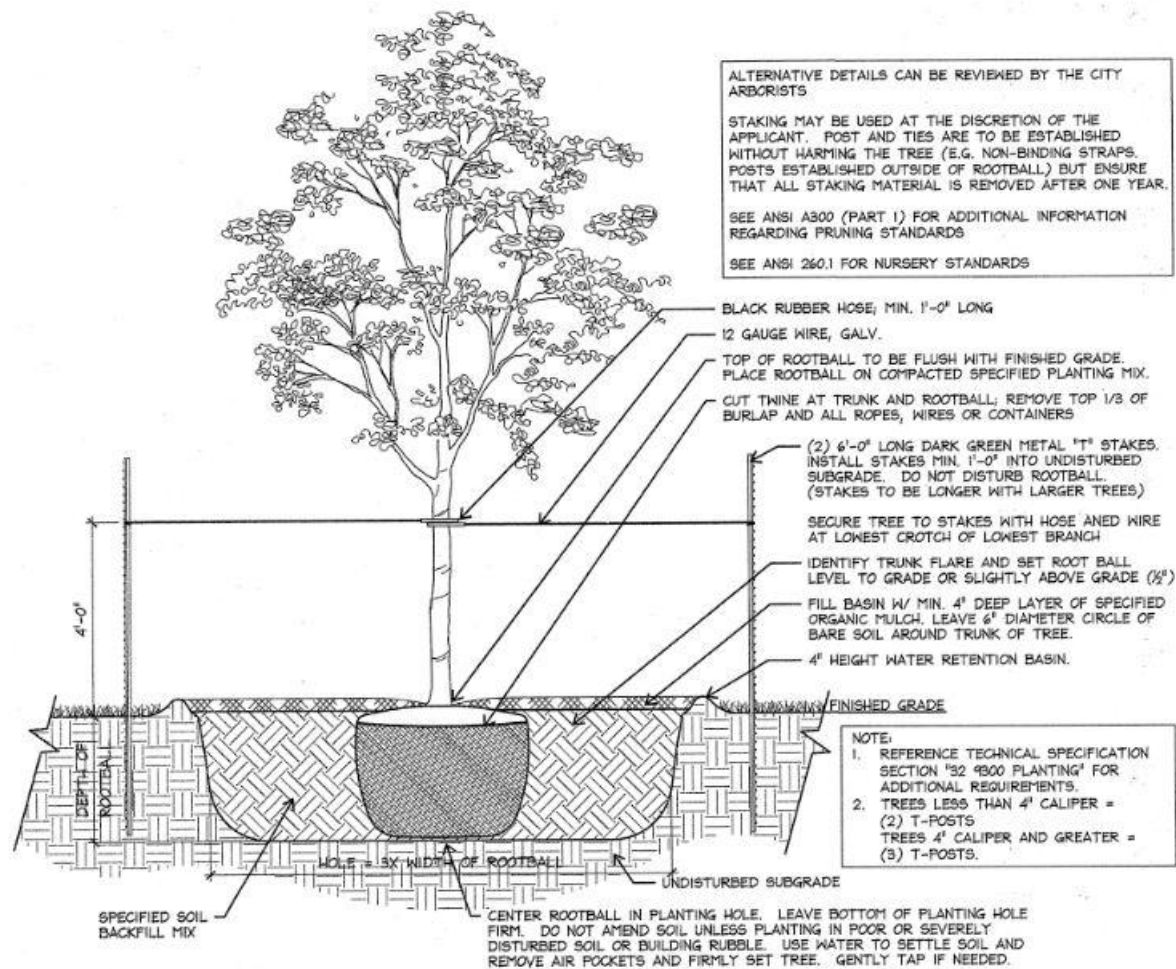
Continuous
planting beds

Receives
stormwater
runoff

Publicly
accessible
open space



Landscaped 96% of street yard
Continuous planting beds for street trees
1000 ft² receives stormwater runoff



