



Applications at the City of Austin



Rocky Mountain Land Use Institute, March 13, 2015



Waterfront Planning & Green Infrastructure



Affordable Housing Requirements in a Density Bonus Program



Corridor Planning Trend Analysis & Department Collaboration





Waterfront Planning & Green Infrastructure









Green Infrastructure

- Multiple definitions depending on context
- In case of Envision Tomorrow, refers strictly to water quality controls

Water Quality

- First flush of runoff has the most pollutants
- Amount of runoff and associated pollutants increases with impervious cover
- **Impervious cover calculated by the Prototype Builder**
- Able to calculate minimum volume of water to be captured and treated





Example of conventional control



Example of green infrastructure

Benefits of green infrastructure

- Improved water quality
- Greater water infiltration into the soil
 - Improved base flow in streams
 - Improved riparian health
 - Less potential for erosion
- Decreased energy costs
- Improved air quality
- Reduced carbon emissions
- Reduced heat island effect
- Potential open space and habitat
- Water conservation



envision tomorrow+ Green Infrastructure App

Green roof



Cistern



Rain gardens



Green roof with cistern



Biofiltration



Prototype Builder

1. Choose stormwater model

- National
- Local (Austin)

2. Choose level/type of controls using preset buttons

- No green (conventional)
- Minimum green
- Medley of green beyond the minimum
- No controls at all

3. Customize any presets if desired

Green Infrastructure & Stormwater Inputs			
Stormwater Model			
Select model	Local (Austin)		
Located in Barton Springs Zone?	no		
Runoff Coefficient	1.00		
	0.83		
Physical Inputs			Green Infrastructure Presets
Percent of building footprint used as a Green Roof		(enter percentage)	No Green Infrastructure
Green roof media depth	1.00	ft	
Green roof capture efficiency	20%	(enter percentage)	
Green roof connected to Rainwater Harvesting system	yes		Minimum Green Infrastructure
Green roof water harvesting depth	1.00	ft	
Green roof water harvesting efficiency	45%	(enter percentage)	
equivalent 7' x 8.5' cisterns	0.0		Green Infrastructure Medley
equivalent 7' x 8.5' cisterns	0	square feet	
Percent of building footprint used for Rainwater Harvesting (not included in green roof rainwater harvesting)		(enter percentage)	
Rainwater harvesting depth	0.10	ft	No water quality controls & No fee-in-lieu
Rainwater harvesting efficiency	85%	(enter percentage)	
Rainwater harvesting of parking area/structure	no		
equivalent 7' x 8.5' cisterns	0.0		
Landscaping area needed	0	square feet	
Percent of landscaping/open space used for Biofiltration	50%	(enter percentage)	
Biofiltration media depth	4.00	ft	
Biofiltration capture efficiency	80%	(enter percentage)	
Percent of landscaping/open space used for Rain Gardens	50%	(enter percentage)	
Rain garden depth	2.00	ft	
Rain garden capture efficiency	80%	(enter percentage)	
% of site required for Conventional Underground?	0.00%		
Conventional Facility Capture Efficiency	no		
	92%	(enter percentage)	

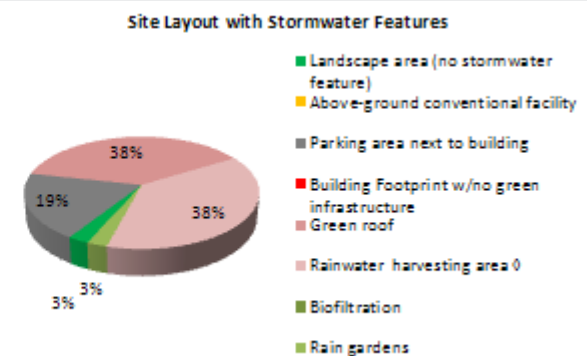
4. Input annual rainfall

- To correctly calculate pollutant load reductions

Pollutant Loads	
Annual Rainfall	32.5 in
⊕	90% (enter percentage)
Total Suspended Solids (TSS) reduction	84%
Total Nitrogen (TN) reduction ⊕	50%
Total Lead (TL) reduction ⊕	75%
F.Coli Reduction ⊕	79%
Total key pollutants removed (TSS, TN, TL)	569 lbs/yr

5. Review dashboard

Green Infrastructure Stats		
Impervious Cover	95%	
Water quality capture depth (in)		1.25
Water quality capture volume required (gal)		33,941
Green Infrastructure Outputs		
	Square feet	Gallons Captured
Total green infrastructure water capture		103,819
Conventional water quality facility	-	-
Financial Stats		
Rental (Residential and Commercial)	Target Return	Actual Return
Cash-on-Cash (After Year 3)	10.0%	8.8%
IRR on Project Cost (Unleveraged Return)	12.0%	11.2%
Owner Residential	Target Return	Actual Return
Project Rate of Return	25.0%	N/A
Return to Equity	75.0%	N/A



- Square footage and gallons captured for each control
- Impact on project cost
 - Derived from cost section

Stormwater & Green Infrastructure Cost per Gallon			
Green roof ☐	\$ 34.00	\$ 839,921	total
Biofiltration	\$ 3.50	\$ -	total
Rain gardens	\$ 4.50	\$ 58,649	total
Rainwater harvesting	\$ 4.00	\$ 264,328	total
Conventional above ground ☐	\$ 6.10	\$ -	total
Conventional underground ☐	\$ 10.50	\$ -	total
Mitigation fee/Fee-in-lieu only? ☐	no	\$ -	enter amount
Total cost		\$1,162,899	

Green Infrastructure Stats		
Impervious Cover	95%	
Water quality capture depth (in)		1.25
Water quality capture volume required (gal)		33,341
Green Infrastructure Outputs		
	Square feet	Gallons Captured
Landscape area (no stormwater feature)	1,089	
Above-ground conventional facility	-	
Parking area next to building	8,356	
Building Footprint w/no green infrastructure	-	
Green roof	16,513	24,704
Green roof water harvesting area	16,513	55,583
Rainwater harvesting area ☐	16,513	10,499
Biofiltration	-	-
Rain gardens	1,089	13,033
Total green infrastructure water capture		103,819
Conventional water quality facility	-	-
Financial Stats		
Rental (Residential and Commercial)	Target Return	Actual Return
Cash-on-Cash (After Year 3)	10.0%	8.8%
IRR on Project Cost (Unleveraged Return)	12.0%	11.2%
Owner Residential		Target Return
Project Rate of Return	25.0%	N/A
Return to Equity	75.0%	N/A

Scenario Builder

- Annual indicators
 - Runoff reduction
 - Energy savings
 - Air pollutant reduction
 - CO2 reduction
 - Potential open space & habitat
- Based on **Center for Neighborhood Technology** *Value of Green Infrastructure* guide

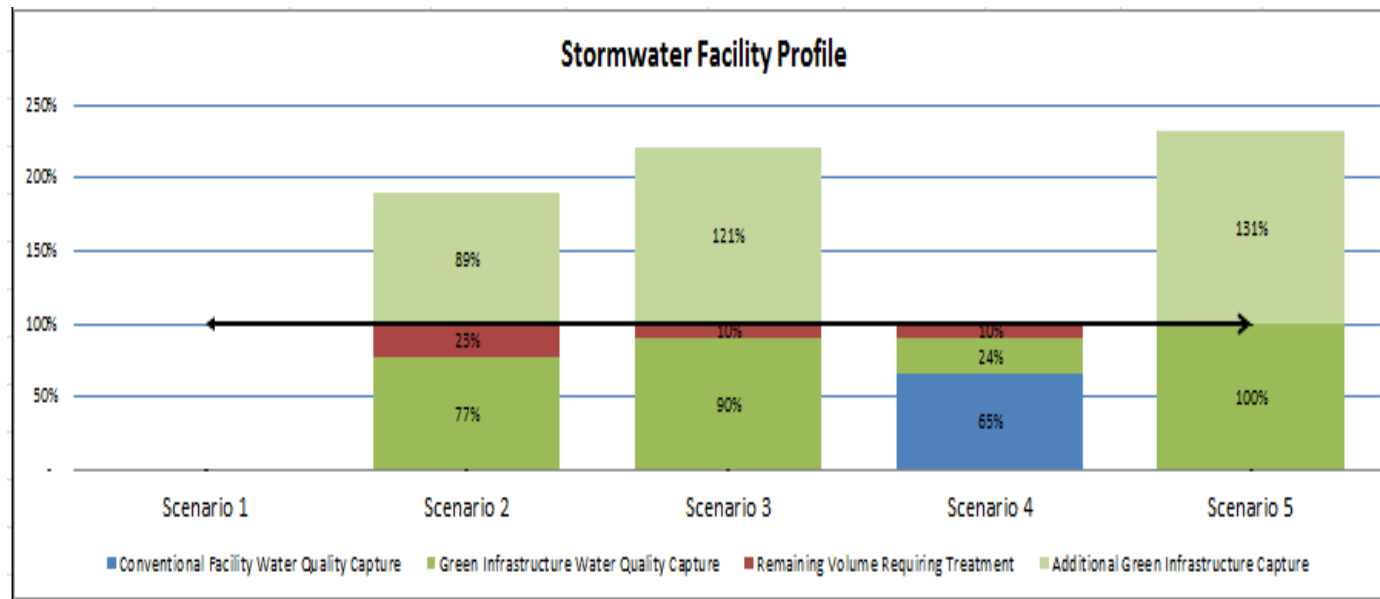


Additional Indicators:

Stormwater facility profile

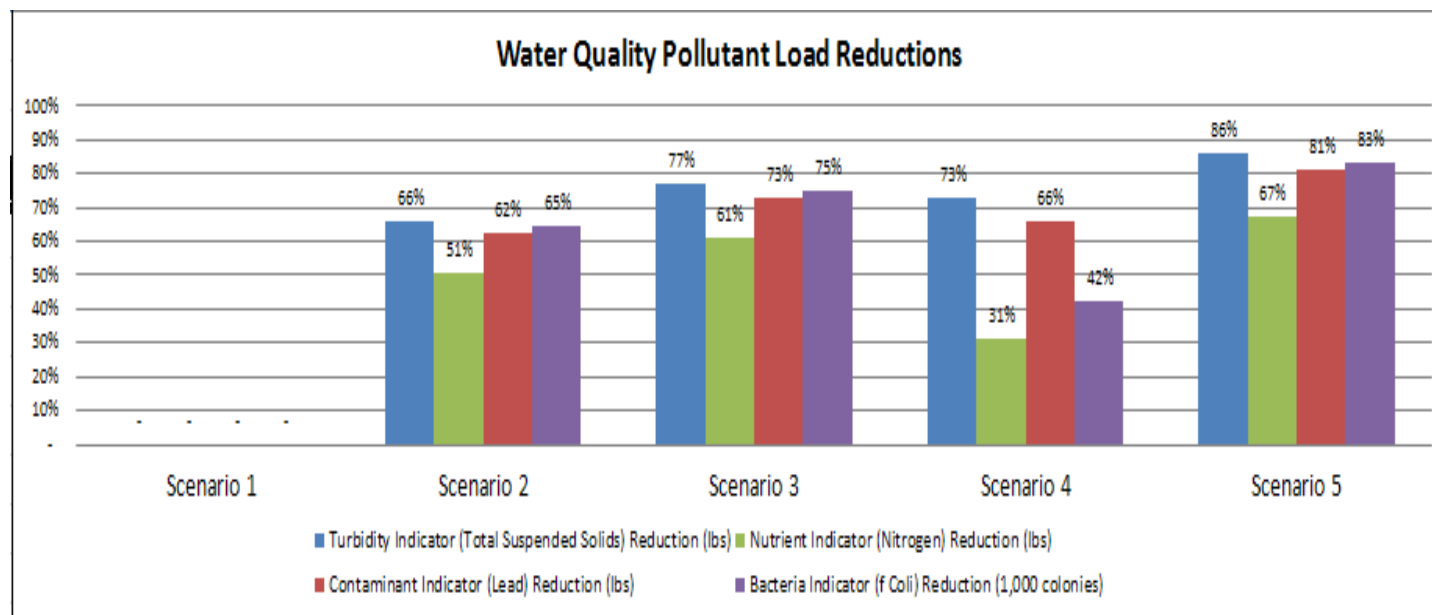
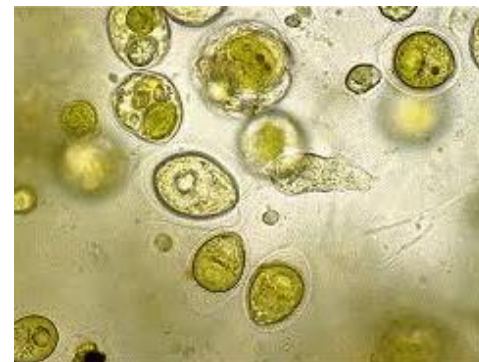
Opportunities for:

