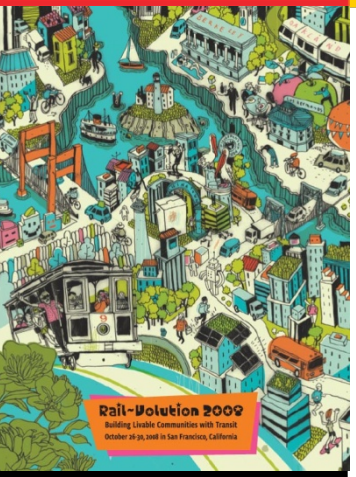
Rail~Volution

Building Livable Communities with Transit



San Francisco
2008

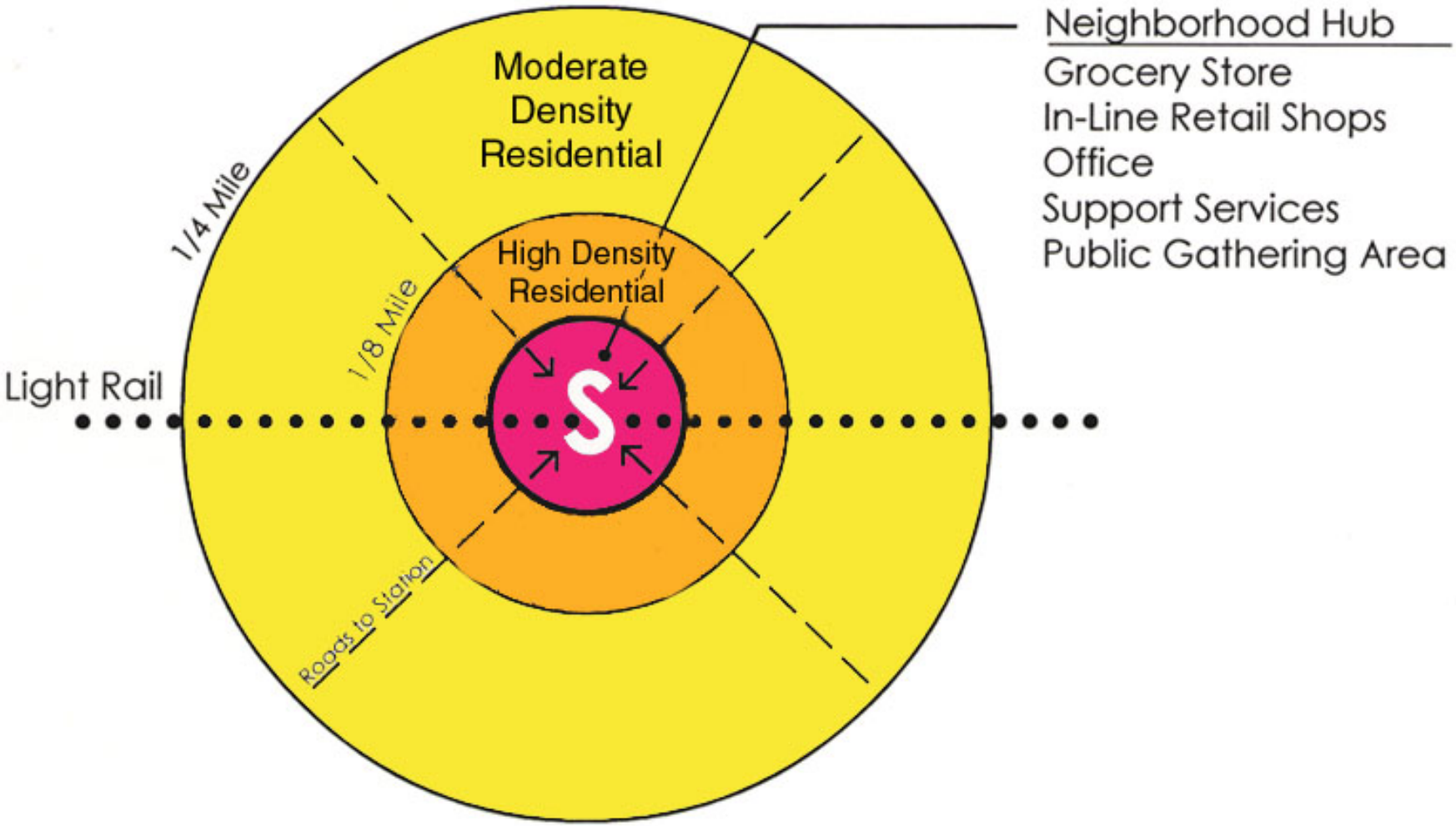
Integrating Urban Design, Architecture and Engineering in Station Design

CRANDALL ARAMBULA

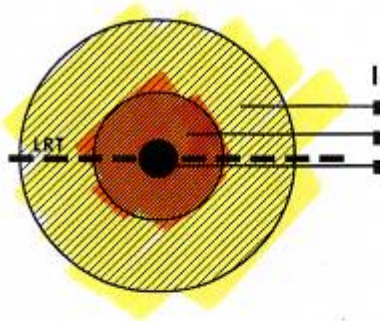
October 29, 2008

Ideal Station
Land Use & Ridership

Ideal Station



IDEAL TOD ASSUMPTIONS



Ideal Transit Oriented Development (TOD)
- Residential - 25 units/acre
- Residential - 40 units/acre
- Neighborhood Hub (Grocery Store, Retail and Open Space)

The Ideal Transit Oriented Development (TOD) has the following characteristics:
- Occurs on vacant land within a 360 degree, 1/4 mile radius of the transit stop.
- Has a neighborhood hub adjacent to the transit station containing a grocery store, retail, support services and public gathering space.

Assumptions related to the Ideal TOD development potential and transit ridership are listed below:

Gross Areas - Ideal TOD

■ Within 1/8 mile of station	31.4 acres
■ 1/8 mile to 1/4 mile of station	94.2 acres

Developable Area

■ Subtract 10% for environmentally sensitive are	
■ Subtract 25% for streets and public facilit	
■ Within 1/8 mile of station, 31.4 acre	20.4 acres
■ 1/8 mile to 1/4 mile of station	61.2 acres

Households & Employ

■ 20.4 acres x 40 dwe	816 units
■ 61.2 acres x 25 dwell	1,531 units
■ Employment, 3 acres	oyees/acre 285 employees

3,200 Transit Trips (10% on transit)

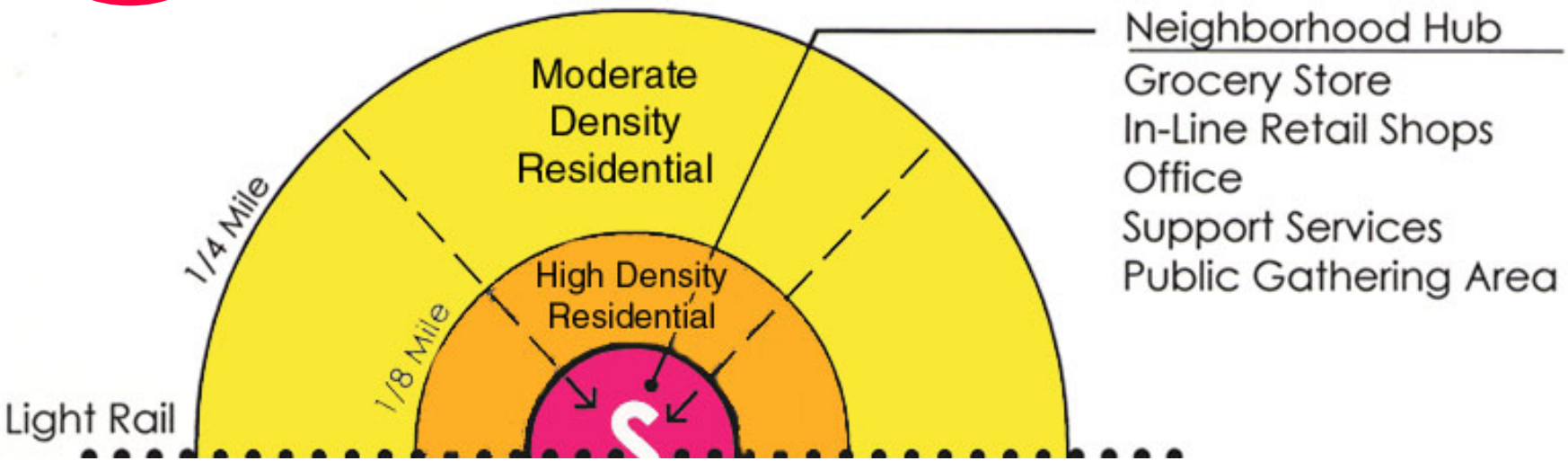
Generated Trips

■ 2,347 dwelling units x 10.8 trips per day	25,347 trips per day
■ 285 employees x 24.88 trips per day	7,090 trips per day

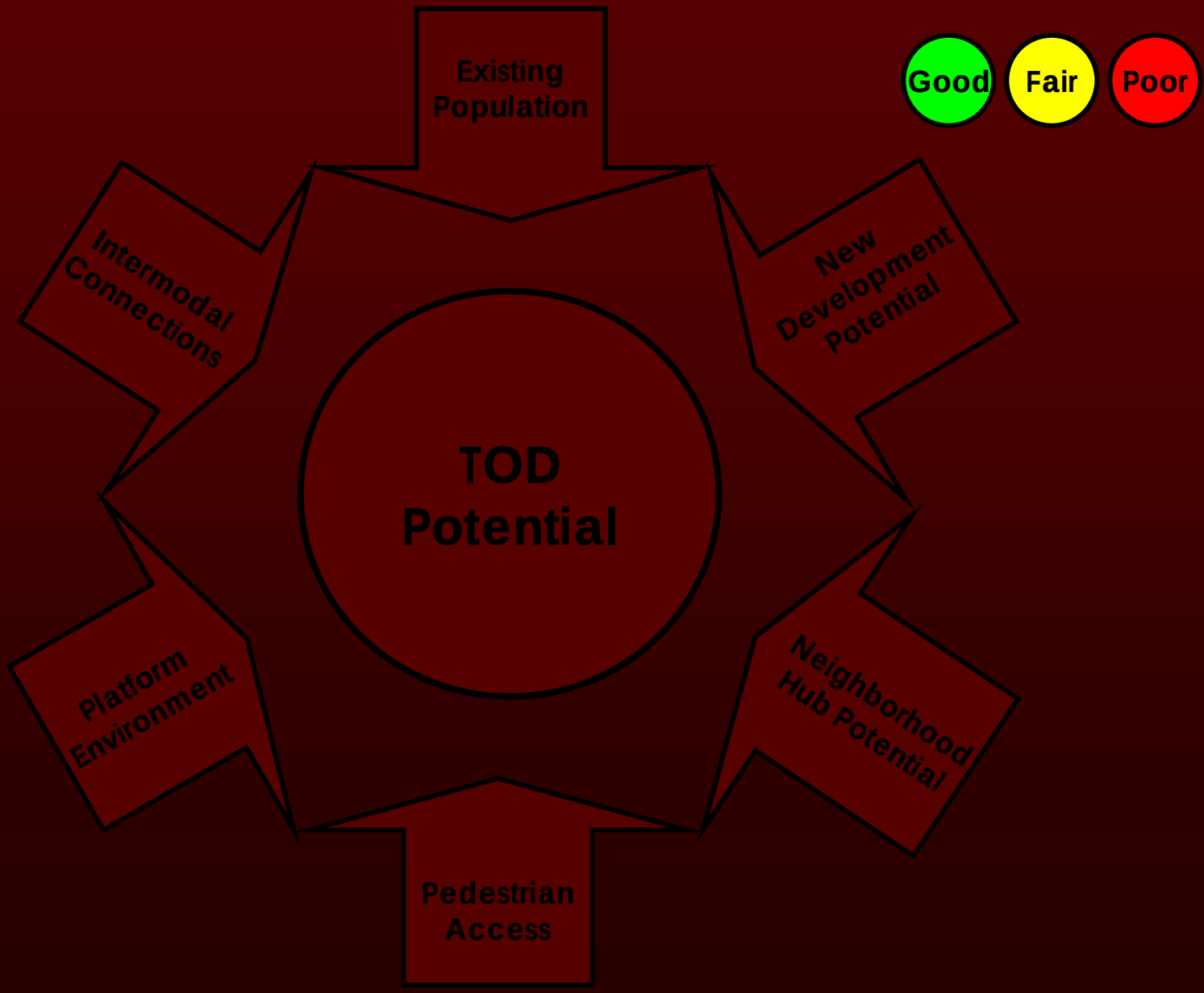
Transit Trips

■ 32,437trips x 10% on transit	3,244 trips per TOD

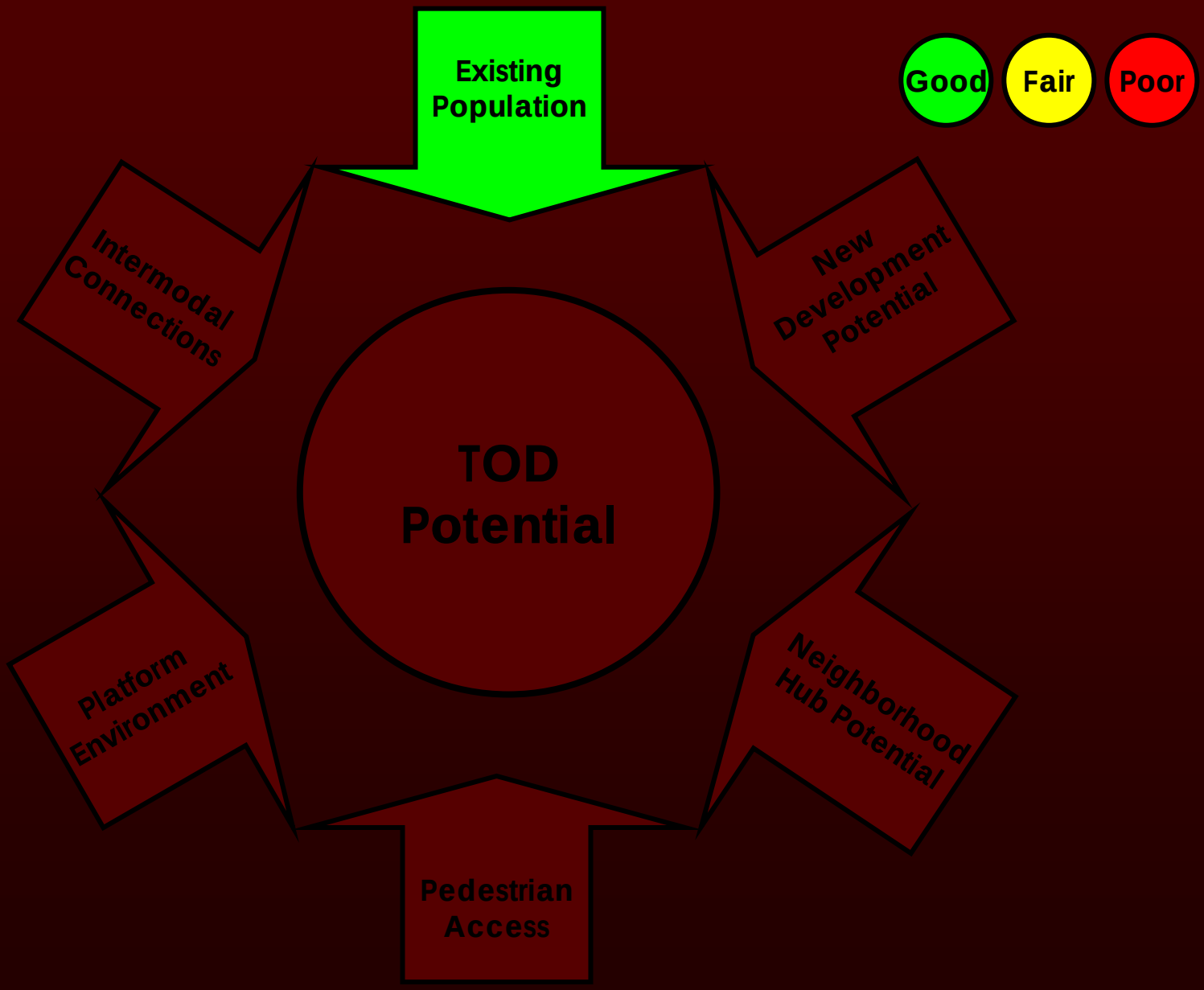
Ideal Station



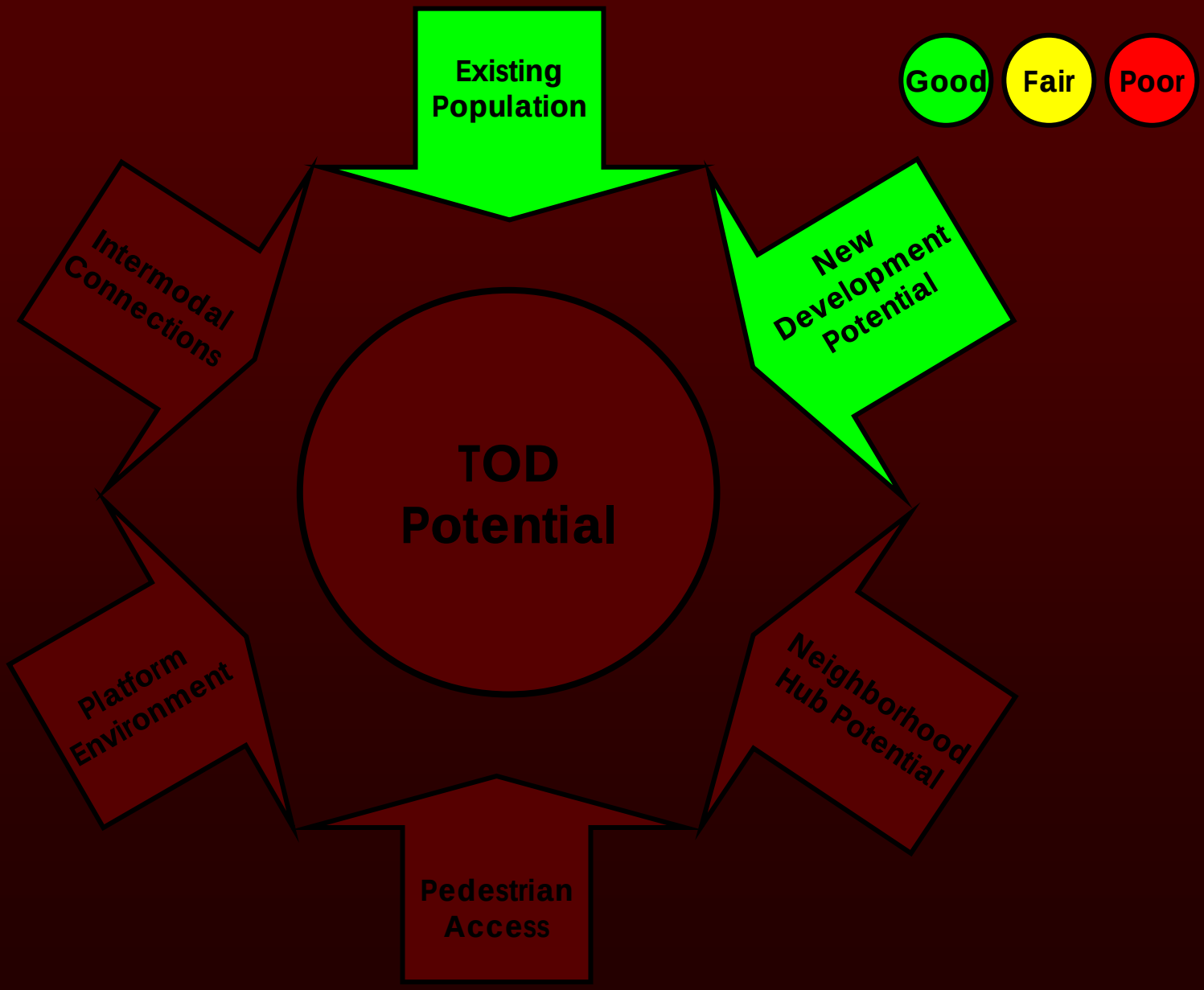
TOD Potential



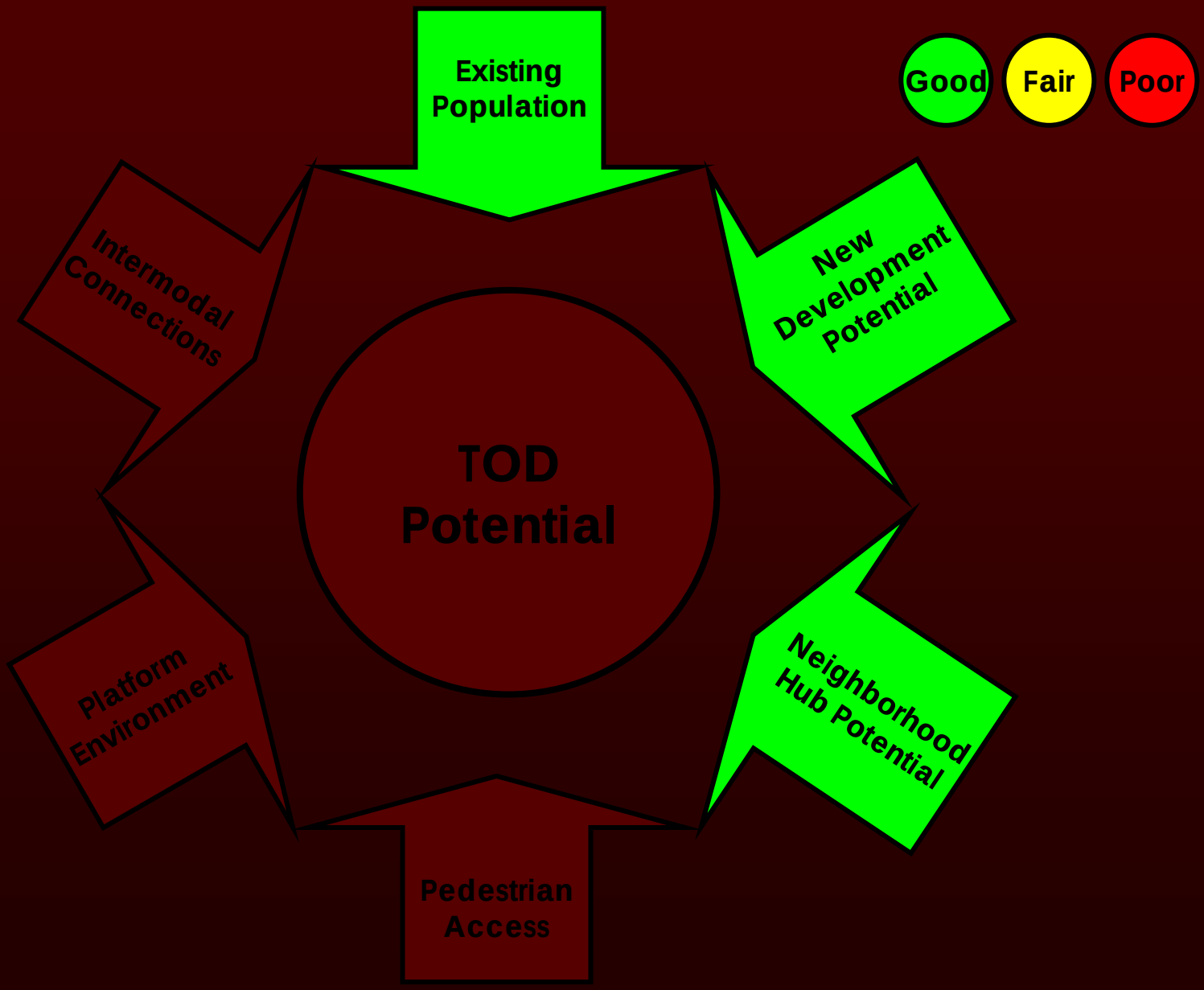
TOD Potential



TOD Potential



TOD Potential



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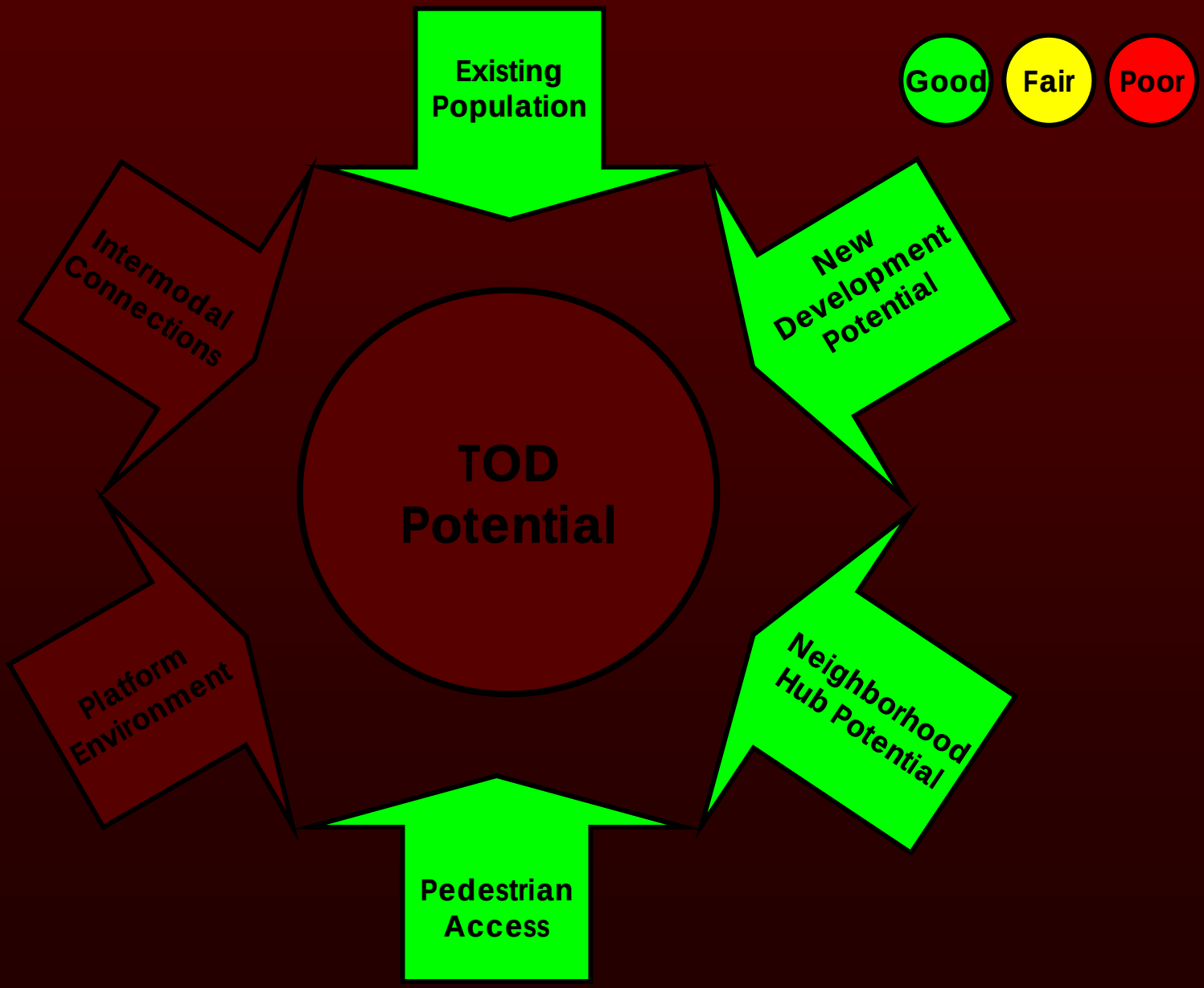

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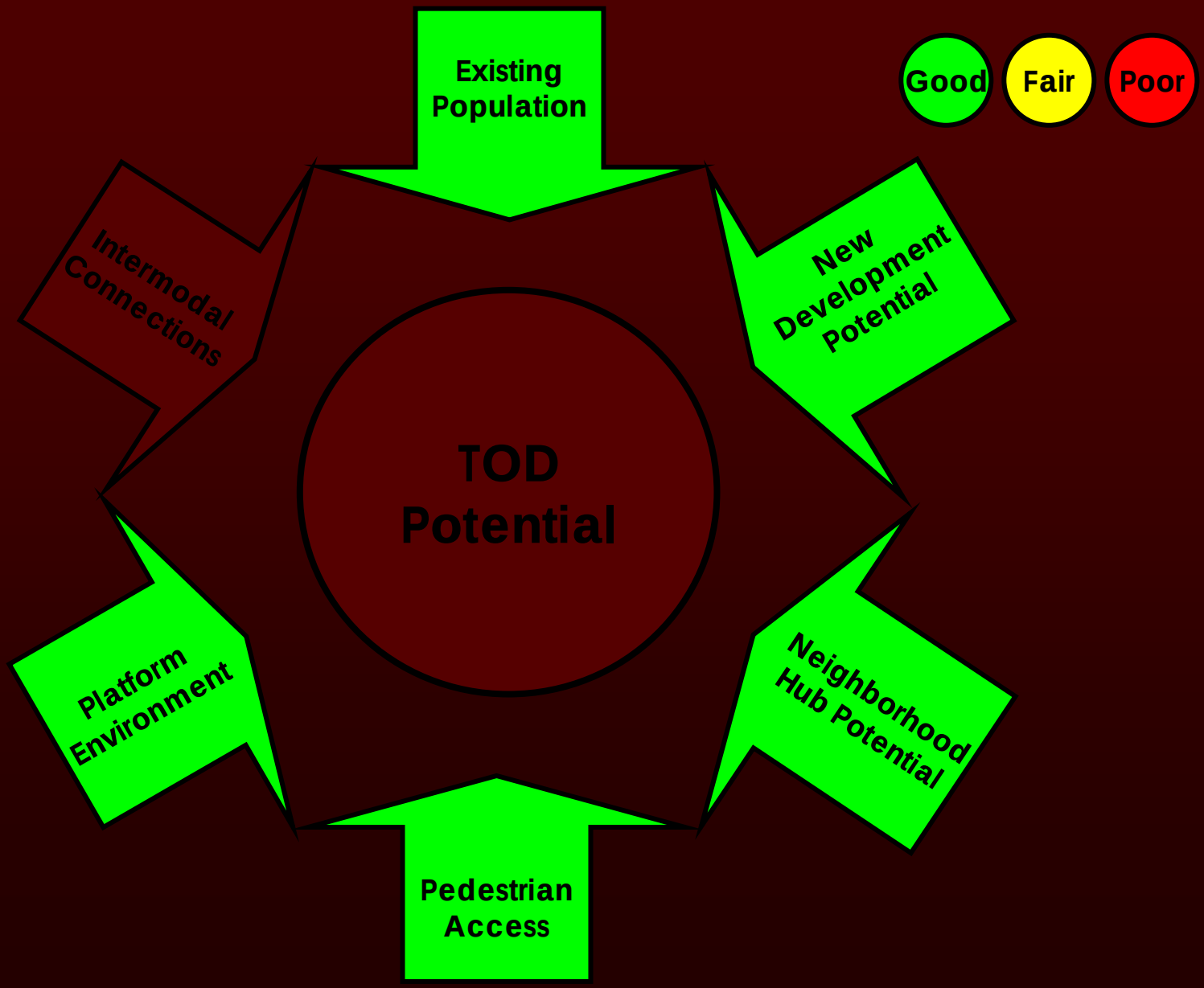

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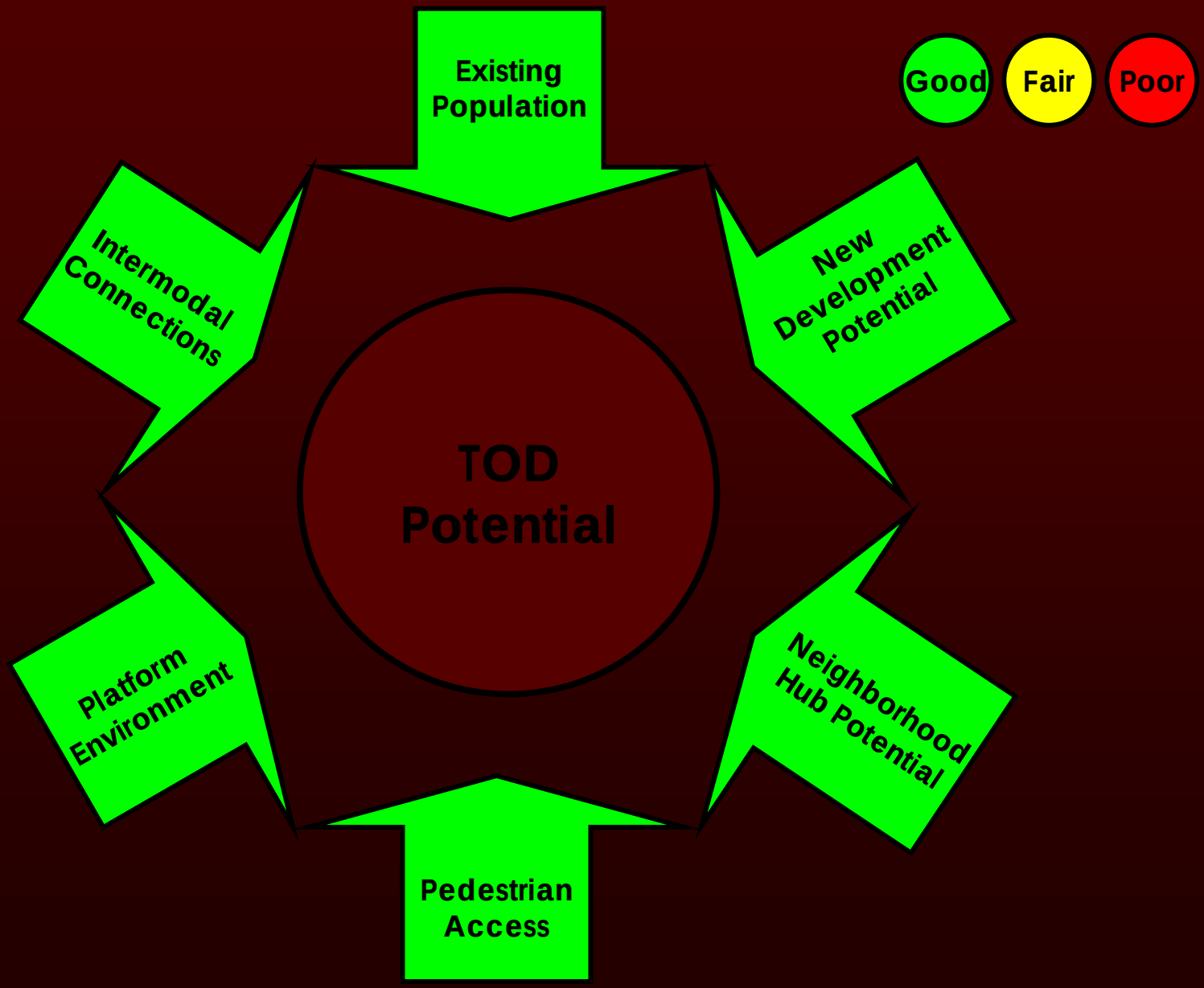
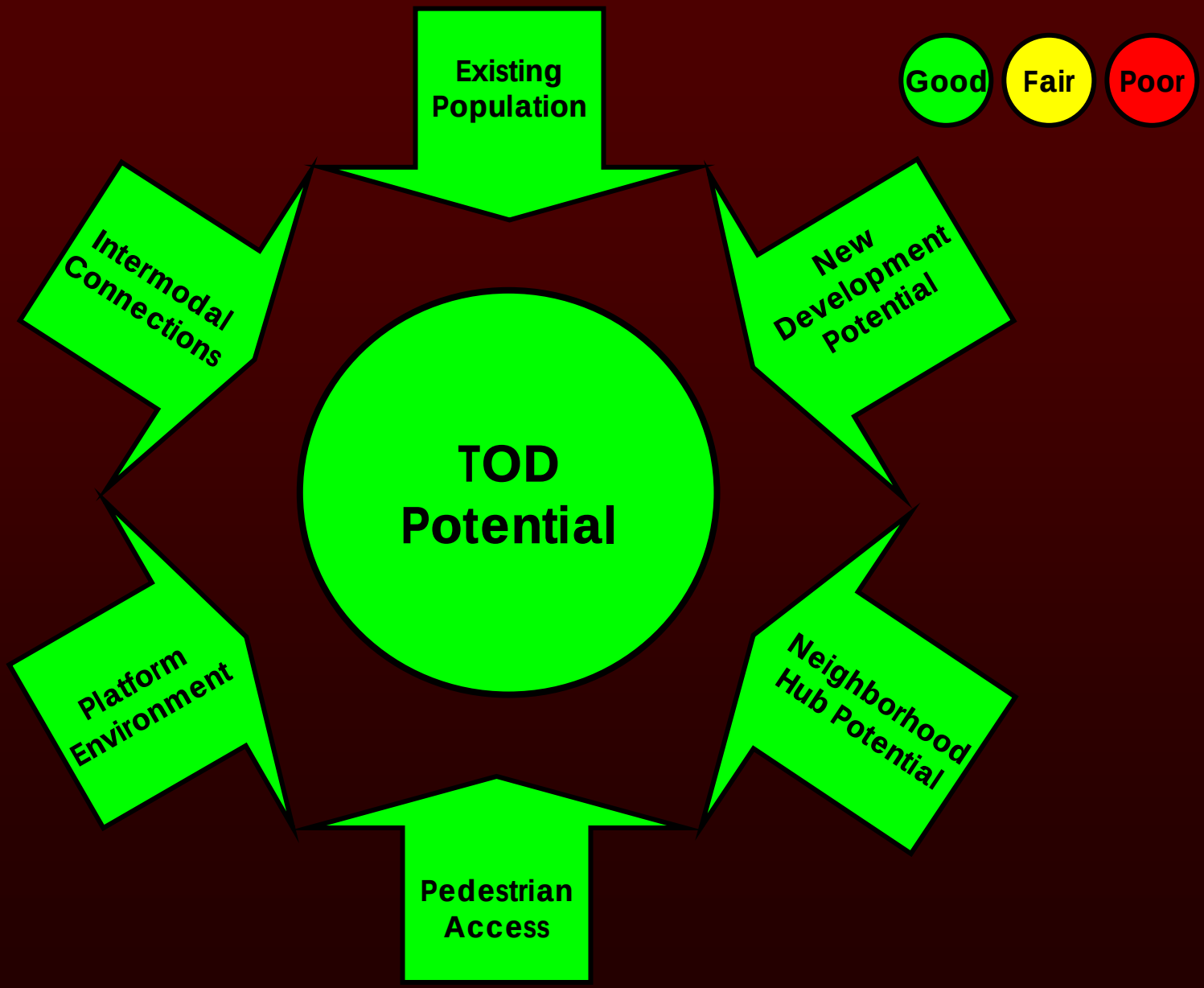
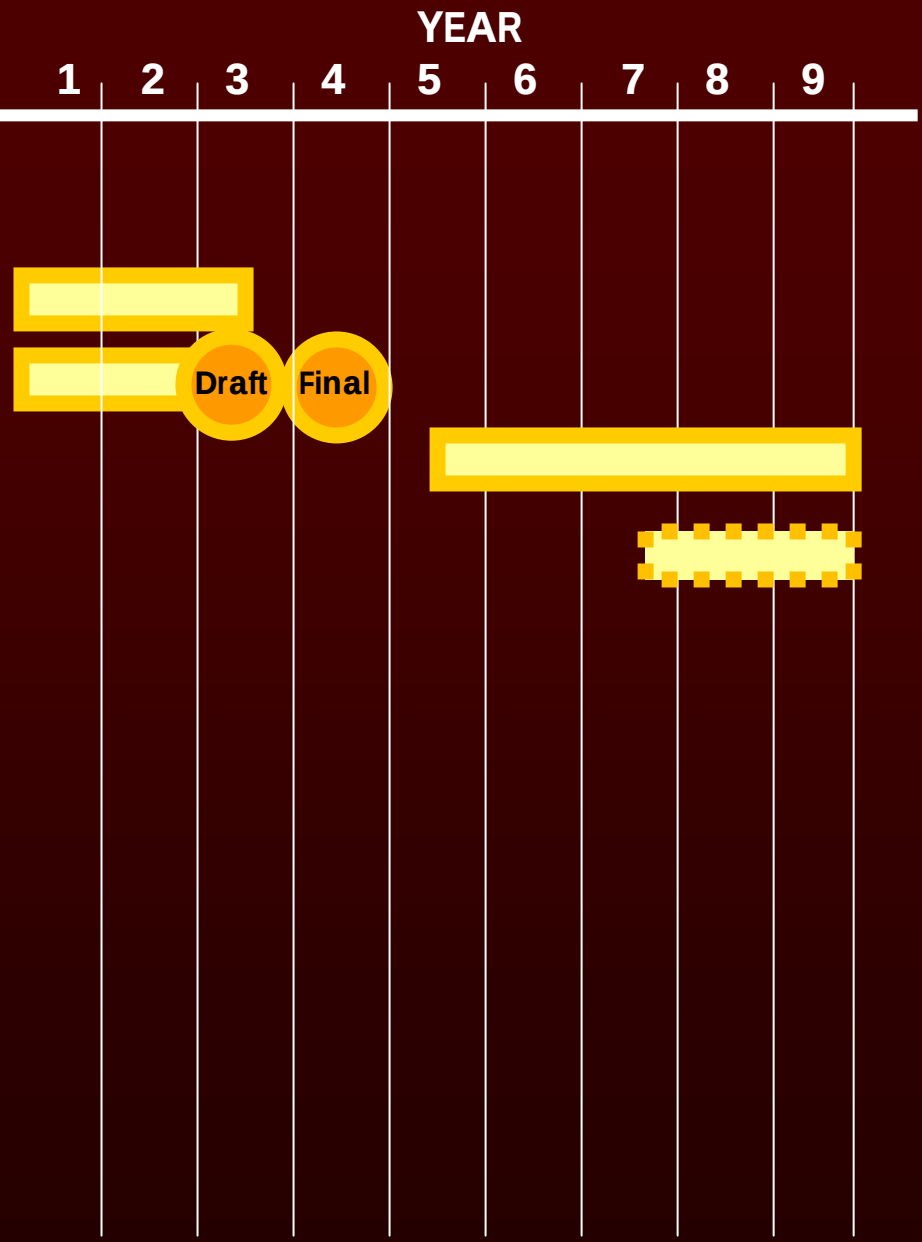