5 TREE STAKING DETAIL IN CONTINUOUS PLANTING AREA

SECTION

NOT TO SCALE

Continuous Planting Bed



Golden Corral

Integrate Nature into the City



CORRAL LN

CHAPARRAL RD

S IH 35 SVRD SB

S IH 35 SB

S IH 35 NB

S IH 35 SVRD NB

S IH 35 NB TO BOGGY CREEK RAMP



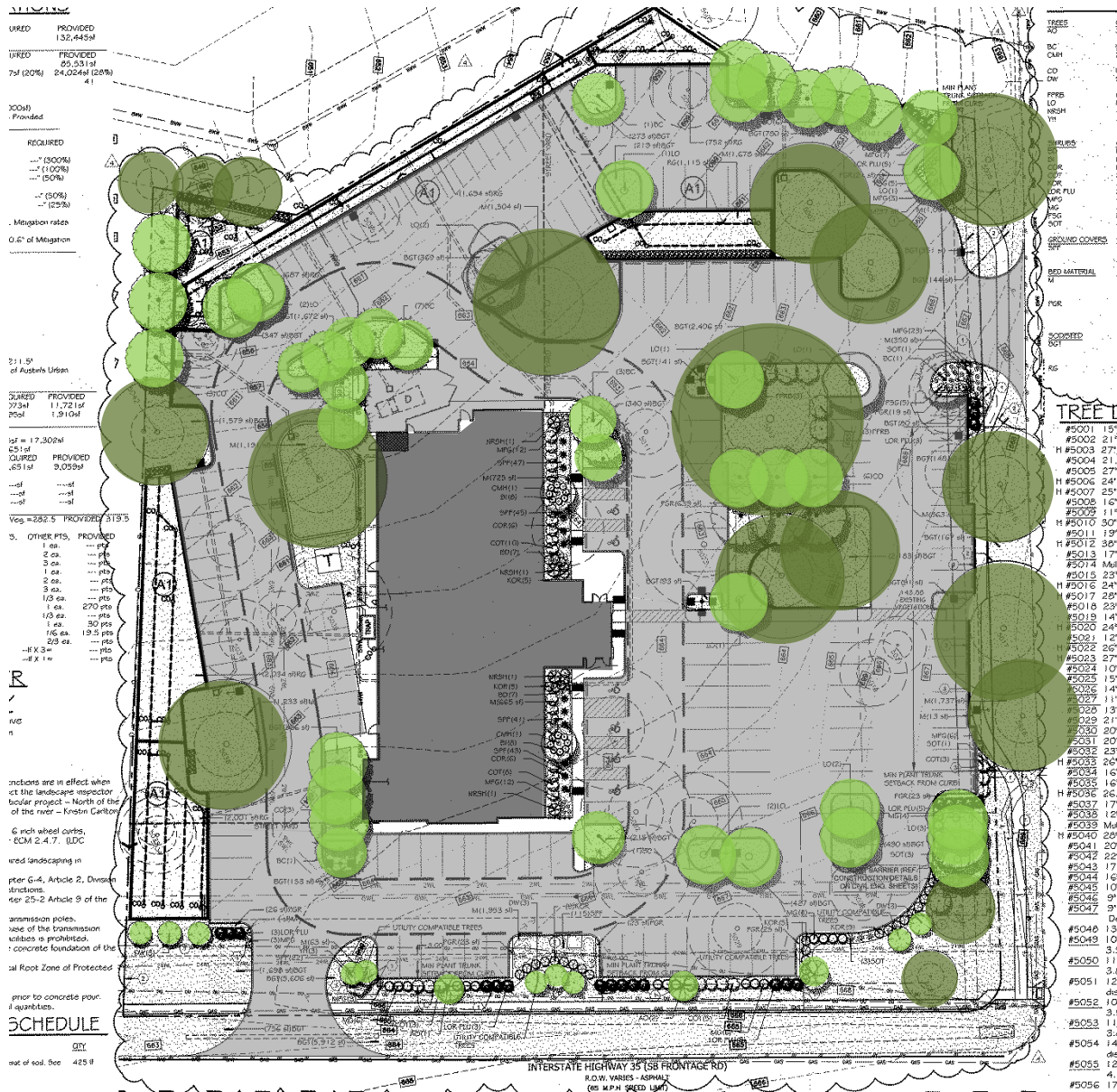
0
0.1 Miles



Greenfield development of 3.02 acres
Suburban watershed (South Boggy)
73% impervious cover