- District-wide management opportunity
- Hydrological connections



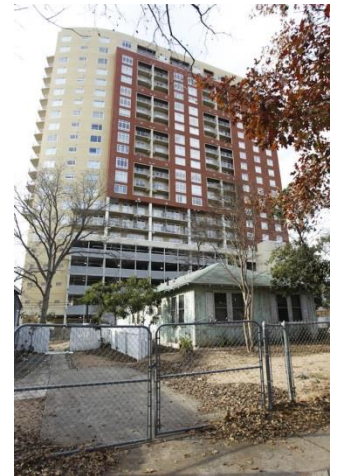
Pollutant load reductions -- key indicators

- Total Suspended Solids: turbidity
- Total Nitrogen: nutrient excess
- Total Lead: contaminants
- F.Coli: bacteria





Affordable Housing Requirements in a Density Bonus Program





Downtown Density Bonus Program

- **Historically residential area**
- **On-site affordability requirements**
- **Ordinance change required affordable units to reflect the rest of the project in:**
 - **Size**
 - **Mix**

Sensitivity Analysis



	Downtown			Skyhouse			Millennium Rainey		
	5% similar unit mix	5% units	No afford. units	5% similar unit mix	5% units	No afford. units	5% similar unit mix	5% units	No afford. units
Internal rate of return	12.4%	12.5%	12.9%	11.5%	11.5%	11.9%	11.9%	11.9%	12.4%
Difference	-0.1%	-0.4%		-0.1%	-0.4%		-0.0%	-0.5%	



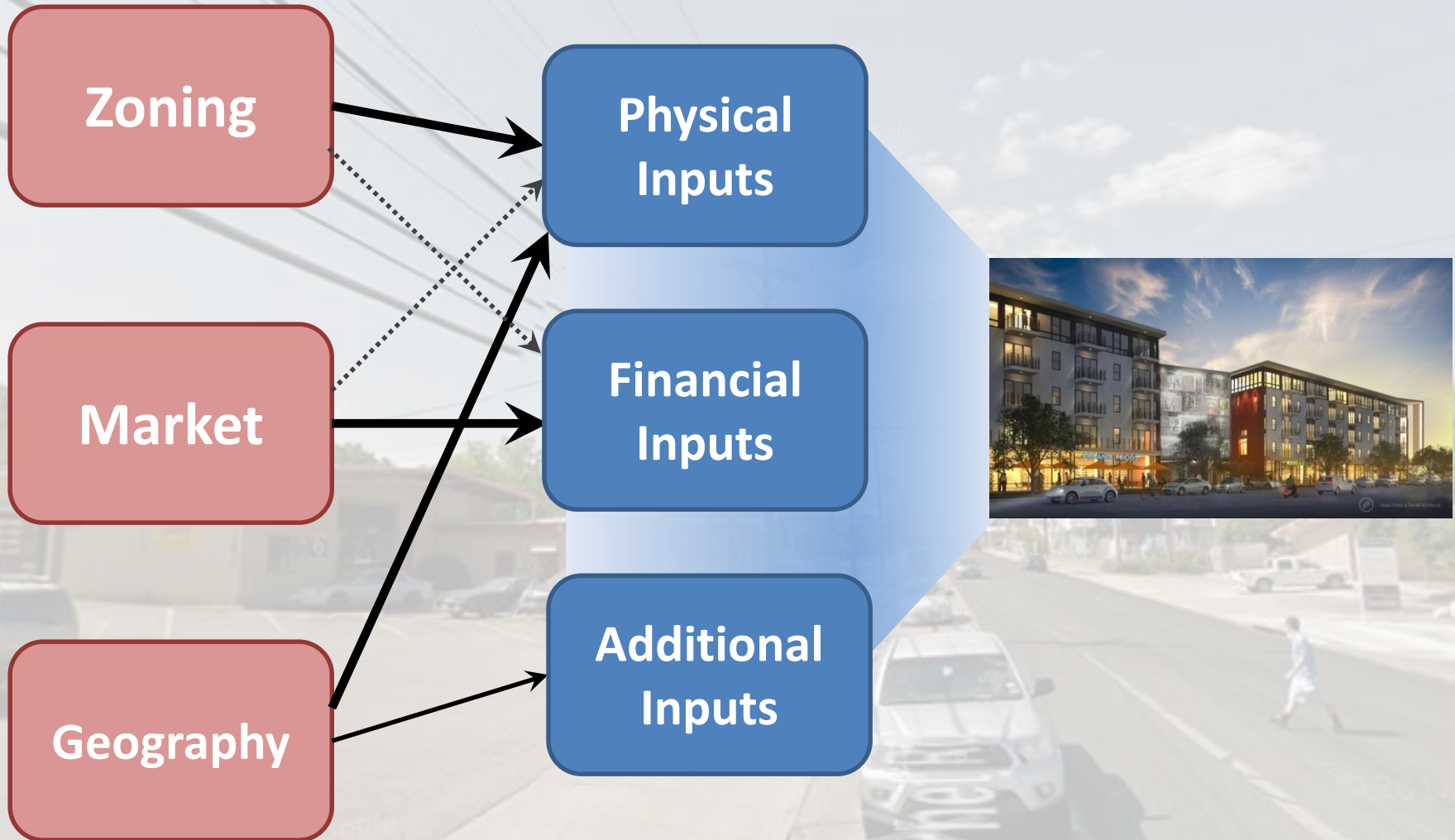
Corridor Planning Trend Analysis & Department Collaboration





Envision Tomorrow Modeling

Creating Building Types



Envision Tomorrow Modeling

Creating Building Types

Zoning

Major Zoning Related Inputs:

- Building height
- FAR (calculated)
- Land use
 - residential often subsidizes retail
- Impervious cover
- Parking ratios
- Park dedication fees
- Austin Energy fees
- Water quality fees

Envision Tomorrow Modeling

Creating Building Types

Major Market Related Inputs:

- Land acquisition costs
 - (TCAD * 120% to reflect market rates)
- Cost of construction
 - dependent on size of project
 - > relates to size of parcel
- Market rents for:
 - residential
 - retail
 - office

Market

Envision Tomorrow Modeling

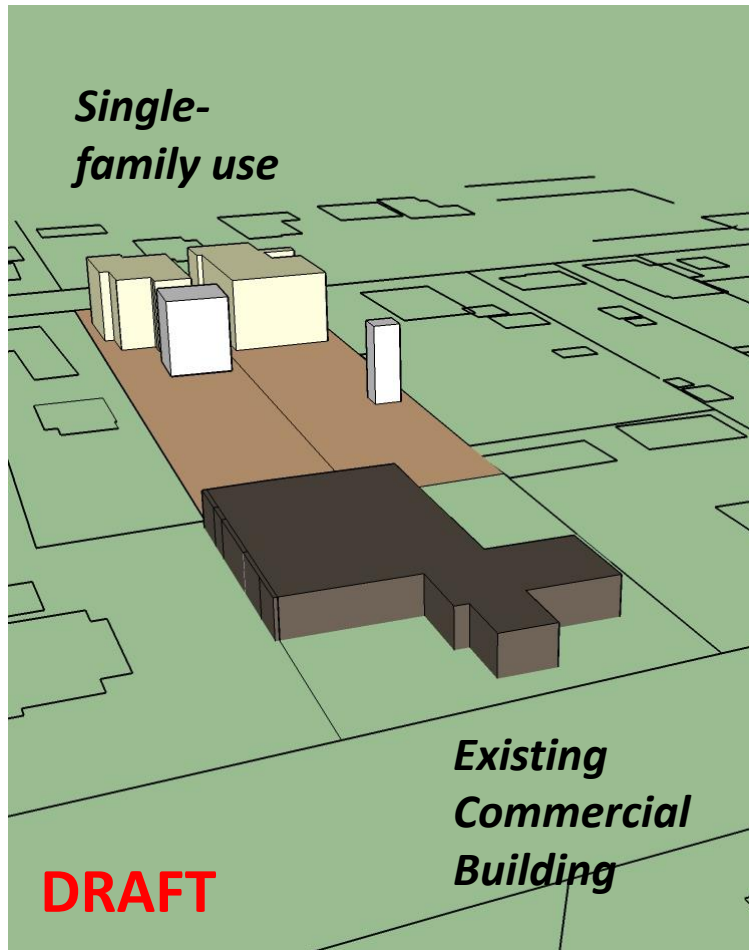
Creating Building Types

Major Geographic Related Inputs:

- **Size of parcel**
- **Water quality treatment zone**
 - allowable controls and quantities (i.e., Barton Springs Recharge Zone versus Urban watershed)

Geography

Envision Tomorrow Modeling: Single-Family Compatibility and Parking for Shallow Parcels

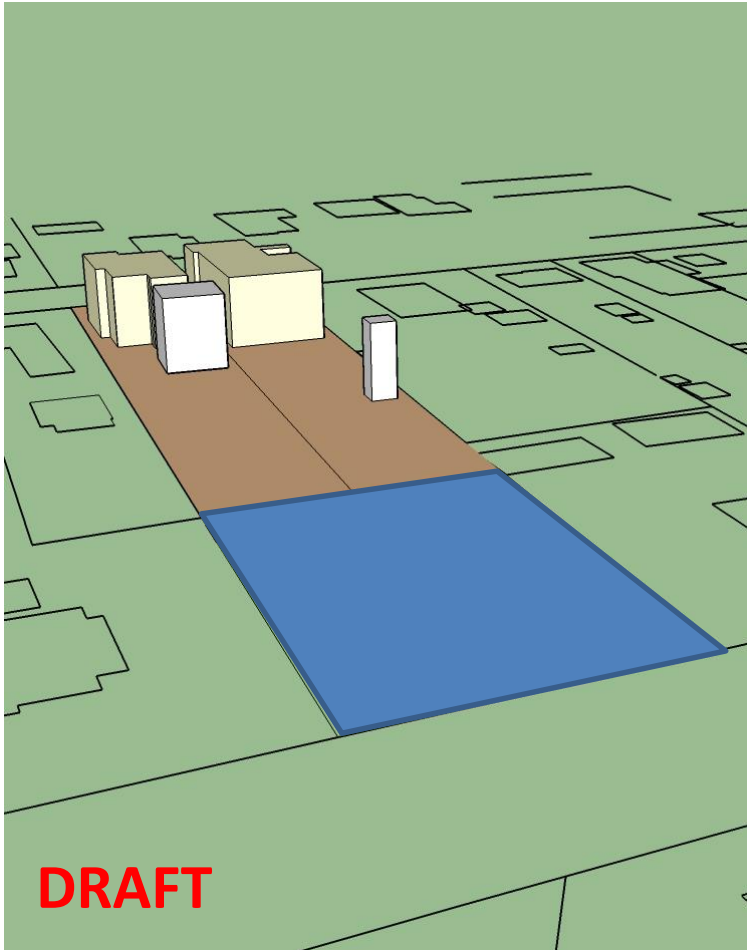


Service garage built in 1961 (54 years old)

Site	13,888 sf	1/3 acre	138' deep	100' wide
Bldg footprint	5,732 sf			

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Envision Tomorrow Modeling: Single-Family Compatibility and Parking for Shallow Parcels