TOD Potential



Ideal Station
Timing

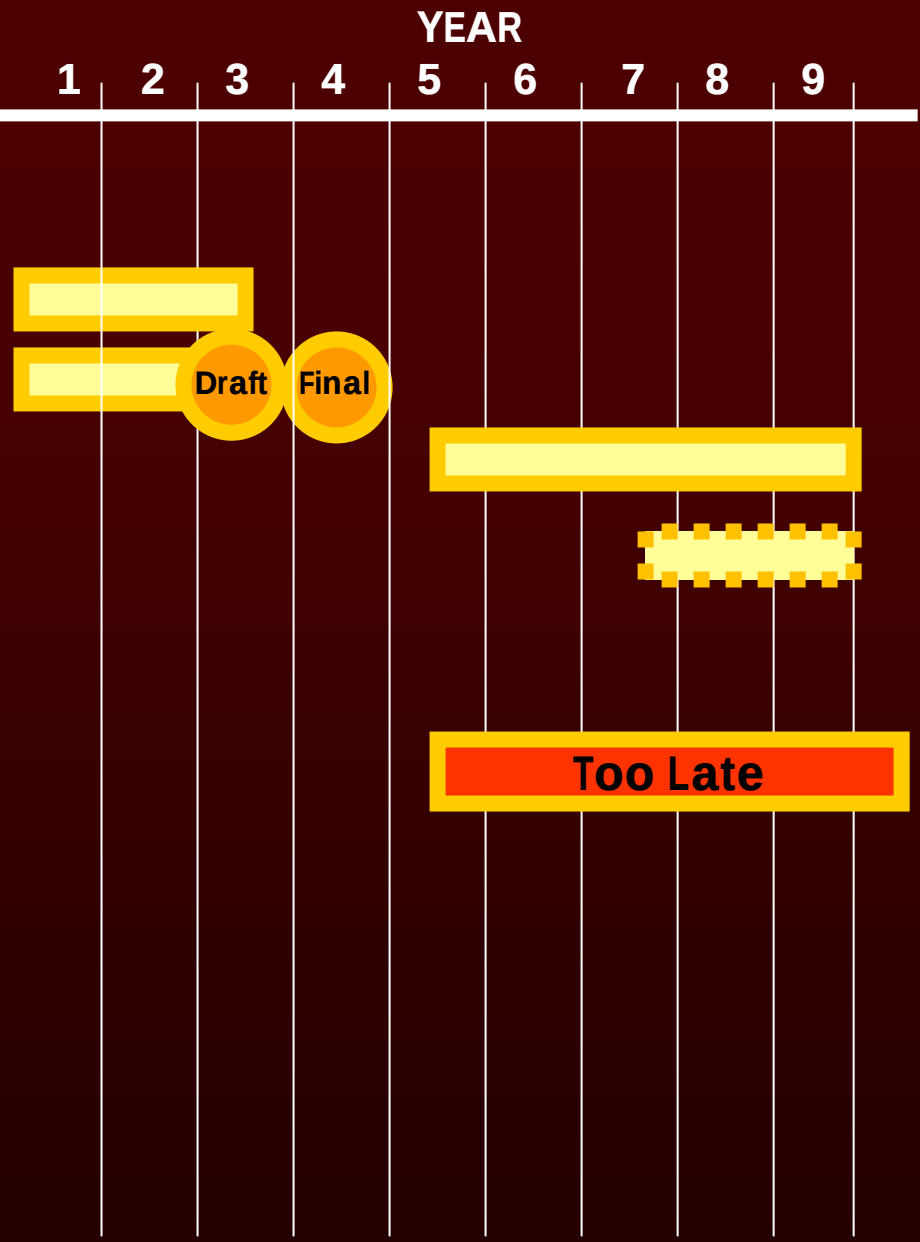
Project Timeline



LRT Project

- Preliminary Engineering
- EIS
- Final Design
- Value Engineering

Project Timeline



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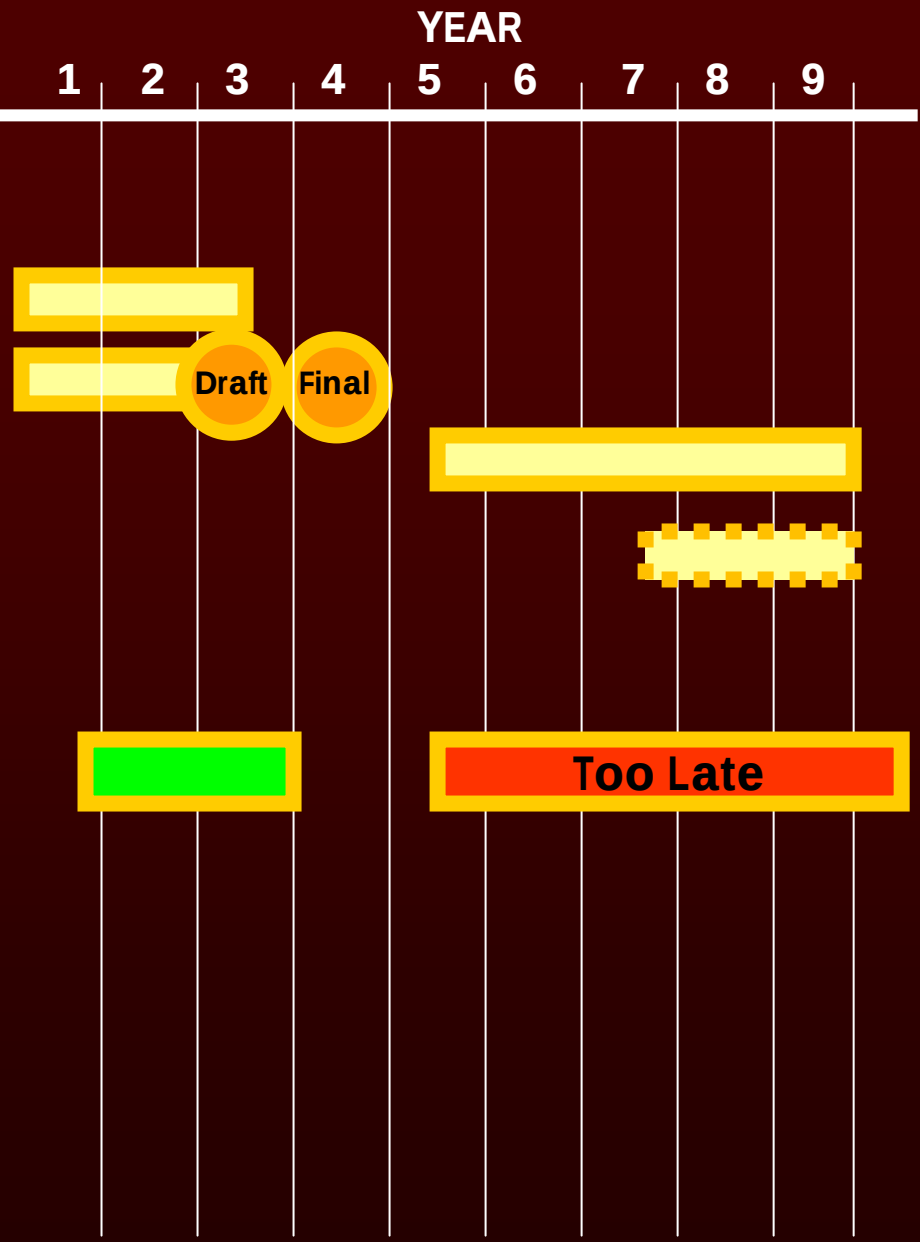
TOD Station Area Planning

Project Timeline



LRT Project

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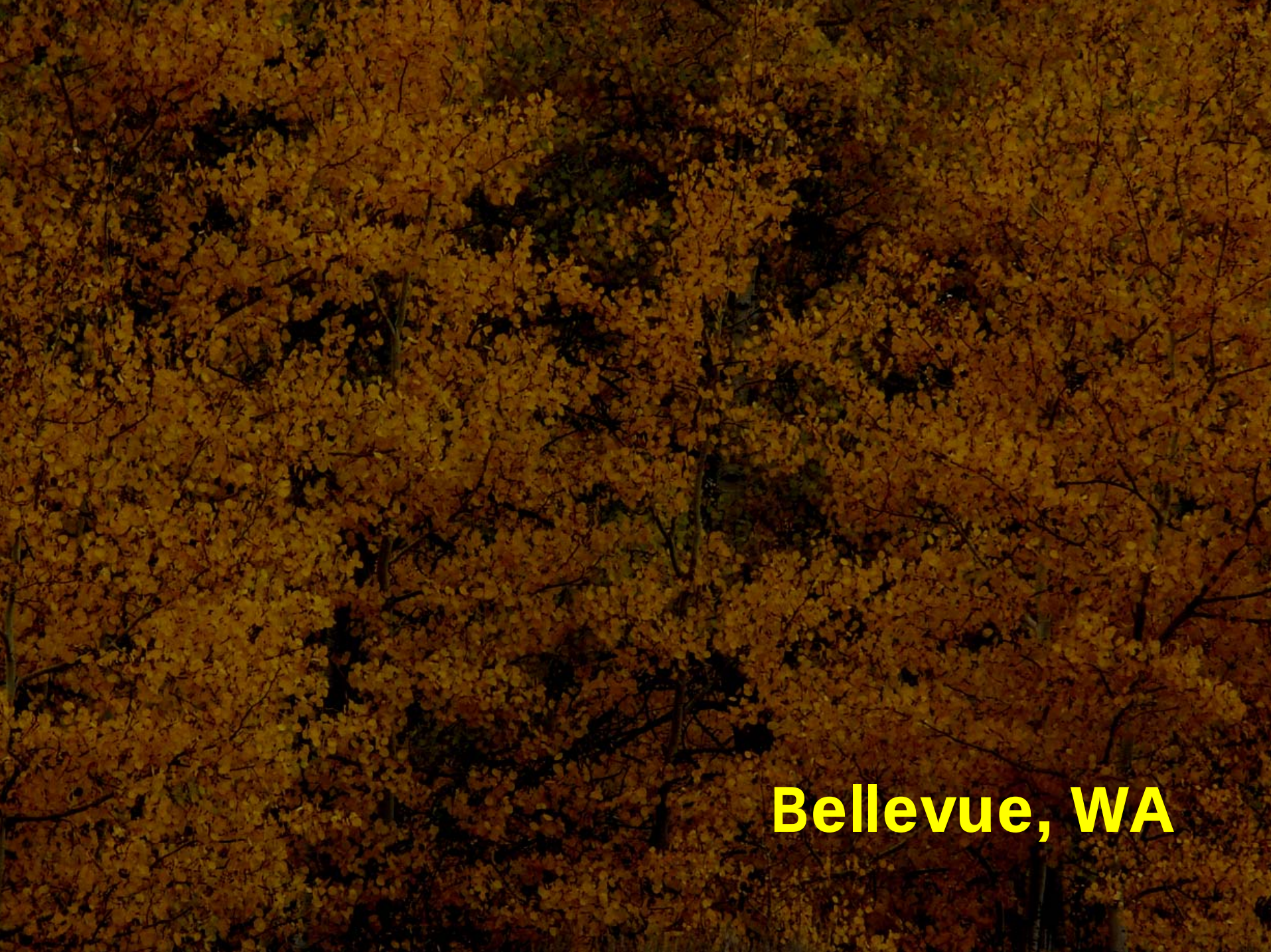
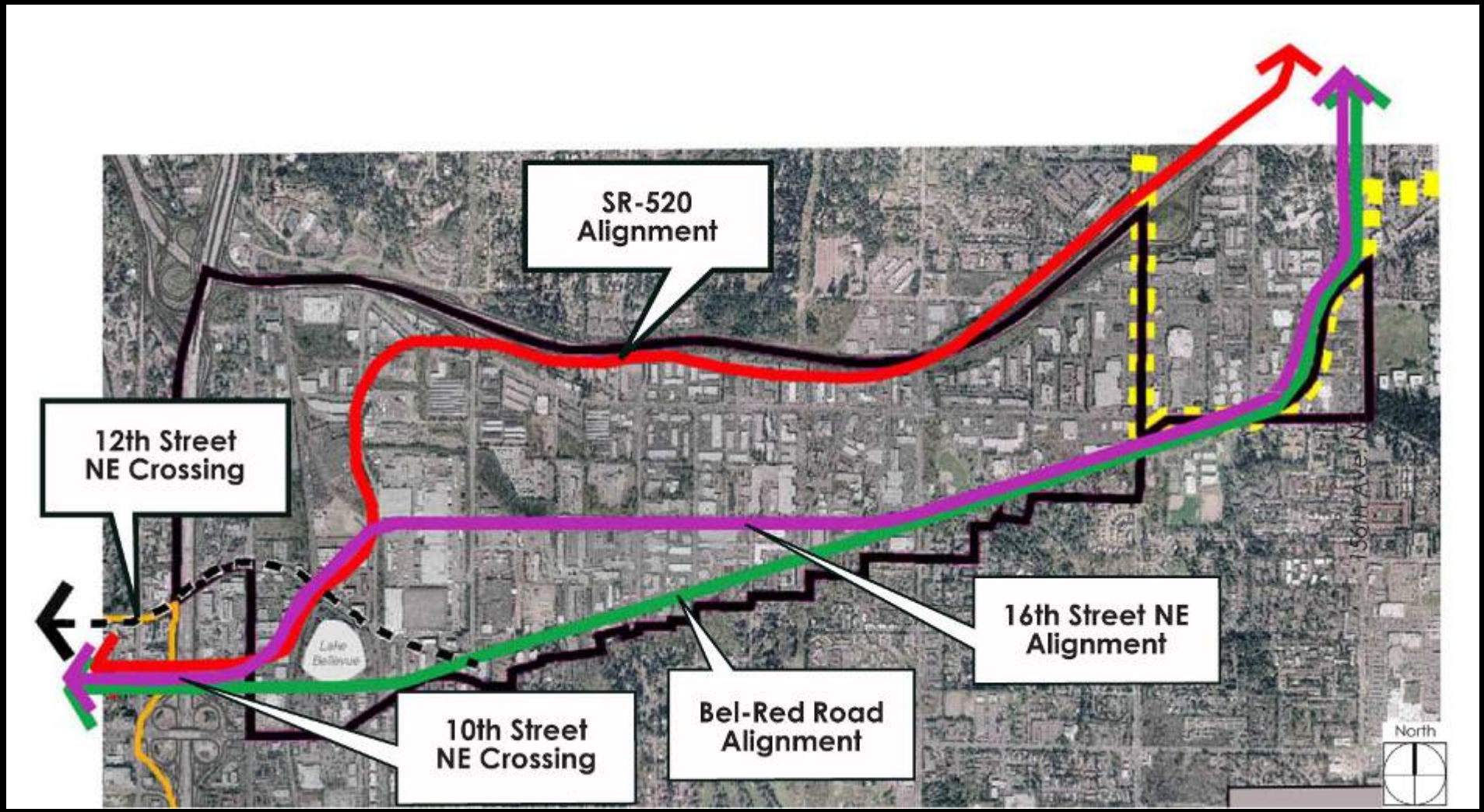
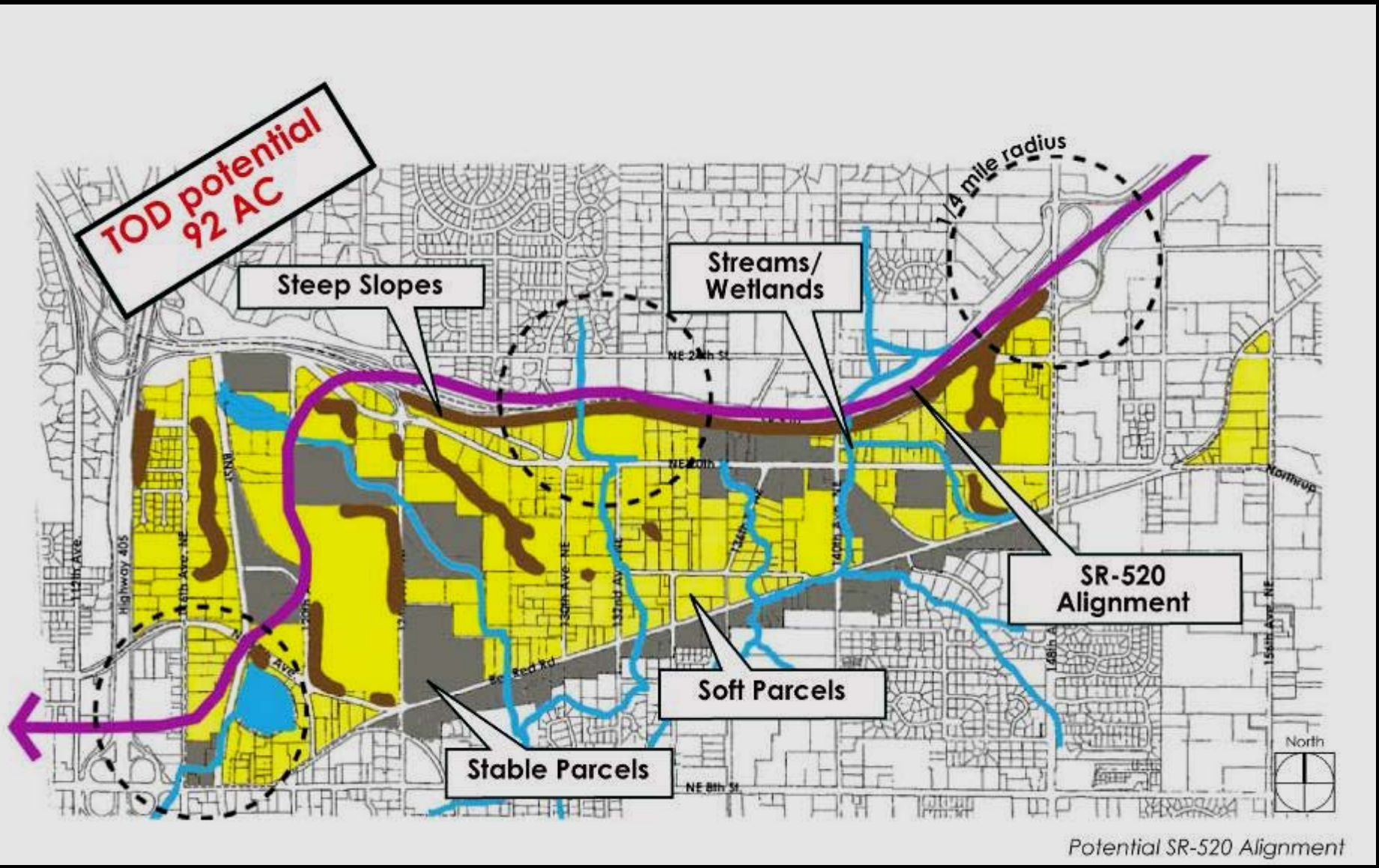
TOD Station Area Planning

LRT Alignment Selection

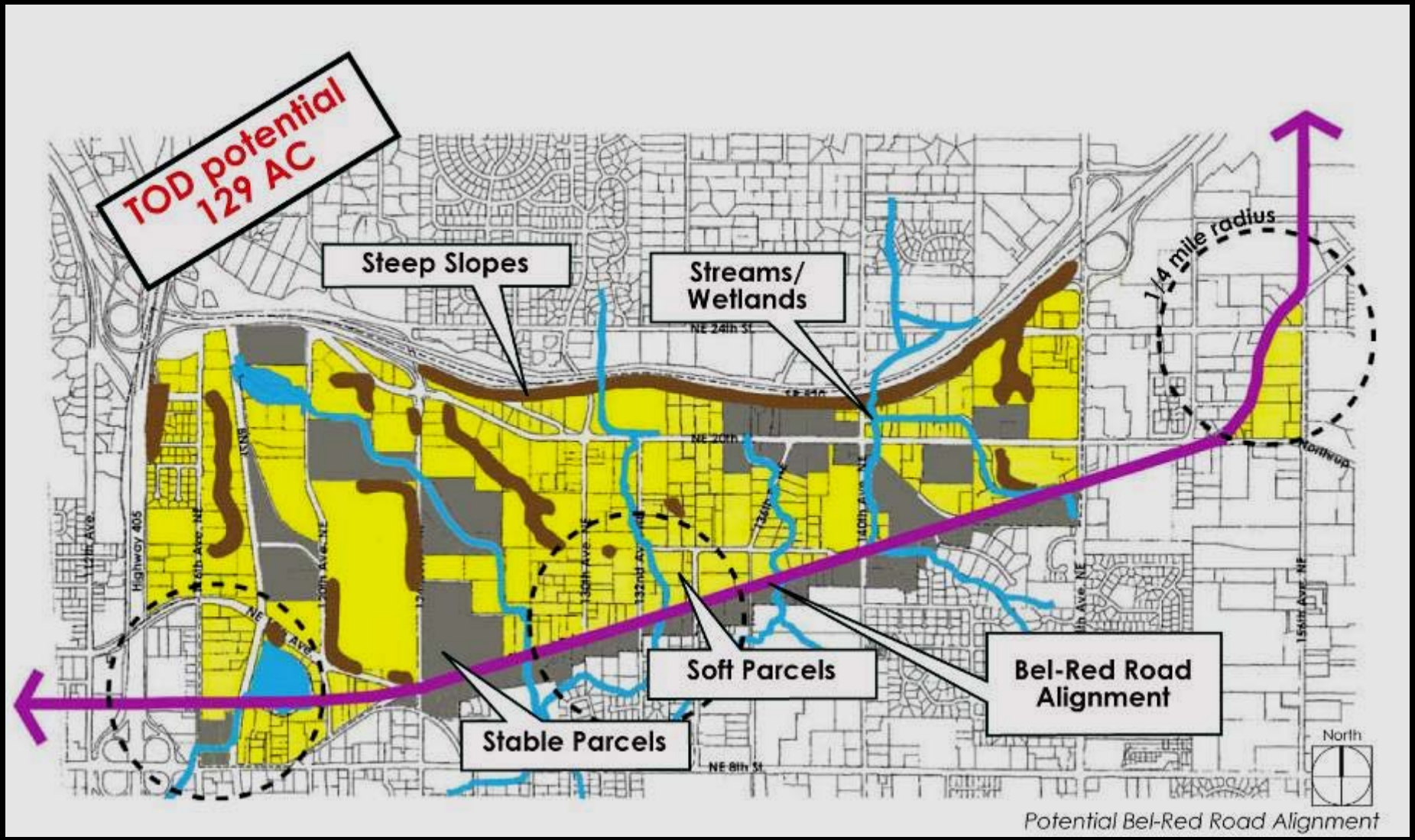

Bellevue, WA



BelRed HCT Redevelopment Corridor, Bellevue, WA



BelRed HCT Redevelopment Corridor, Bellevue, WA



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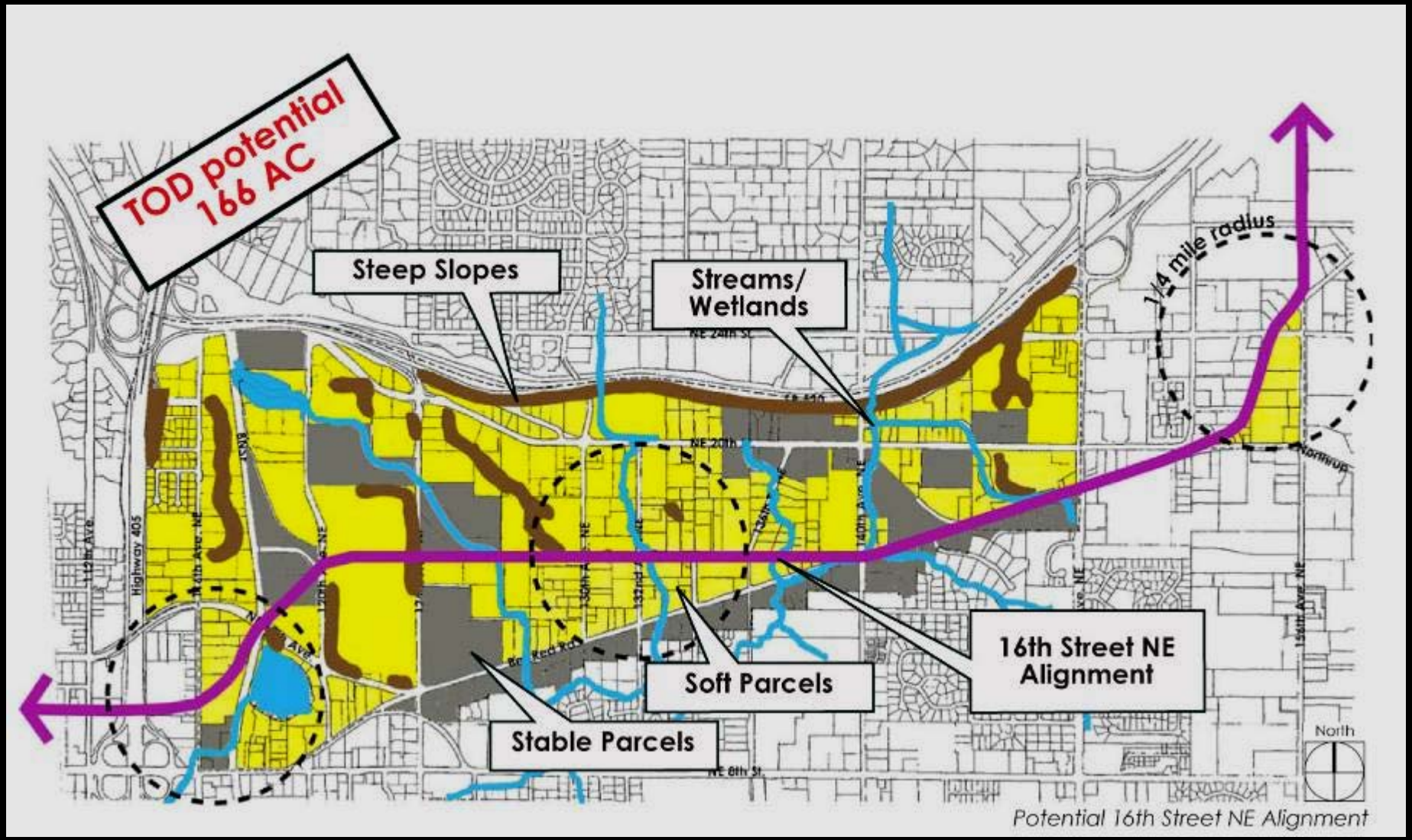


BelRed HCT Redevelopment Corridor, Bellevue, WA

BelRed HCT Redevelopment Corridor, Bellevue, WA

BelRed Station Area Plans, Bellevue, WA

BelRed Station Area Plans, Bellevue, WA

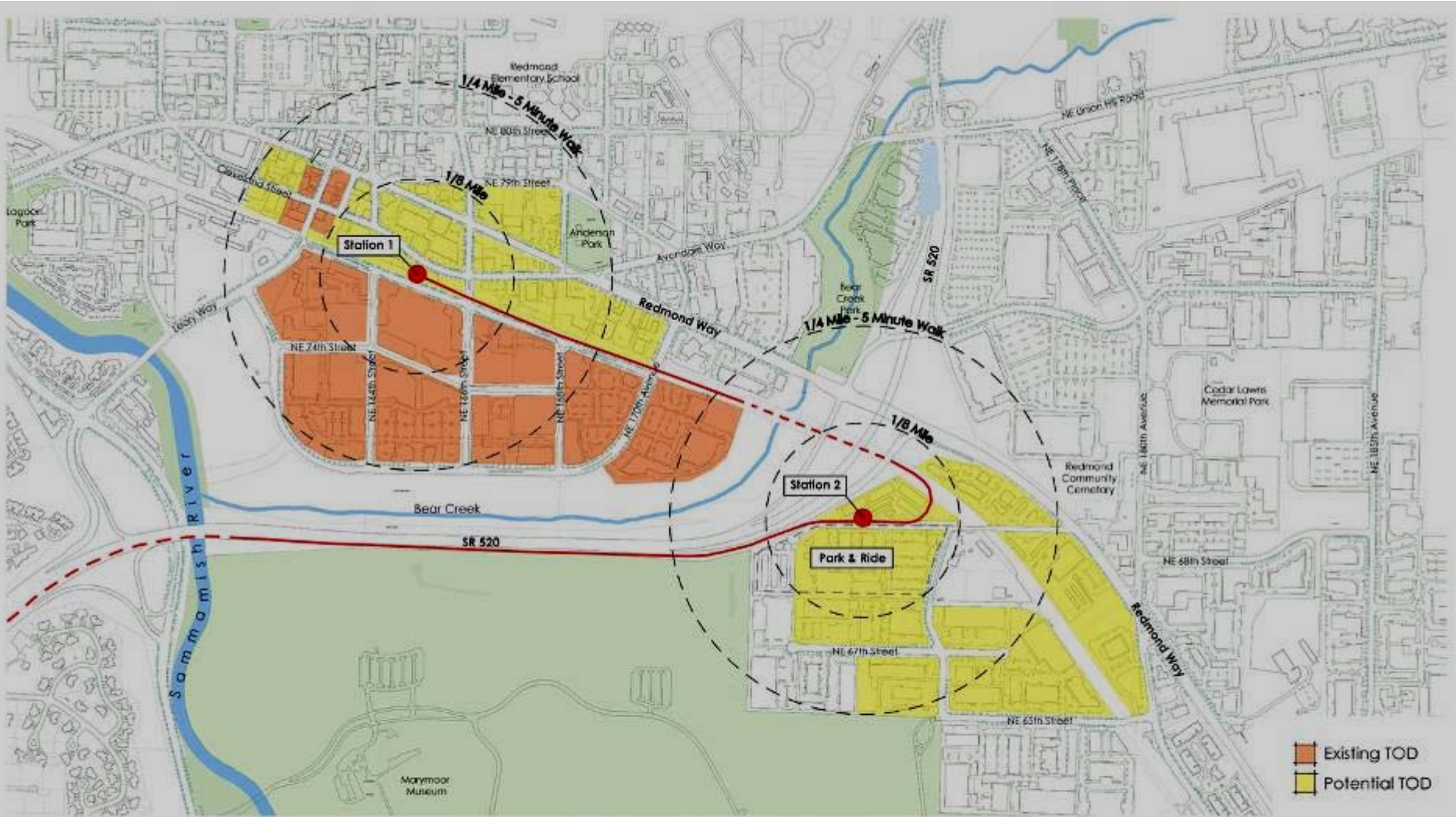
Redmond, WA

1) SR 520 Alignment

2) Bear Creek Alignment

3) BN Alignment

Alternative Alignments



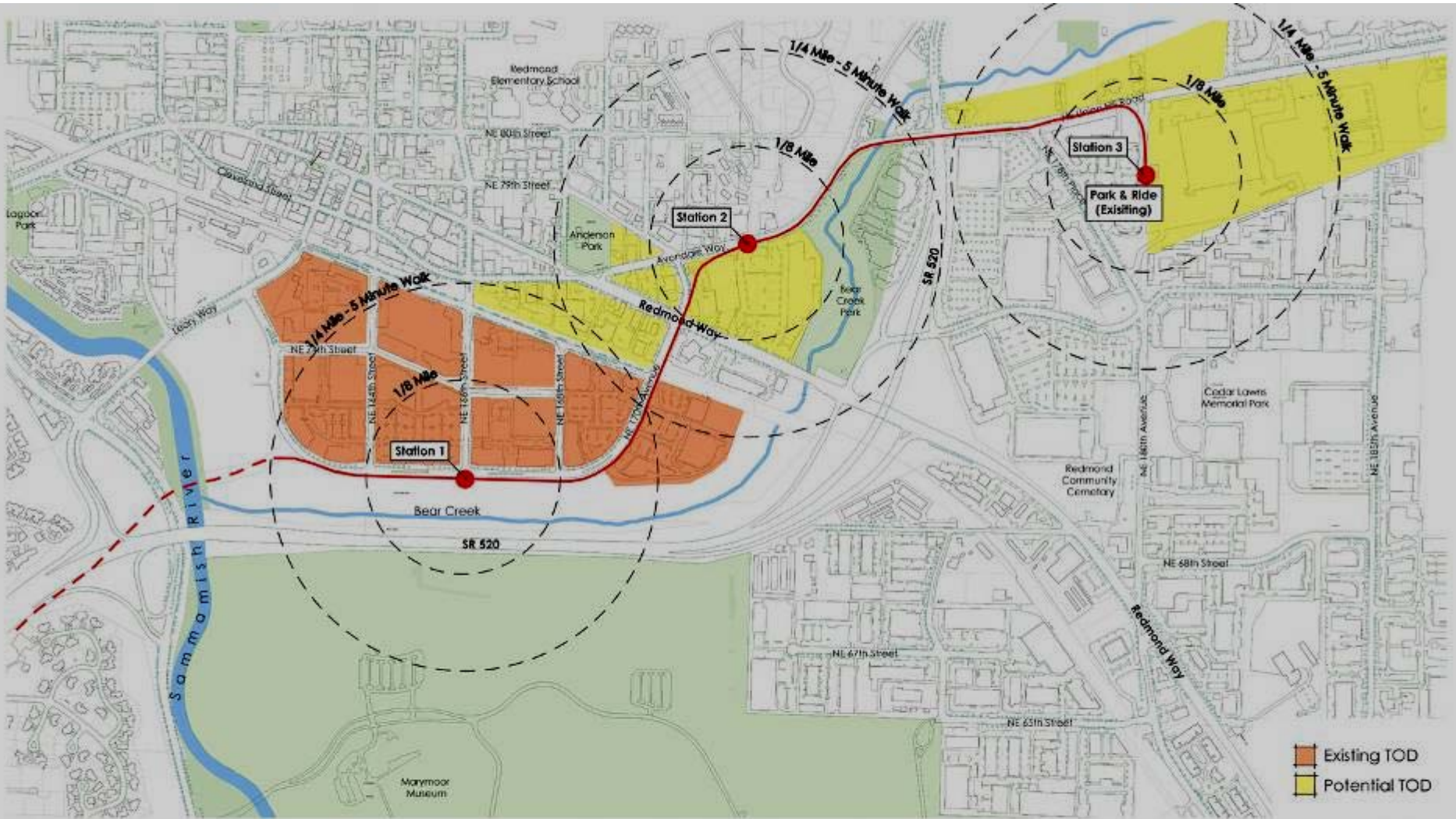
SR 520 Alignment Option

Downtown High Capacity Transit Study

Redmond, Washington

Crandall Arambula PC
URS • Urban Advisors, Ltd

NORTH
1"=600'