Meters

Pre-project
Trees
Oak wilt area



All tree
mitigation
done on-site



Retained Tree



Mitigation Tree

South Congress Hotel

Integrate Nature into the City





Imagine Austin Corridor

SOUTH CONGRESS AVE

80
Meters

Imagine Austin Corridor

SOUTH CONGRESS AVE



Redevelopment of 0.95 acres
Urban watershed (East Bouldin)
100% to 95% impervious cover

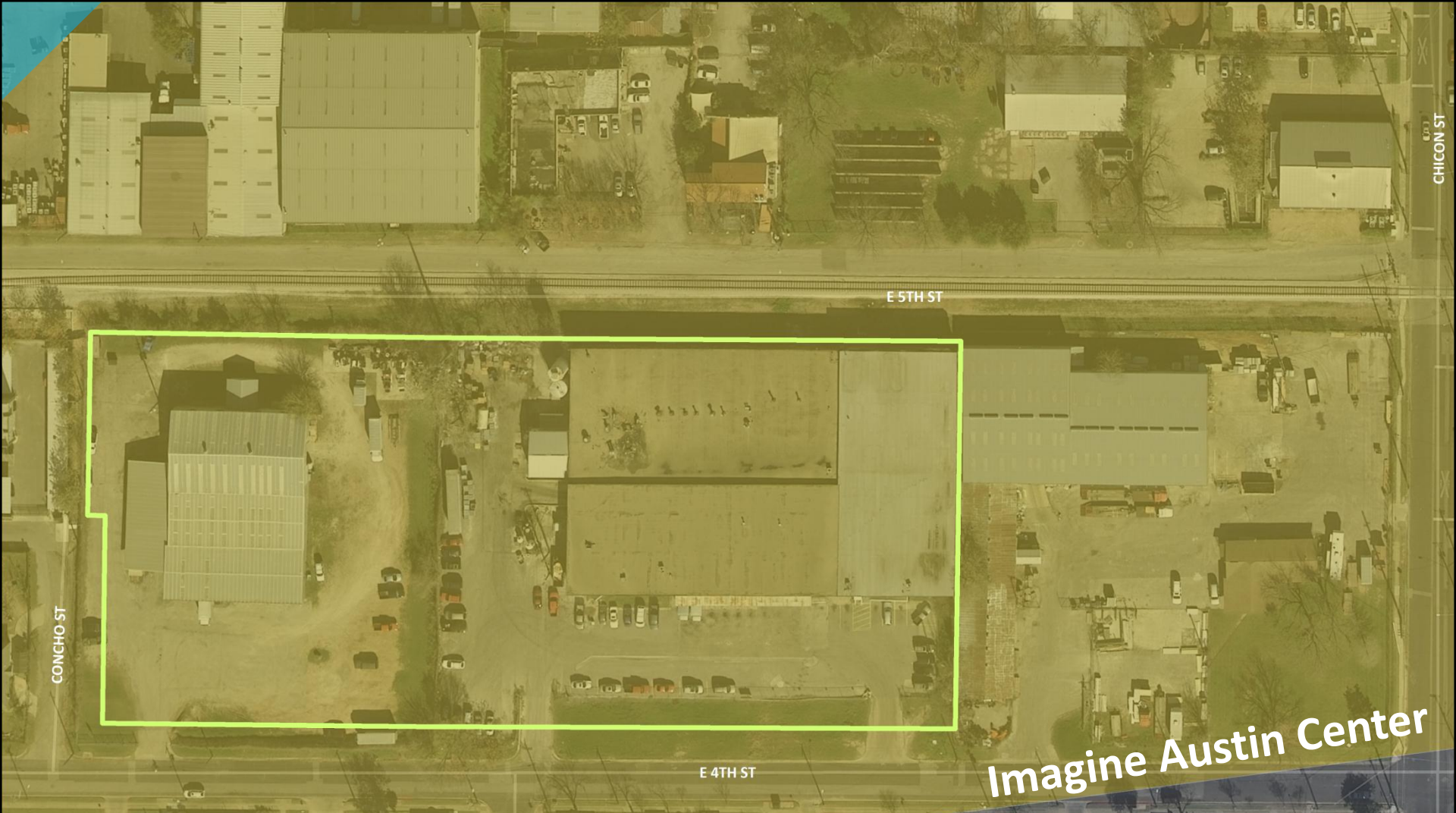
Meters

-
- The image is a detailed architectural site plan of a building complex, likely a school or institutional building, situated on a street corner. The plan shows various rooms, including classrooms, a kitchen, a library, and a gymnasium. A large green wall is highlighted in the center of the plan, with a callout box pointing to it. The wall is labeled "Green walls" and has a list of features and specifications. The plan also shows the building's relationship to the surrounding streets, including South Congress Avenue and Milon Street. The plan is drawn in a technical style with lines, text, and color coding.
- Green walls**
- 1. A green wall is a vertical structure that is covered in climbing plants. It can be made of a variety of materials, including concrete, brick, and metal. It can be used for a variety of purposes, including:
 - To provide shade and reduce heat gain.
 - To improve air quality.
 - To provide a naturalistic environment.
 - To provide a habitat for wildlife.
 - 2. The green wall is a vertical structure that is covered in climbing plants. It can be made of a variety of materials, including concrete, brick, and metal. It can be used for a variety of purposes, including:
 - To provide shade and reduce heat gain.
 - To improve air quality.
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 - To improve air quality.
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 - To provide a habitat for wildlife.
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 - To provide a habitat for wildlife.
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 - To provide shade and reduce heat gain.
 - To improve air quality.
 - To provide a naturalistic environment.
 - To provide a habitat for wildlife.