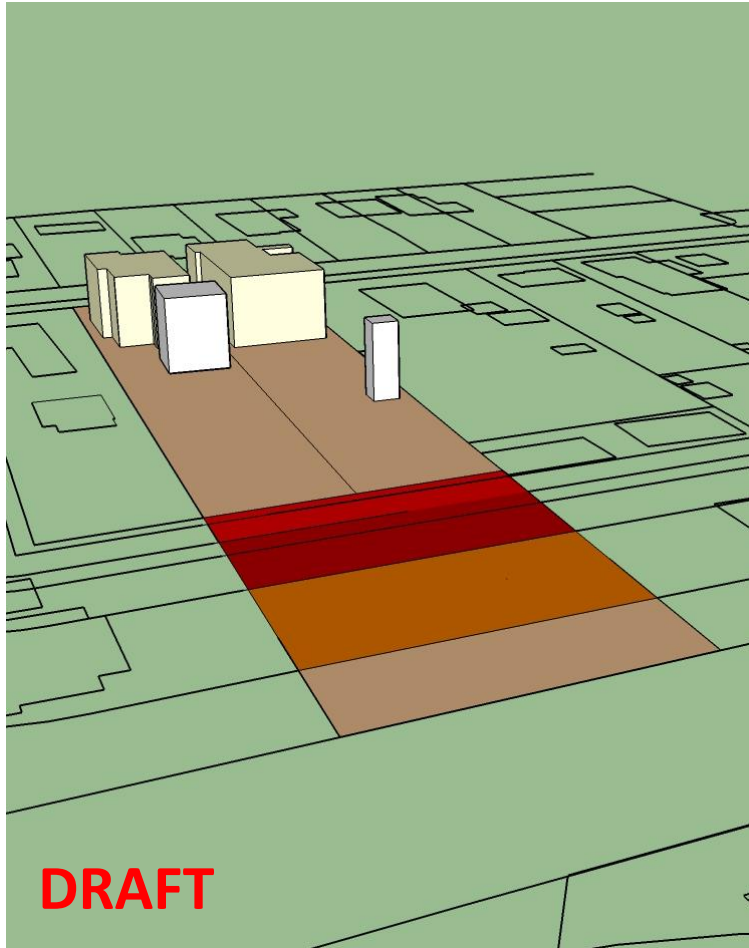


Rebuilding on parcel with service garage built in 1961

Site	13,888 sf	1/3 acre	138' deep	100' wide
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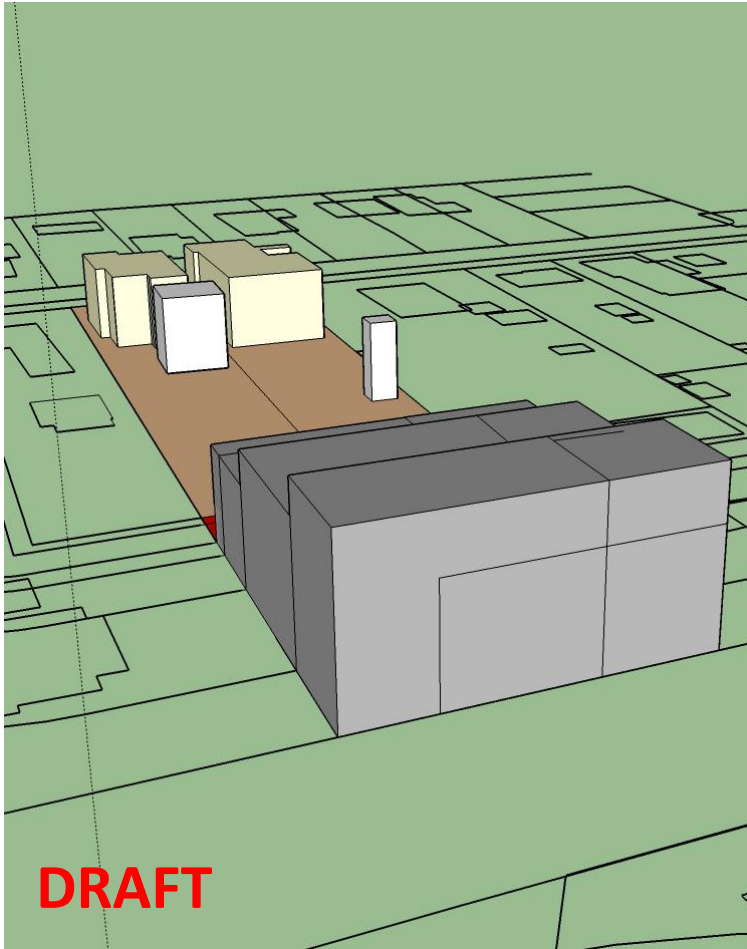
Site	13,888 sf	1/3 acre	138' deep	100' wide
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Single-family compatibility zones

No build	2,060 sf	15%	25'	
2-story (30')	3,500 sf	25%	35'	
3-story (40')	5,000 sf	36 %	50'	
4-story (50')	3,330 sf	24%	33'	

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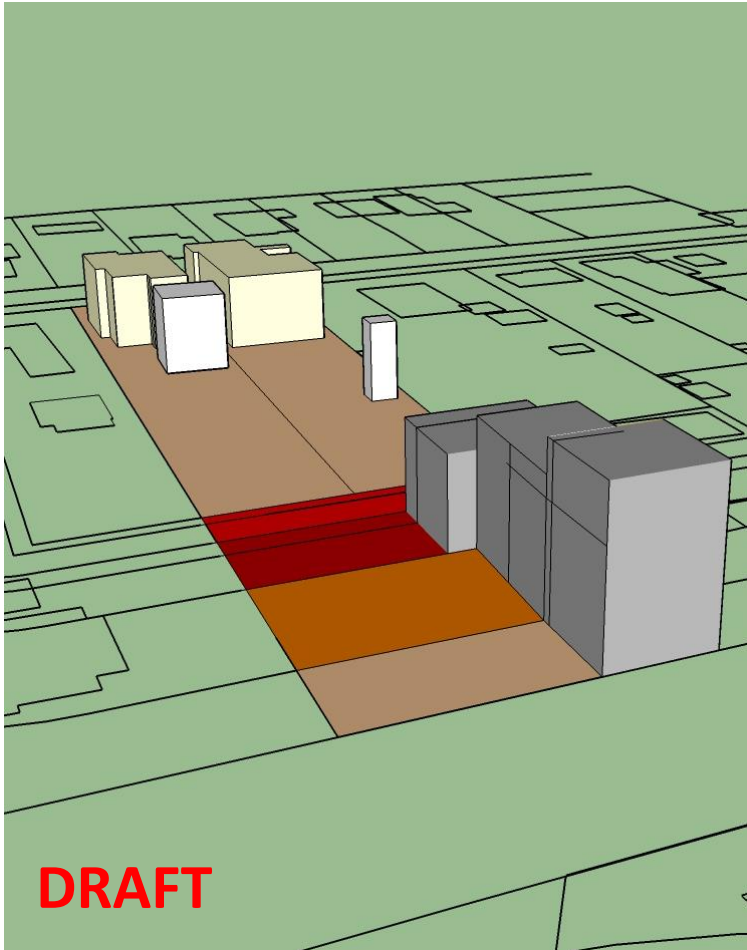
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Envision Tomorrow Modeling: Single-Family Compatibility and Parking for Shallow Parcels



Rebuilding mixed use

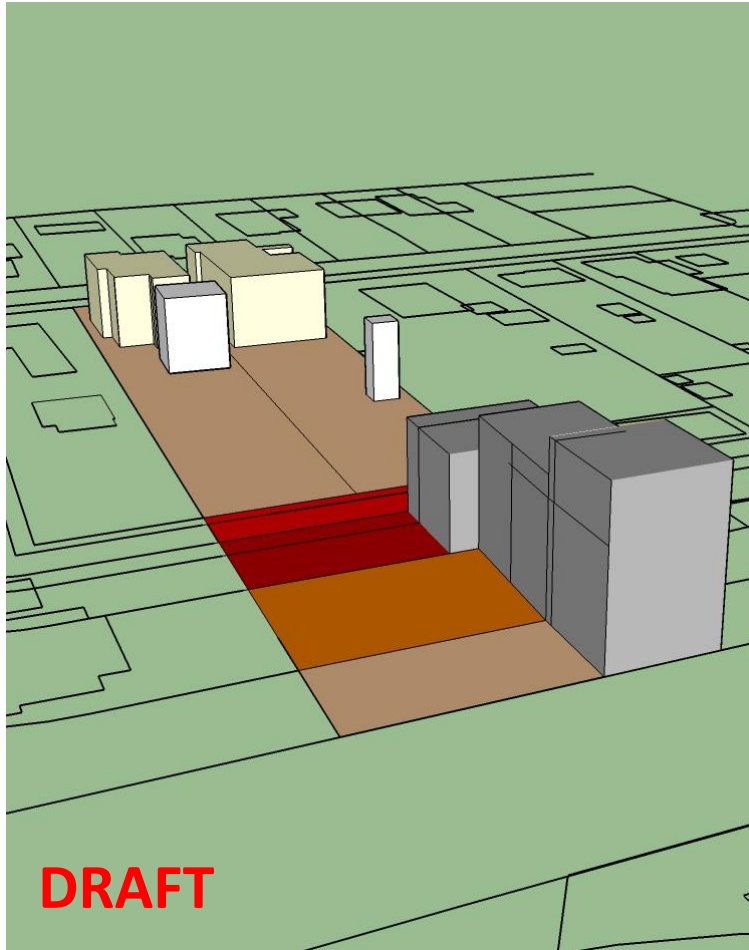
Site	13,888 sf	1/3 acre	138' deep	100' wide
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Modeling assumptions

Residential parking ratio	1.5 space/unit		
Retail parking ratio	3.6 spaces / 1000 sf		
Land cost	\$501,587	\$35/ sf	

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Rebuilding mixed use

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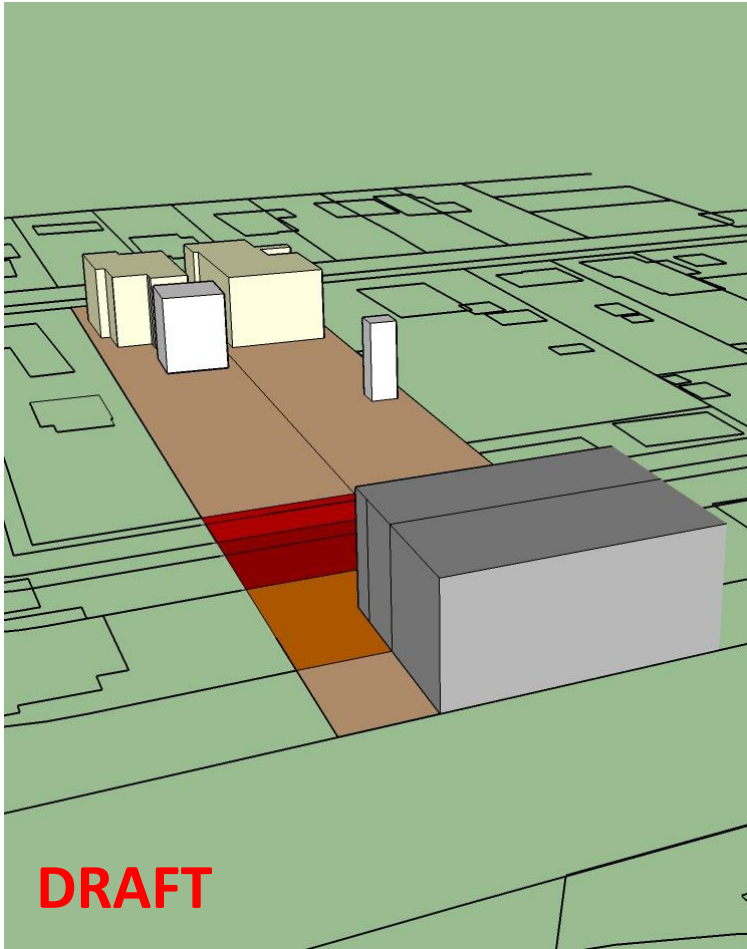
Results

Project cost	\$2,383,600		
Rate of return	7.9%	Target 12%	

NOT FINANCIALLY FEASIBLE

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Envision Tomorrow Modeling: Single-Family Compatibility and Parking for Shallow Parcels



Rebuilding mixed use 2-story

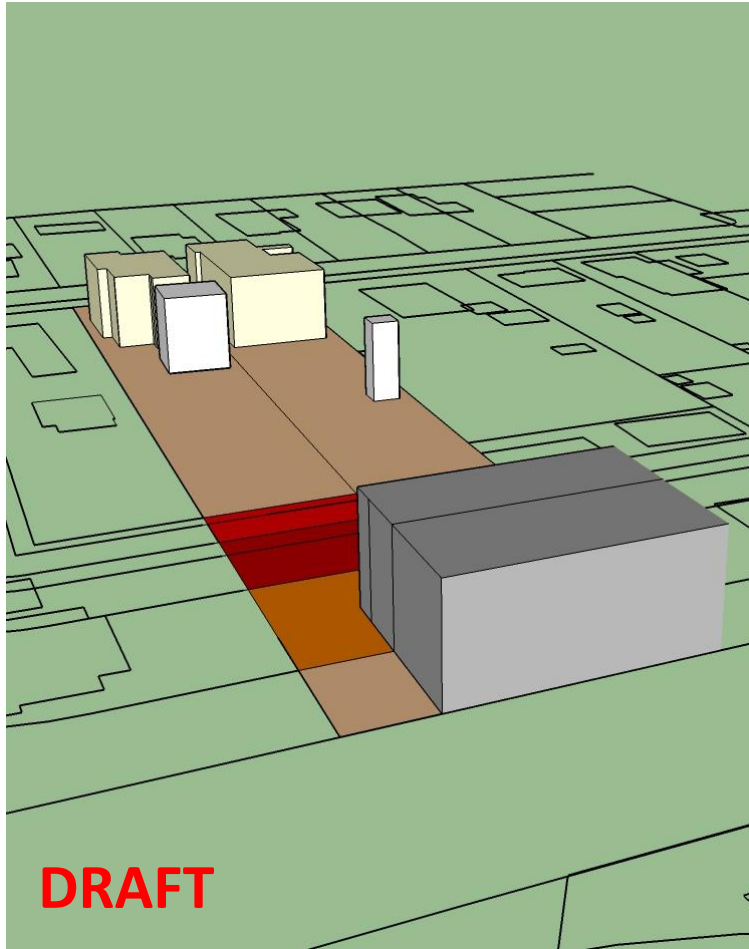
Site	13,888 sf	1/3 acre	138' deep	100' wide
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Modeling assumptions