Bear Creek Alignment

Downtown High Capacity Transit Study

Redmond, Washington

Crandall Arambula PC
URS • Urban Advisors, Ltd

NORTH
1"=600'

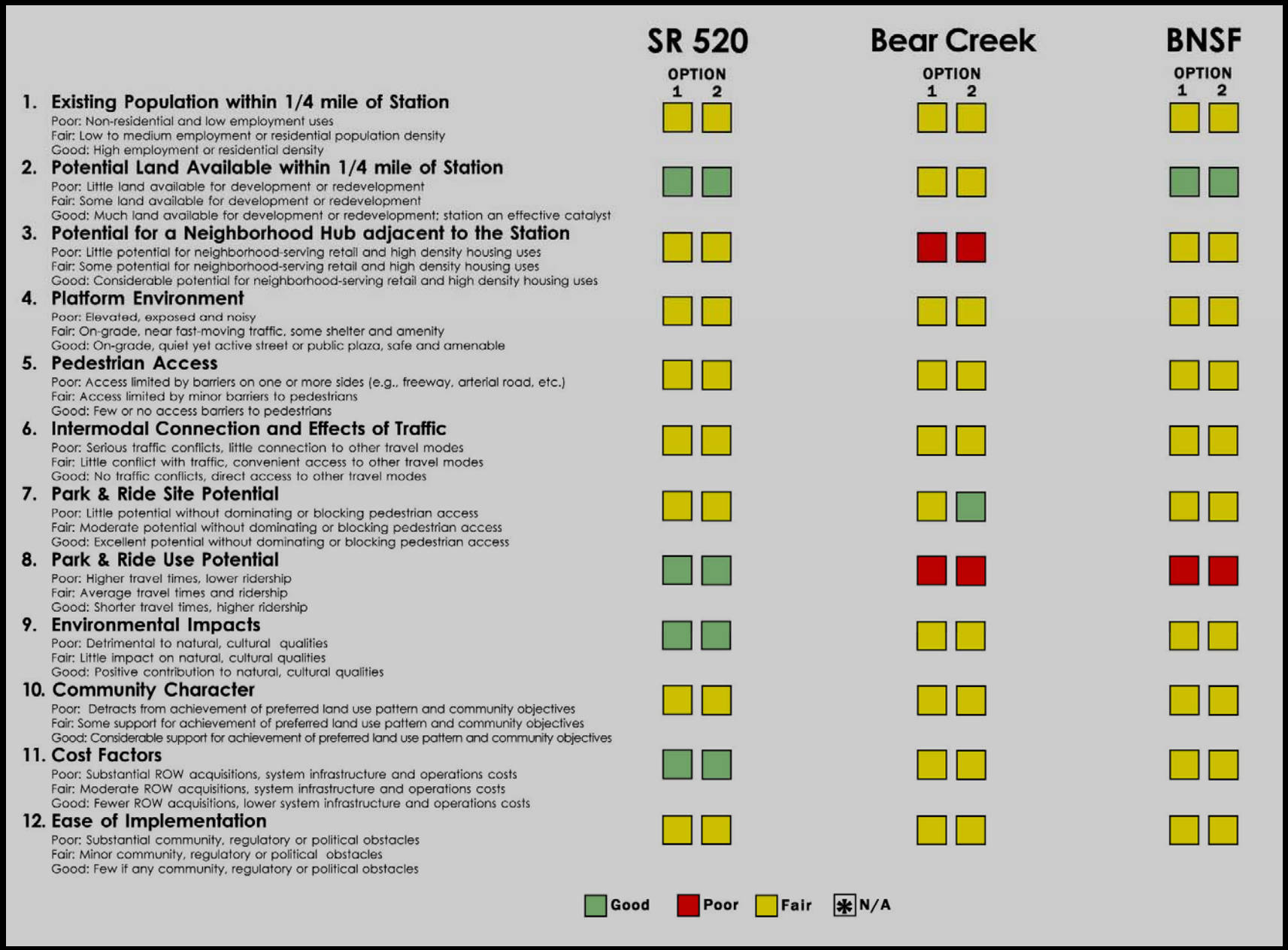
Burlington Northern Railway Alignment Option

Downtown High Capacity Transit Study

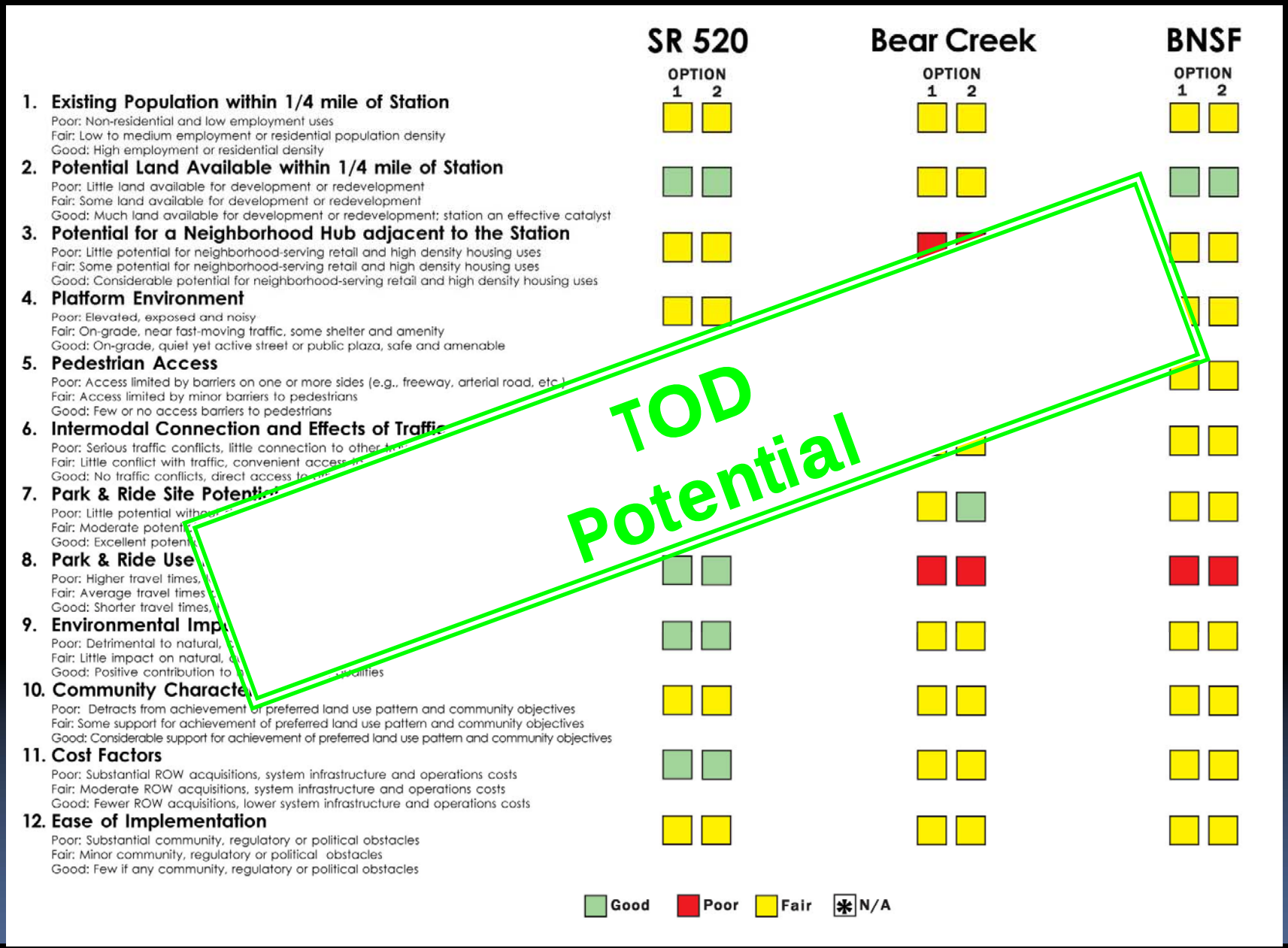
Redmond, Washington

Crandall Arambula PC
URS • Urban Advisors, Ltd

NORTH
1"=600'

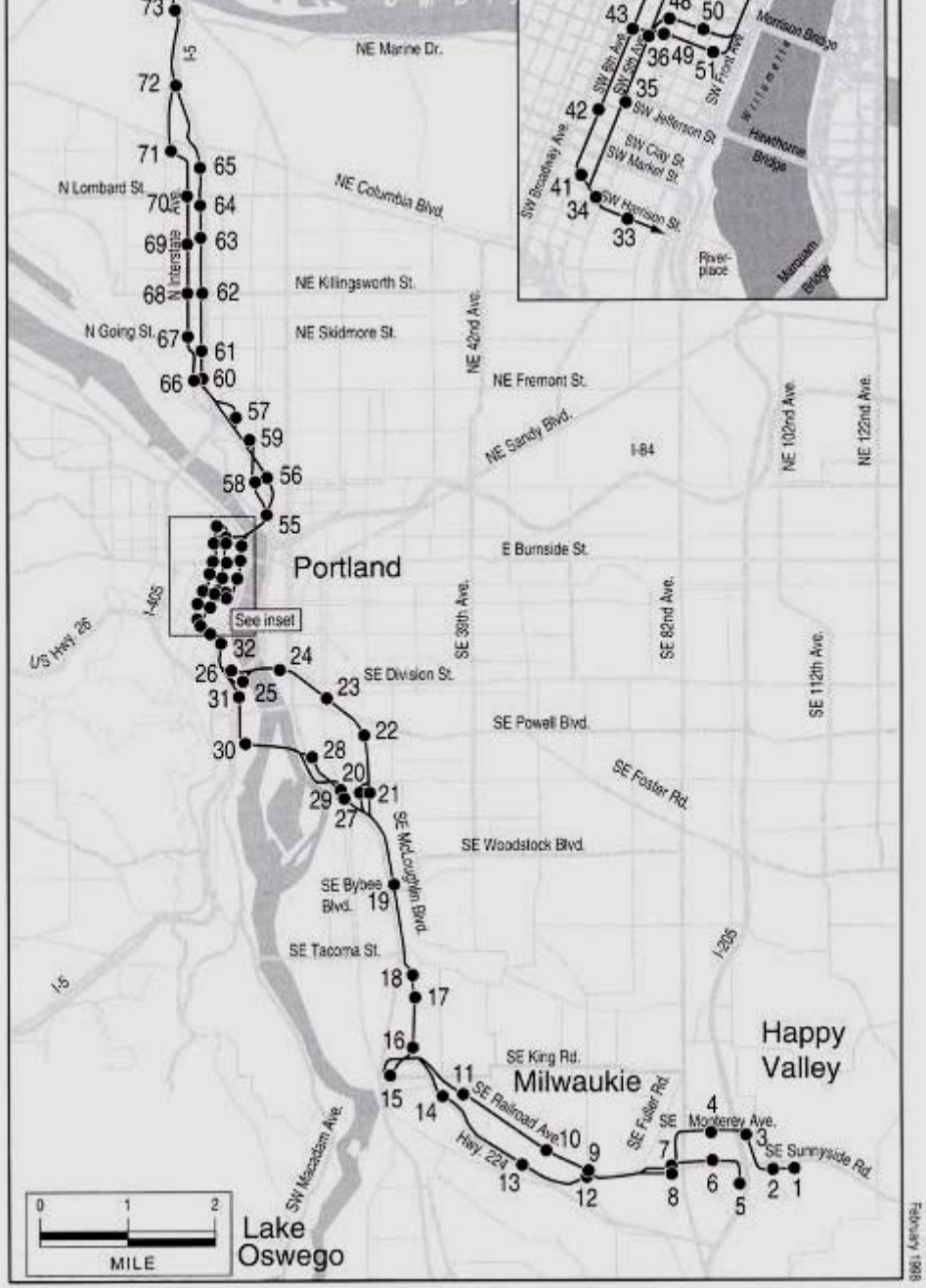


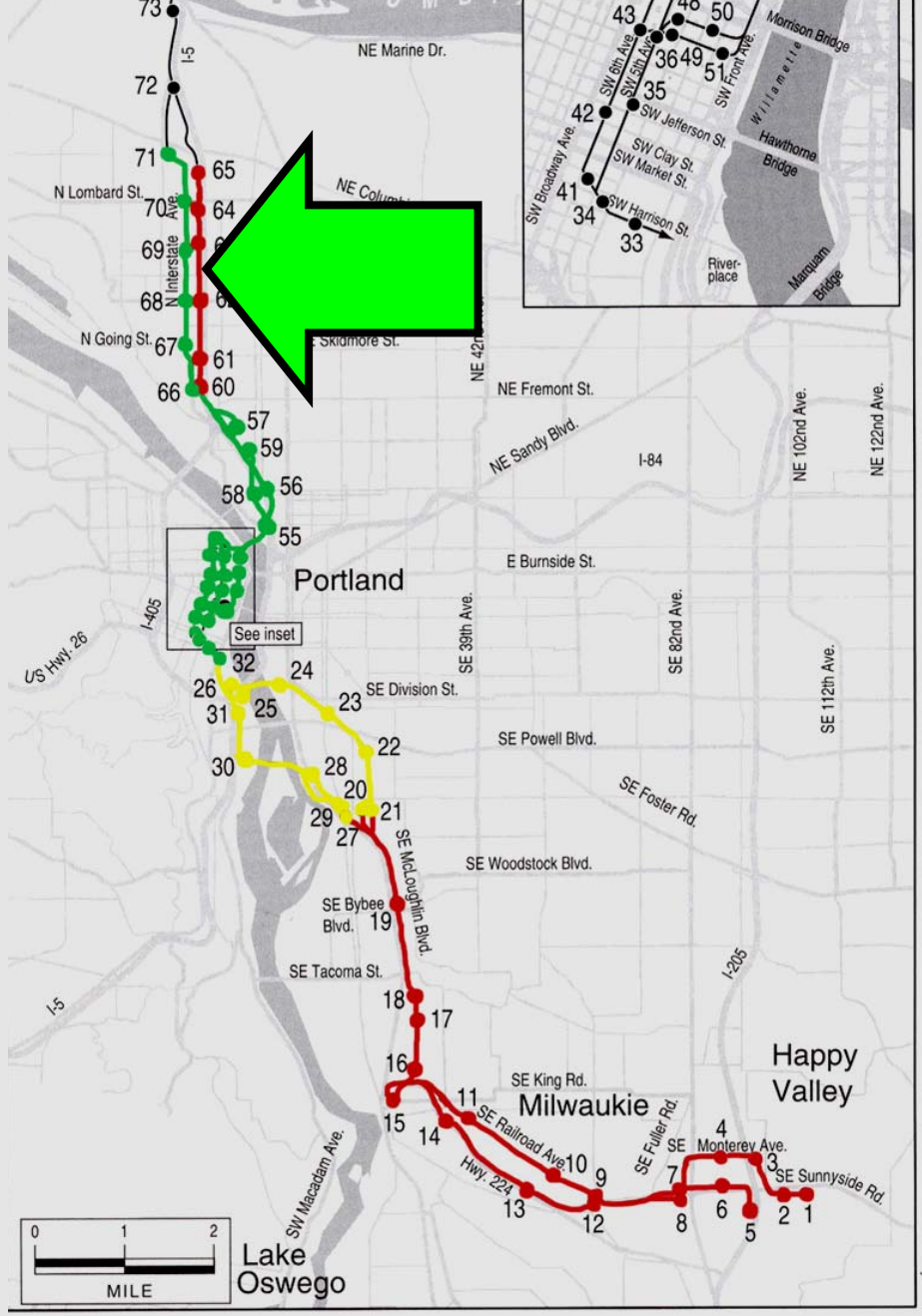
Downtown High-Capacity Transit & TOD Study, Redmond, WA



Downtown High-Capacity Transit & TOD Study, Redmond, WA

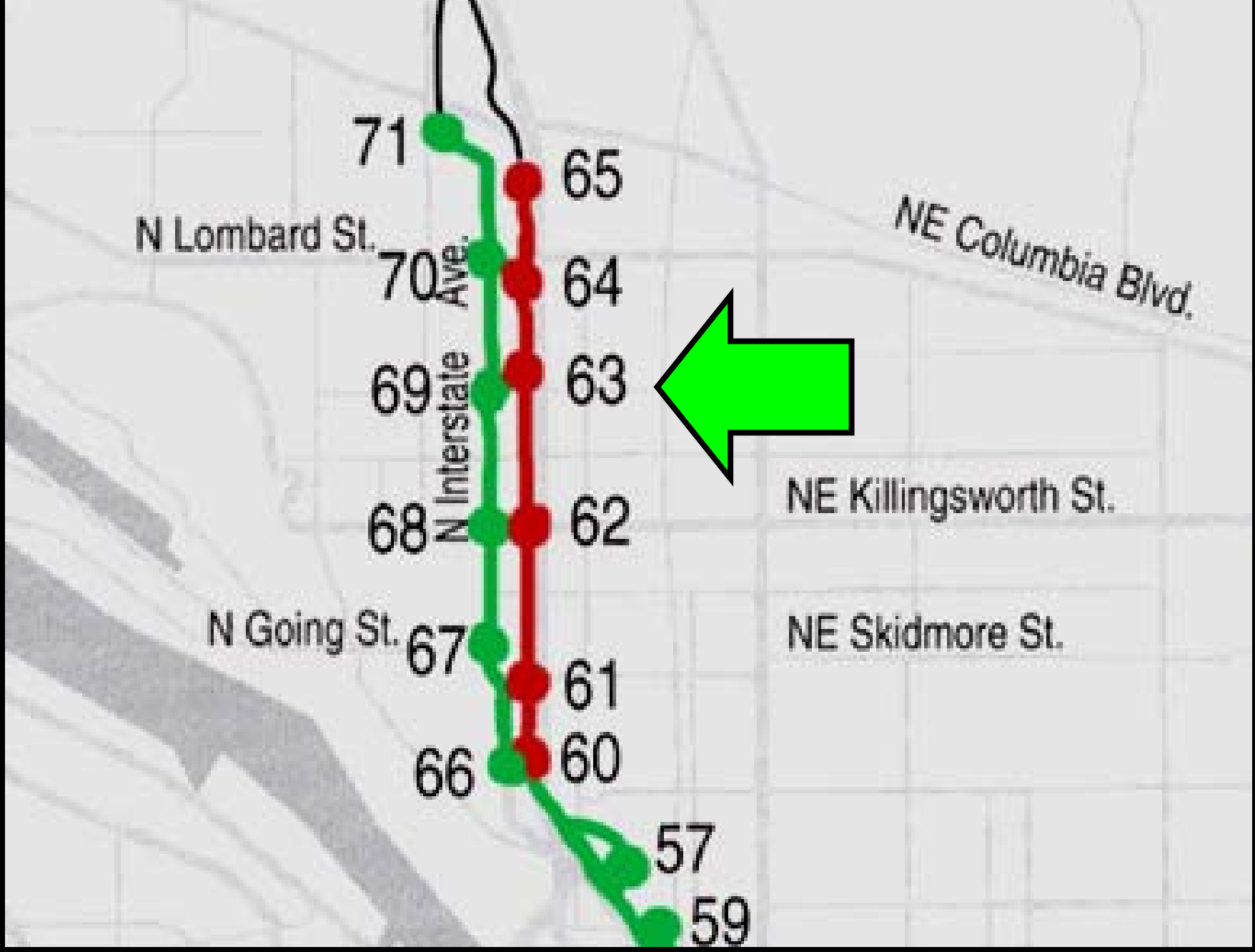
Portland, OR





Alignments Options

Station Area Potential



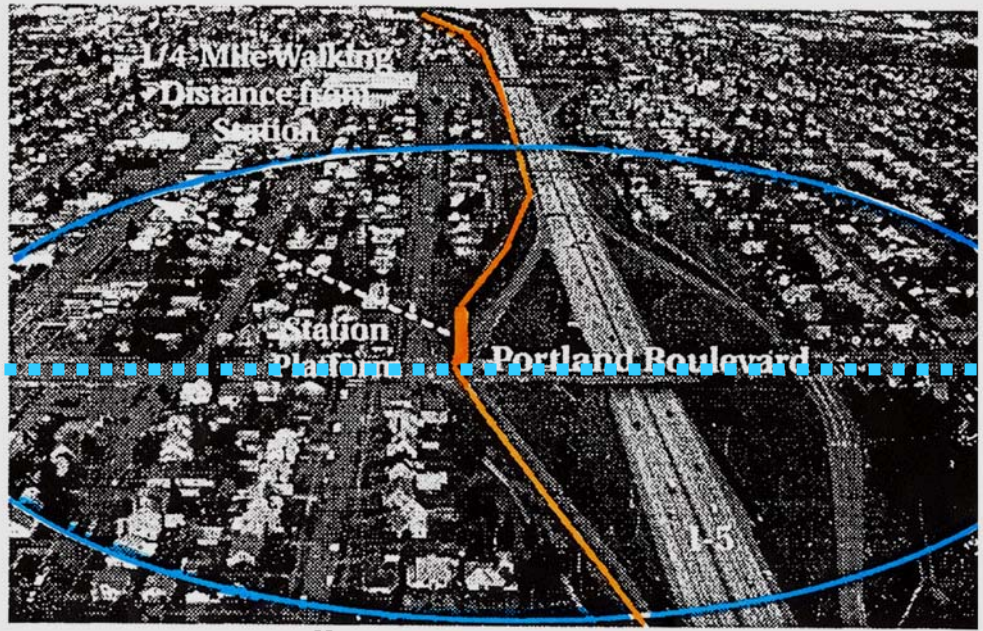
Station Area Potential

STATION CRITERIA

1. **Existing Population**
   Existing Population Within 1/4 Mile Of The Station
2. **Future Development**
   Potential For New Development Within 1/4 Mile Of The Station
3. **Neighborhood Hub**
   Potential For A Neighborhood Hub Adjacent To The Station
4. **Pedestrian Access**
   Potential For On-grade Access From All Directions
5. **Platform Environment**
   Potential For An On-grade Platform In A Quiet Safe Environment
6. **Traffic Effects**
   Intermodal Connections And Effects On Traffic

SUMMARY

Good | Fair/Good | Fair | Fair/Poor | Poor

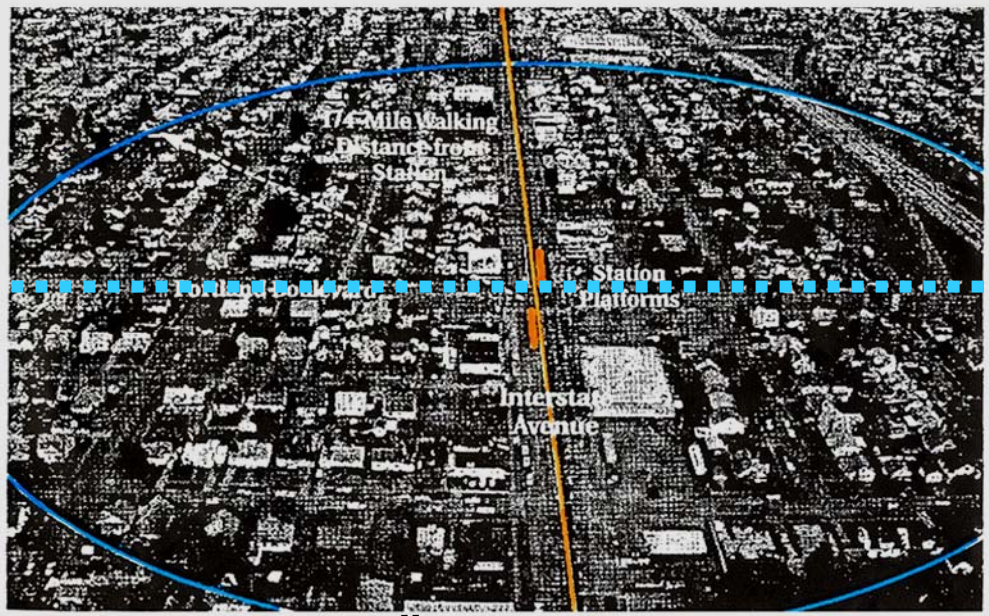


Interstate 5 Alignment

STATION CRITERIA

1. **Existing Population**
   Existing Population Within 1/4 Mile Of The Station
2. **Future Development**
   Potential For New Development Within 1/4 Mile Of The Station
3. **Neighborhood Hub**
   Potential For A Neighborhood Hub Adjacent To The Station
4. **Pedestrian Access**
   Potential For On-grade Access From All Directions
5. **Platform Environment**
   Potential For An On-grade Platform In A Quiet Safe Environment
6. **Traffic Effects**
   Intermodal Connections And Effects On Traffic

SUMMARY



Interstate Ave. Alignment

STATION CRITERIA

1. **Existing Population**
   Existing Population Within 1/4 Mile Of The Station
2. **Future Development**
   Potential For New Development Within 1/4 Mile Of The Station
3. **Neighborhood Hub**
   Potential For A Neighborhood Hub Adjacent To The Station
4. **Pedestrian Access**
   Potential For On-grade Access From All Directions
5. **Platform Environment**
   Potential For An On-grade Platform In A Quiet Safe Environment
6. **Traffic Effects**
   Intermodal Connections And Effects On Traffic

SUMMARY

Good | Fair/Good | Fair | Fair/ | Poo

TOD Potential

STATION C

1. **Existing Popula**
   Existing Population W
   Of The Station
2. **Future Developme**
   Potential For New Develo
   Within 1/4 Mile Of The Station
3. **Neighborhood Hub**
   Potential For A Neighborhood Hub Adjacent To The Station
4. **Pedestrian Access**
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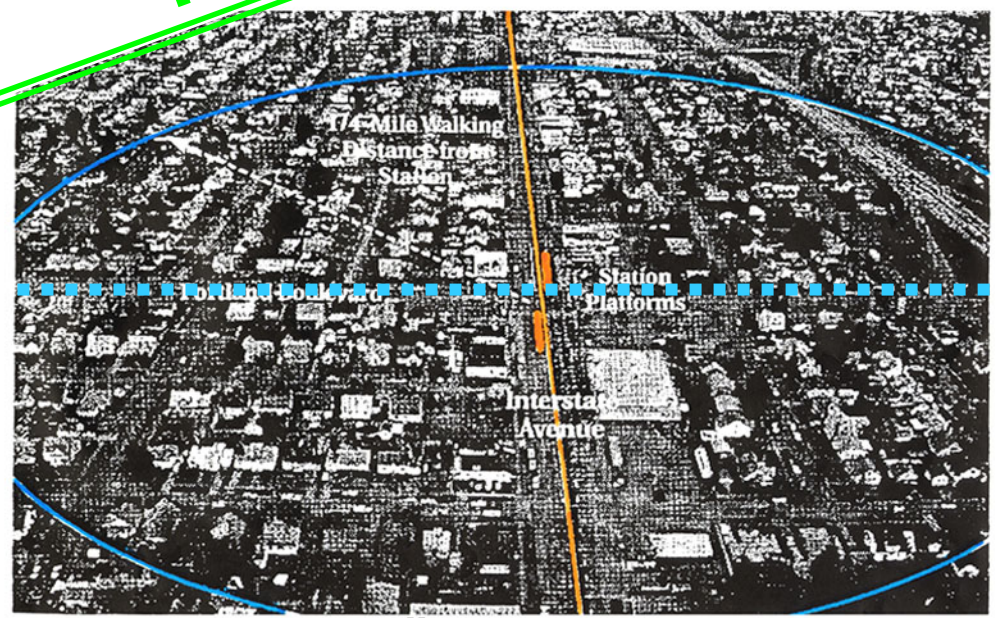
   Intermodal Connections And Effects On Traffic

SUMMARY

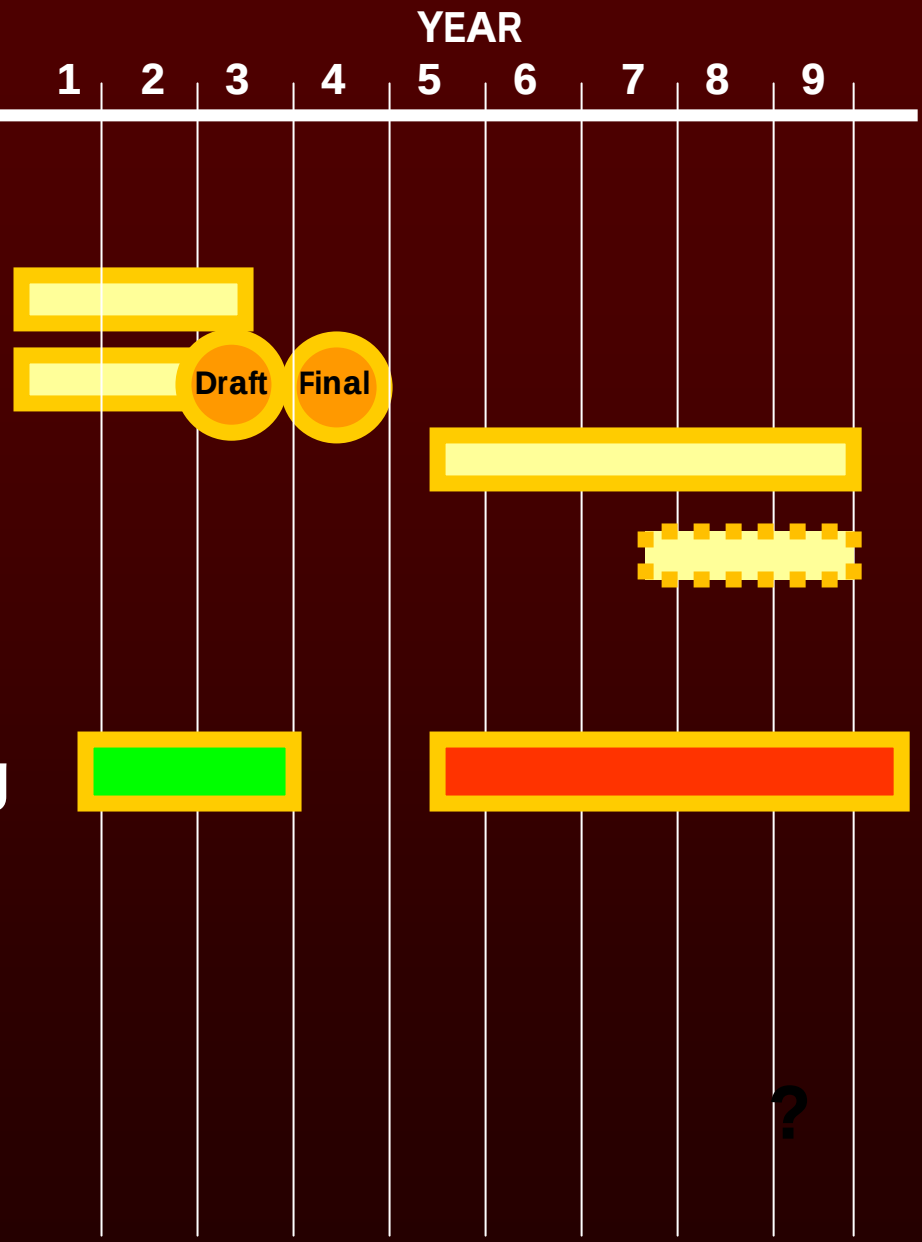


Interstate Ave. Alignment

Alignment Selection- Lessons Learned

Alignment alternatives must consider TOD potential along entire alignment.

Project Timeline

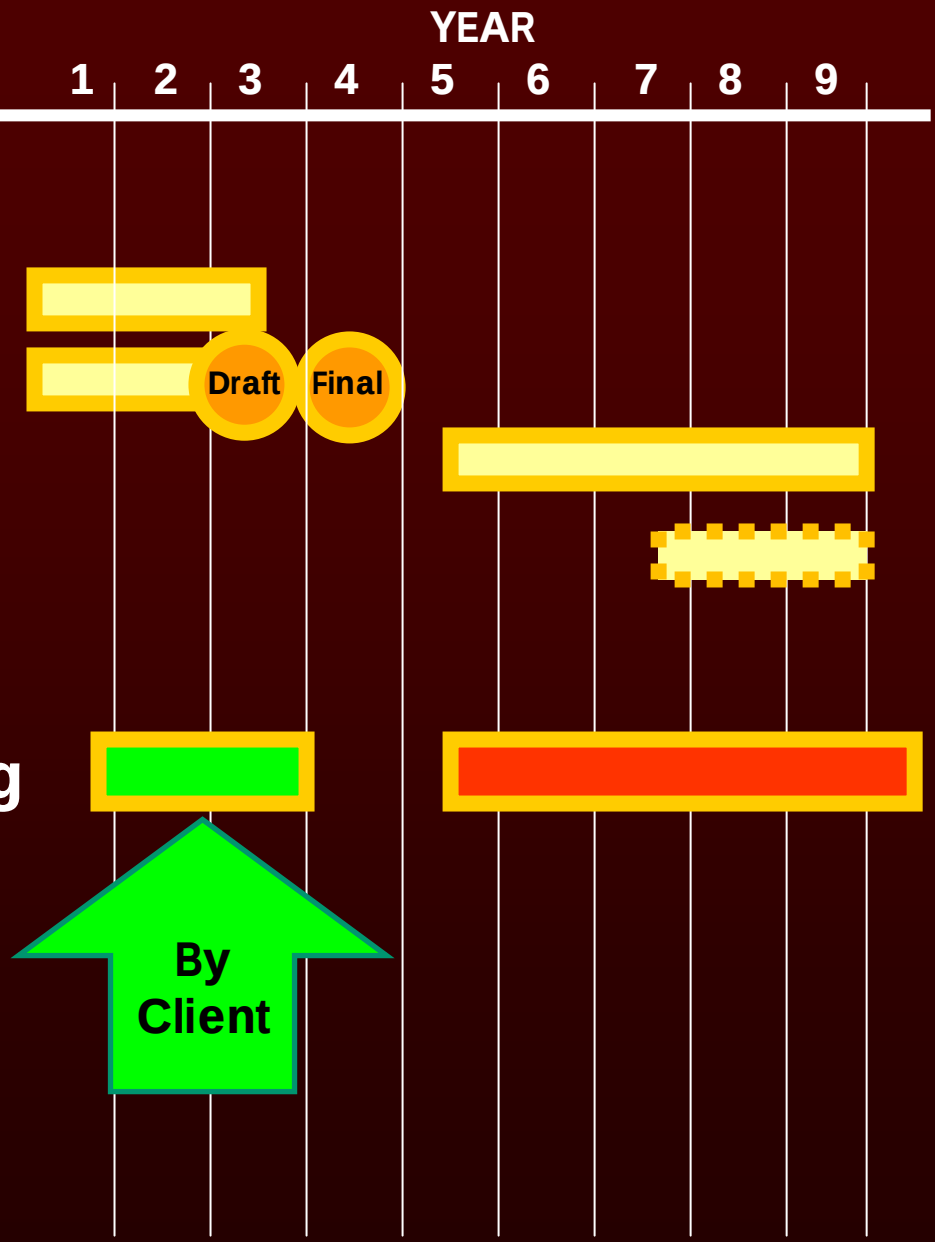


1 LRT Project

- Preliminary Engineering
- EIS
- Final Design
- Value Engineering

2 TOD Station Area Planning

Project Timeline



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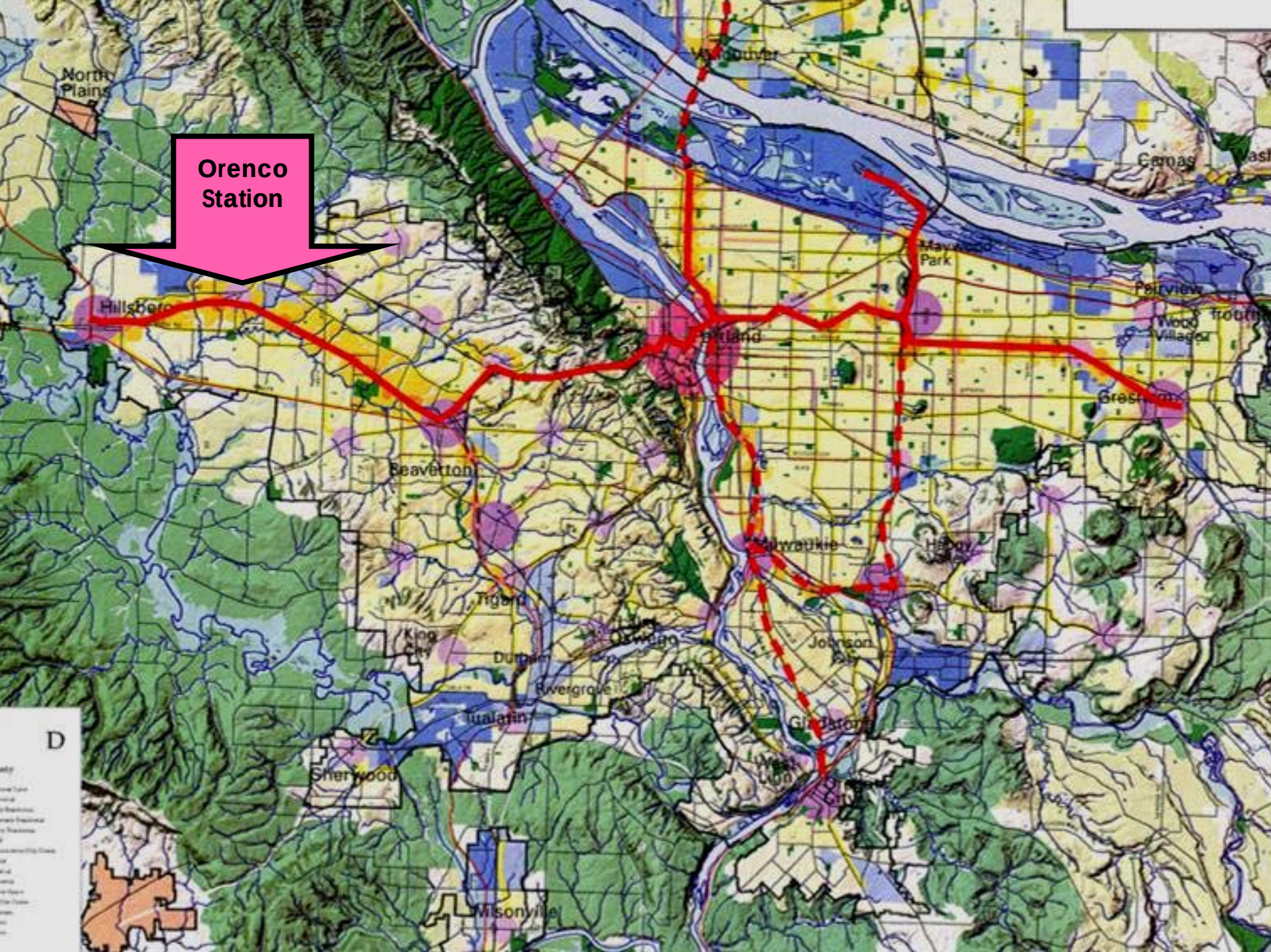
Station Location