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 - To provide shade and reduce heat gain.
 - To improve air quality.
 - To provide a naturalistic environment.
 - To provide a habitat for wildlife.
 - 7. The green wall is a vertical structure that is covered in climbing plants. It can be made of a variety of materials, including concrete, brick, and metal. It can be used for a variety of purposes, including:
 - To provide shade and reduce heat gain.
 - To improve air quality.
 - To provide a naturalistic environment.
 - To provide a habitat for wildlife.
 - 8. The green wall is a vertical structure that is covered in climbing plants. It can be made of a variety of materials, including concrete, brick, and metal. It can be used for a variety of purposes, including:
 - To provide shade and reduce heat gain.
 - To improve air quality.
 - To provide a naturalistic environment.
 - To provide a habitat for wildlife.
 - 9. The green wall is a vertical structure that is covered in climbing plants. It can be made of a variety of materials, including concrete, brick, and metal. It can be used for a variety of purposes, including:
 - To provide shade and reduce heat gain.
 - To improve air quality.
 - To provide a naturalistic environment.
 - To provide a habitat for wildlife.
 - 10. The green wall is a vertical structure that is covered in climbing plants. It can be made of a variety of materials, including concrete, brick, and metal. It can be used for a variety of purposes, including:
 - To provide shade and reduce heat gain.
 - To improve air quality.
 - To provide a naturalistic environment.
 - To provide a habitat for wildlife.
- Architectural Details:**
- Room Labels:** KITCHEN, LIBRARY, GYMNASIUM, CLASSROOM, OFFICE, etc.
 - Dimensions:** Various dimensions are provided for rooms and walls.
 - Orientation:** The plan includes a north arrow and labels for streets (South Congress Avenue, Milon Street).
 - Scale:** A scale bar is provided at the bottom of the plan.
 - Notes:** A large block of text at the bottom provides additional information about the project, including a list of features and specifications.