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Envision Tomorrow Modeling: Single-Family Compatibility and Parking for Shallow Parcels



Rebuilding mixed use 2-story

Site	13,888 sf	1/3 acre	138' deep	100' wide
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Modeling assumptions

Residential parking ratio	1.5 space/unit		
Retail parking ratio	3.6 spaces / 1000 sf		
Land cost	\$501,587	\$35/ sf	

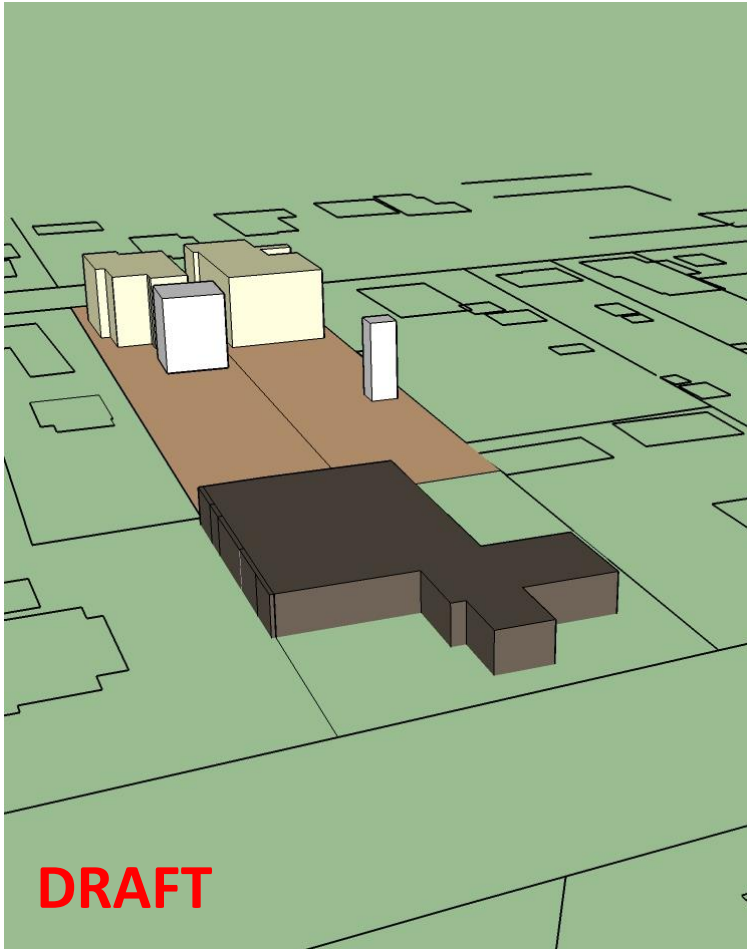
Results

Project cost	\$1,668,541		
Rate of return	7.7%	Target 12%	

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Envision Tomorrow Modeling: Single-Family Compatibility and Parking for Shallow Parcels



Remodeling current owner				
Site	13,888 sf	1/3 acre	138' deep	100' wide

Modeling assumptions

Residential parking ratio	1.5 space/unit
Retail parking ratio	3.6 spaces / 1000 sf

Results

Project cost	\$623,480		
Rate of return	14.4%	Target 12%	


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Single-Family Compatibility

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-  Capital Metro Bus Rapid Transit Stops
- Single family compatibility, <20k sf**
-  No Structure
-  30' or 2 Stories
-  40' or 3 Stories
-  Up to 50'
-  North Burnet Gateway
-  Neighborhood planning areas

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Building Types

Burnet Flats



Burnet Marketplace



Building Types



- 5-story Mixed (residential-retail) w/Structured Parking
- 5-story Office mixed
- 4-story Mixed (residential-retail)
- 4-story Office
- 4-story Office mixed
- 3-story Mixed (residential-retail)
- 3-story Office
- 3-story Office mixed
- 1-story Retail

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Building Types



Building Types

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Building Types

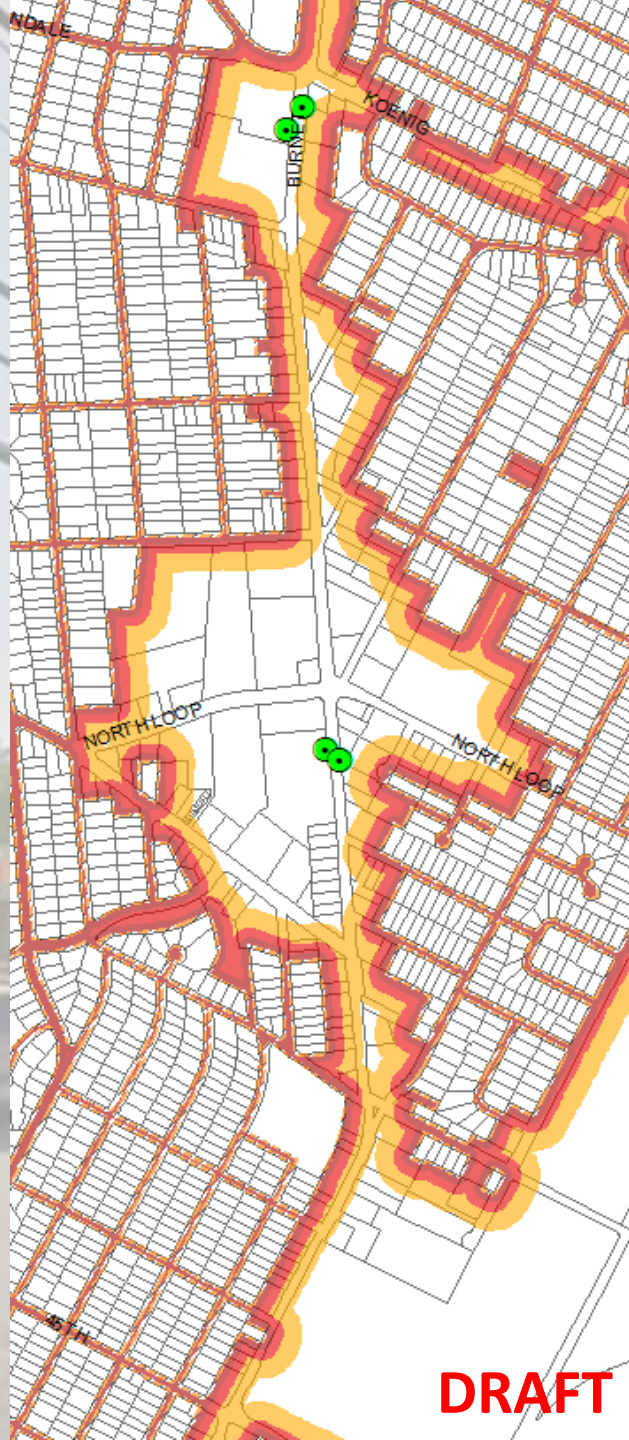


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Lower Burnet Compatibility



Cap Metro Bus Rapid Transit Stops



Parcels

Single-family compatibility



No Structure



30' or 2 Stories



40' or 3 Stories



Up to 50'

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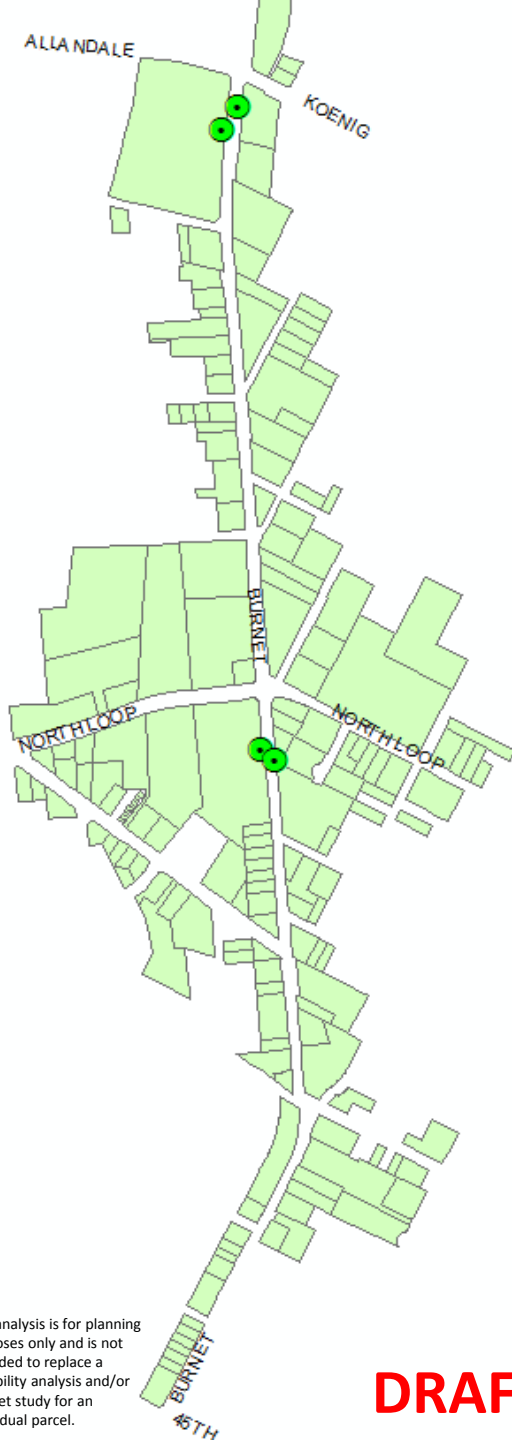
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Lower Burnet Opportunities

Commercial and multi-family parcels

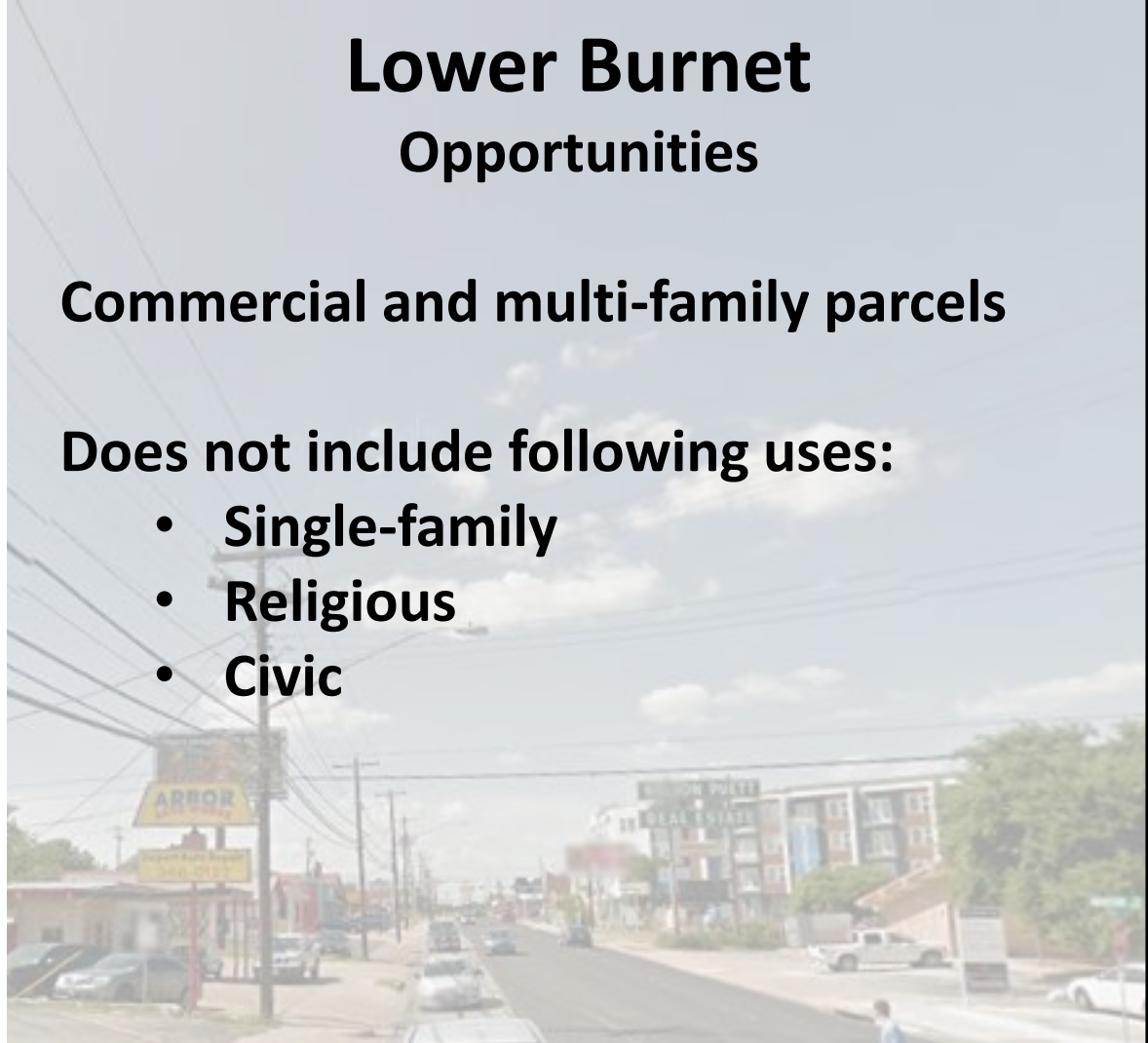
Does not include following uses:

- **Single-family**
- **Religious**
- **Civic**

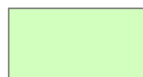


This analysis is for planning purposes only and is not intended to replace a feasibility analysis and/or market study for an individual parcel.