Hillsboro, Oregon
Orenco Station


Orenco Station
North Plains
Hillsboro
Beaverton
Tigard
King City
Durham
Tualatin
Sherwood
Wilsonville
Oswego
Riverdale
Johnson City
Gladstone
Milwaukie
Happy Valley
Portland
Vancouver
Camas
Maywood Park
Parkrose
Wood Village
Troutdale
Gresham
D

WELCOME TO

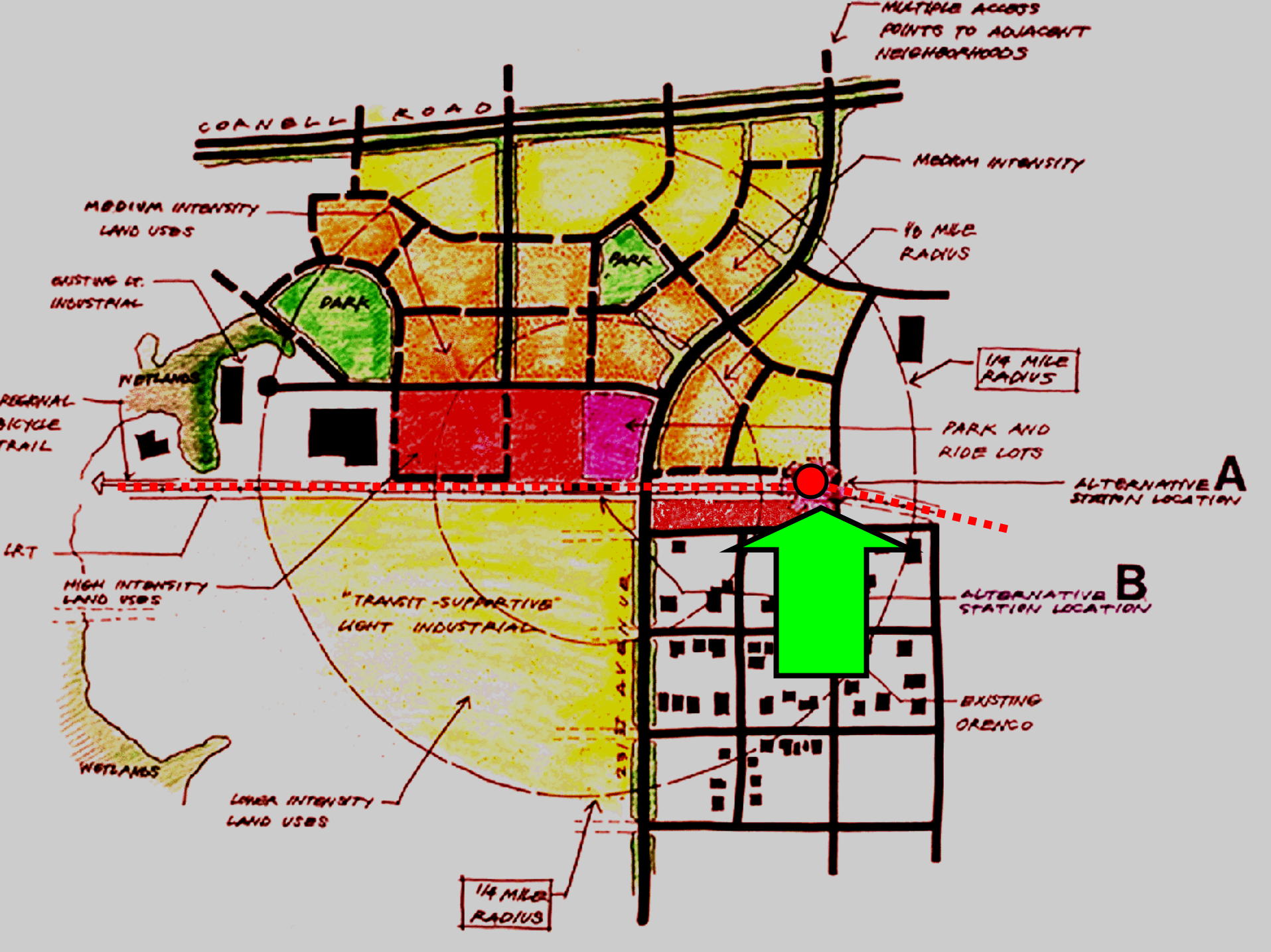
ORENCO STATION

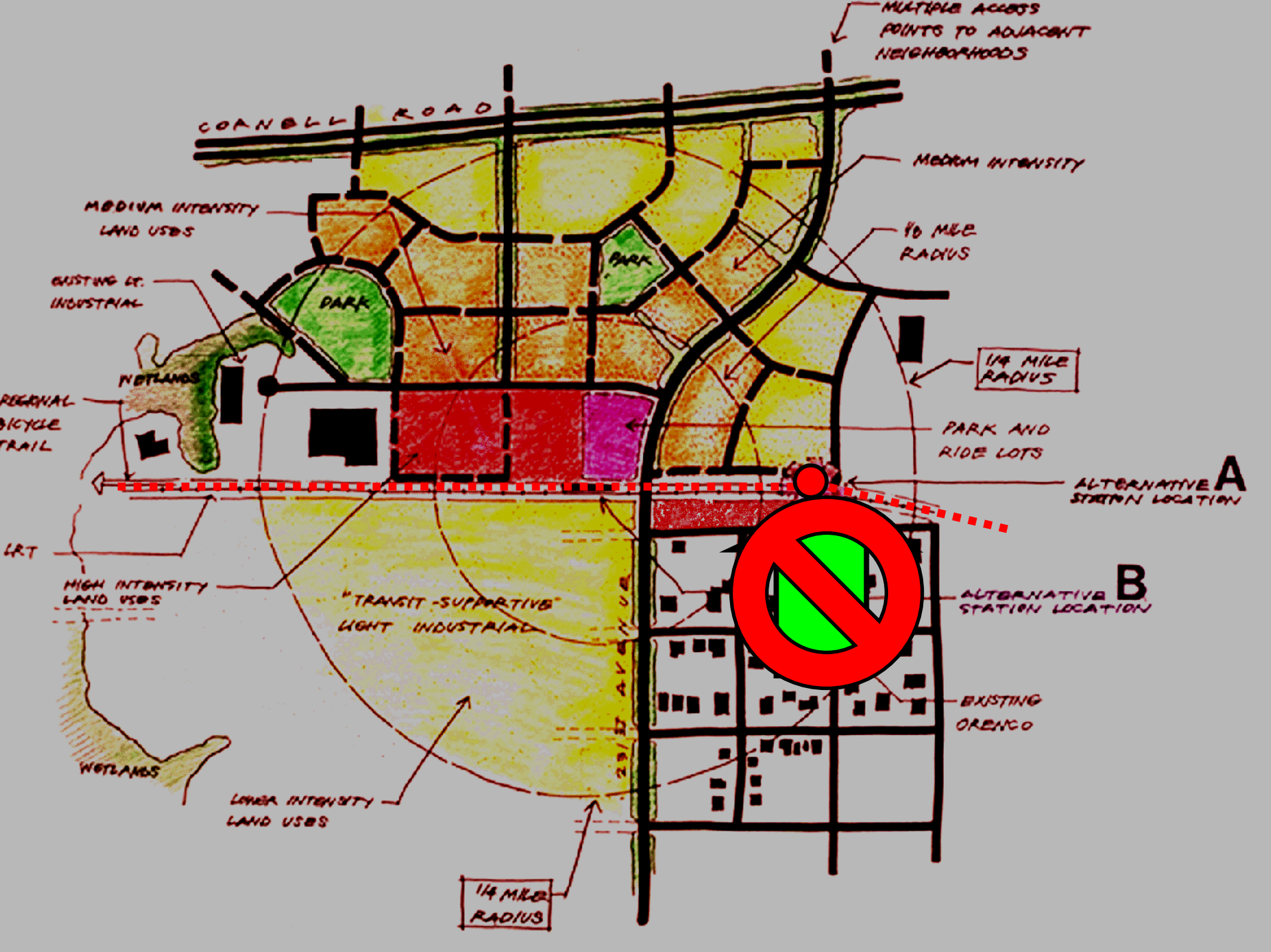
ORENCO STATION

Live life to the MAX!

Come live in one of the nation's most honored new neighborhoods, surrounded by great restaurants, shops, parks, recreation, and employment, and just a hop on MAX to Portland and beyond. Homes for just about every lifestyle and budget:

MORELLO CONDOMINIUMS:


MULTIPLE ACCESS POINTS TO ADJACENT NEIGHBORHOODS
COANELL ROAD
MEDIUM INTENSITY
MEDIUM INTENSITY LAND USES
½ MILE RADIUS
PARK
PARK
EXISTING LT. INDUSTRIAL
WETLANDS
REGIONAL BICYCLE TRAIL
¼ MILE RADIUS
PARK AND RIDE LOTS
ALTERNATIVE STATION LOCATION A
LRT
HIGH INTENSITY LAND USES
"TRANSIT-SUPPORTIVE" LIGHT INDUSTRIAL
ALTERNATIVE STATION LOCATION B
EXISTING ORENCO
WETLANDS
LOWER INTENSITY LAND USES
¼ MILE RADIUS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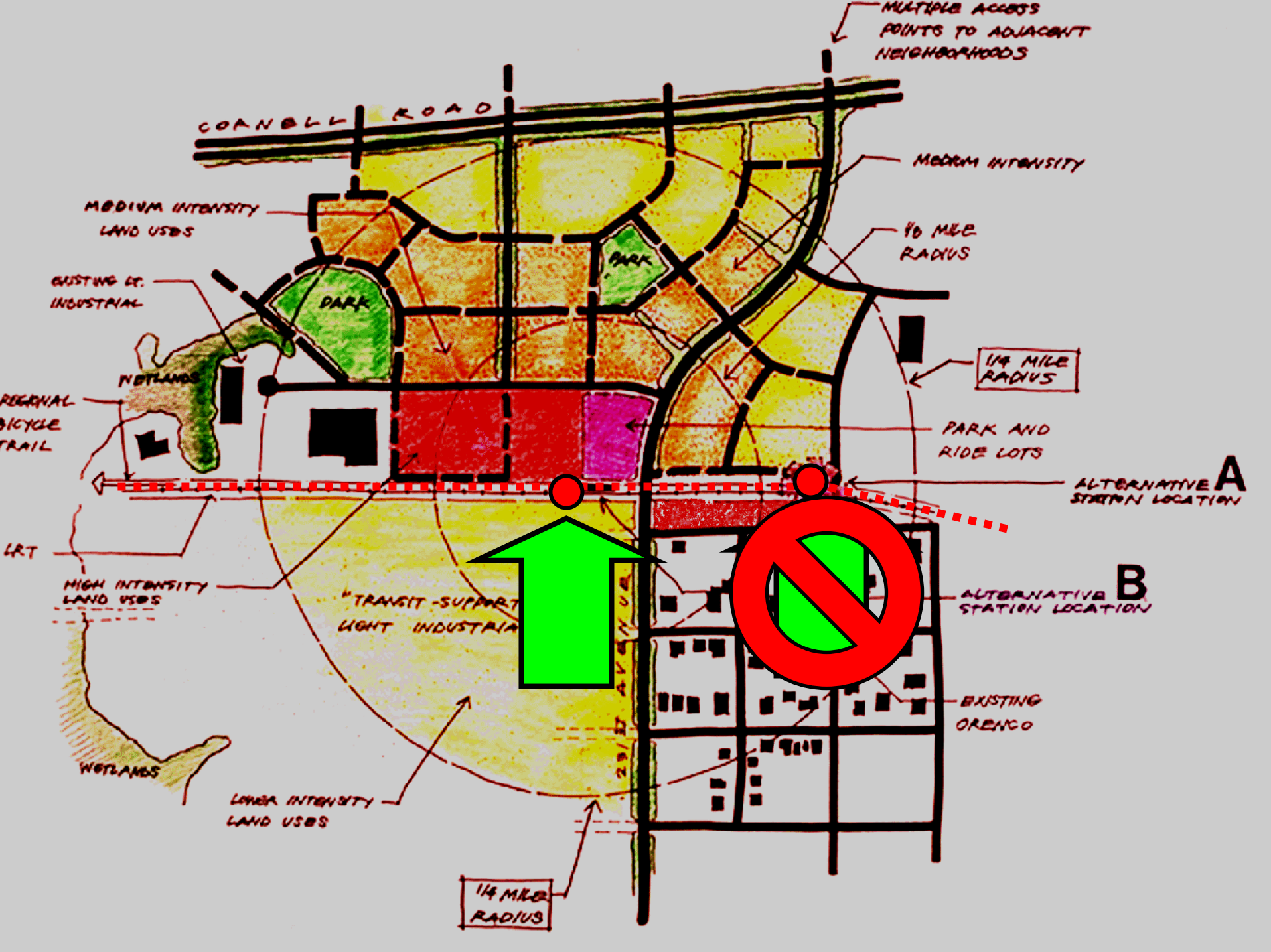
ALTERNATIVE STATION LOCATION B
EXISTING ORENCO
WETLANDS
LOWER INTENSITY LAND USES
¼ MILE RADIUS


MULTIPLE ACCESS POINTS TO ADJACENT NEIGHBORHOODS
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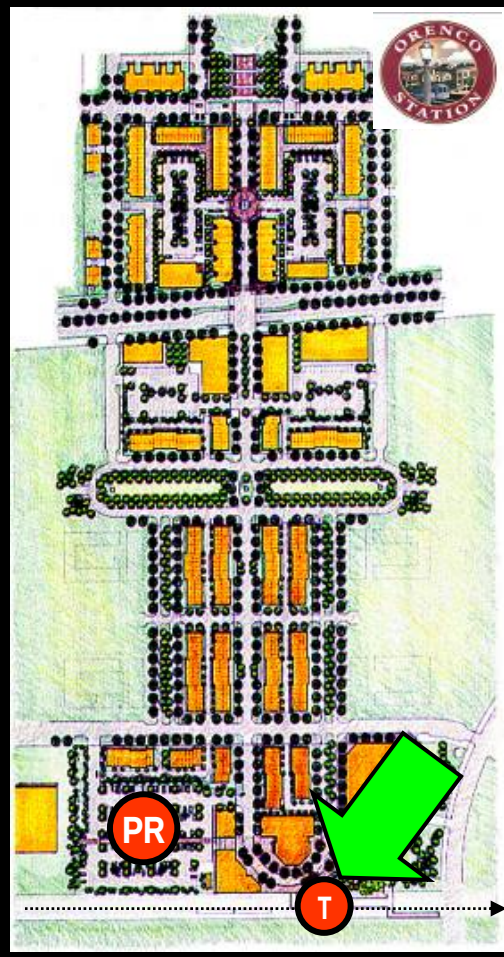
ALTERNATIVE B STATION LOCATION
EXISTING ORENCO
WETLANDS
LOWER INTENSITY LAND USES
¼ MILE RADIUS

DJC
THE DAILY JOURNAL OF COMMERCE
MAGAZINE
AUGUST EDITION

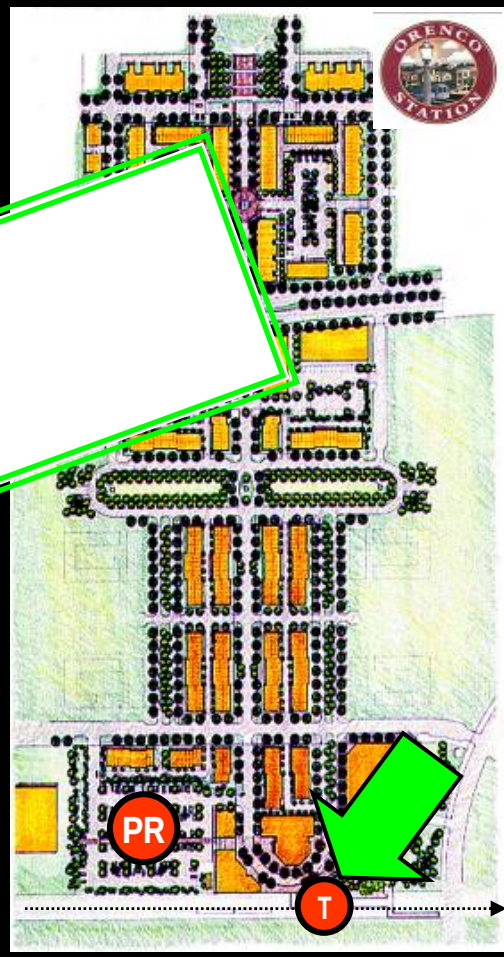
Hillsboro development Oregon's top project

Take a mix of housing, parks, a traditional neighborhood "main street" retail area and a com-

friendly environment, homes are closer to the street and feature detailed Craftsman and English Cottage exteriors, many with front porches. Single-family, detached and attached homes are integrated to help create the look and feel of a traditional neigh-

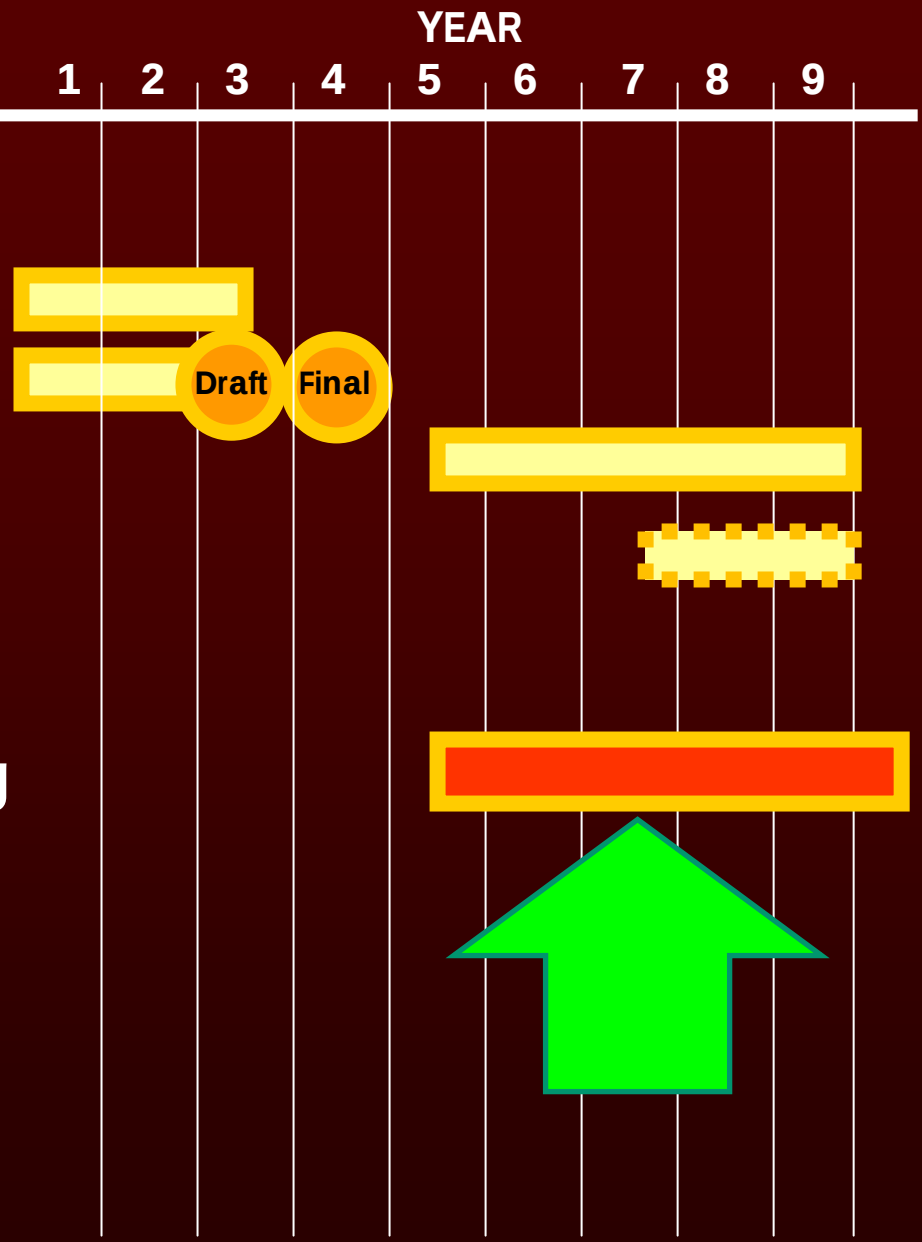


Orenco Station TOD, Hillsboro, OR



Orenco Station TOD, Hillsboro, OR

Project Timeline



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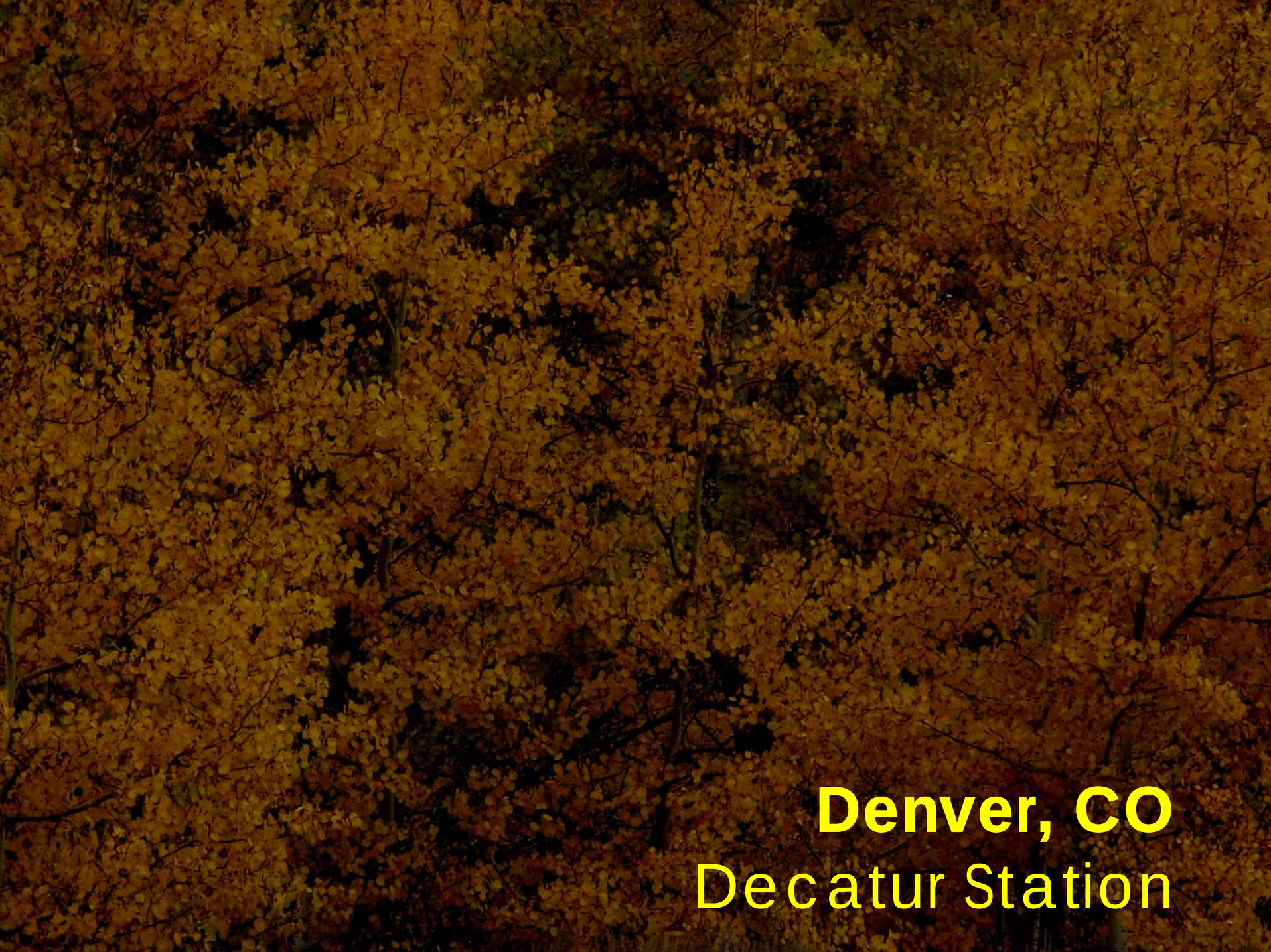
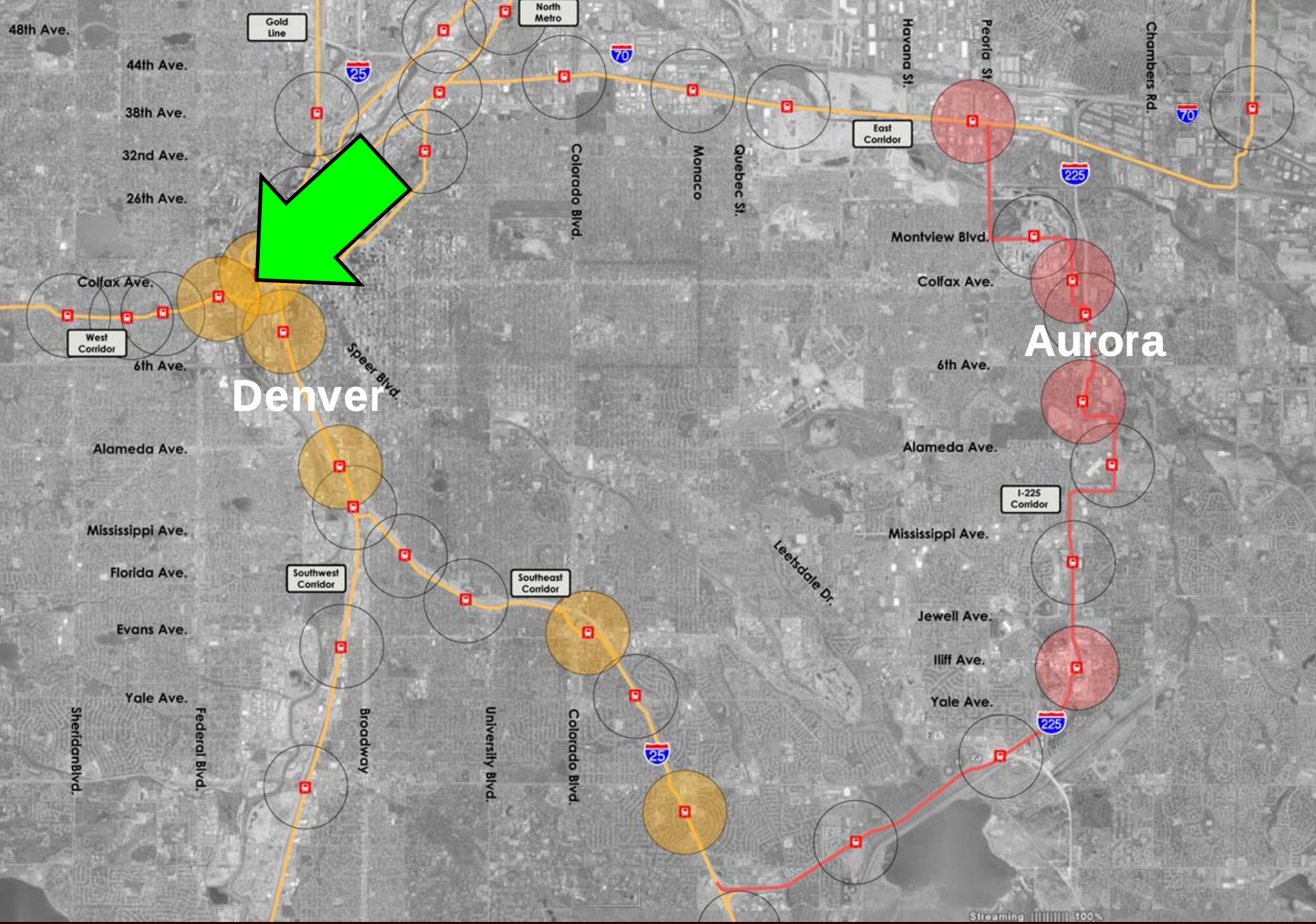
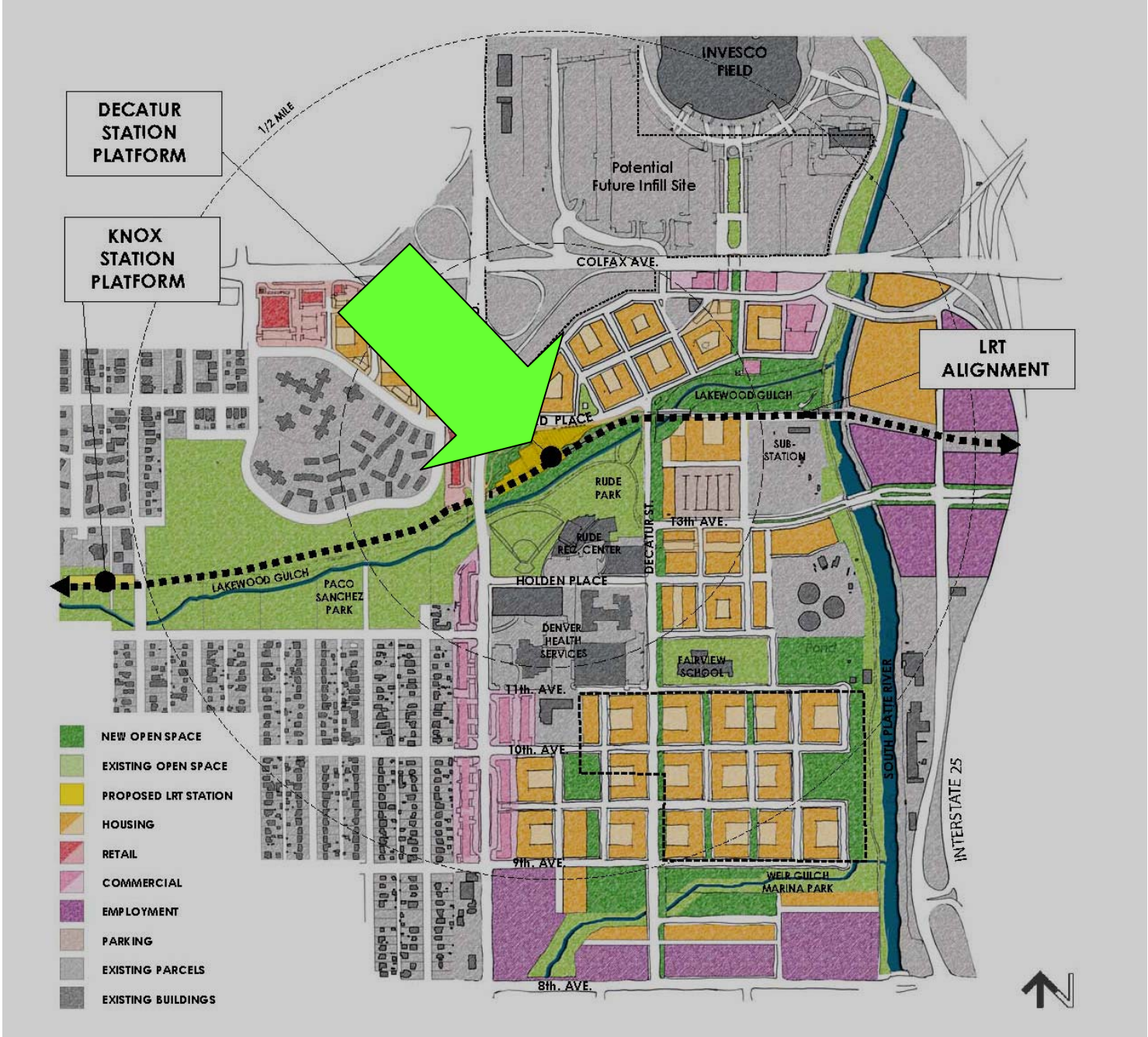
- Value Engineering

2 TOD Station Area Planning


Denver, CO
Decatur Station



Denver and Aurora Station Area Plans, CO



Option B – Land Use

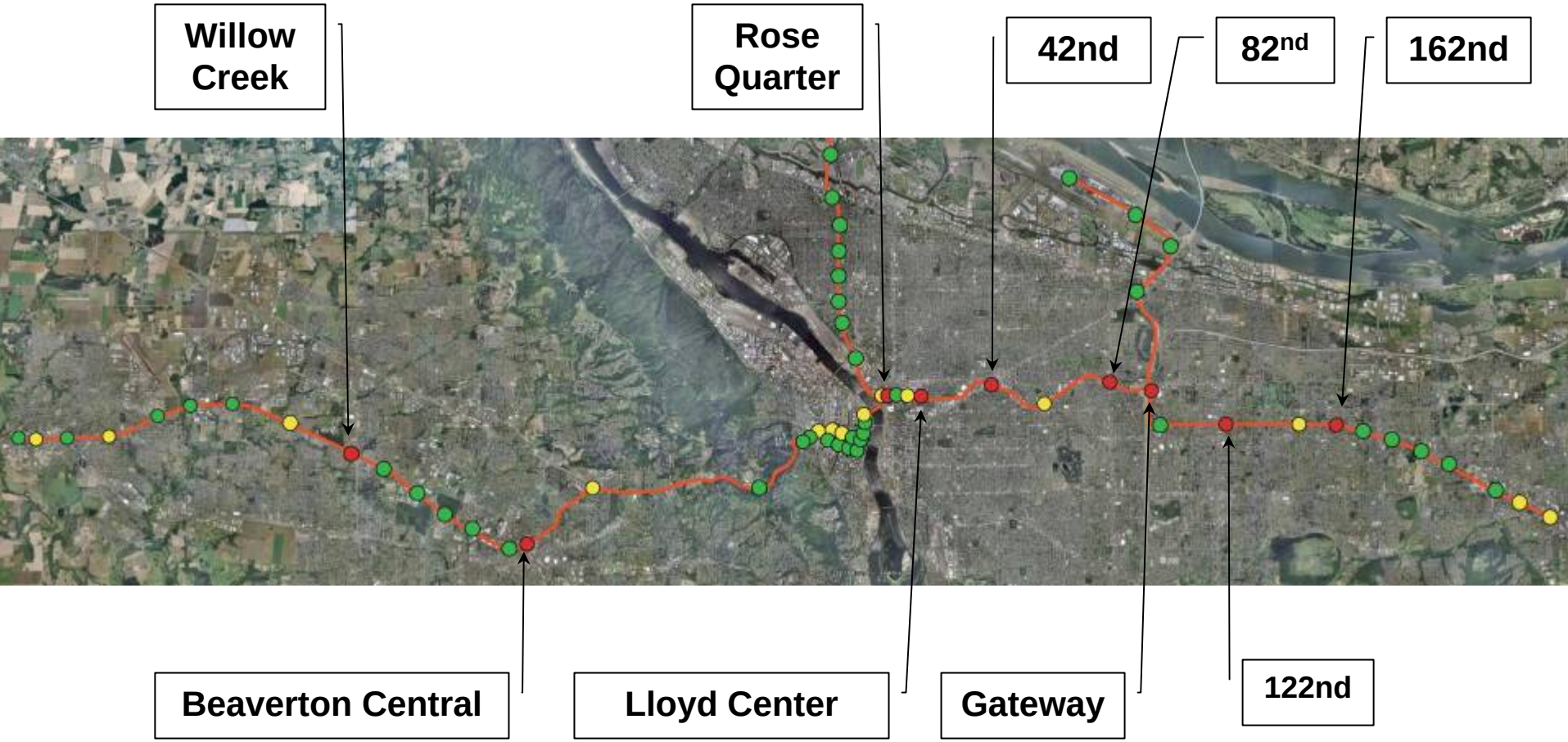
Option B – Proposed Station Platform Location