The background image is a photograph of an industrial or parking area. In the foreground, there is a concrete curb and a paved road. To the left, there are some trees with yellowing leaves. In the background, there are several cars parked, a green dumpster, and a large industrial building. A blue semi-transparent overlay covers the middle portion of the image, containing the title and subtitle text.

Saltillo Station

Beneficial Use of Stormwater

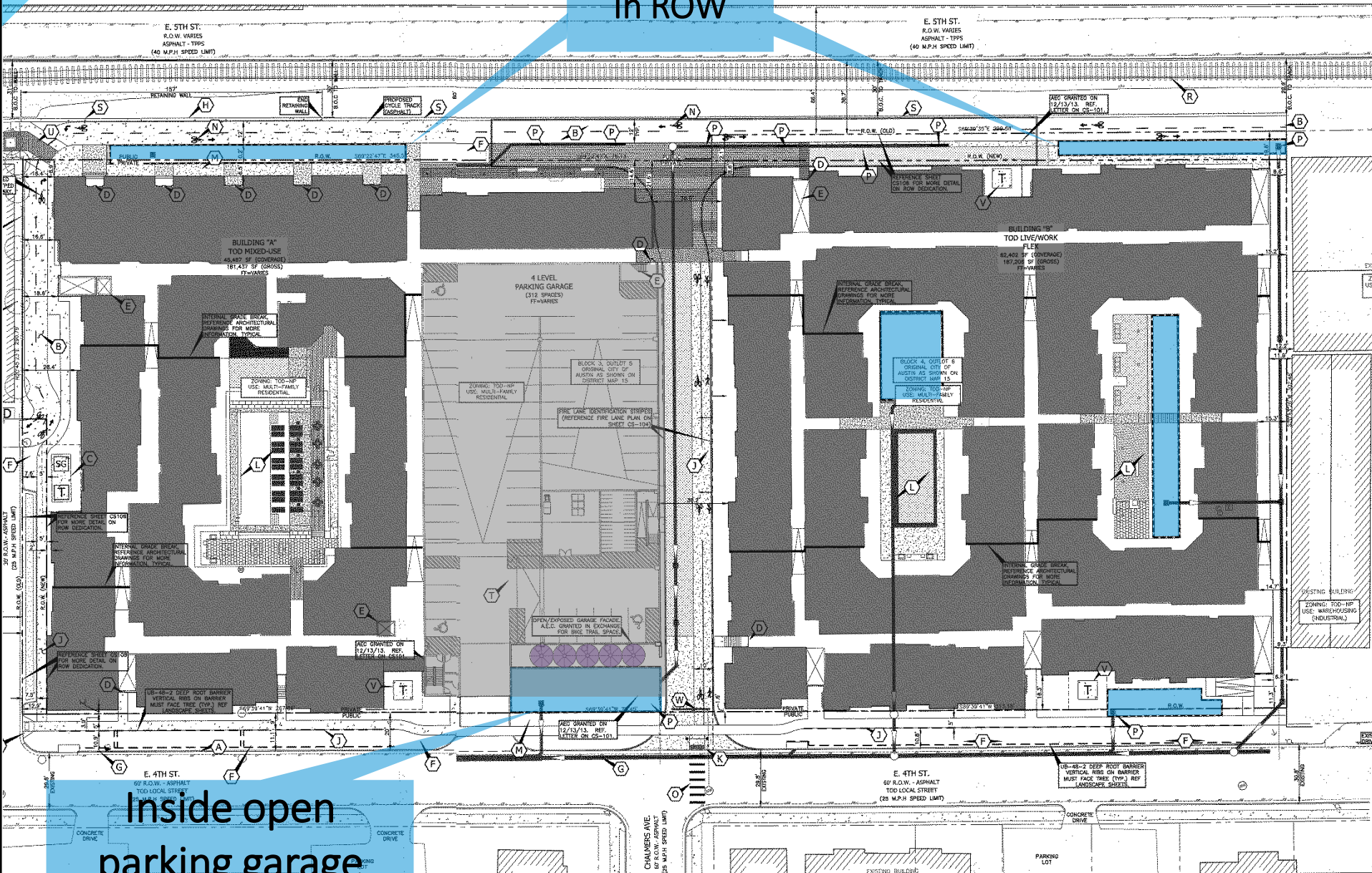


Imagine Austin Center

Redevelopment of 4.46 acres in Imagine Austin Center
Urban watershed (Lady Bird Lake)
83.4% to 82.9% impervious cover

In ROW

Inside open
parking garage
facade





Corazon

Beneficial Use of Stormwater

Imagine Austin Corridor

EAST 7TH STREET

E 7TH ST

SAN MARCOS ST

WALLER ST

BRUSHY ST

MEDINA

WALLER ST

E 6TH ST

E 5TH ST

SAN MARCOS ST

MEDINA

E 4TH ST

N IH 35 SVRD NB

N IH 35 NB

N IH 35 SB

N IH 35 NB TO 6TH RAMP

E 6TH TO IH 35 SB RAMP



0
Meters
125





Redevelopment of 1.87 acres in Imagine Austin Center
Urban watershed (Waller Creek)
25% to 95% impervious cover