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Cap Metro Bus Rapid Transit Stops



Opportunity Parcels









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Lower Burnet Base Zoning

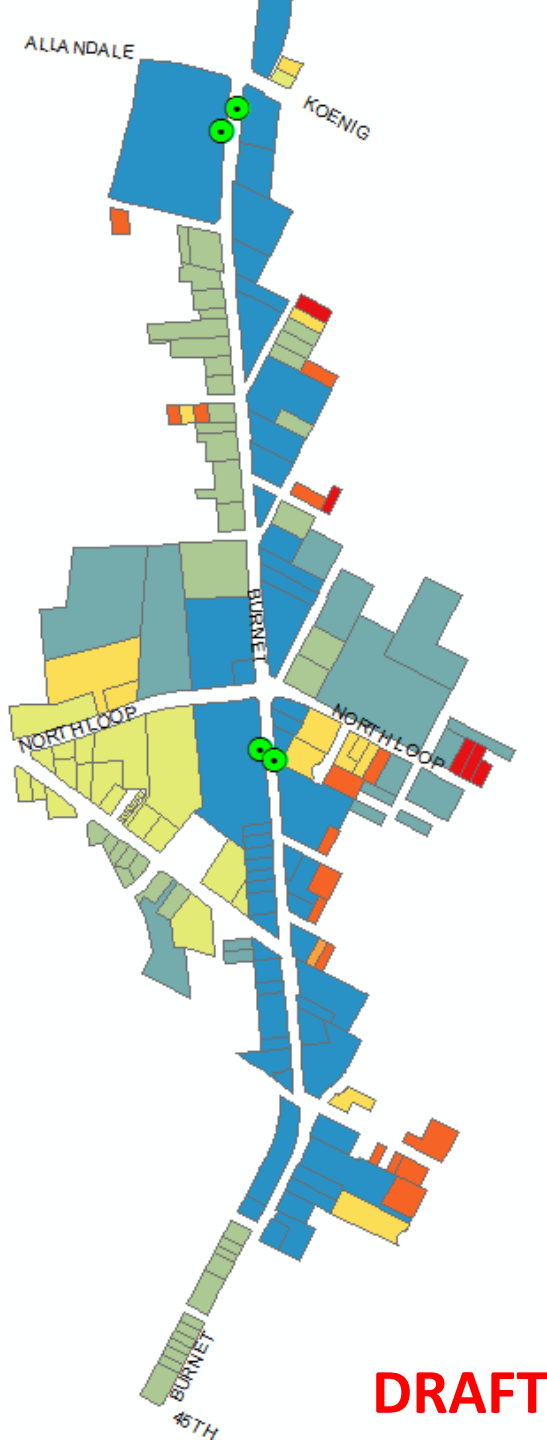
- Vertical mixed use (VMU) supersedes many aspects of base zoning
- Similar categories provide similar uses but differ in development standards
 - Allowed impervious cover
 - Setbacks
 - FAR

● Cap Metro Bus Rapid Transit Stops

Base Zoning

	VMU (vertical mixed use)
	MF (multi-family)
	CS (commercial services)
	GR (general retail)
	LR (limited retail)
	GO (general office)
	LO (limited office)
	NO (neighborhood office)

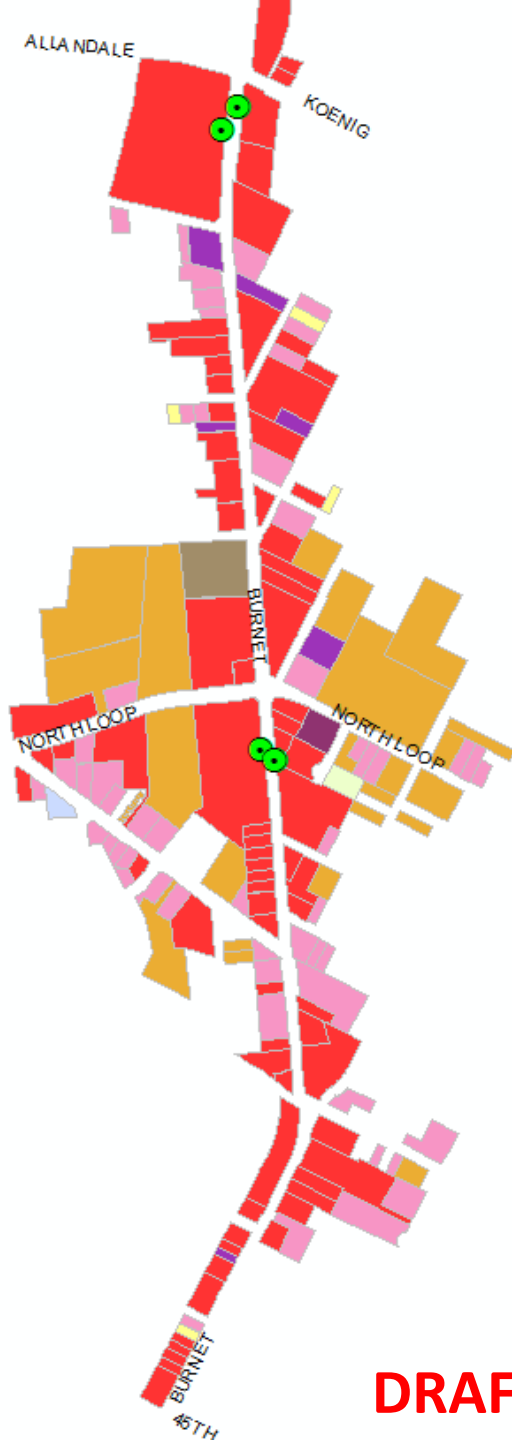
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Lower Burnet

Land Use

- Commercial primarily along corridor with some office
- Existing multi-family likely to remain multi-family



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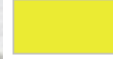


Cap Metro Bus Rapid Transit Stops

Land Use



Single Family



Mobile Home



Large Lot Single Family



Multi-family



Commercial



Mixed Use



Office



Industrial



Resource Extraction



Civic



Open Space



Transportation



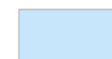
Roads



Utilities



Undeveloped



Water



Unknown

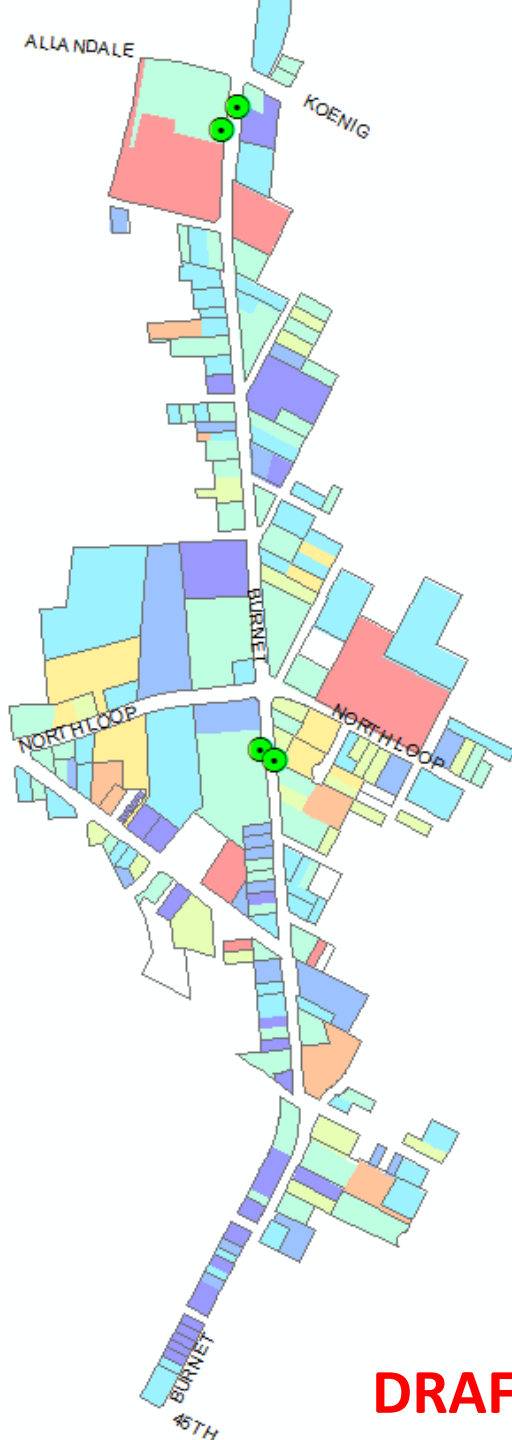
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Lower Burnet

Land Acquisition Costs

- Includes both land and any improvements
- Generally higher on per square foot basis in Lower Burnet

NOTE: TCAD 2014 data is incomplete for some parcels.



DRAFT

● Cap Metro Bus Rapid
Transit Stops

2014 Land Acquisition Costs

	<=\$5
	\$5-10
	\$10-20
	\$20-30
	\$30-40
	\$40-50
	\$50-60
	>\$60

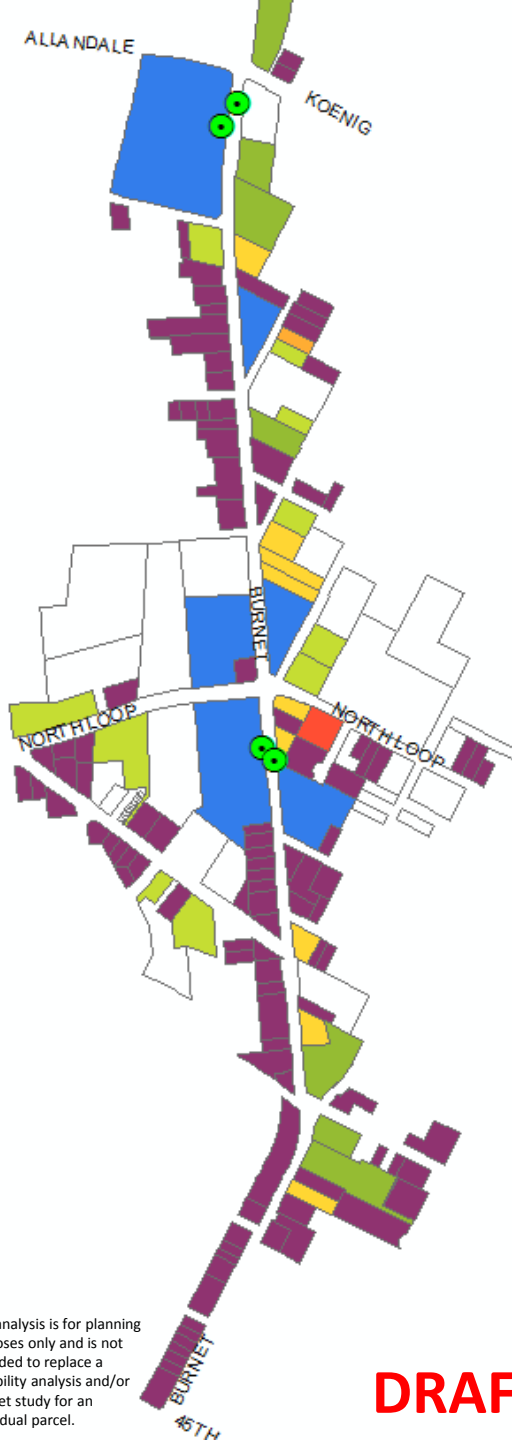
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Lower Burnet