Option B - Station Platform Location

Lakewood Gulch at Federal Blvd. Bridge

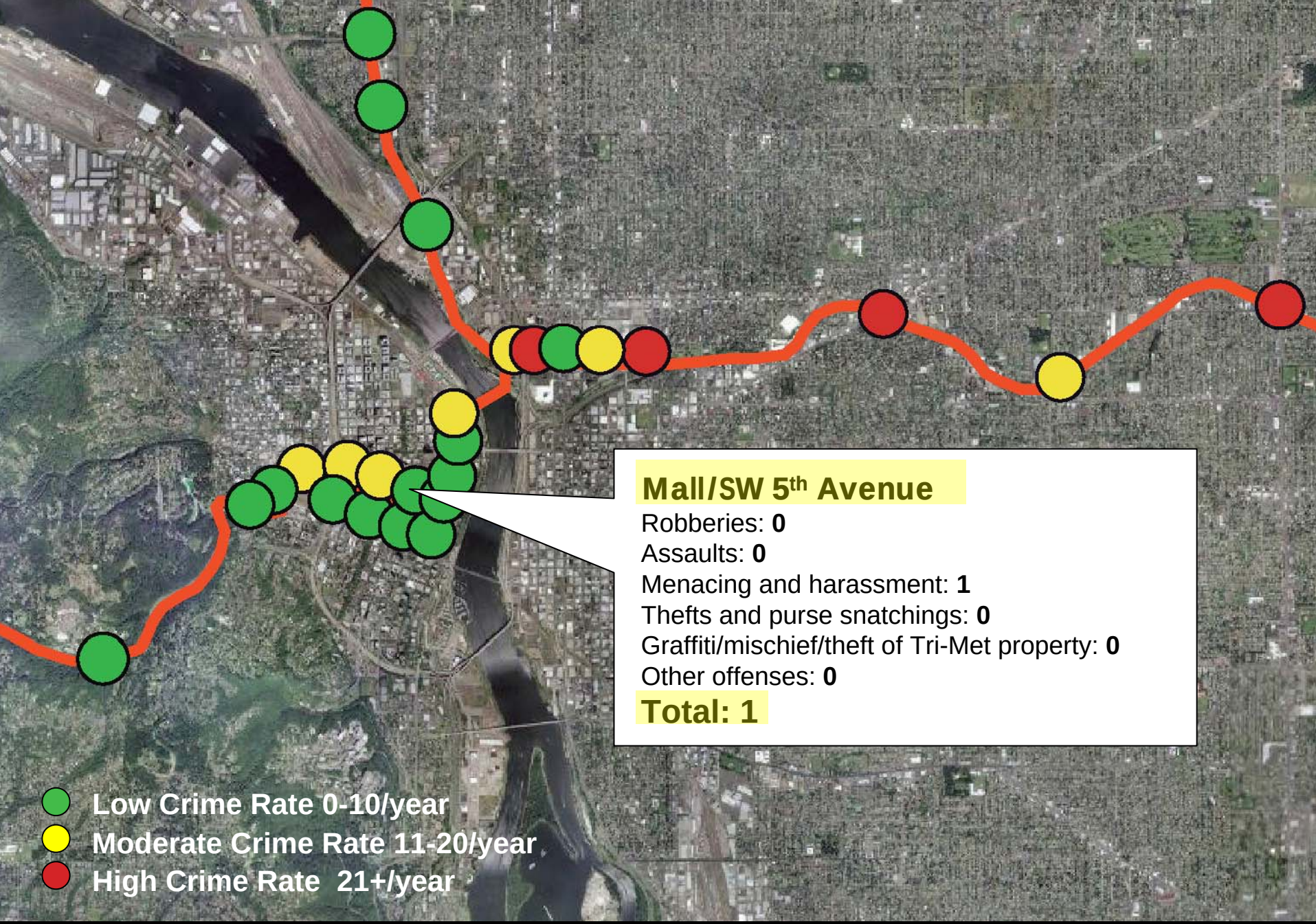
Option B - Station Platform Location

Lakewood Gulch at Federal Blvd. Bridge

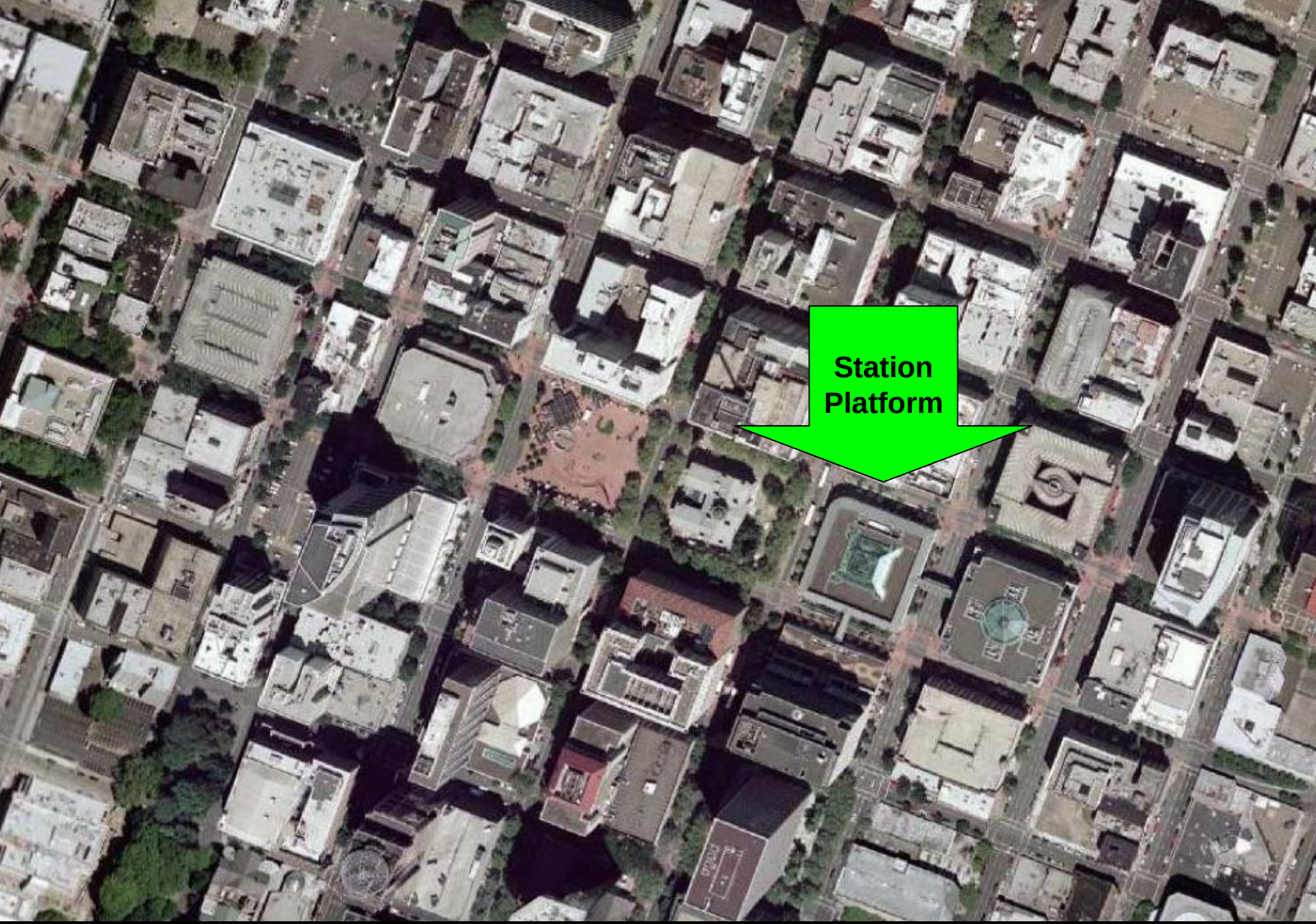


- Low Crime Rate 0-10/year
- Moderate Crime Rate 11-20/year
- High Crime Rate 21+/year

Portland Light Rail Station Crime Rates



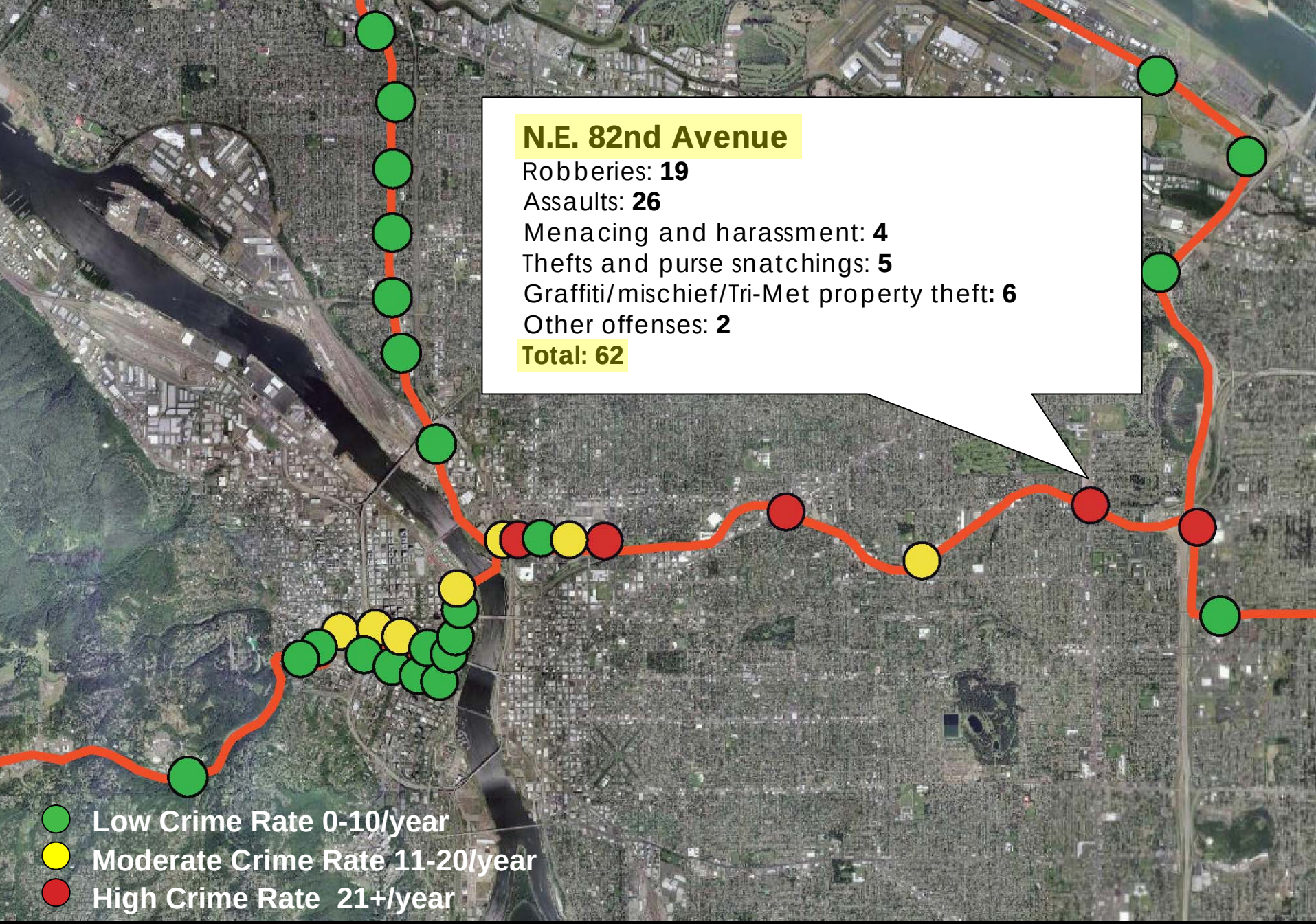
Portland Light Rail Station Crime Rates



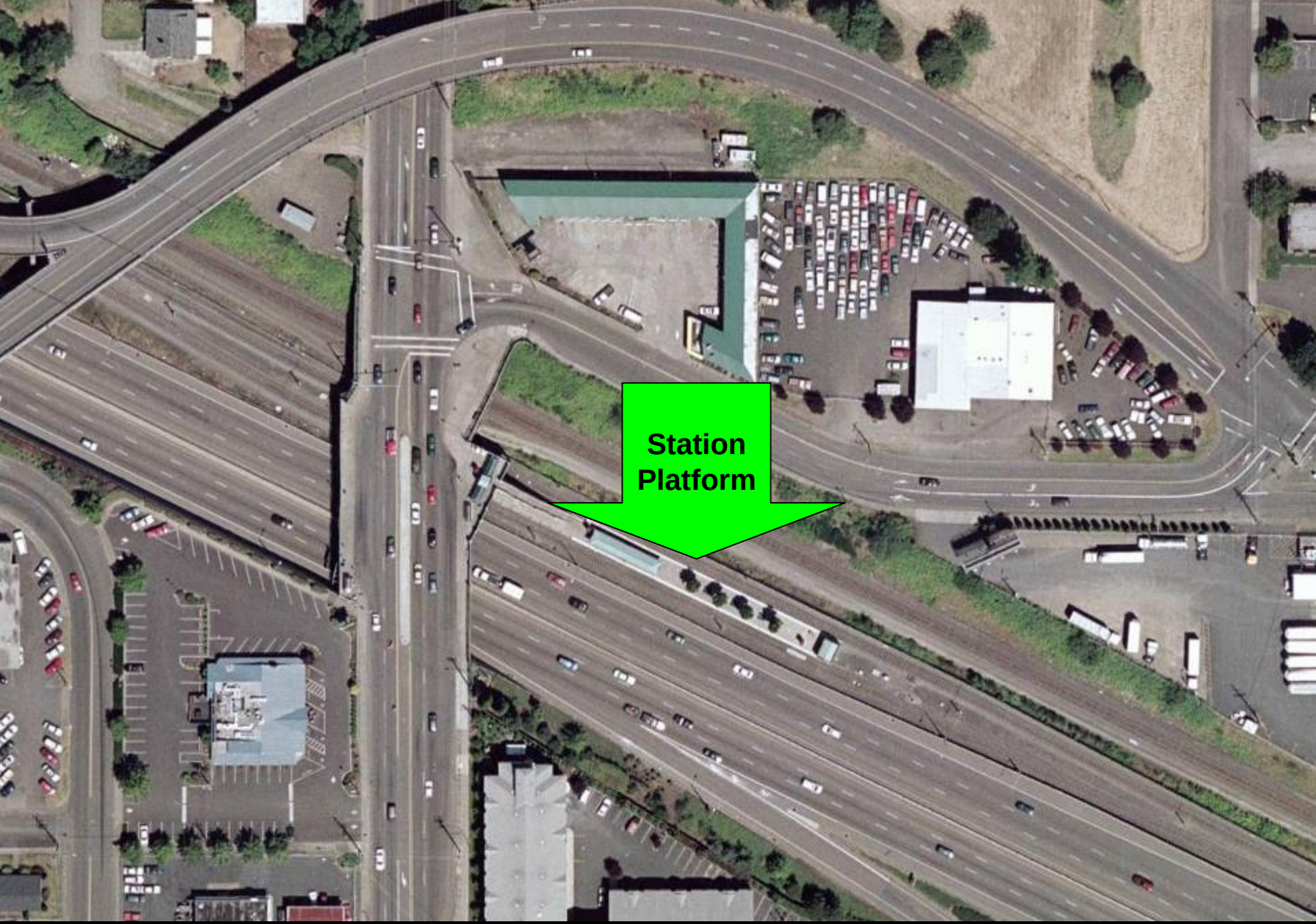
Mall/SW 5th Avenue Station

Mall/SW 5th Avenue Station

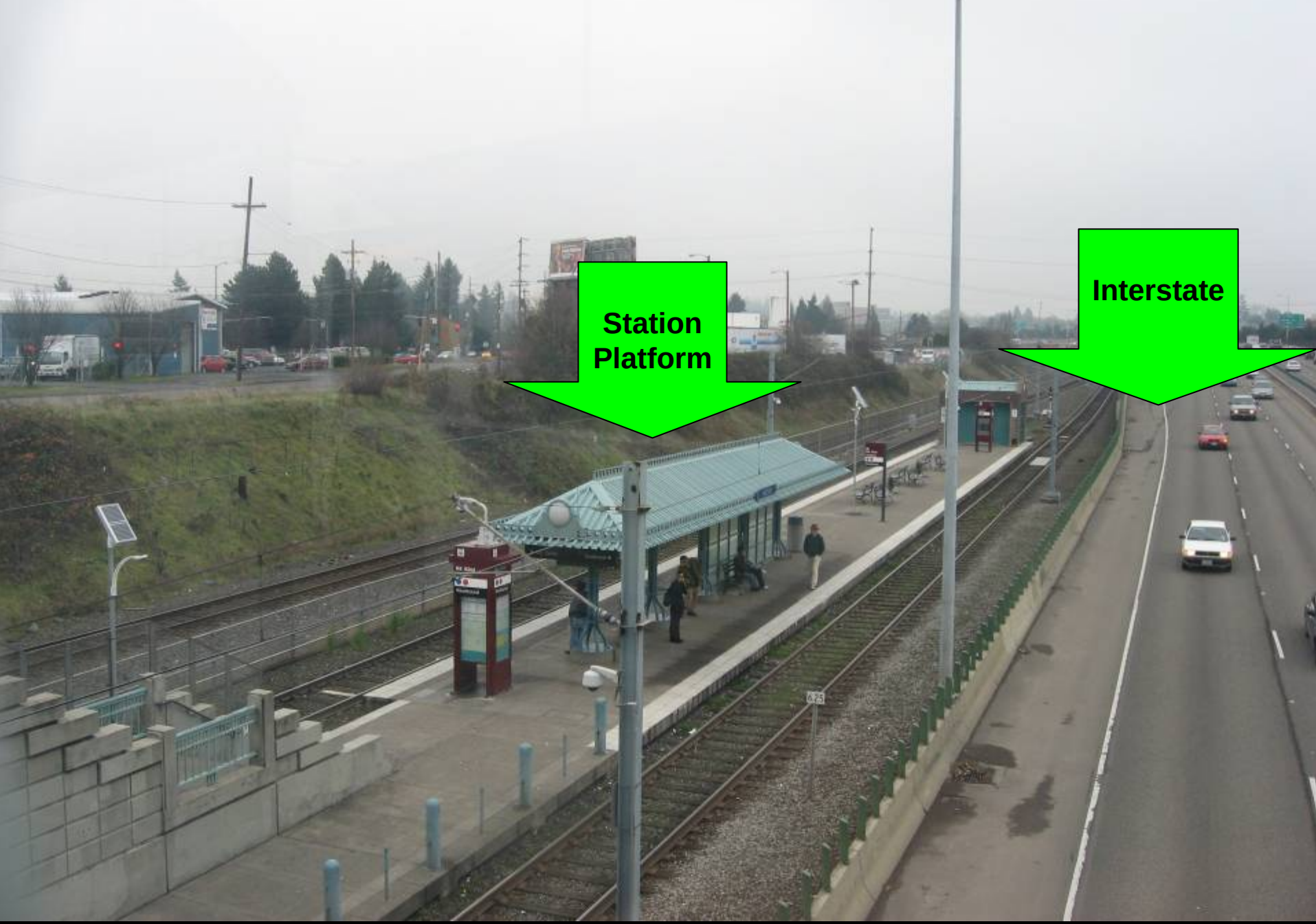
Mall/SW 5th Avenue Station



Portland Light Rail Station Crime Rates



82nd Avenue Station



82nd Avenue Station

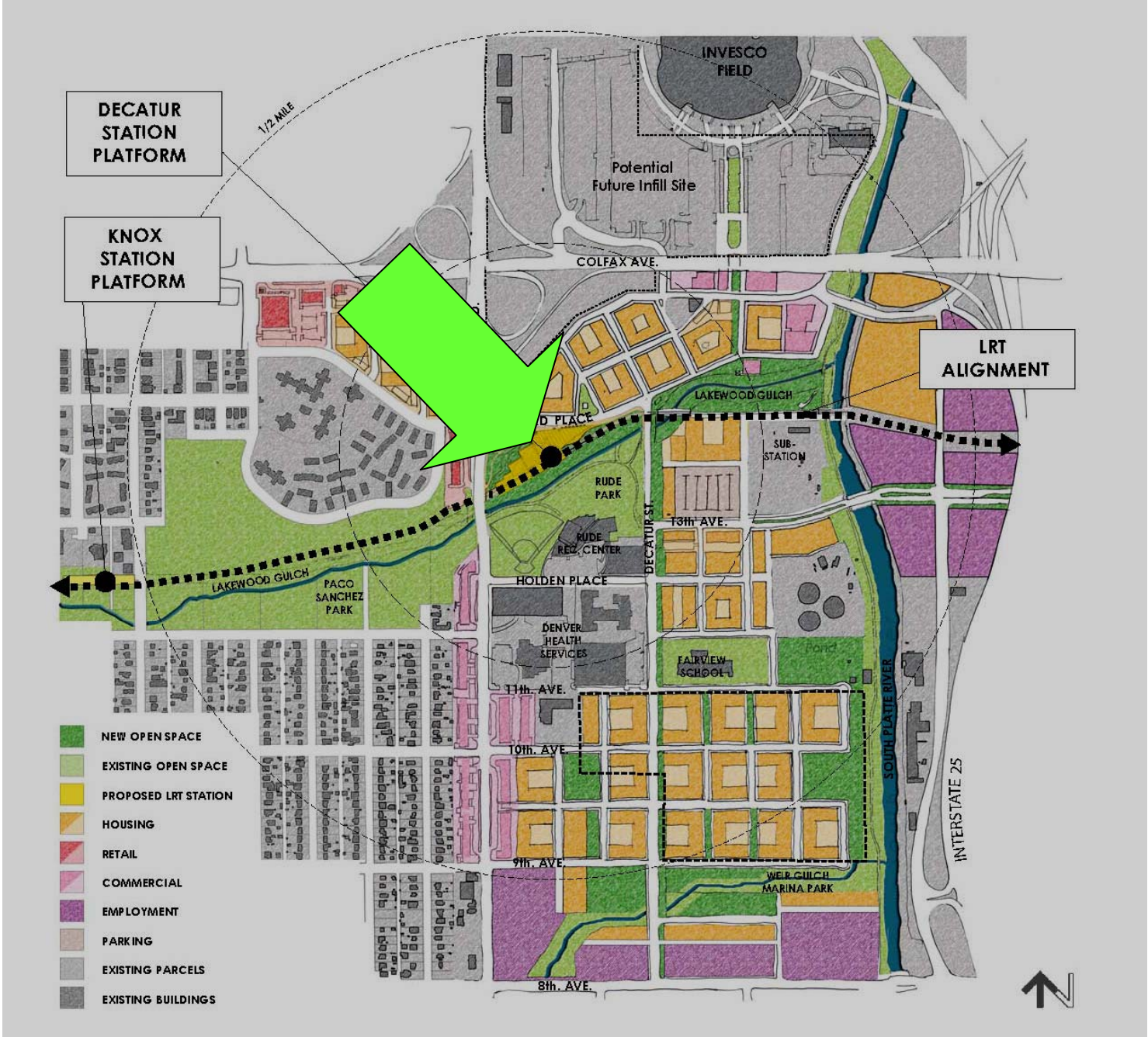
82nd Avenue Station

Lower Crime Stations

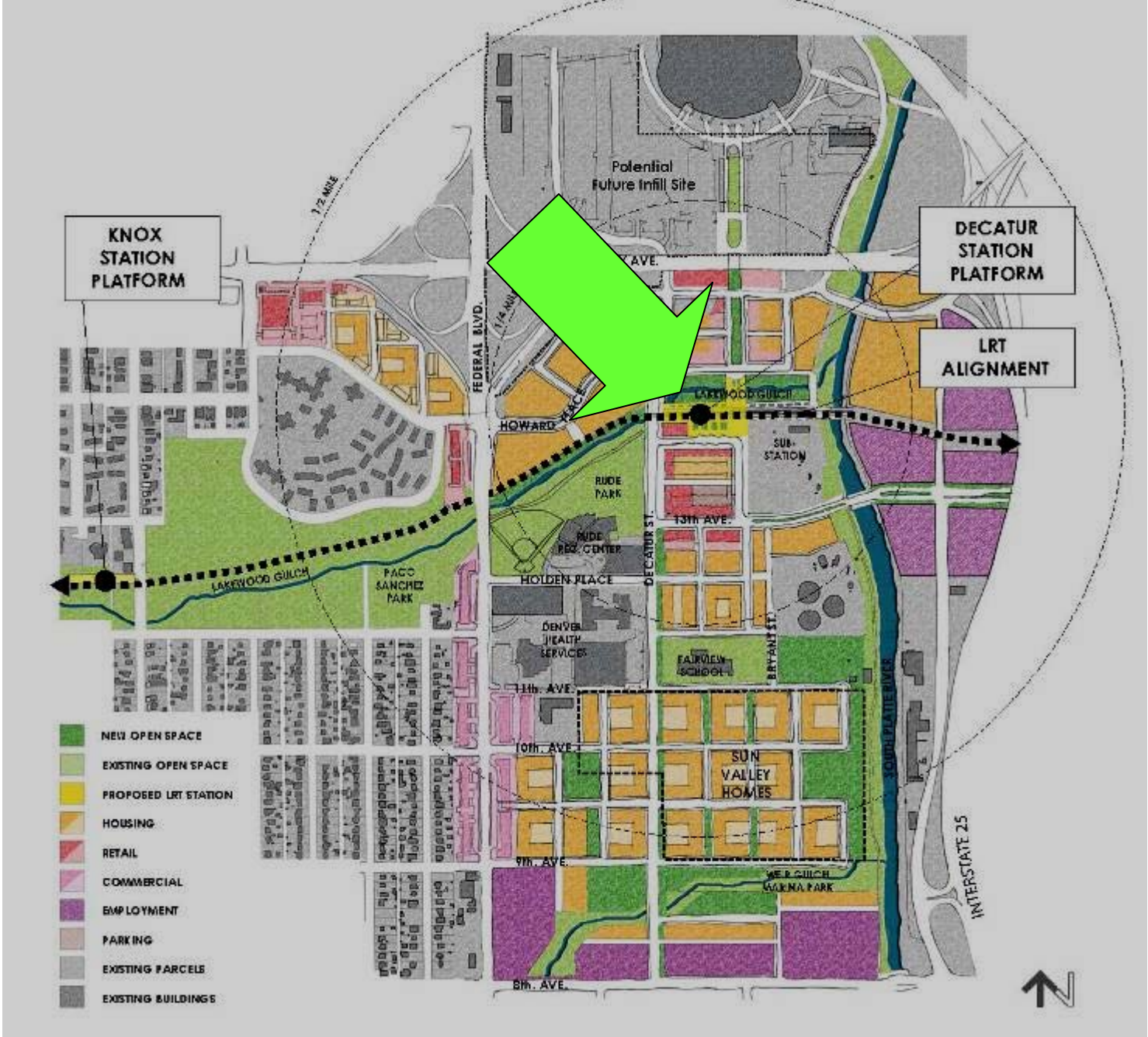
- Moderate to high pedestrian traffic
- Pedestrian traffic from transit users and adjacent businesses
- Located at street level
- "Eyes on the station" from adjacent housing, retail and commercial

Higher Crime Stations

- Low pedestrian traffic
- Pedestrian traffic is limited to transit users
- Located below grade "buried stations"
- No "eyes on the station"
- Direct adjacency to parks