Legacy Apartments

Beneficial Use of Stormwater

Local Flood
Identified
Problem Area

LAMAR SQUARE DR

S LAMAR BLVD

W GIBSON ST

S 7TH ST

Saxon
Pub

JEWELL ST

WEST BOULDIN CREEK

W MONROE ST

S 7TH ST

W MILTON ST

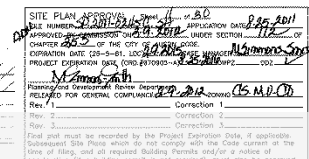
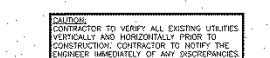
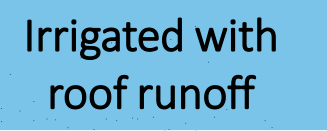
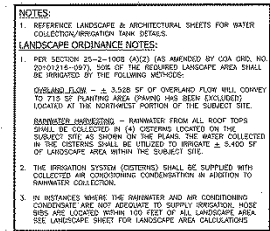
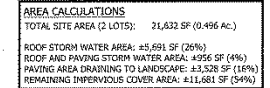
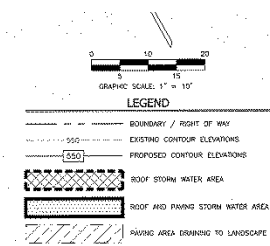
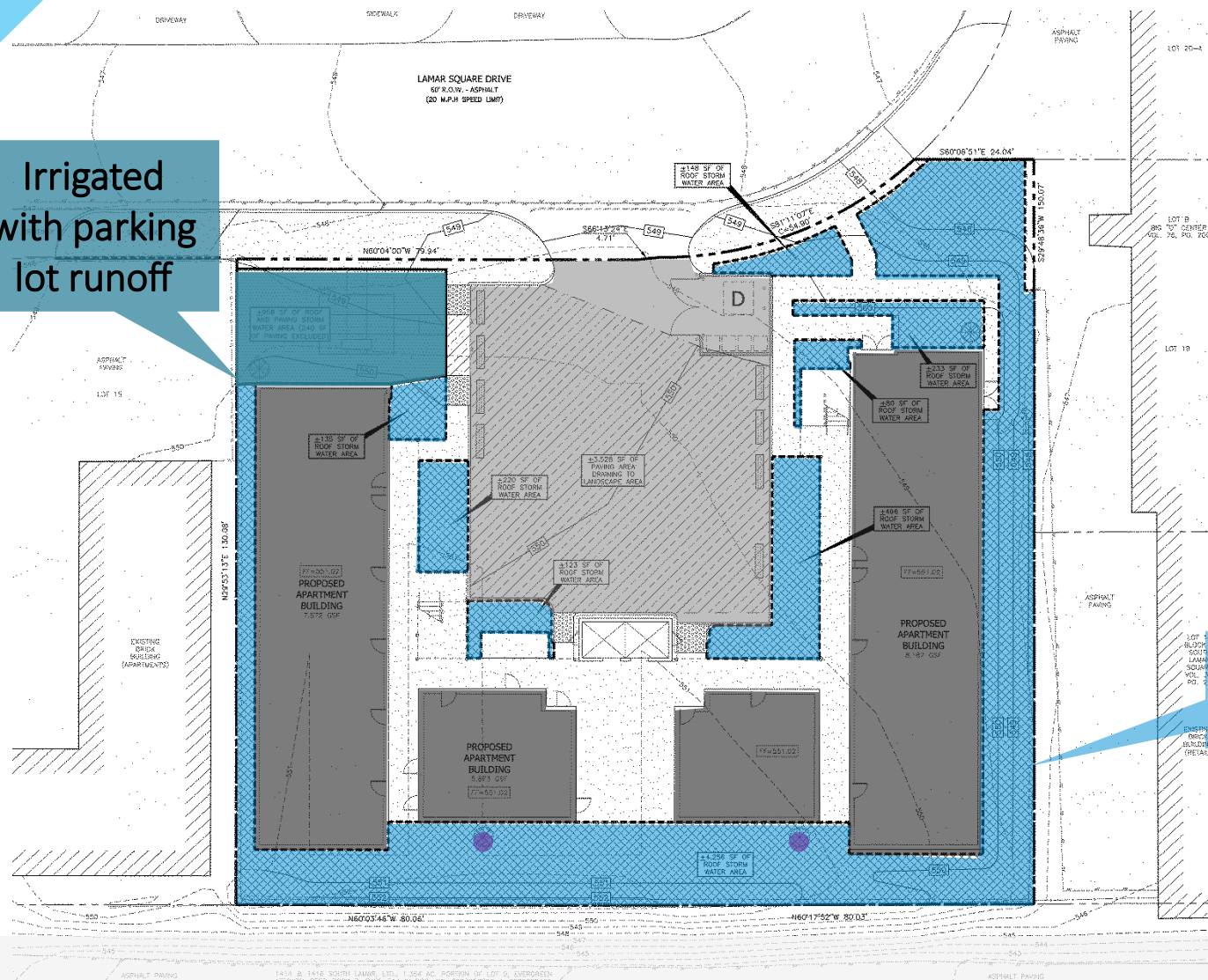


0

Meters
125



Redevelopment of 0.5 acres
Urban watershed (West Bouldin/Lady Bird Lake)
95% to 66% impervious cover



- Use overland flow and rainwater harvesting/condensate to water *all* landscaping (hose bibs in case of severe drought)
- Payment-in-lieu for water quality



District at SoCo

Flood Mitigation for Redevelopment



Flood detention added after negotiation with neighbors
(see the [last meeting's presentation](#) for a full set of case studies for food mitigation for redevelopment)

Exercise

- The posters on the wall represent the four major topics covered by the GIWG
- Each poster contains the key themes (in black) as well as the potential solutions (in green) provided by our stakeholders
- You have 2 green dots to place next to the themes that are your top priorities
- You have 4 blue dots to place next to your favorite solutions

Going Forward

CodeNEXT Process

- Fall 2015: Draft Code Testing
- Summer 2016: Public Review Draft Anticipated
- Fall 2016: Public Review Process

Future GIWG Meetings

- What is being proposed in the draft code?
- Topic-specific meetings as key issues arise

Contact Information

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Green Infrastructure Working Group:

<http://www.austintexas.gov/page/green-infrastructure-working-group>