Zoning-Market Capacity

Projects likely to pencil given:

- Zoning
- Compatibility
- Size of parcel
- Land acquisition costs
- Construction costs
- Current market rents



● Cap Metro Bus Rapid Transit Stops

Building Types

- 5-story Mixed (residential-retail) w/Structured Parking
- 5-story Office mixed
- 4-story Mixed (residential-retail)
- 4-story Office
- 4-story Office mixed
- 3-story Mixed (residential-retail)
- 3-story Office
- 3-story Office mixed
- 1-story Retail
- REMODEL

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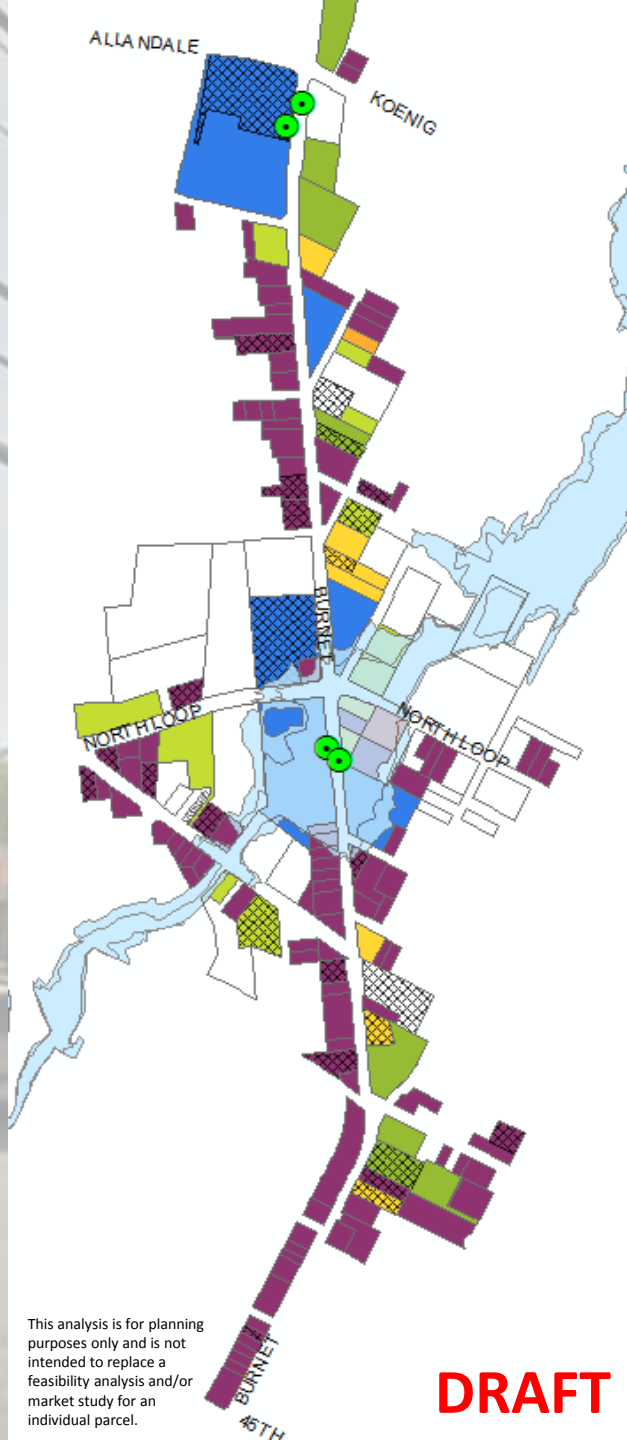
DRAFT

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Lower Burnet

Determining Developable Parcels

- Impact of 100-year floodplain
- Recent investments
 - >10% of TCAD value
 - Less likely to redevelop in near future



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DRAFT

- 100-year Floodplain
- Recent Investments >10% TCAD value
- Cap Metro Bus Rapid Transit Stops

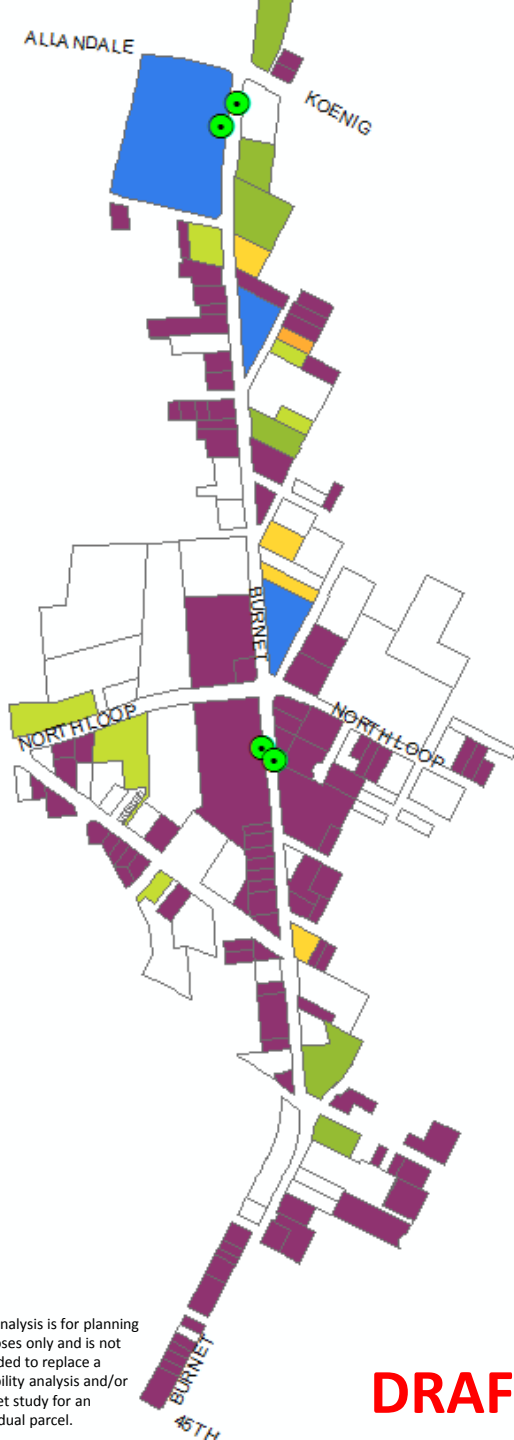
Building Types

- 5-story Mixed (residential-retail) w/Structured Parking
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Lower Burnet Developable Parcels

- More properties likely to “remodel” instead of redevelop
 - Remodeling does not require site plan
 - Must leave only one original wall standing during remodeling
- Others may not do further remodeling



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● Cap Metro Bus Rapid Transit Stops

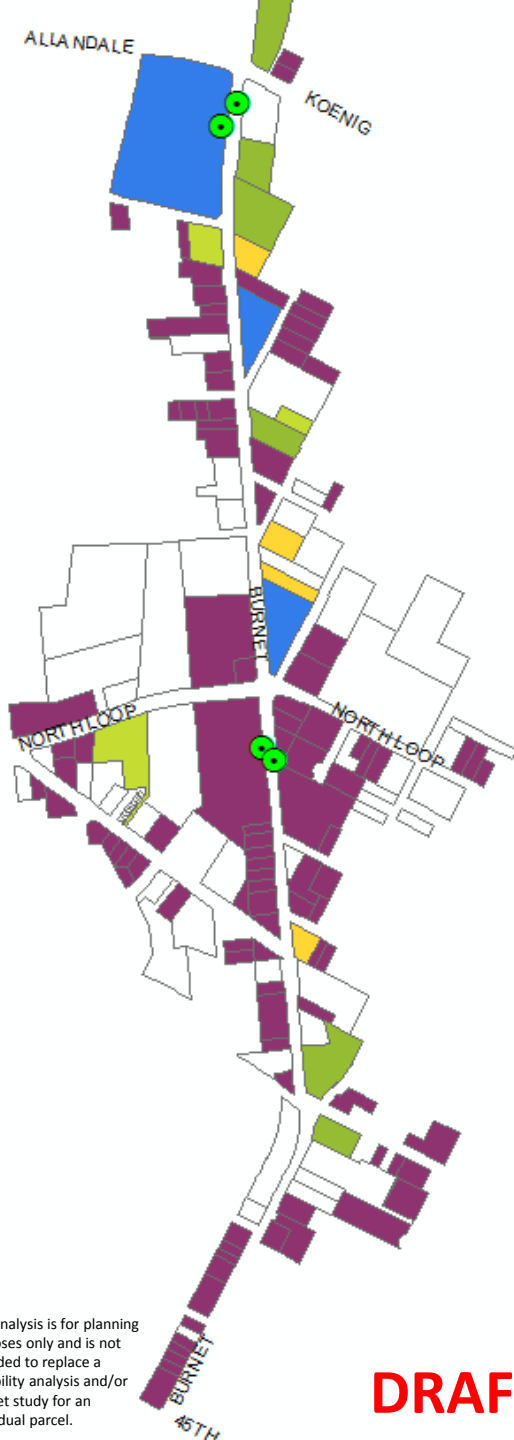
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Lower Burnet Trend

- Evaluation of developable parcels for:
 - Surrounding land uses/development
 - Accessibility
 - Site plans under review
- Market study needed for more detail of likely absorption of retail and office



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DRAFT

● Cap Metro Bus Rapid Transit Stops

Building Types

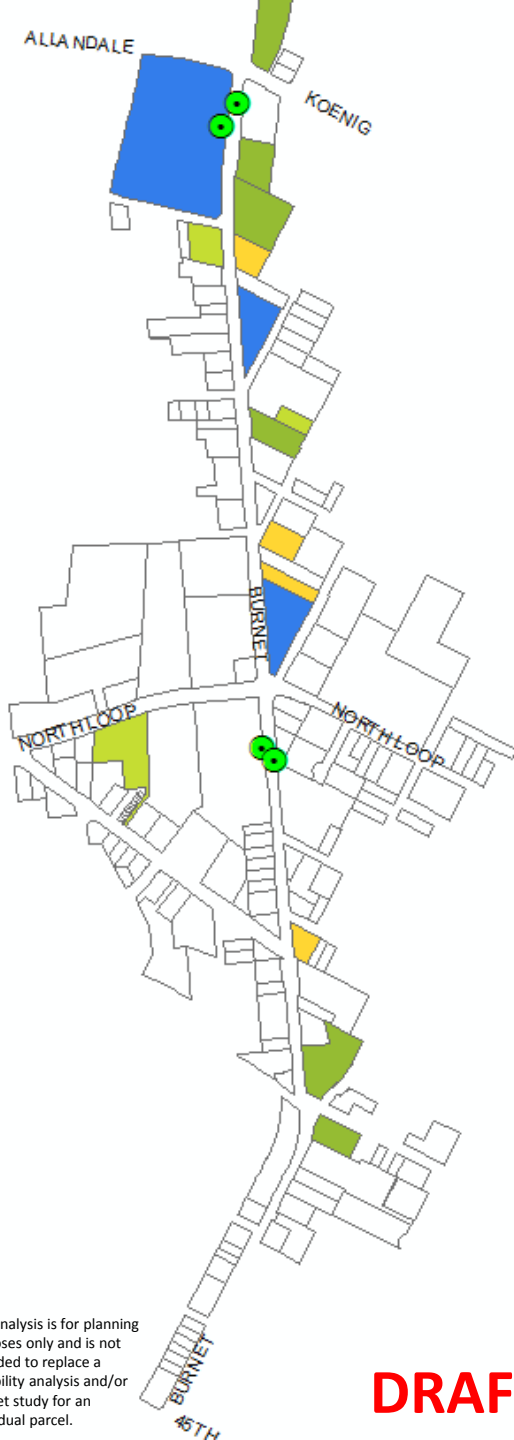
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Lower Burnet

Trend without Remodels

- Areas where significant private-sector streetscape improvements likely through existing code
- CIP needed for other areas
 - Current building placement would remain



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● Cap Metro Bus Rapid Transit Stops