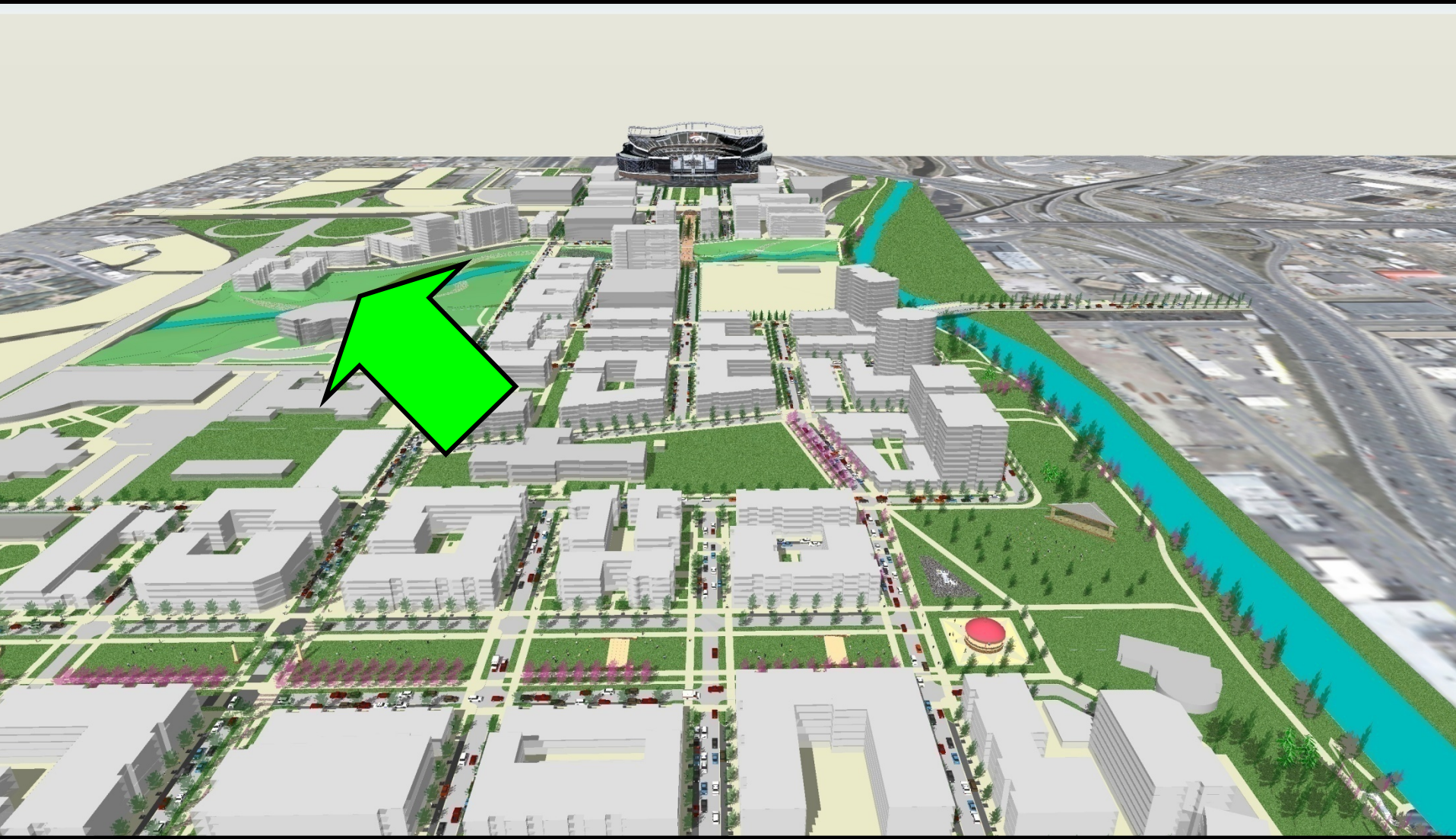


Option B – Land Use

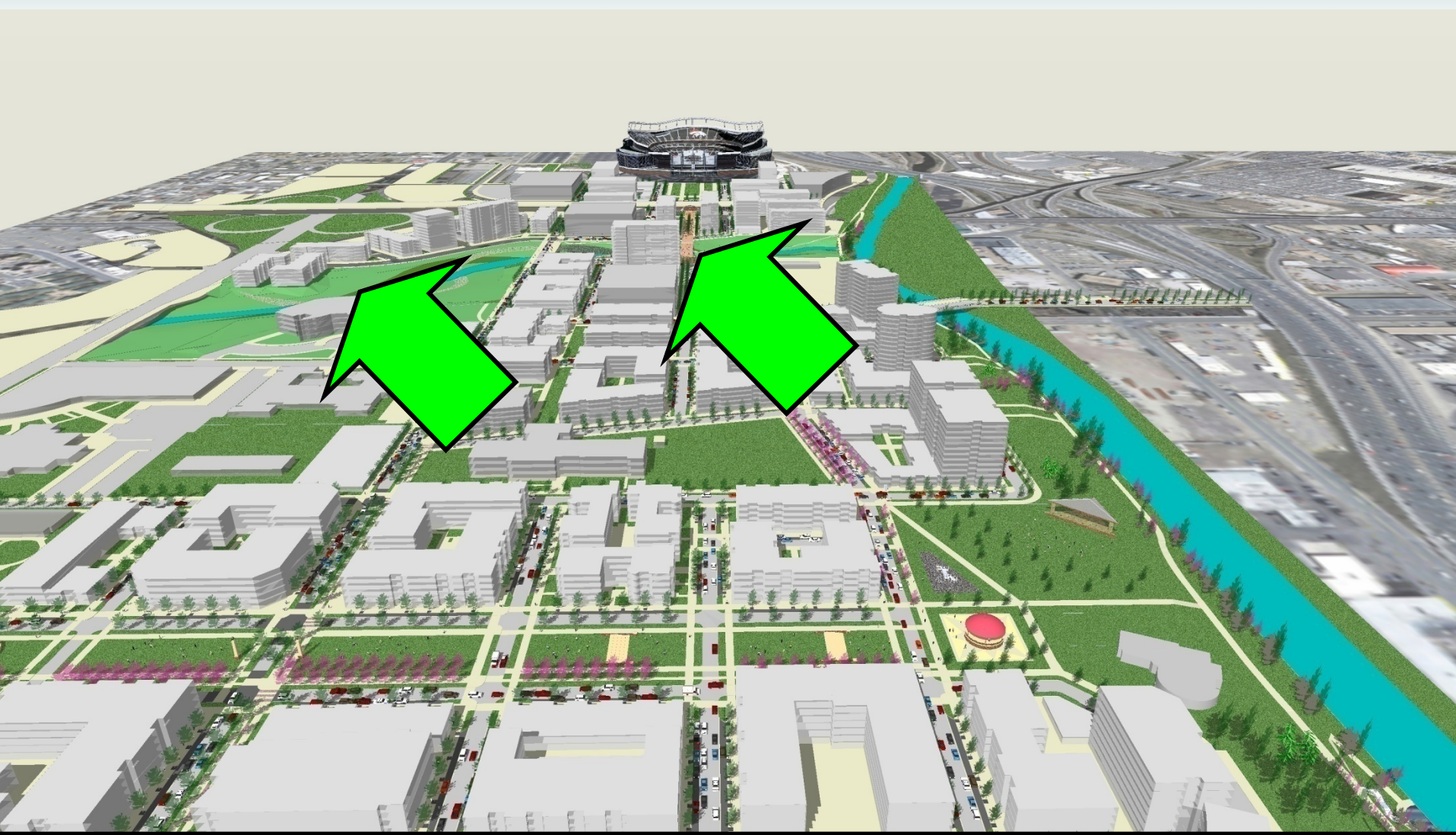


Option C - Land Use

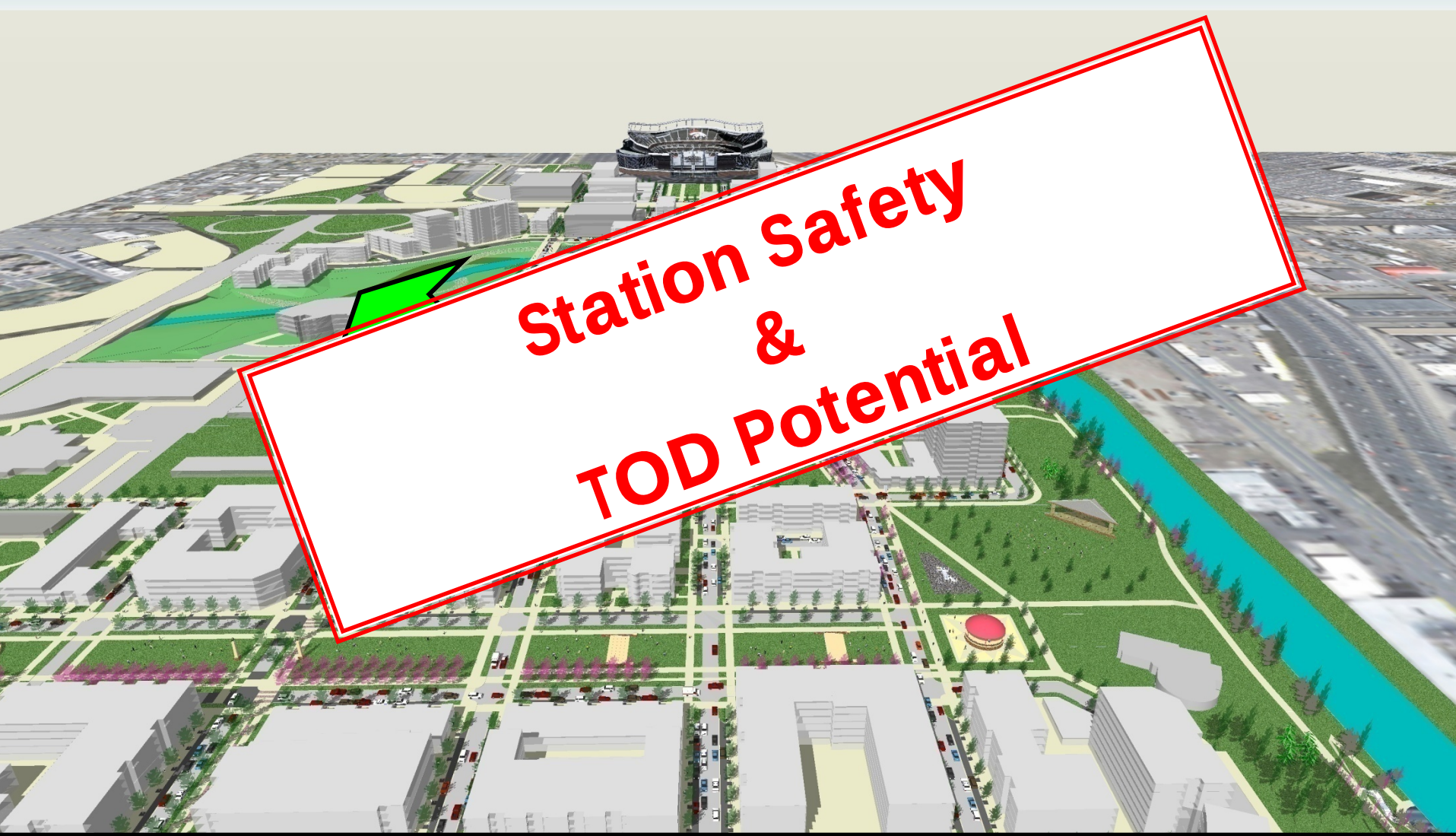
Option C – Station Platform Location



Decatur Station

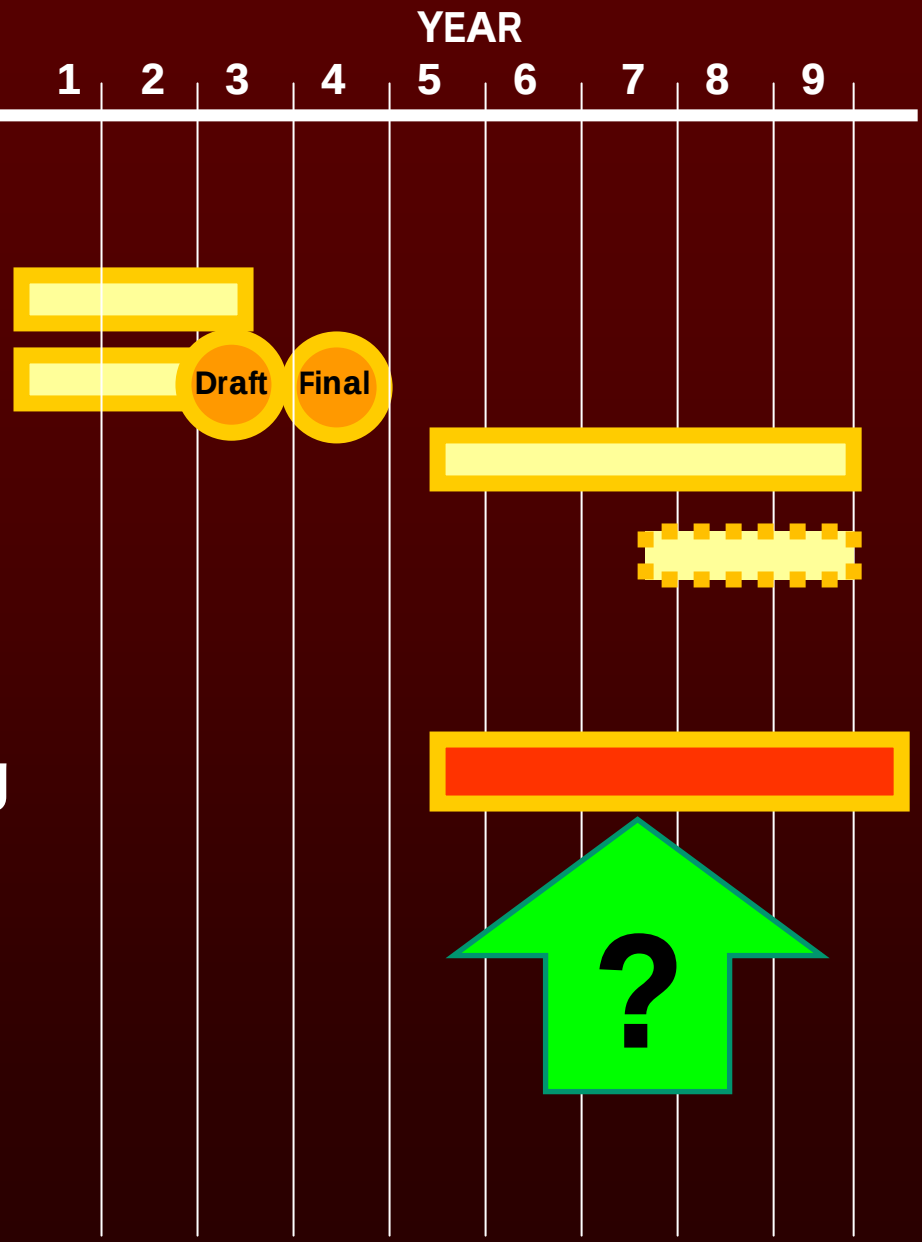


Decatur Station



Decatur Station

Project Timeline



1 LRT Project

- Preliminary Engineering
- EIS
- Final Design
- Value Engineering

2 TOD Station Area Planning

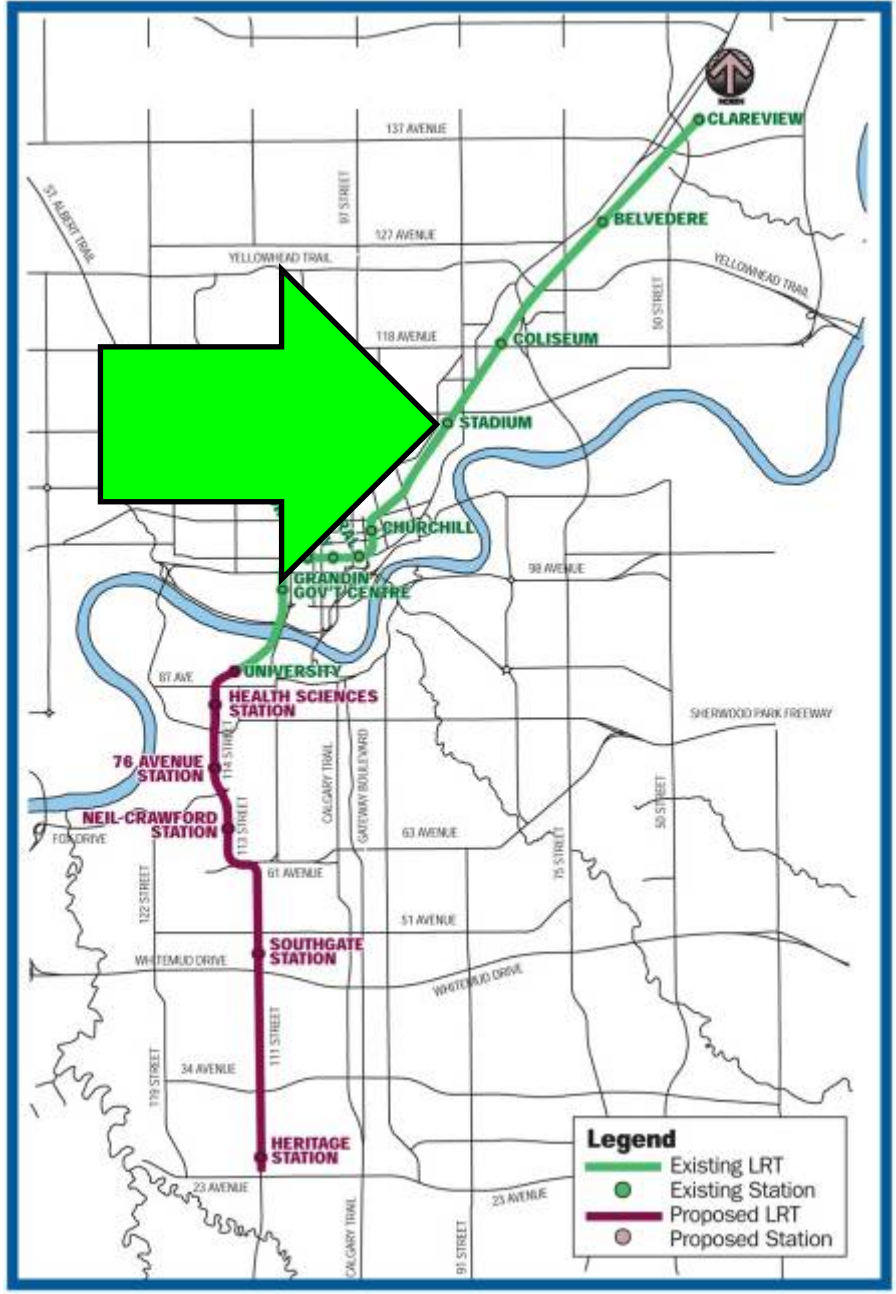
Station Location- Lessons Learned

Station locations should be determined through a design process that identifies:

1) **Development potential**
2) **Ability to create a safe station**

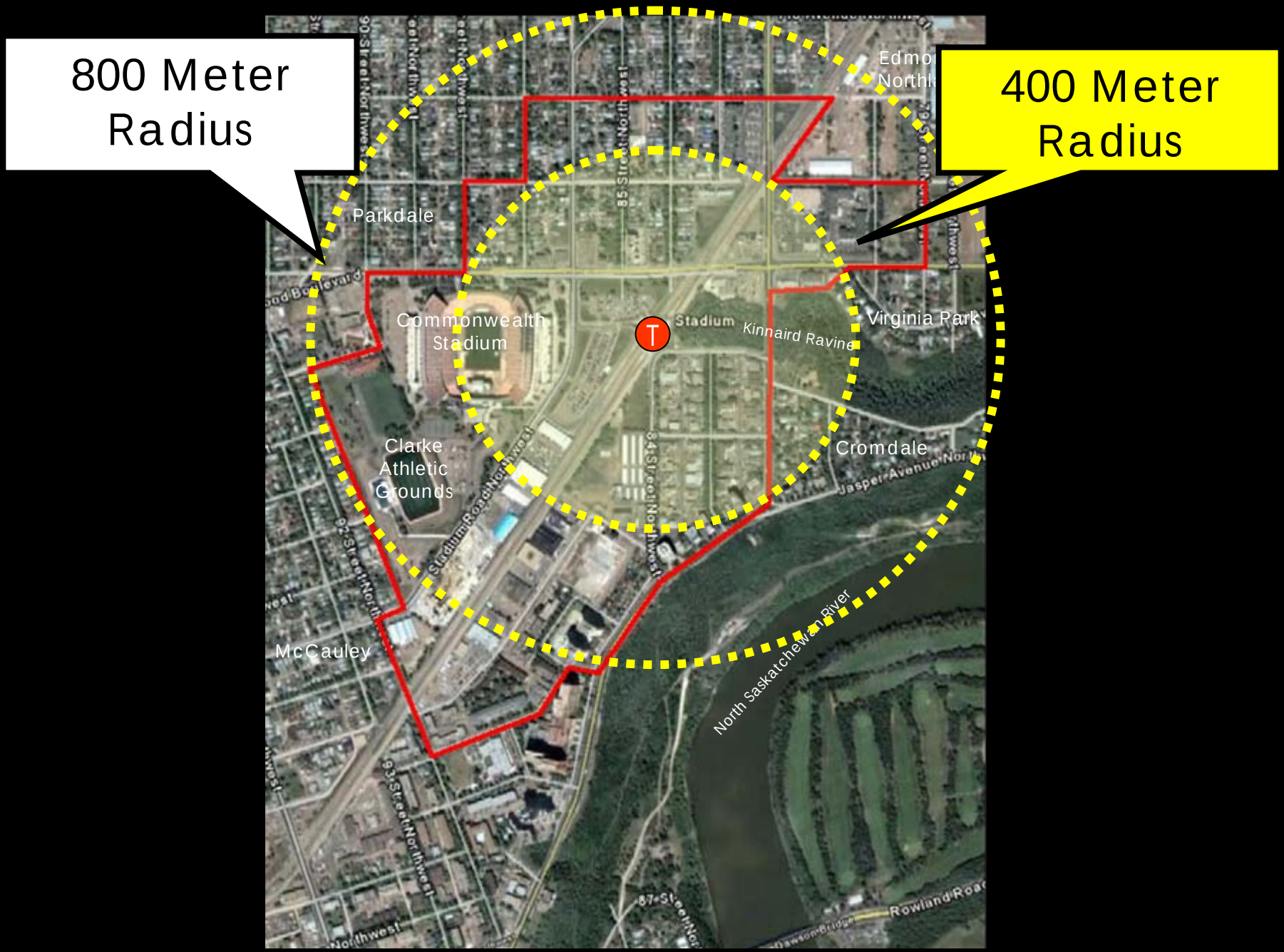
Station Area Plans

Edmonton, Alberta
Stadium Station



Edmonton LRT System

Stadium LRT Station Area Transportation Issues



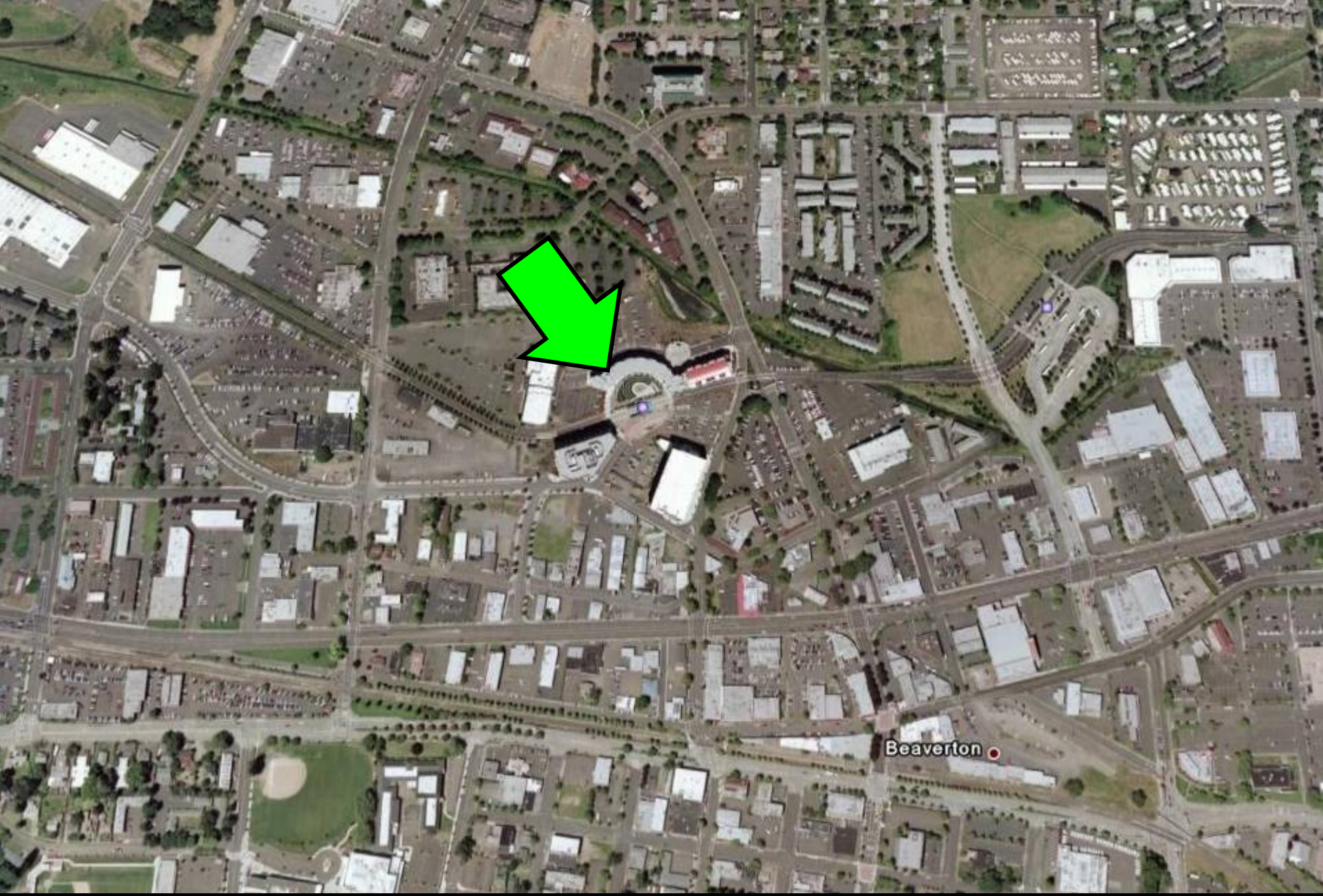
Stadium LRT Station Issues

Stadium LRT Station Area Transportation Issues

Stadium LRT Station Area Transportation Issues

Stadium LRT Station Area Transportation Issues

Beaverton, OR
The Round



The Round, Beaverton, Oregon

COMING SOON.

the Round

Beaverton, OR

Beaverton looks to take control of the Round

City officials want to bring in their own developer to finish the beleaguered downtown centerpiece

The Round was expected to include stores, offices, condominiums, apartments, a movie theater and a hotel surrounding a brick courtyard, all accessible by light rail.

If the land goes into foreclosure, it could be sold at a sheriff's sale. If that happens, the city would be in danger of losing the land altogether.

Offer for land fails

Beaverton downtown deal collapses again

Contractors who have gone unpaid balk at a deal in which the city would take over the Round at Beaverton Central

By AARON FENTRESS
THE OREGONIAN

BEAVERTON — Lienholders have turned down a proposed deal expected to save the Round at Beaverton Central, leaving the city and developers looking for other ways to complete the perpetually-under-construction downtown core.

Beaverton had offered to buy the 4.5-acre site from BCB Group Developers LLC for $3.4 million over two years. That money would have gone to about 75 contractors owed $4.8 million to keep them from foreclosing on the property on Southwest Watson Avenue, just north of Canyon Road.

A handful of lienholders wary about giving up their lien rights, however, did not like the deal because it lacked guarantees that future city administrations would continue to make the staggered payments.

If nothing is resolved, lienholders could begin foreclosure proceedings that could result in a sheriff's sale of the property. But most have indicated that they would like to see the project completed.

Beaverton officials made the purchase offer to try to avoid foreclosure. They remain hopeful the project will be completed by either BCB or another developer, said Linda Adlard, Beaverton chief of staff and lead negotiator for the city. But securing an investor has proved difficult.

Beaverton and BCB have begun discussing other alternatives to save the project, envisioned as an amalgamation of stores, offices, condominiums, apartments, a movie theater and hotel surrounding a brick courtyard and accessible by light rail.

At this point, Beaverton taxpayers are not losing money on the project. Beaverton exchanged the land, valued at $2.7 million, to BCB for its work on preparing the soft soil for construction. That work cost about $3 million more than the land's value, prompting Beaverton to give BCB a $3 million tax break over 10

Please see **ROUND,** Page C7

Round: Developer ran out of cash

Continued from Page C1

years after completion of the project.

"The reality is that all of the creditors are victims and they have the right to

the $2.9 million in liens now, she said.

That means contractors would

Developer of Round in default on loan

Foreclosure filing | A city official downplays the problem as a "hiccup" for the struggling project

By DAVID R. ANDERSON
THE OREGONIAN

BEAVERTON — The developer of the Round at Beaverton Central, the troubled urban-style project along MAX light rail, is in default on a $31.5 million loan and the lender is asking that a third party take control of the development, according to legal documents.

The Round: Project suffers setbacks over past 10 years

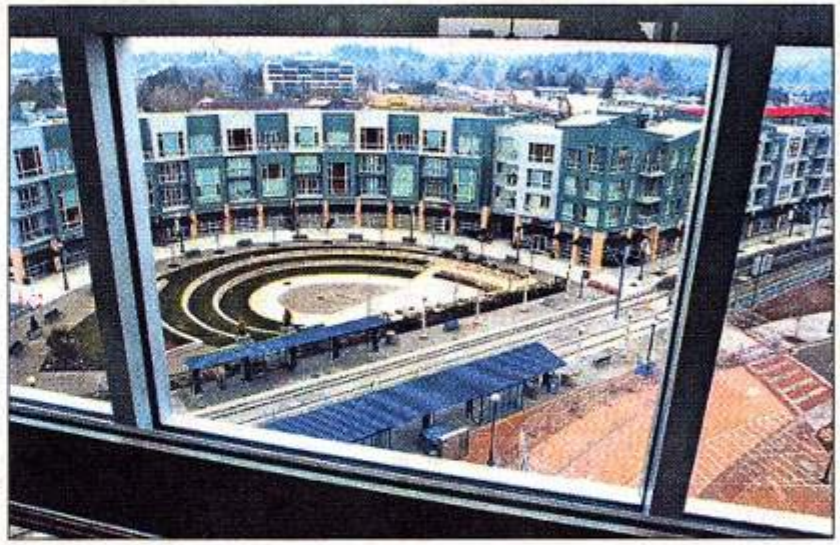
Continued from Page D1

to comment.

The news of the foreclosure, first reported by the Beaverton Valley Times on Thursday, comes as the city is seeking a developer to buy the former Westgate Theatre site next to the Round and develop it in a similar fashion, with multistory buildings of ground-floor retail and housing and offices above, with structured parking.

The Round has struggled since 1997, when the city sold the former sewage treatment plant to a developer and called for multistory buildings with ground-floor retail and restaurants with housing and offices above.

The first developer declared



BENJAMIN BRINK/THE OREGONIAN

Developers of the Round at Beaverton Central are in default on a $31.5 million loan, according to legal documents.

The Round at Beaverton Central timeline

1979: Beaverton leaders propose a site for two eight-story office buildings that would include City Hall and the city library. The plan fails after an economic downturn.

April 1997: City leaders approve plans for development of the Round by BCB Group Developers.

tenants move in.

July 2004: City officials declare Dorn-Platz has defaulted on its agreement and has fallen behind schedule, which called for the project to be finished in 2005.

June 2005: City leaders sign new development agreement

The Round – Summary Evaluation

A Regional Embarrassment

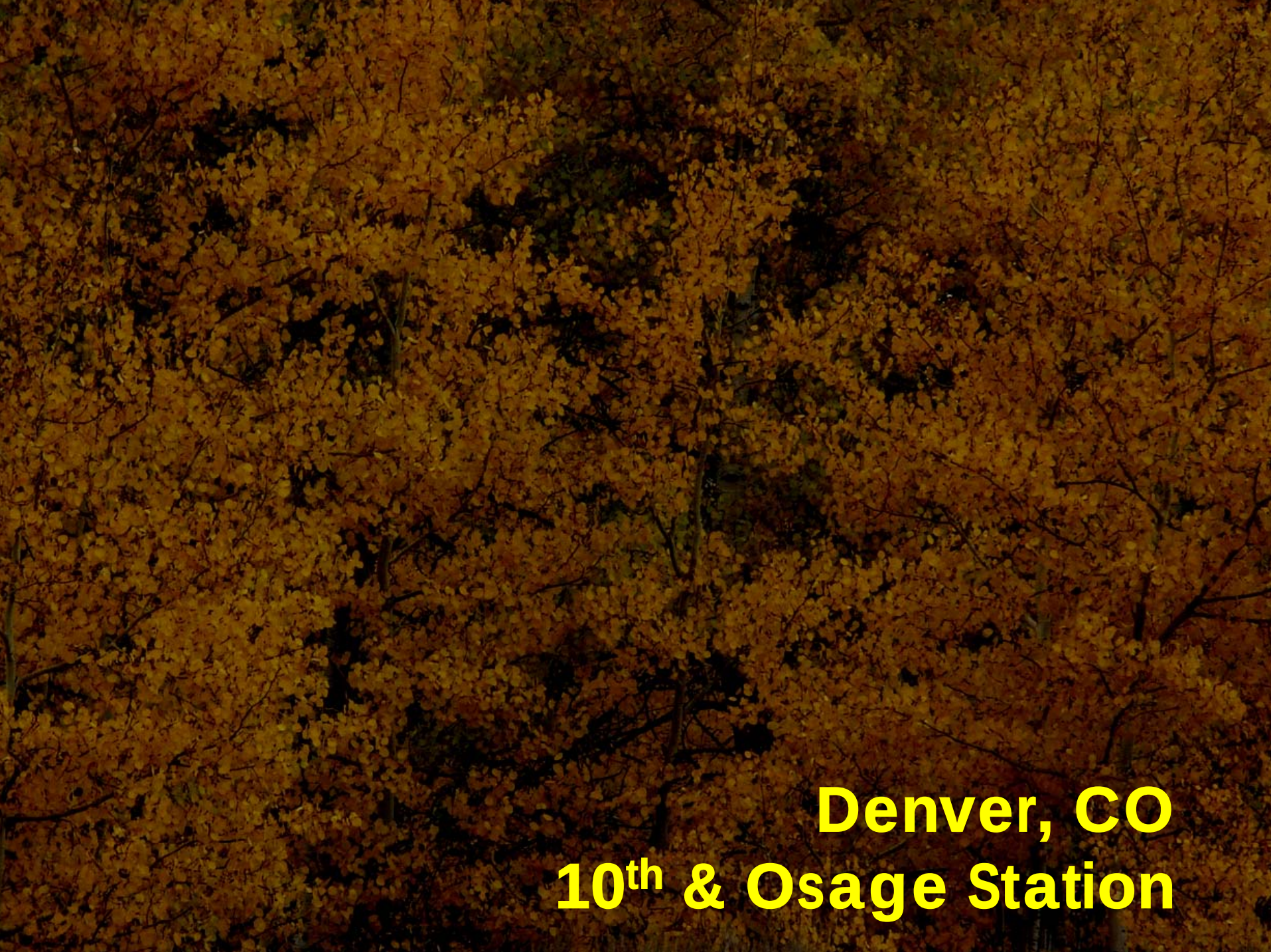
Fatal Flaws

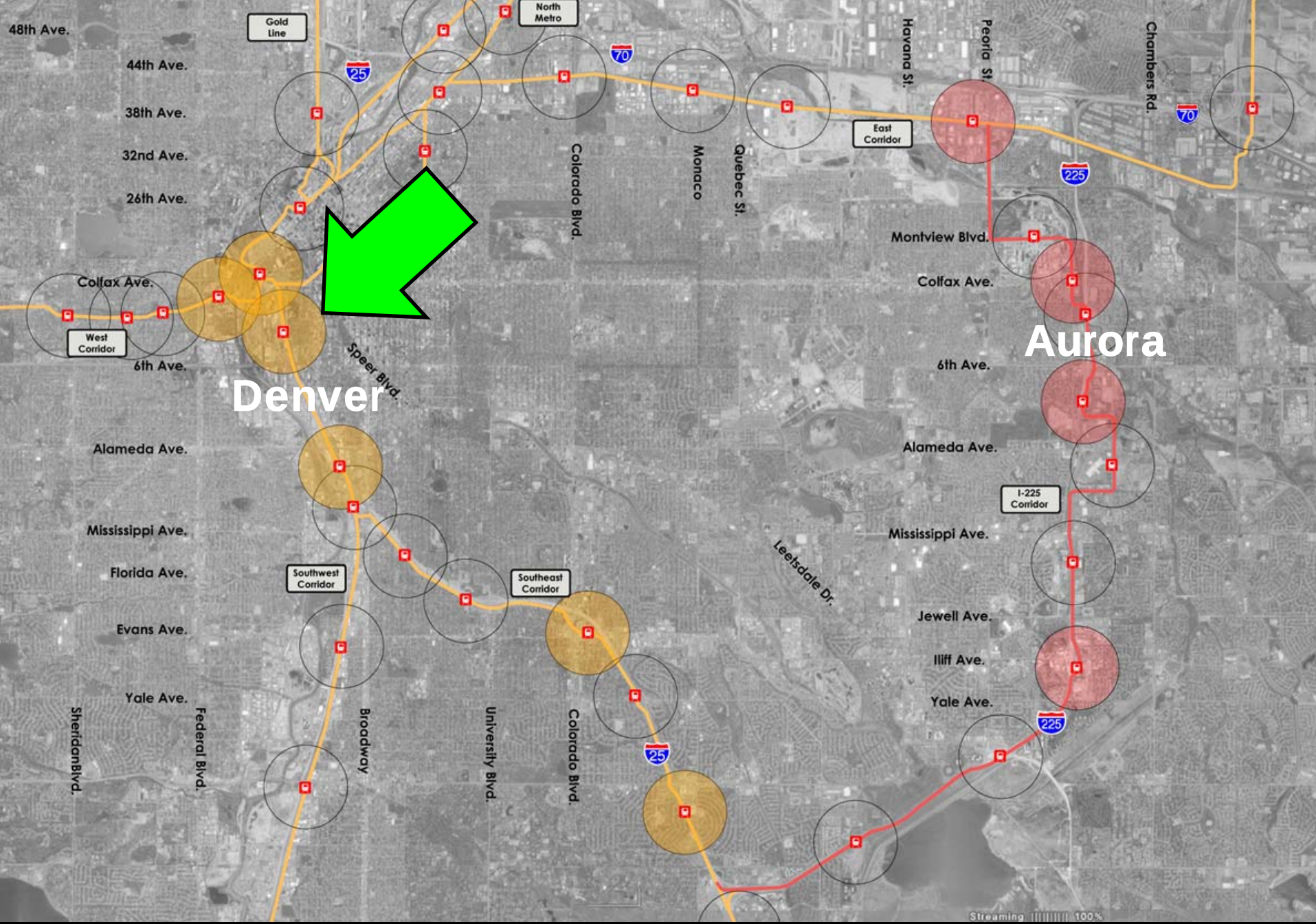
1) A "develop… …tion
2) A de… …ate for a station area frame…
3) Selecti… …at was all flash, with little substance

A developer offering is not a substitute for a public planning process

Fundamental

1) Isolated st… …location with little pedestrian or auto connectivity to the surrounding area
2) Low population density in the station area
3) New development potential limited by existing low density uses
4) Did not respond to basic siting requirements for housing, retail or office uses


Denver, CO
10th & Osage Station



Denver and Aurora Station Area Plans, CO

10th and Osage

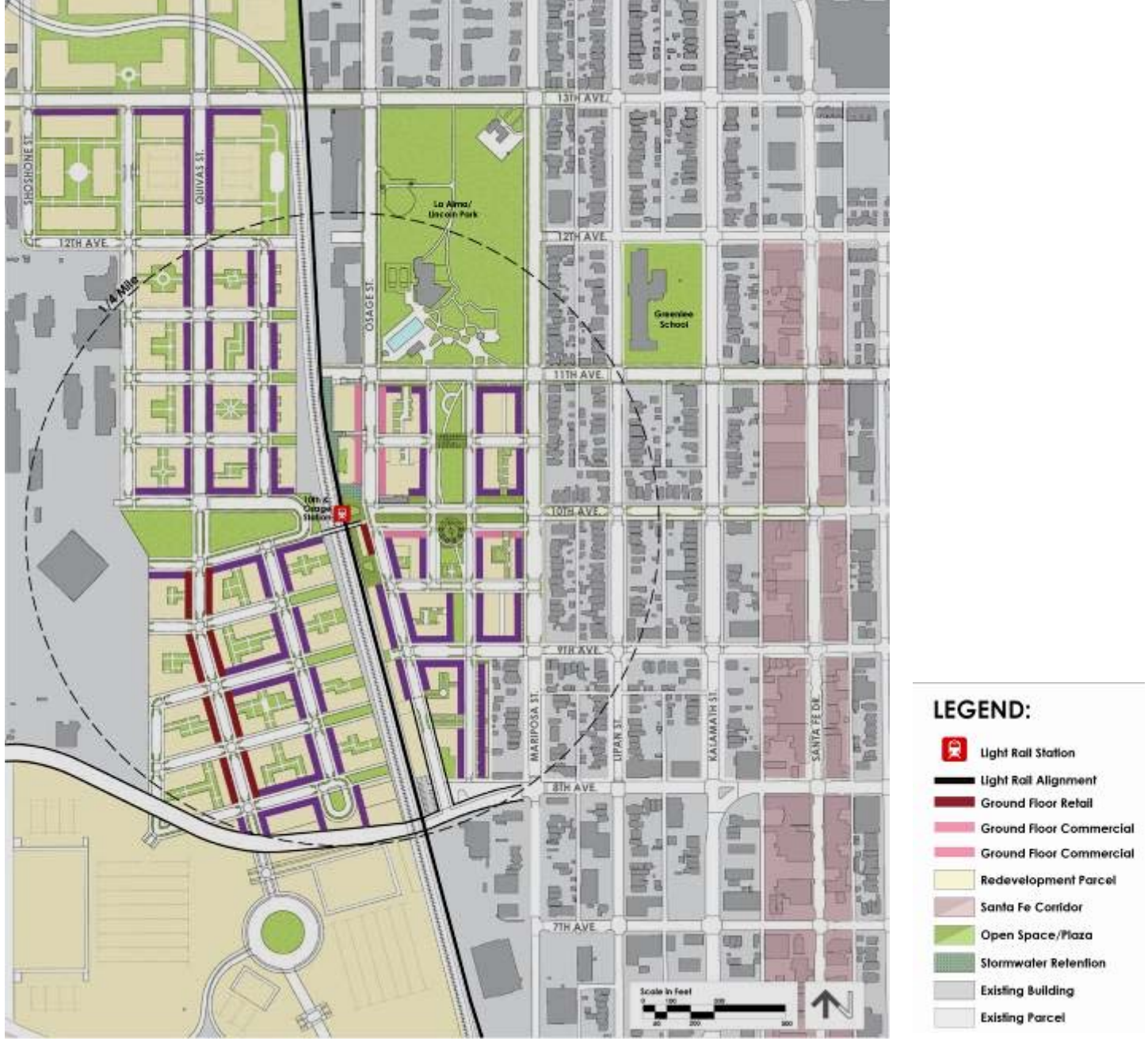
DEVELOPMENT SUMMARY

Retail - 139,000 SF
Commercial - 322,200 SF
Office - 280,000 SF
Housing - 6,900 Dwelling Units
Parking - 8,900 spaces
Open Space - 381,000 SF

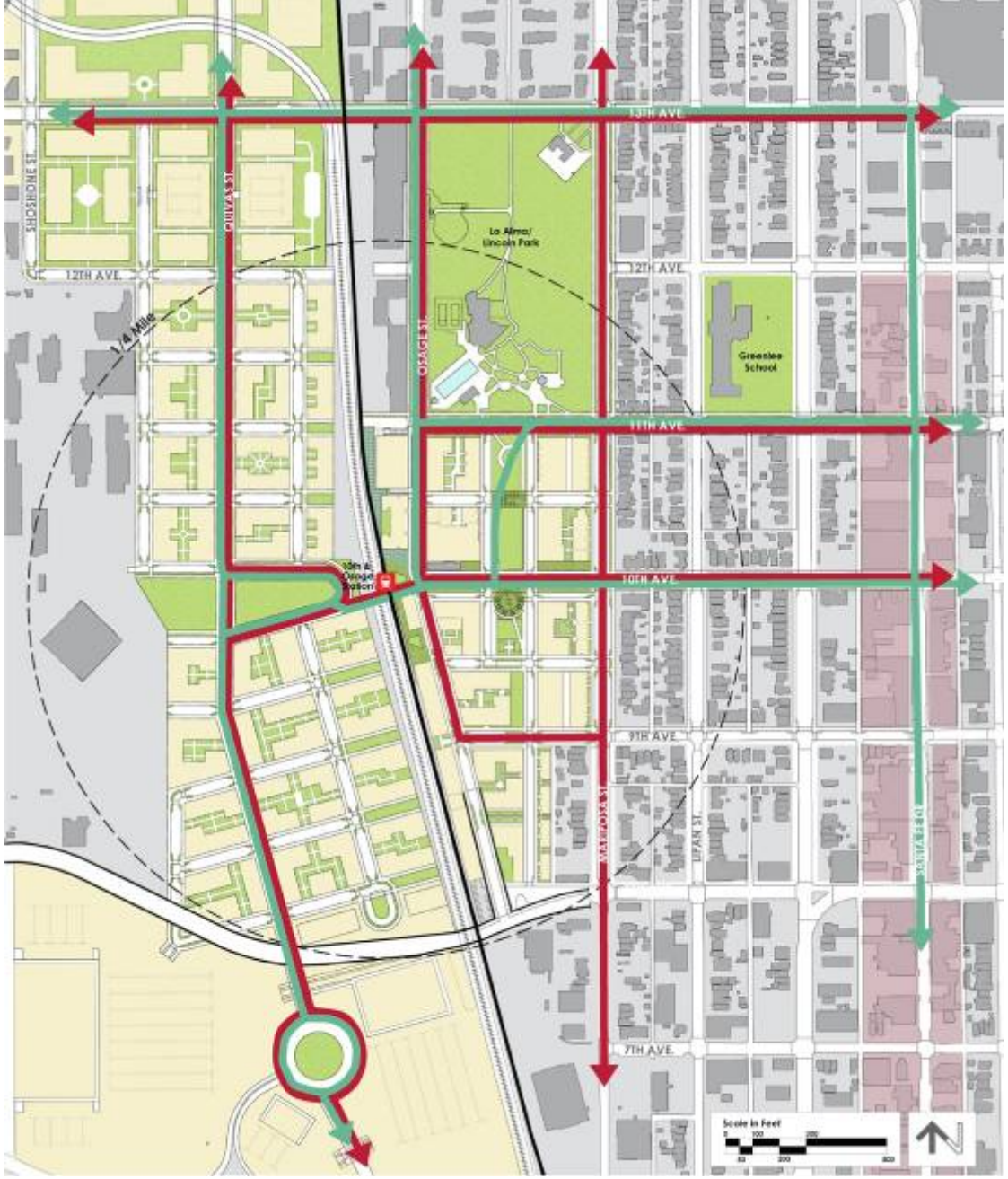
LEGEND:

- Light Rail Station
- Light Rail Alignment
- Retail
- Commercial
- Residential
- Office
- Parking Structure
- Auraria West Campus
- Open Space/Plaza
- Stormwater Retention
- Existing Building
- Existing Parcel