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Mid Burnet Compatibility



Cap Metro Bus Rapid Transit Stops



Parcels

Single-family compatibility



No Structure



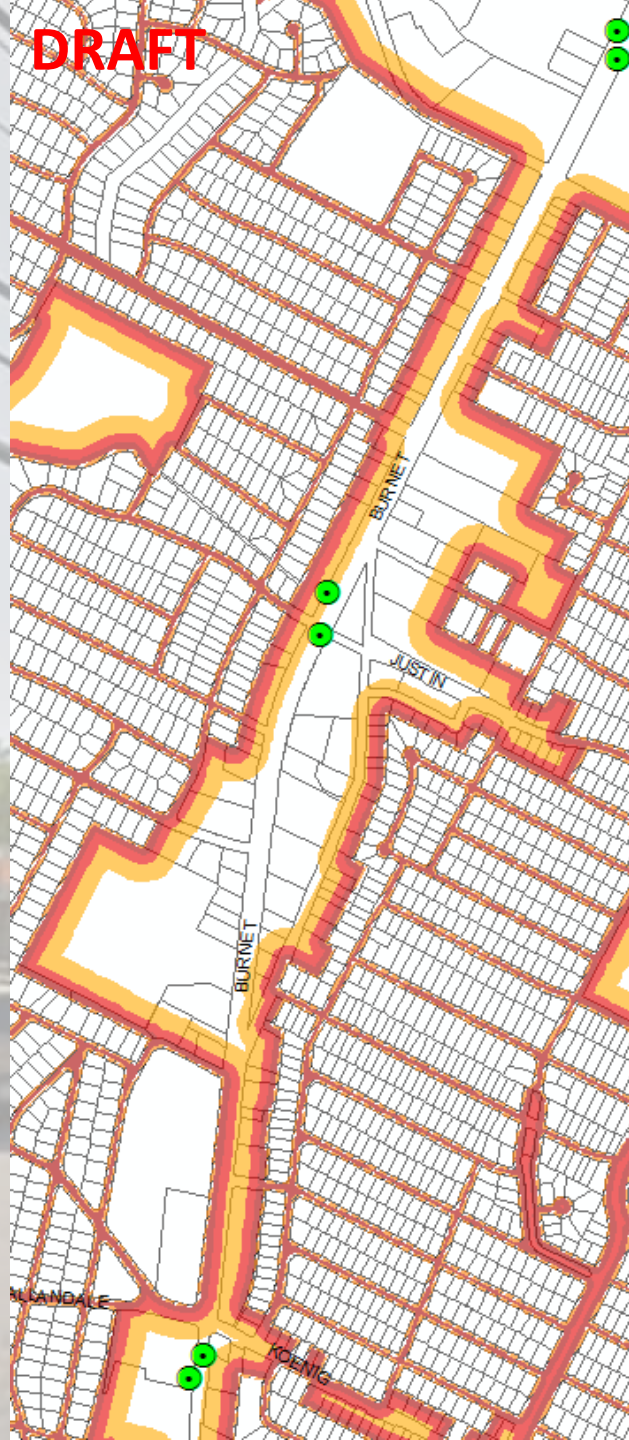
30' or 2 Stories



40' or 3 Stories



Up to 50'



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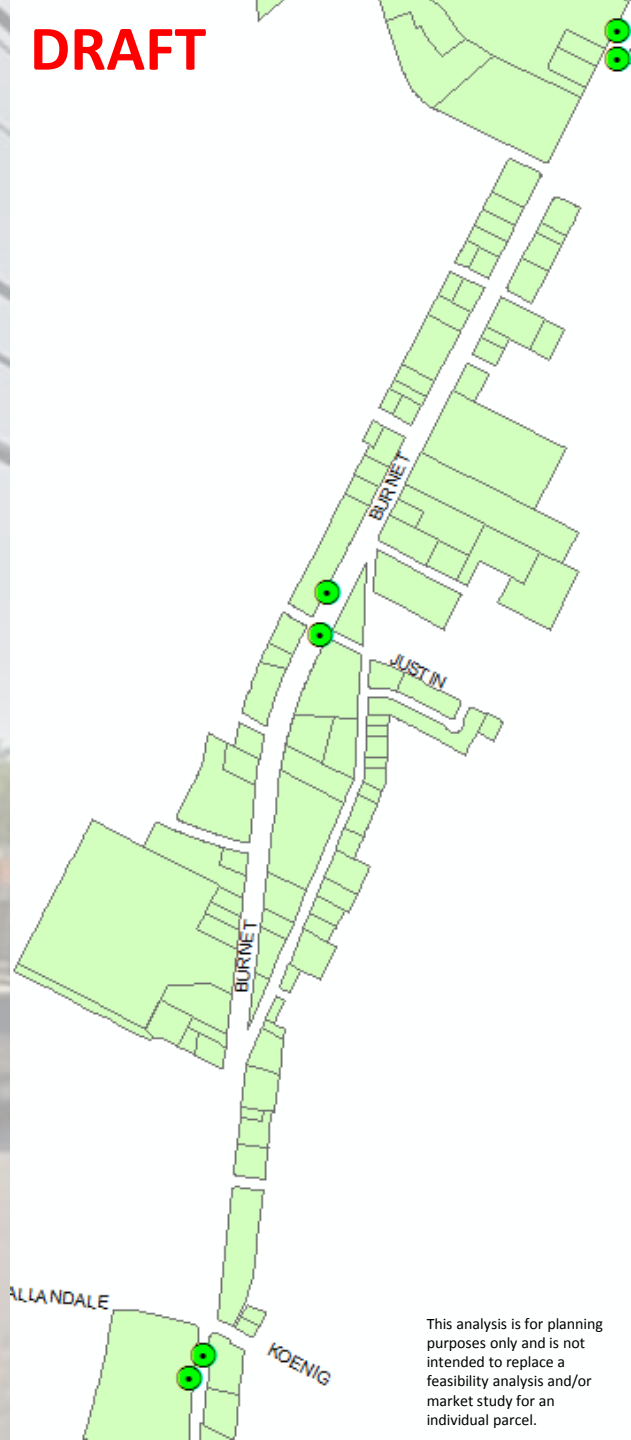
DRAFT

Mid Burnet Opportunities

Commercial and multi-family parcels

Does not include following uses:

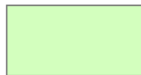
- Single-family
- Religious
- Civic



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Cap Metro Bus Rapid Transit Stops



Opportunity Parcels

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Mid Burnet Trend

- **Parcels producing significant income (mini-storage) less likely to redevelop**
- **Market study needed for more detail on likely absorption of retail and office**



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● Cap Metro Bus Rapid Transit Stops

Building Types

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Mid Burnet

Trend without Remodels

- Areas where significant private-sector streetscape improvements likely through existing code
- CIP needed for other areas
 - Current building placement would remain



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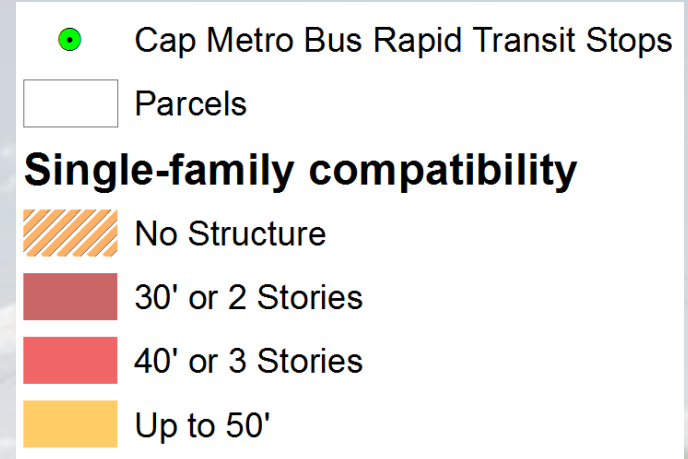
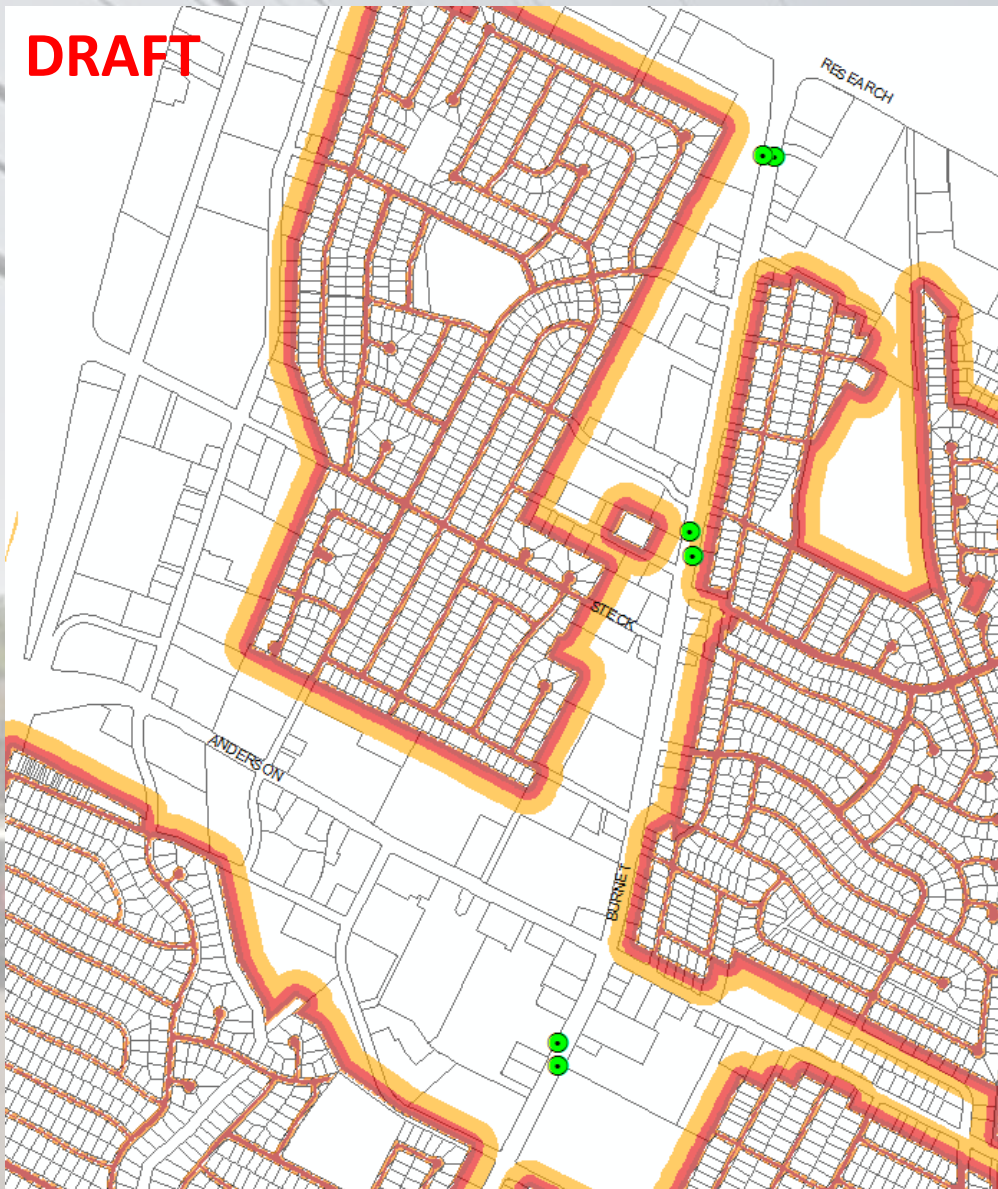
● Cap Metro Bus Rapid Transit Stops

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Upper Burnet and Anderson: Compatibility



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Upper Burnet and Anderson: Opportunities

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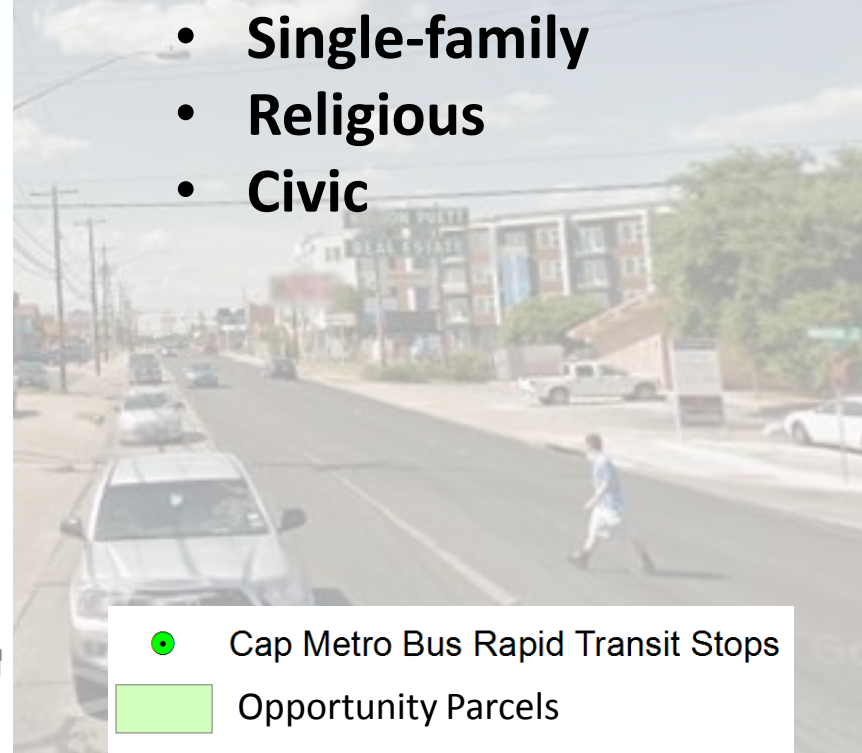