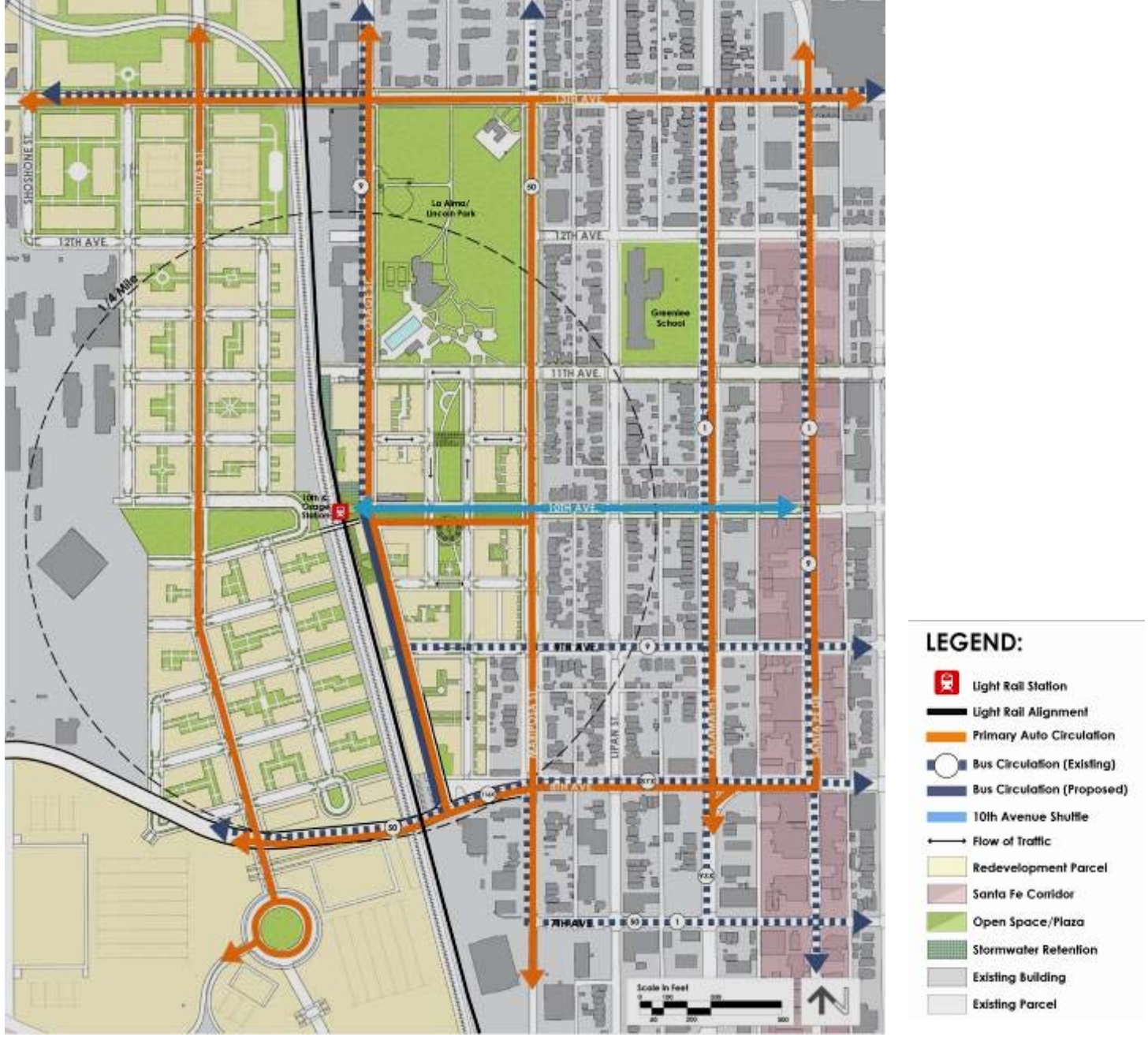
Land Use



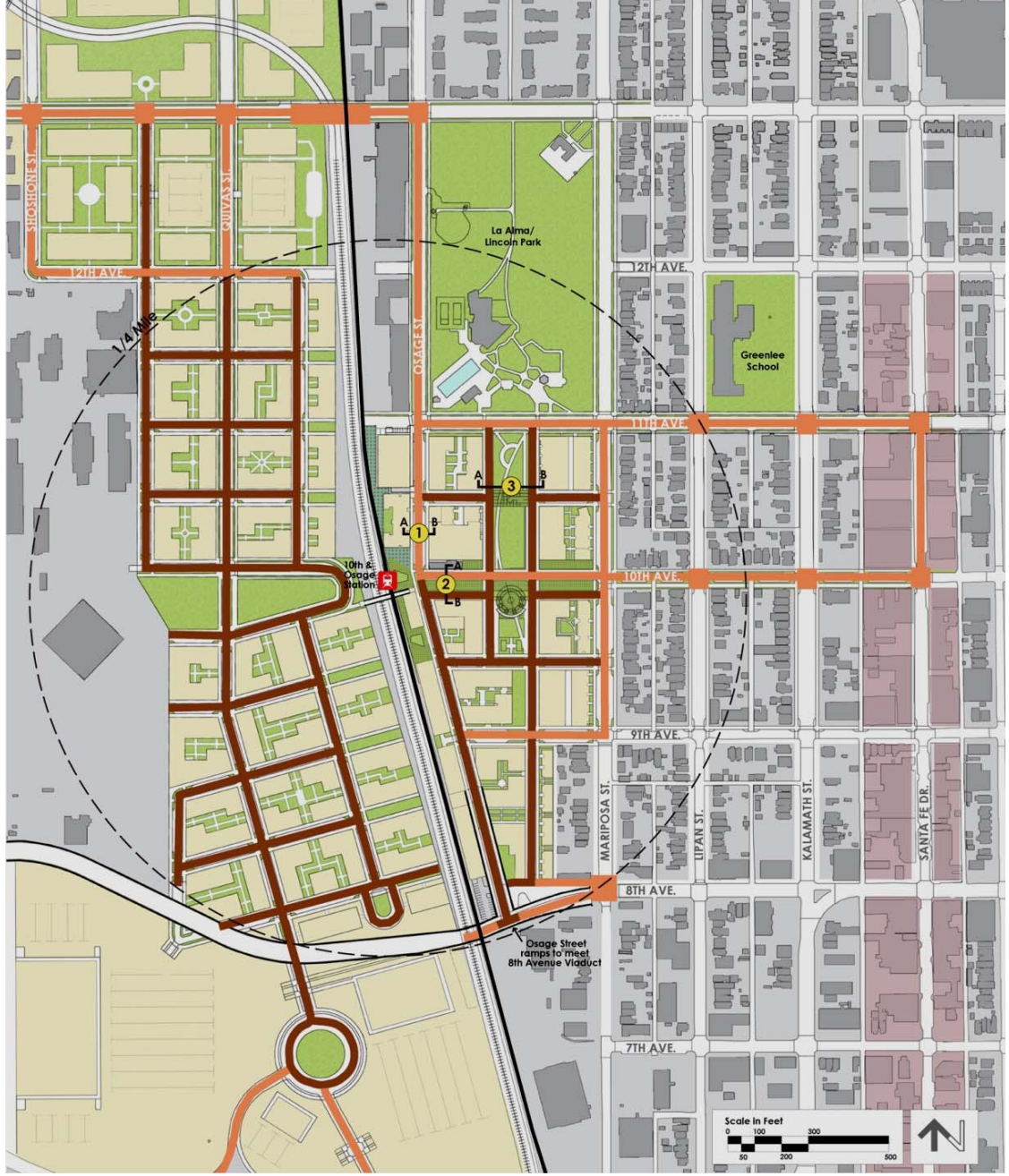
Recommended Ground Floor Uses and Active Edges



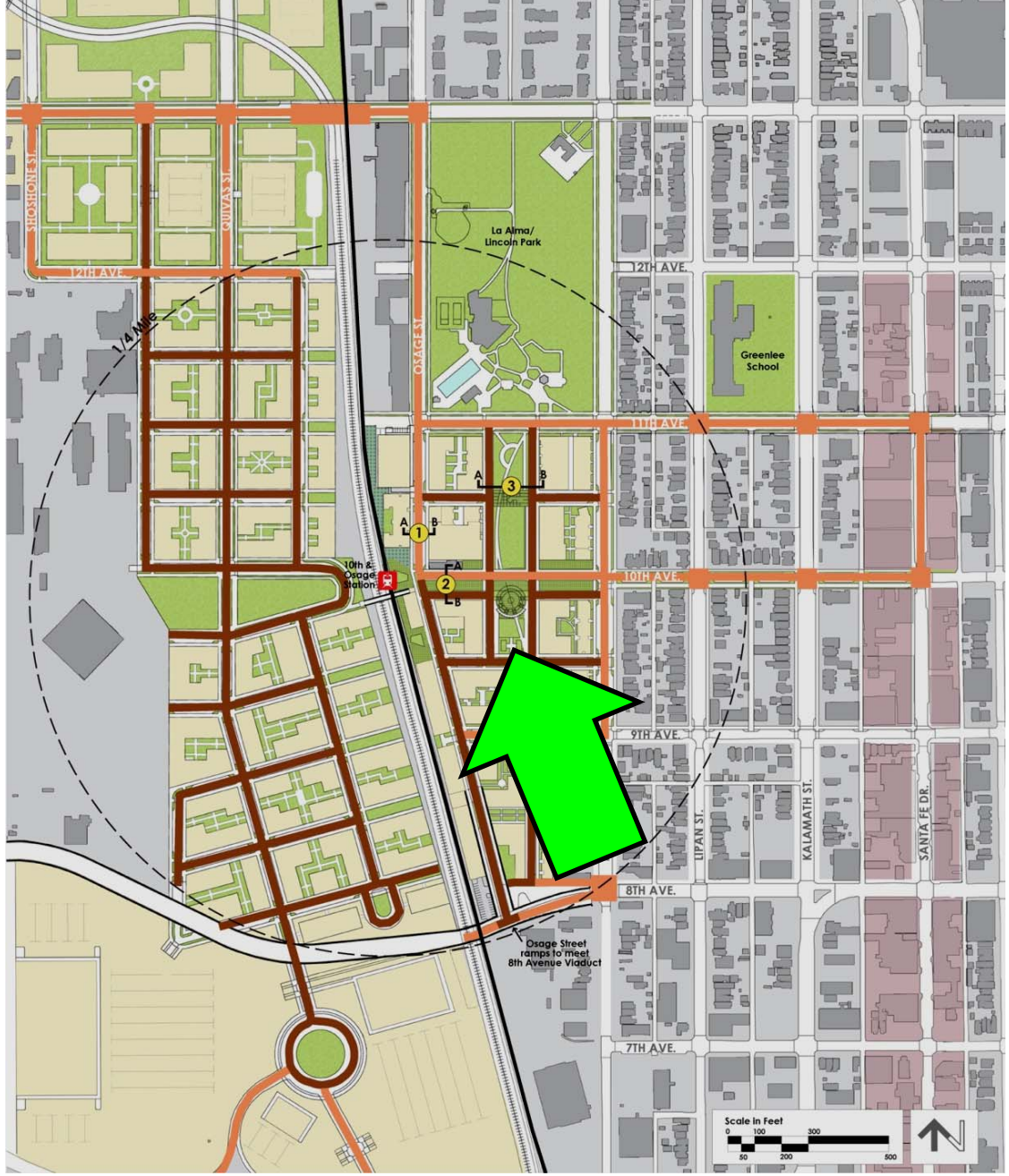
Primary Pedestrian & Bicycle Circulation



Primary Auto and Bus Circulation



Infrastructure

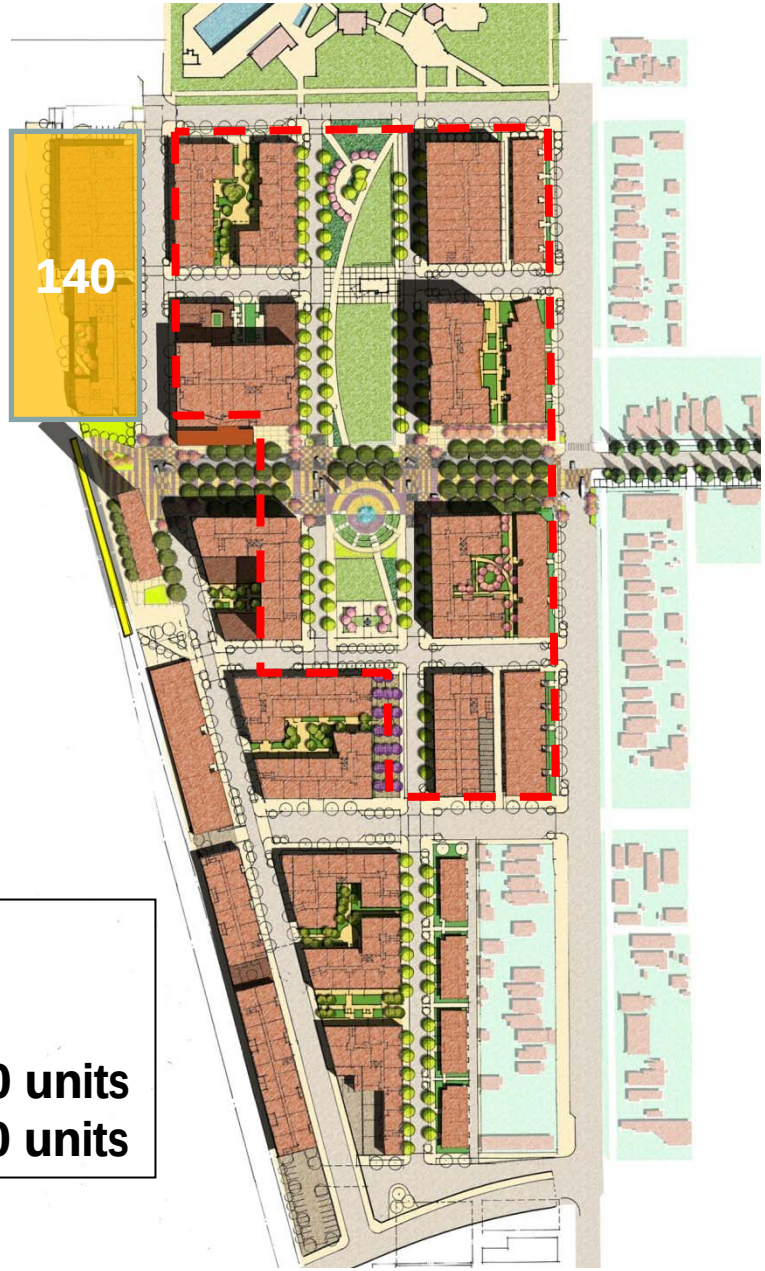


Infrastructure

Park Blocks

Park Block and Promenade Intersection

Existing South Lincoln Park Homes – 270 Units



Phase 1

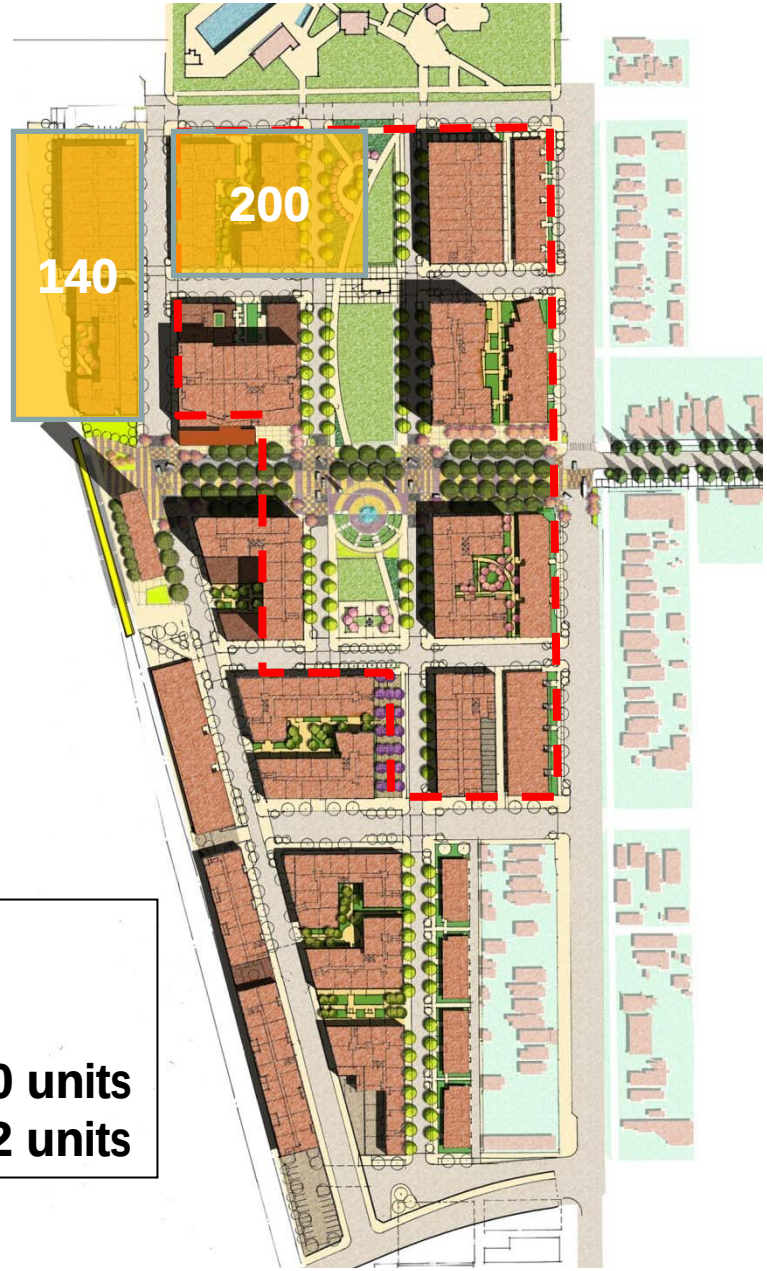
New	**140 units**
Relocated	**0 units**

South Lincoln Park Homes – Potential Phasing

Phase 2A

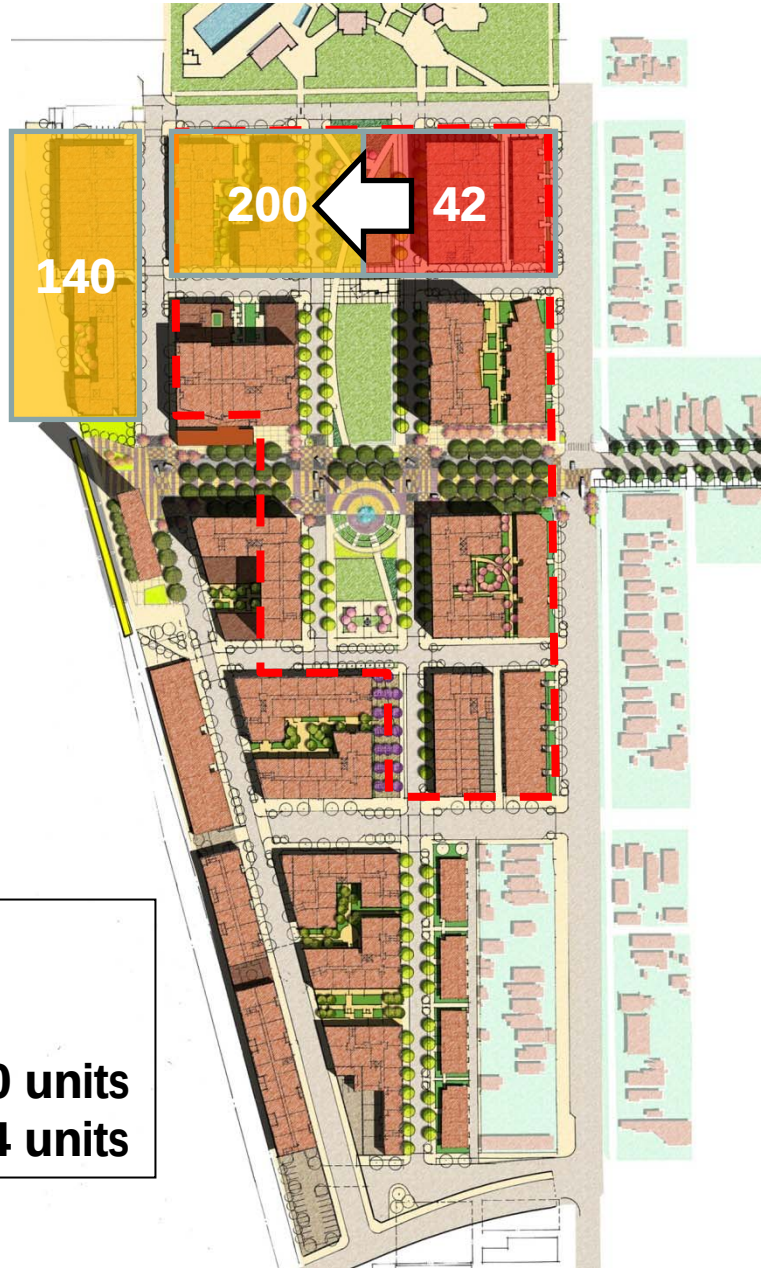
New	**140 units**
Relocated	**42 units**

South Lincoln Park Homes – Potential Phasing



Phase 2B

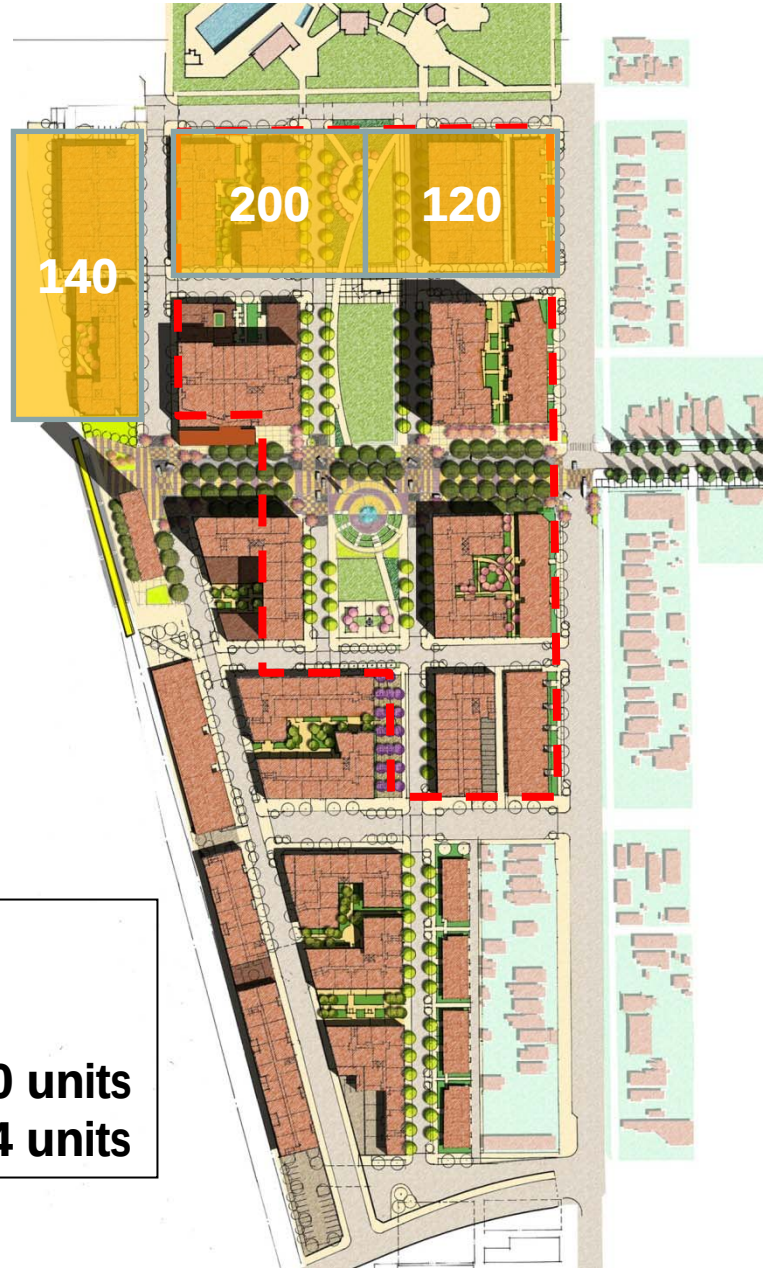
New	**340 units**
Relocated	**42 units**



Phase 3A

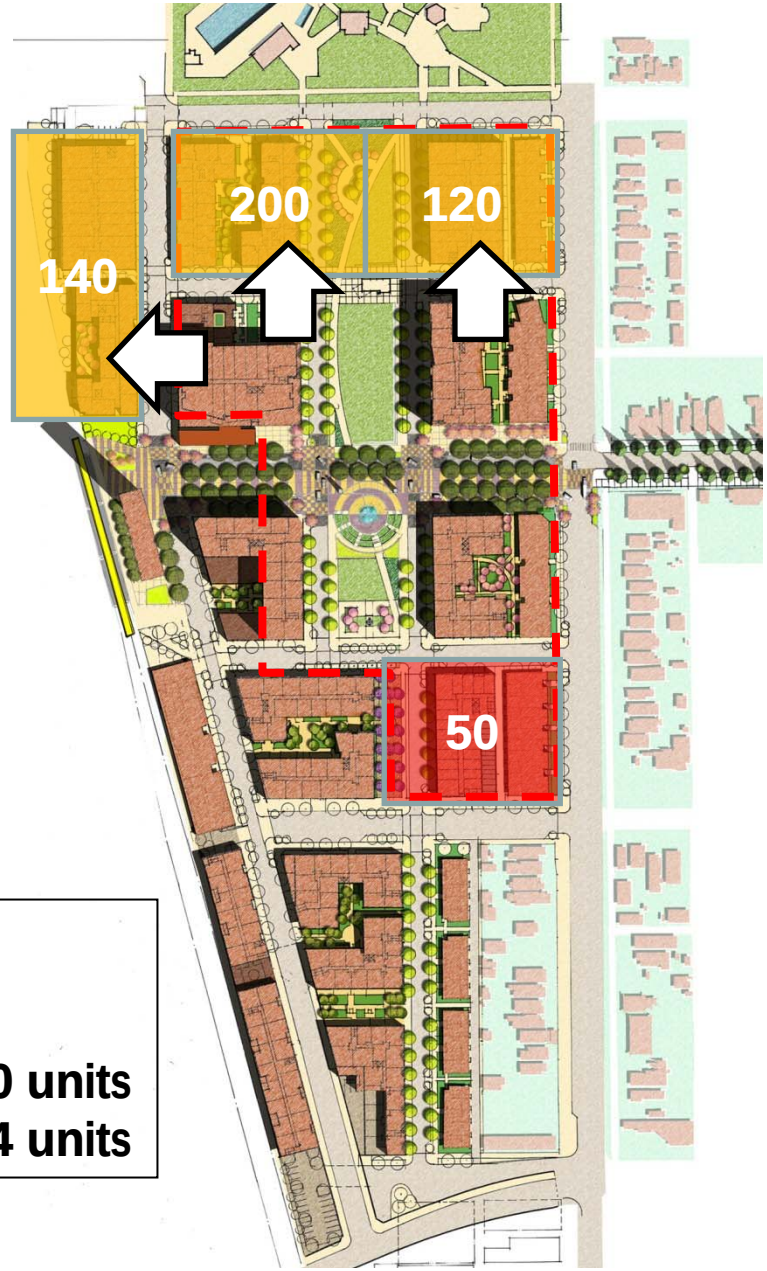
New	**340 units**
Relocated	**84 units**

South Lincoln Park Homes – Potential Phasing



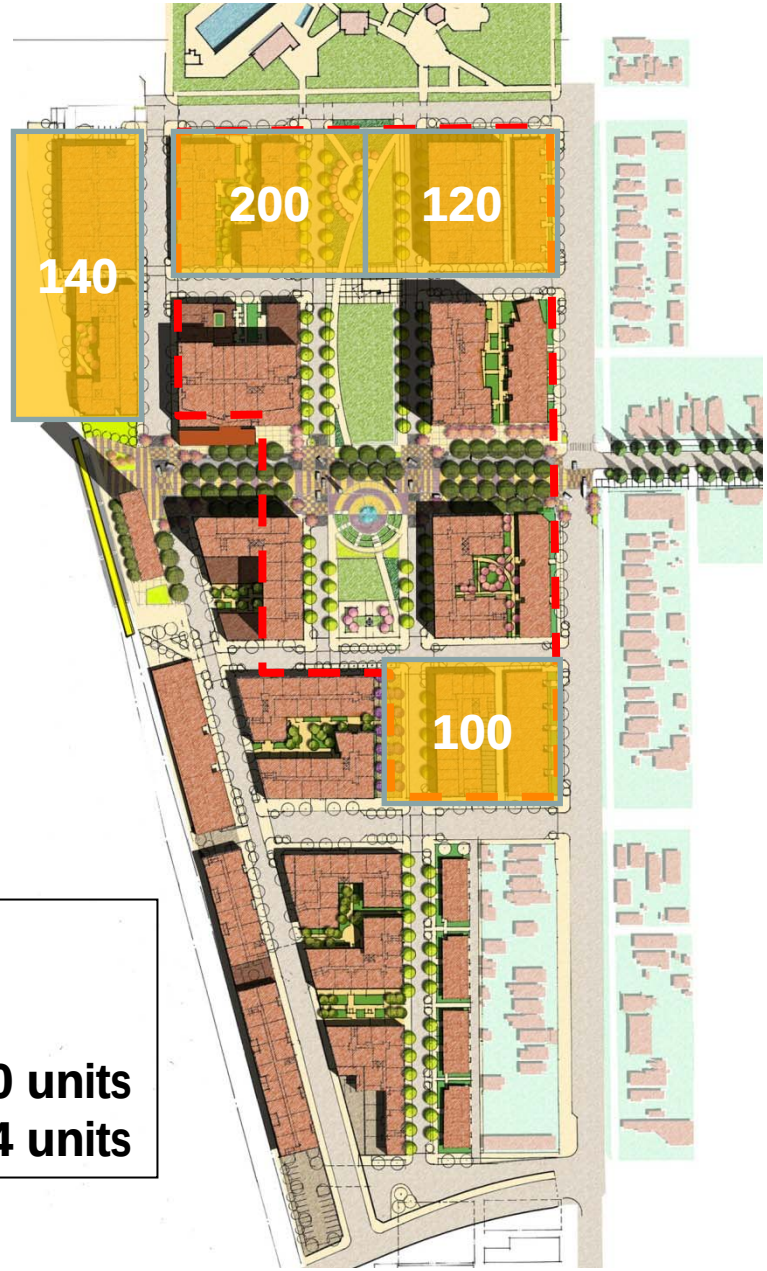
Phase 3B

New	**460 units**
Relocated	**84 units**



Phase 4A

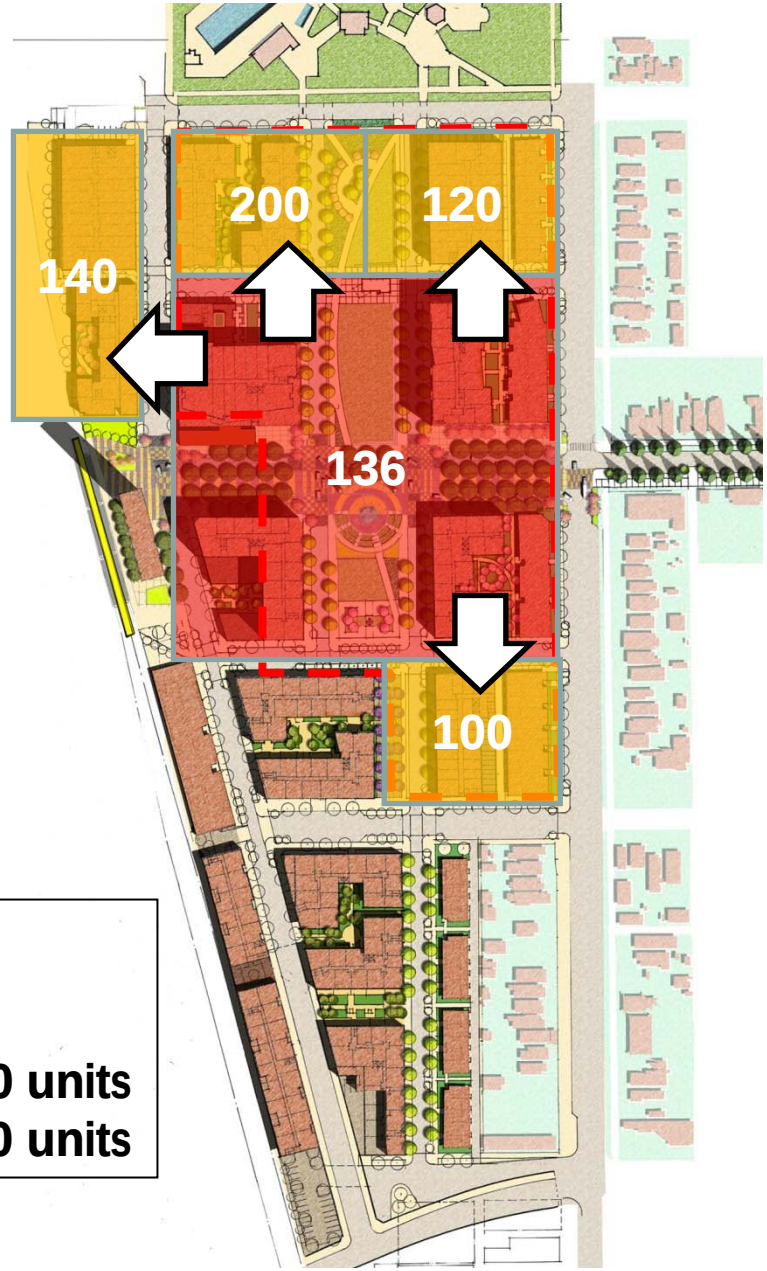
New	**460 units**
Relocated	**134 units**



Phase 4B

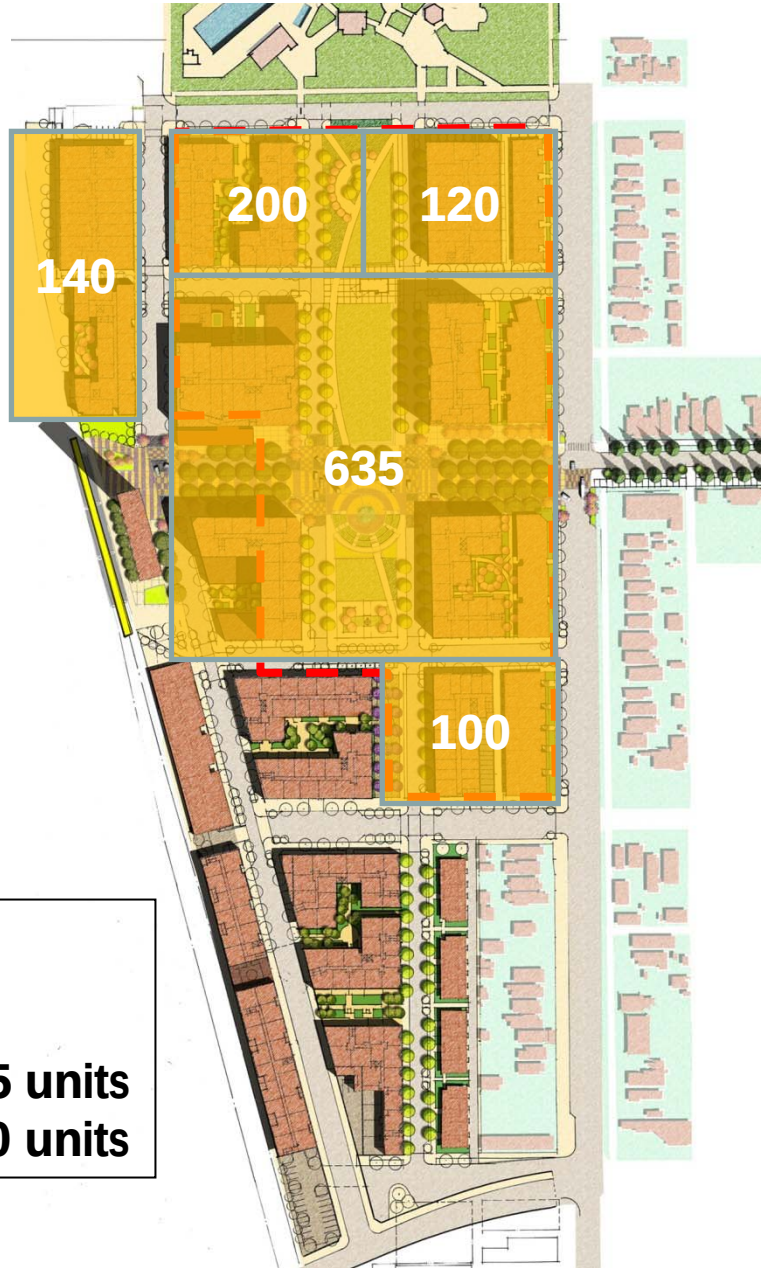
New	**560 units**
Relocated	**134 units**

South Lincoln Park Homes – Potential Phasing



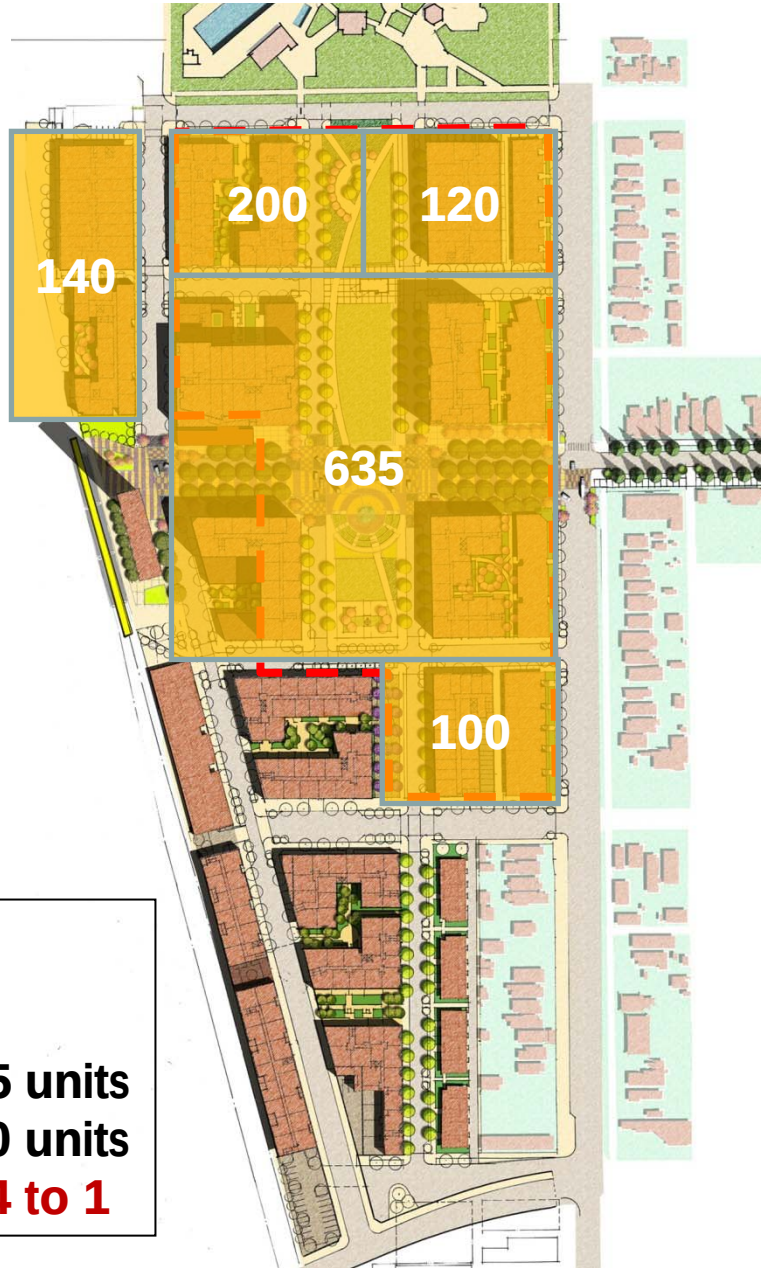
Phase 5A

New	**560 units**
Relocated	**270 units**



Phase 5B

New	**1195 units**
Relocated	**270 units**



Phase 5B

New	1195 units
Relocated	270 units
New/Relocated	4.4 to 1

DEVELOPMENT SUMMARY

Retail - 139,000 SF
Commercial - 322,200 SF
Office - 280,000 SF
Housing - 6,900 Dwelling Units
Parking - 8,900 spaces
Open Space - 381,000 SF