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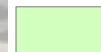
Commercial and multi-family parcels

Does not include following uses:

- **Single-family**
- **Religious**
- **Civic**



Cap Metro Bus Rapid Transit Stops



Opportunity Parcels

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Upper Burnet and Anderson: Trend

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- Evaluation of developable parcels for:
 - Surrounding land uses/development
 - Accessibility
 - Site plans under review
- Further market study needed for retail and office uses

● Cap Metro Bus Rapid Transit Stops

Building Types

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Upper Burnet and Anderson: Trend without Remodels

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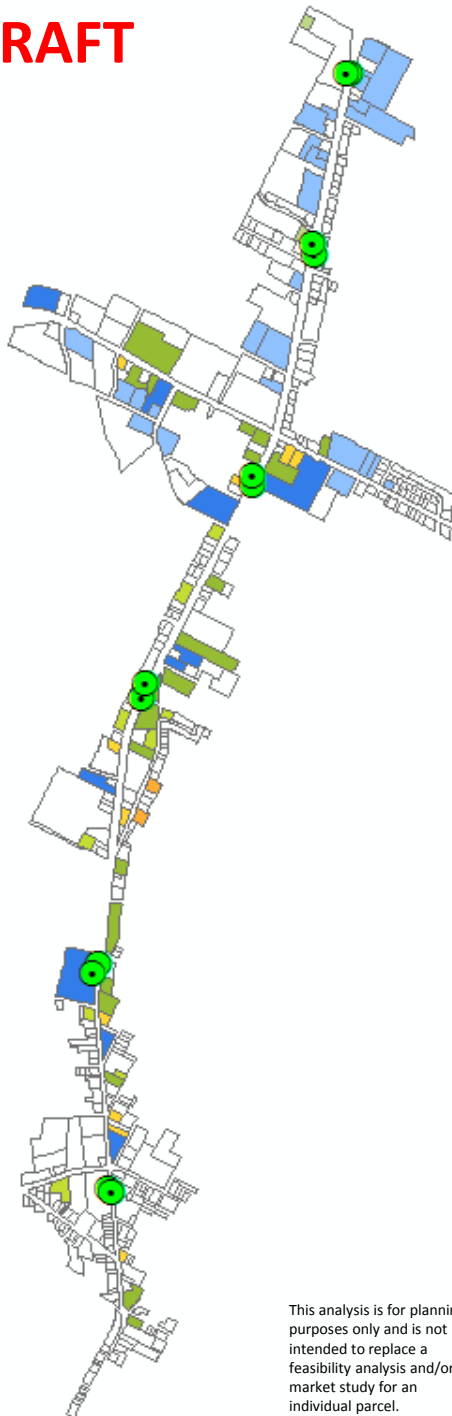
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Additional comments

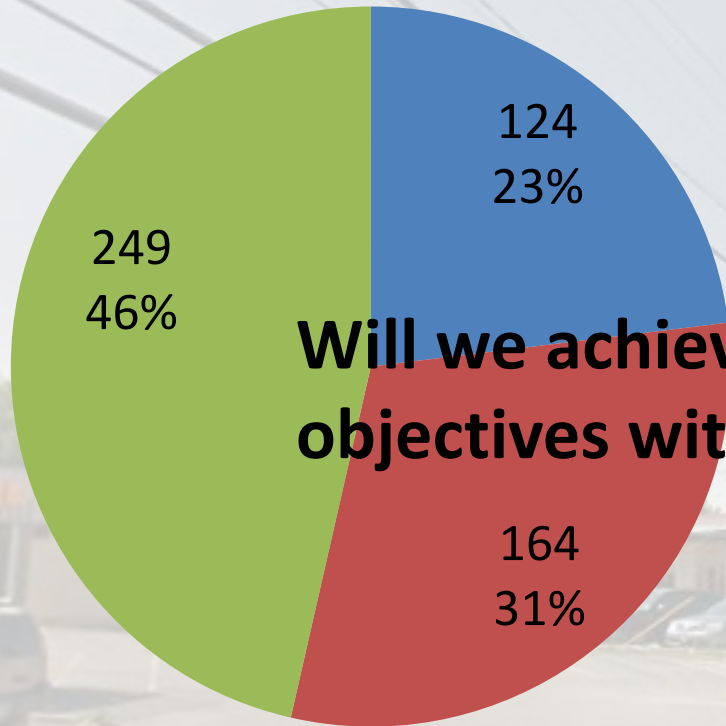
- **Assembling shallow parcels**
 - **For Lower Burnet less likely to be financially feasible due to combination of:**
 - **Required parking ratios**
 - **Cost of land**
 - **Depth of parcel**
 - **Expensive land used for non-revenue-producing parking**
 - **May occur in mid and upper sections**
- **Mixed Use (MU) zoning not likely to produce housing because of large unit square footage requirements.**

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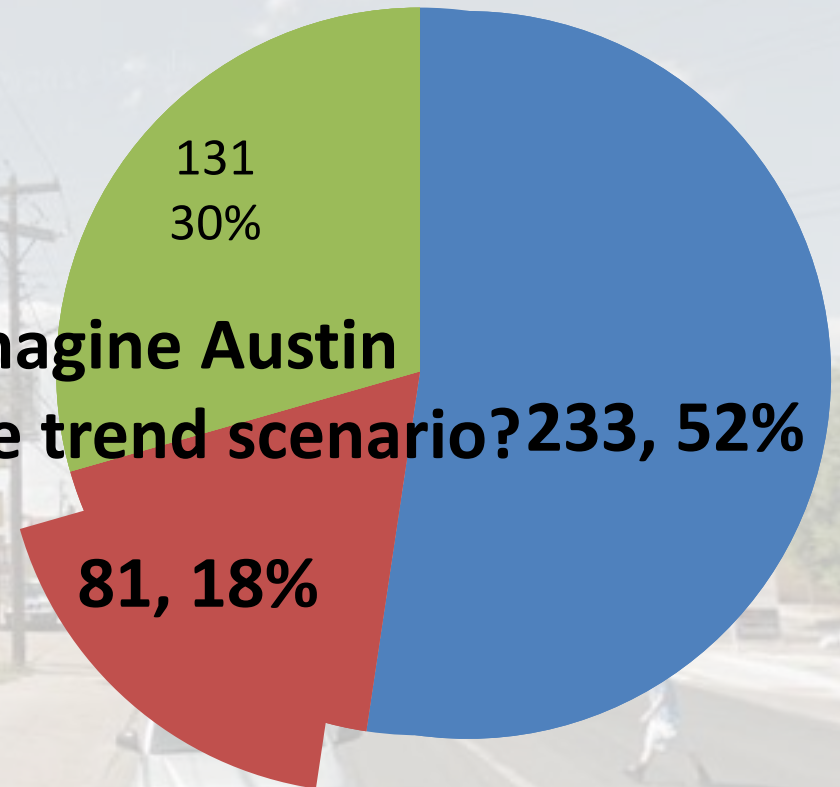
Envision Tomorrow Modeling

DRAFT Trend Scenario Totals

by ACREAGE



by PARCEL



Will we achieve Imagine Austin objectives with the trend scenario? 233, 52%

■ REMODEL

■ Redevelopment

■ Other (MF, condos, already redeveloped or remodeled, significant current income, etc)

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Envision Tomorrow Modeling

Opportunities for code revision

Zoning

Zoning Related Inputs

- Building height
- FAR (calculated)
- Land use
 - residential often subsidizes retail
- Impervious cover
- Parking ratios
- Park dedication fees
- Austin Energy fees
- Water quality fees

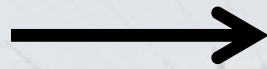


Envision Tomorrow Modeling

Springboard for collaboration

Collaborating departments and agencies

- **Transportation**
- **Water Utility**
- **Electric Utility**
- **Parks and Recreation**
- **Watershed**
- **Public Works**
- **Capital Planning**
- **Economic Development**
- **Transit agency**
- **School district**



Integrating land use and transportation planning

Travel app results for daily trips:

- ***Walking***
- ***Transit***
- ***Vehicle***
- ***Internal***
- ***External***

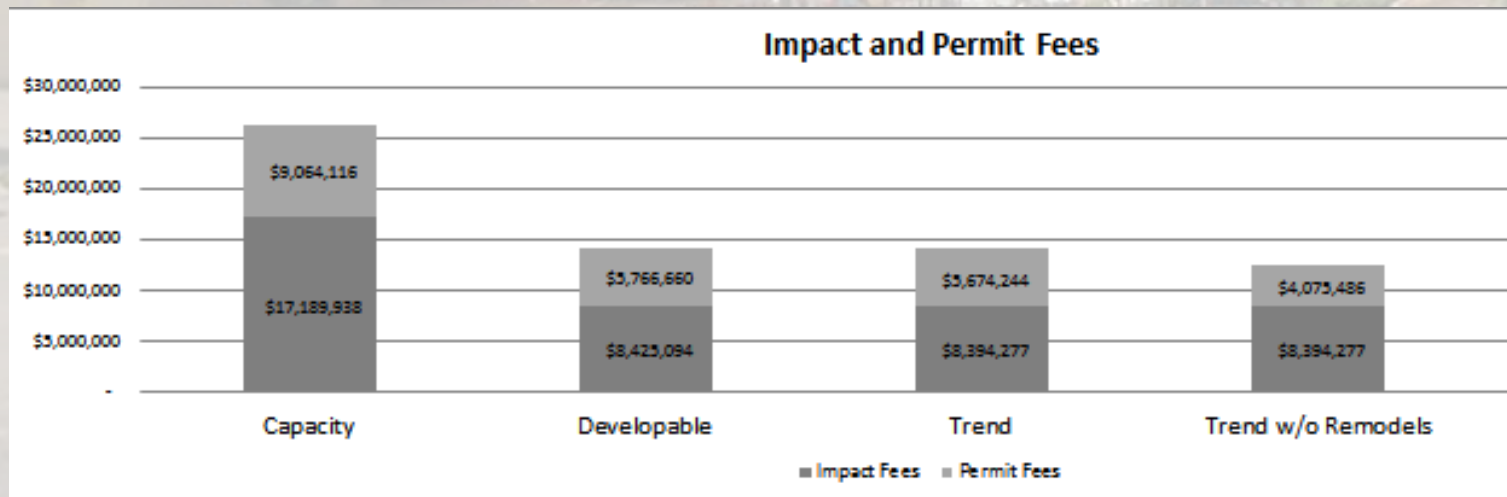
Envision Tomorrow Modeling

Springboard for collaboration

Collaborating departments and agencies

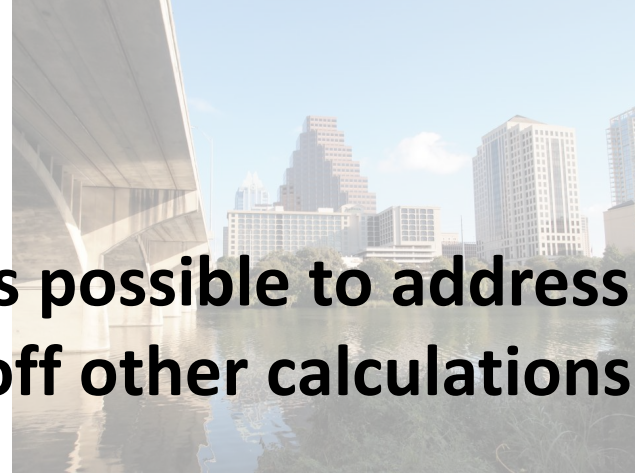
- Transportation
- Water Utility
- Electric Utility
- Parks and Recreation
- Watershed

CIP planning and
departmental goals





- **Open source**
- **Custom applications possible to address specific**
- **Ability to leverage off other calculations**



- **Sensitivity analysis for issues of particular interest**
- **Insight into cost of community benefits**



- **Insight into regulatory and market interactions**
- **Potential for strategic CIP planning**
- **Springboard for collaboration with other departments and agencies**





a suite of urban and regional planning tools

Applications at the City of Austin

For more information contact:

Sylvia N. Leon Guerrero

Urban Design Division

512.974.2757

Sylvia.LeonGuerrero@austintexas.gov

Rocky Mountain Land Use Institute, March 13, 2015