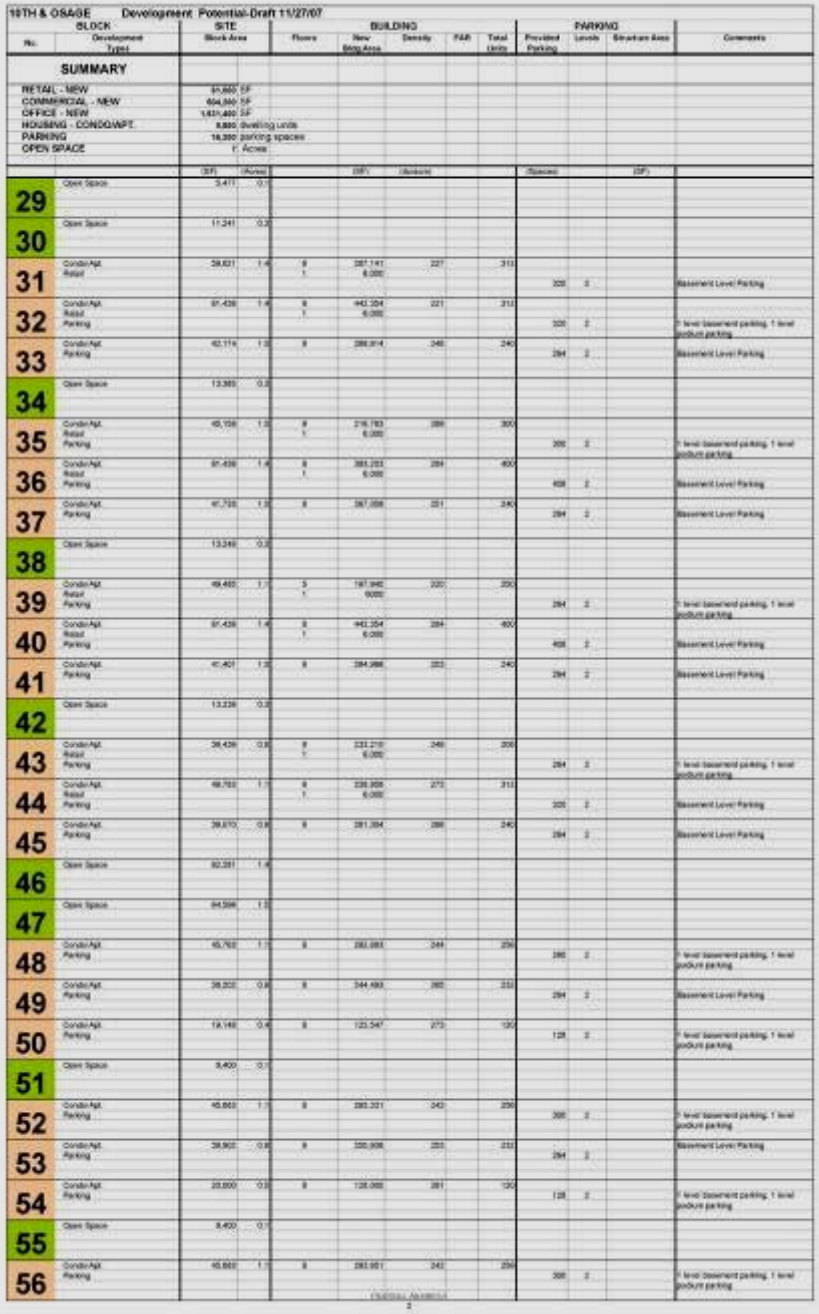
LEGEND:

- Light Rail Station
- Light Rail Alignment
- Retail
- Commercial
- Residential
- Office
- Parking Structure
- Auraria West Campus
- Open Space/Plaza
- Stormwater Retention
- Existing Building
- Existing Parcel

10th & Osage Station Area Plan, Denver, CO

10TH & OSAGE Development Potential-Draft 11/27/07

No.	Development Type	SITE Block Area	BUILDING Floors	New Bldg Area	Density	FAR	Total Units	PARKING Provided Parking	Levels	Structure Area	Comments
	SUMMARY										
	RETAIL - NEW	91,800 SF									
	COMMERCIAL - NEW	404,560 SF									
	OFFICE - NEW	1,631,400 SF									
	HOUSING - CONDO/APT.	8,800 dwelling units									
	PARKING	16,300 parking spaces									
	OPEN SPACE	1. Acres									
		(SF) (Acres)		(SF)	(du/acre)			(Spaces)		(SF)	
1	a. Condo/Apartment	25,000 0.6	4	86,000	120		72				
	Commercial		1	6,480							
	b. Condo/Apartment	25,000 0.6	4	46,000	112		66				
	Commercial		1	5,500							
	Parking							188	1		Podium and Basement Level Parking
2	Condo/Apt	40,000 0.9	5	180,000	233		209				
	Commercial		1	6,000							
	Parking							156	1		Basement Level Parking 1 space per 2 units
3	Condo/Apt	24,000 0.6	8	192,000	267		154				
	Commercial										
	Parking							150	1		Podium and Basement Level Parking Under Blocks 3 and 4
4	Townhouse	15,000 0.4	2	30,000	35		9				
	Parking							20			Individual Parking Garages Accessed from Mid-block Driveway
5	Condo/Apt	48,000 1.1	7	280,000	163		112				Buckhorn Exchange structured parking provided on ground floor at existing location
	Commercial		1	6,000							
	Retail		1	7,000							
	Parking							274	2	41,100	Basement Level Parking
6	Condo/Apt	24,000 0.6	13	220,000	220		176				
	Commercial		1	6,000							
	Parking							156	1		Basement Level Parking Under Blocks 6 and 7
7	Townhouse	15,000 0.4	3	30,000	60		24				
	Commercial		1	3,000							
	Parking							44			
8	Retail	6,000 0.1	1	6,000							Parking provided at block 7
9	Condo/Apt	51,000 0.7	11	27,000	304		216				
	Commercial		1	6,000							
	Parking							216	3	43,200	Basement Level Parking
10	Condo/Apt	25,000 0.6	7	280,000	180		90				
	Commercial		1	6,000							
	Parking							197	1	46,000	Basement Level Parking Under Blocks 10 and 11 - Allow Possible Parking Under New Roadway
11	Townhouse	12,000 0.3	3	30,000	90		9				
	Parking							20			
12	Condo/Apt	15,000 0.4	2	36,000	83		30				
	Commercial		1	6,000							
	Parking							27		11,000	Podium Parking
13	a. Condo/Apt	40,000 0.9	8	280,000	185		171				
	Parking							177	1	46,000	Basement Level Parking
	b. Open Space	8,000 0.2									
14	Condo/Apt	24,000 0.6	8	120,000	142		82				
	Parking							88	1	24,000	Podium and Basement Level Parking Under Blocks 14 and 15
15	Townhouse	15,000 0.4	2	30,000	50		11				
	Parking							22			Individual Parking Garages Accessed from Mid-block Driveway
16	Condo/Apt	40,900 0.9	5	164,000	154		140				
	Parking							135	1		Basement Level Parking
17	Townhouse	27,000 0.6	2	32,000	32		20				
								46			Individual Parking Garages Accessed from Alley
18	Townhouse	32,500 0.7	3	33,500	114		60				
	Parking							88	1		Podium and Surface Parking Lot
19	Condo/Apt	24,000 0.6	8	163,000	132		73				
	Parking							77	2		Podium and Basement Level Parking
20	Open Space	28,000 0.6									
21	Open Space	28,000 0.6									
22	Open Space	27,000 0.6									
23	Open Space	11,000 0.2									
24	Open Space	11,000 0.2									
25	Commercial	879,780 20.2	2	294,000		0.3					
	Parking							1,176			Surface Parking
26	Commercial	100,780 2.4	2	34,000		0.3					
	Parking							112			Surface Parking
27	Commercial	480,888 10.1	2	120,000		0.3					
	Parking							480			Surface Parking
28	Condo/Apt.	78,717 1.8	4	37,440	37		48				
	Condo/Apt.	78,717 1.8	4	37,800	38		68				
	Parking							128	2		1 level basement parking, 1 level podium parking



10TH & OSAGE Development Potential-Draft 11/27/07

No.	Development Type	SITE Block Area	BUILDING Floors	New Bldg Area	Density	FAR	Total Units	PARKING Provided Parking	Levels	Structure Area	Comments
	SUMMARY										
	RETAIL - NEW	91,800 SF									
	COMMERCIAL - NEW	404,560 SF									
	OFFICE - NEW	1,631,400 SF									
	HOUSING - CONDO/APT.	8,800 dwelling units									
	PARKING	16,300 parking spaces									
	OPEN SPACE	1. Acres									
		(SF) (Acres)		(SF)	(du/acre)			(Spaces)		(SF)	
29	Open Space	5,411 0.1									
30	Open Space	17,241 0.3									
31	Condo/Apt.	58,631 1.4	9	287,141	227		313				
	Retail		1	6,000							
	Parking							333	2		Basement Level Parking
32	Condo/Apt.	97,439 1.4	9	442,264	221		310				
	Retail		1	6,000							
	Parking							320	2		1 level basement parking, 1 level podium parking
33	Condo/Apt.	62,174 1.2	9	288,914	248		240				
	Parking							284	2		Basement Level Parking
34	Open Space	13,365 0.3									
35	Condo/Apt.	45,109 1.0	9	216,783	288		300				
	Retail		1	6,000							
	Parking							300	2		1 level basement parking, 1 level podium parking
36	Condo/Apt.	97,439 1.4	9	383,203	284		400				
	Retail		1	6,000							
	Parking							408	2		Basement Level Parking
37	Condo/Apt.	47,758 1.2	9	267,008	251		240				
	Parking							284	2		Basement Level Parking
38	Open Space	13,348 0.3									
39	Condo/Apt.	49,465 1.1	5	197,940	220		200				
	Retail		1	6000							
	Parking							284	2		1 level basement parking, 1 level podium parking
40	Condo/Apt.	97,439 1.4	9	442,264	284		400				
	Retail		1	6,000							
	Parking							408	2		Basement Level Parking
41	Condo/Apt.	47,401 1.2	9	284,988	253		240				
	Parking							284	2		Basement Level Parking
42	Open Space	13,228 0.3									
43	Condo/Apt.	38,439 0.9	9	233,219	248		209				
	Retail		1	6,000							
	Parking							284	2		1 level basement parking, 1 level podium parking
44	Condo/Apt.	48,763 1.1	9	238,908	273		311				
	Retail		1	6,000							
	Parking							320	2		Basement Level Parking
45	Condo/Apt.	39,670 0.9	9	281,284	286		240				
	Parking							284	2		Basement Level Parking
46	Open Space	62,381 1.4									
47	Open Space	54,596 1.3									
48	Condo/Apt.	45,763 1.1	9	282,883	244		209				
	Parking							280	2		1 level basement parking, 1 level podium parking
49	Condo/Apt.	38,303 0.9	9	344,493	360		233				
	Parking							284	2		Basement Level Parking
50	Condo/Apt.	19,148 0.4	9	123,547	273		120				
	Parking							128	2		1 level basement parking, 1 level podium parking
51	Open Space	9,400 0.2									
52	Condo/Apt.	45,883 1.1	9	283,321	243		209				
	Parking							300	2		1 level basement parking, 1 level podium parking
53	Condo/Apt.	38,903 0.9	9	330,906	253		233				
	Parking							284	2		Basement Level Parking
54	Condo/Apt.	20,000 0.5	9	126,000	281		120				
	Parking							128	2		1 level basement parking, 1 level podium parking
55	Open Space	9,400 0.2									
56	Condo/Apt.	45,883 1.1	9	283,951	243		209				
	Parking							300	2		1 level basement parking, 1 level podium parking

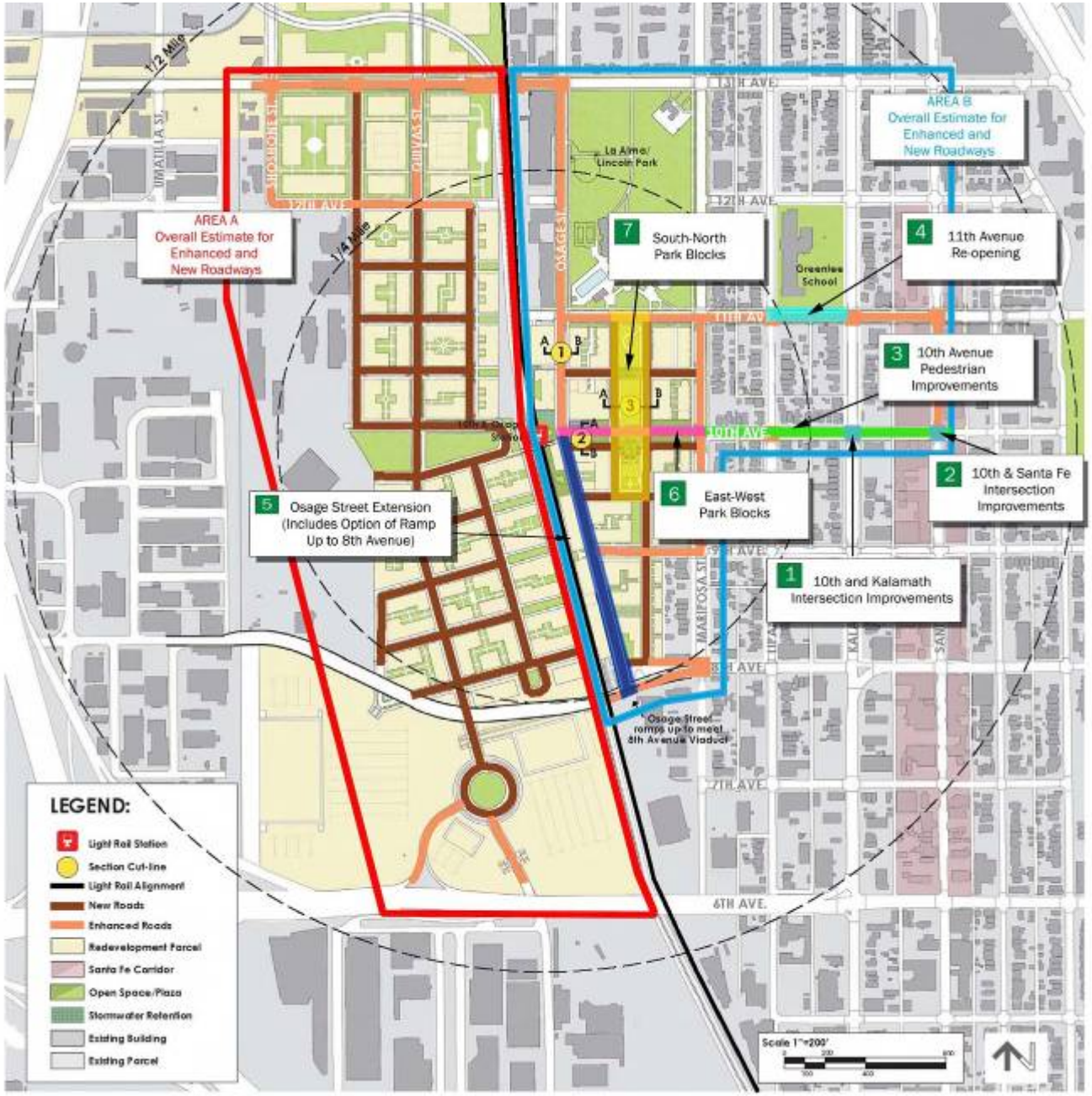
10th & Osage Development Potential

10TH & OSAGE Development Potential-Draft 11/27/07

BLOCK No.	Development Types	SITE Block Area		BUILDING Floors	New Bldg.Area	Density	FAR	Total Units	PARKING Provided Parking	Levels	Structure Area	Comments
	SUMMARY											
	RETAIL - NEW	61,000	SF									
	COMMERCIAL - NEW	504,200	SF									
	OFFICE - NEW	1,631,400	SF									
	HOUSING - CONDO/APT.	8,500	dwelling units									
	PARKING	16,300	parking spaces									
	OPEN SPACE	7	Acres									
		(SF)	(Acres)		(SF)	(du/acre)						
1	A. Condo/Apartment	25,000	0.6	4	96,000	120						
	Commercial			1	9,450							
	B. Condo/Apartment	25,000	0.6	4	40,000	113						
	Commercial			1	5,500							
	Parking											nd Basement Level Parking
2	Condo/Apt.	40,000	0.9	5	18							
	Commercial			1								
	Parking											Level Parking
												pace per 2 units
3	Condo/Apt.	24,000										
	Commercial											
	Parking											Podium and Basement Level Parking Under Blocks 3 and 4
4	Townhouse											
	Parking								20			Individual Parking Garages Accessed from Mid-block Driveway
5	Condo/Apt.							112				Buckhorn Exchange structured parking provided on ground floor at existing location
	Commercial											
	Retail											
	Parking								276	2	43,200	Basement Level Parking
6	Condo/Apt.				220,000	220		132				
	Commercial				8,000							
	Parking								150	1		
												Basement Level Parking
7	Townhouse	,000	0.4	3	30,000	60		24				Under Blocks 6 and 7
	Commercial			1	3,000							
	Parking								44			
8	Retail	6,000	0.1	1	6,000							Parking provided at block 7
9	Condo/Apt.	31,000	0.7	11	27,000	304		216				
	Commercial			1	8,000							
	Parking								216	2	43,200	Basement Level Parking

$3 Billion

10th & Osage Development Potential



10th & Osage Station - Infrastructure Projects

Projects	Project Name	Description		TOTAL
1	Intersection Improvements - 10th & Kalamath	Installation of traffic signal for pedestri	$	500,856
2	Intersection Improvements - 10th & Santa Fe	Installation of traffic signal for p	$	500,856
3	10th Avenue Pedestrian Improvements (Mariposa to Santa Fe)	Sidewalk reconst	$	210,714
4	11th Avenue Re-Opening at Greenlee Elementary	Bike/Ped	$	113,747
5	Osage Street Extension (to 8th)			5,302,175
6	East-West Plaza Blocks		$	1,345,422
7	South-North Park Blocks		$	2,372,122
AREA A	New and Enhanced Ro	enhanced roads	$	12,712,280
AREA B	New and Enha	ew and enhanced roads	$	4,916,180
	TOTAL		$	27,974,352

$30 Million

10th & Osage Station – Summary Infrastructure Cost Estimates

Station Area Plans- Lessons Learned

1) **Development will be piecemeal or will not happen without a plan**

Station Area Plans- Lessons Learned

1) **Development will be piecemeal or will not happen without a plan**
2) **Developer offerings are not a substitute for a public planning process**

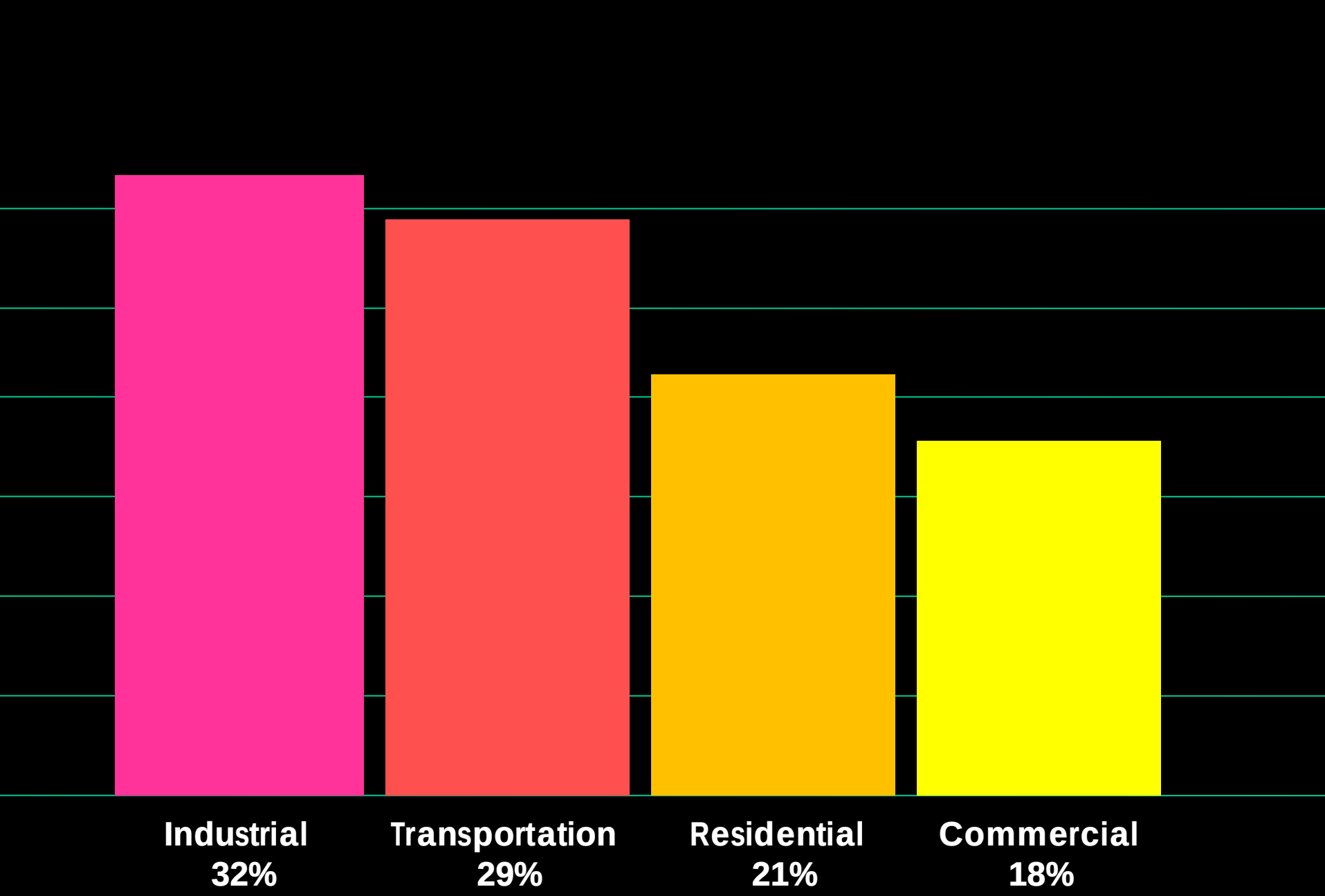
Station Area Plans- Lessons Learned

1) **Development will be piecemeal or will not happen without a plan**
2) **Developer offerings are not a substitute for a public planning process**
3) **Plans need to:**
   - **Be detailed**
   - **Consider quality of life**
   - **Be economically feasible**
   - **Have an implementation strategy**
   - **Be adopted**

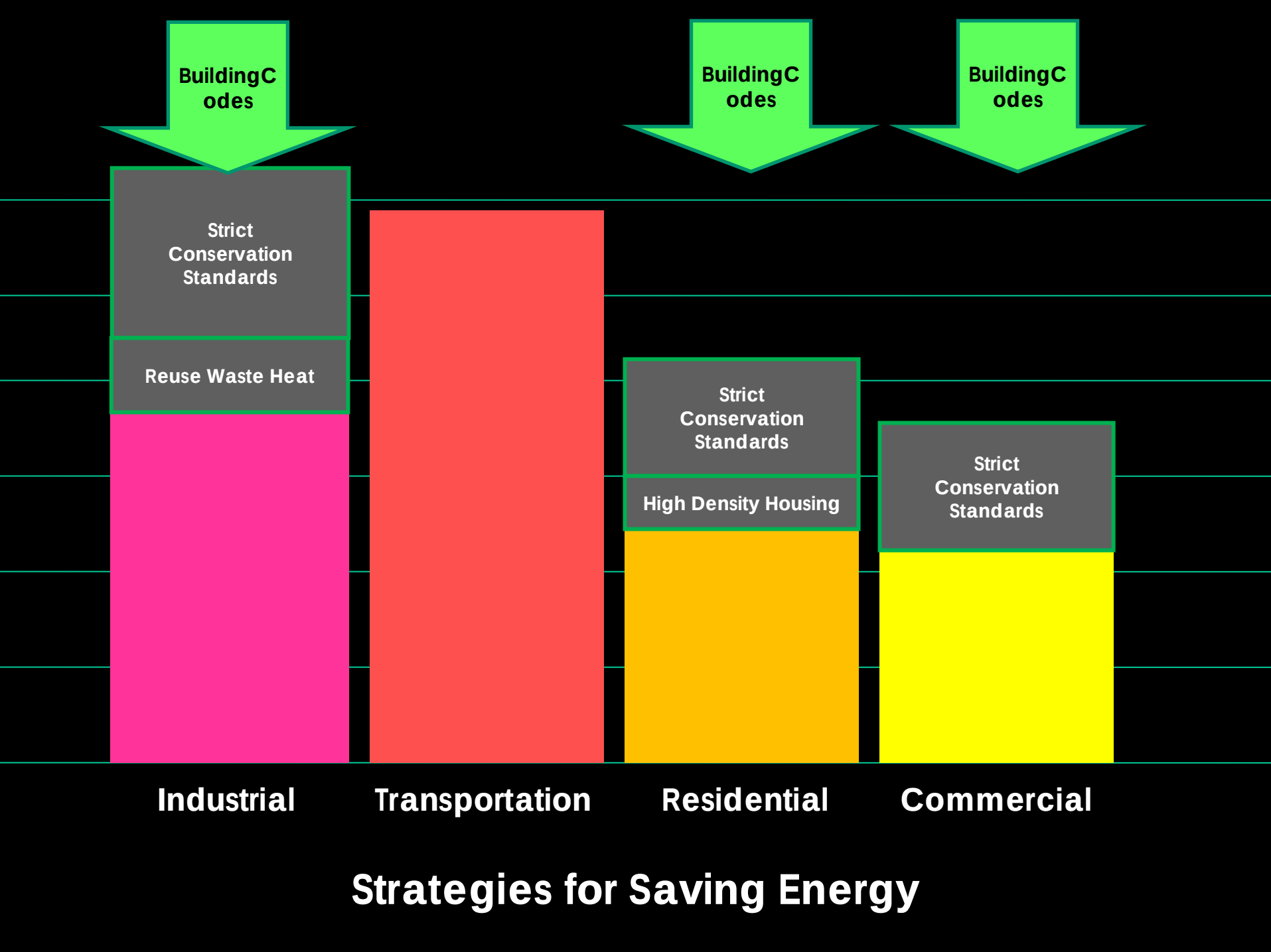
Other Issues

National Energy Issues

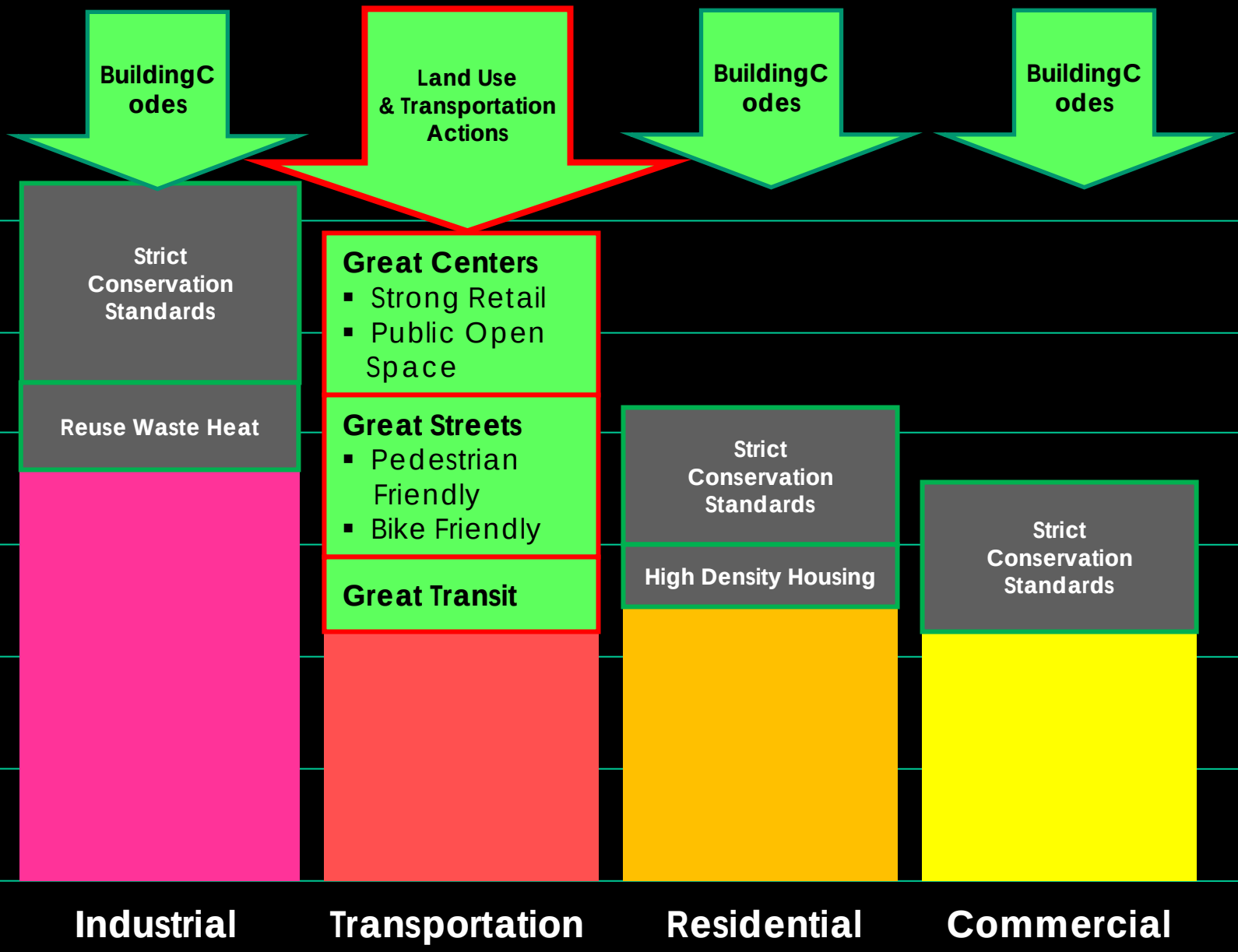
- Environmental (Global warming)
- Economic (Rising energy costs)



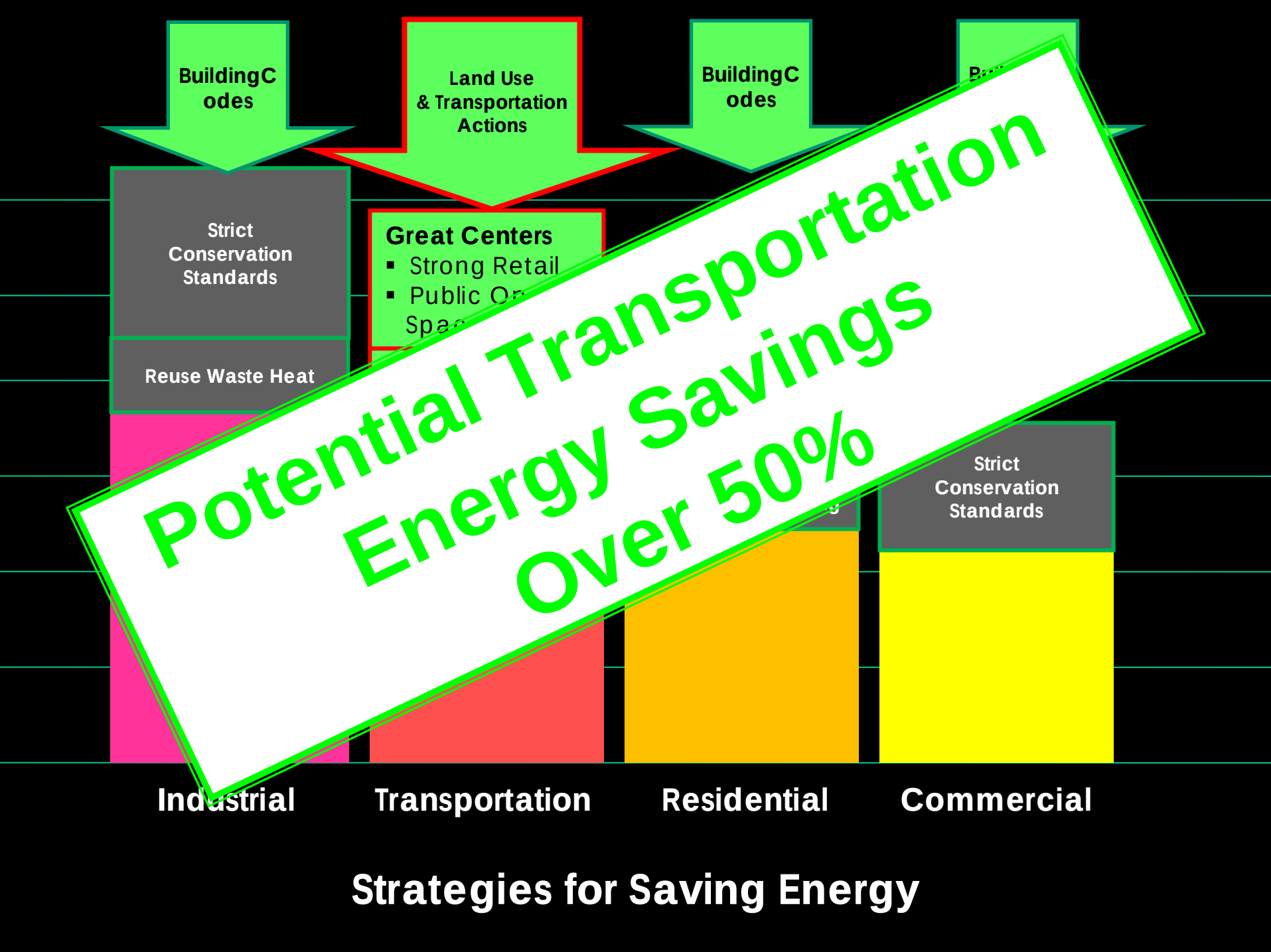
U.S. Energy Use by Sector

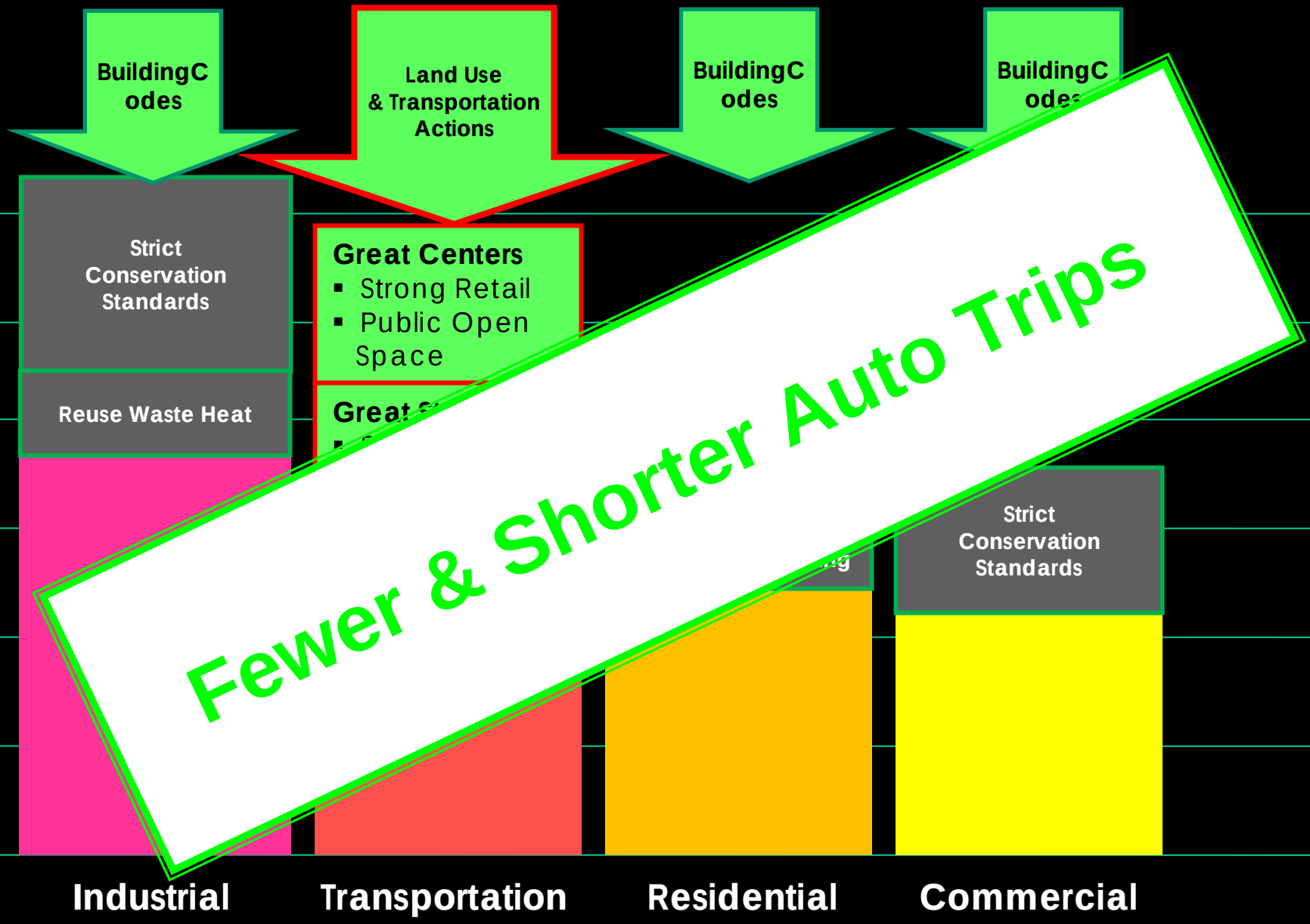


Strategies for Saving Energy



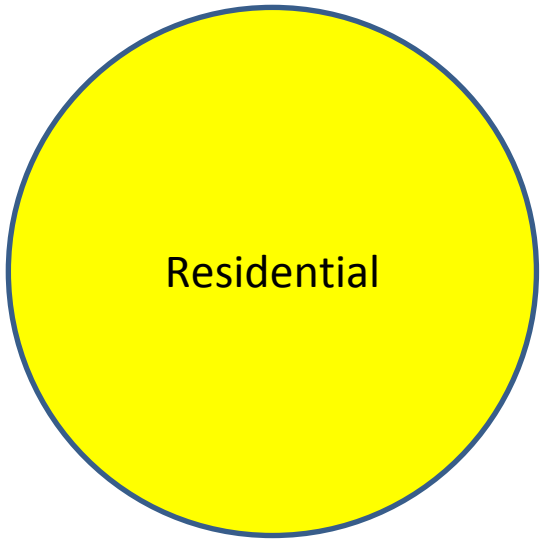
Strategies for Saving Energy


BuildingCodes
Land Use & Transportation Actions
BuildingCodes
Strict Conservation Standards
Reuse Waste Heat
Great Centers
Strong Retail
Public Or
Spa
Potential Transportation Energy Savings Over 50%
Strict Conservation Standards
Industrial
Transportation
Residential
Commercial
Strategies for Saving Energy



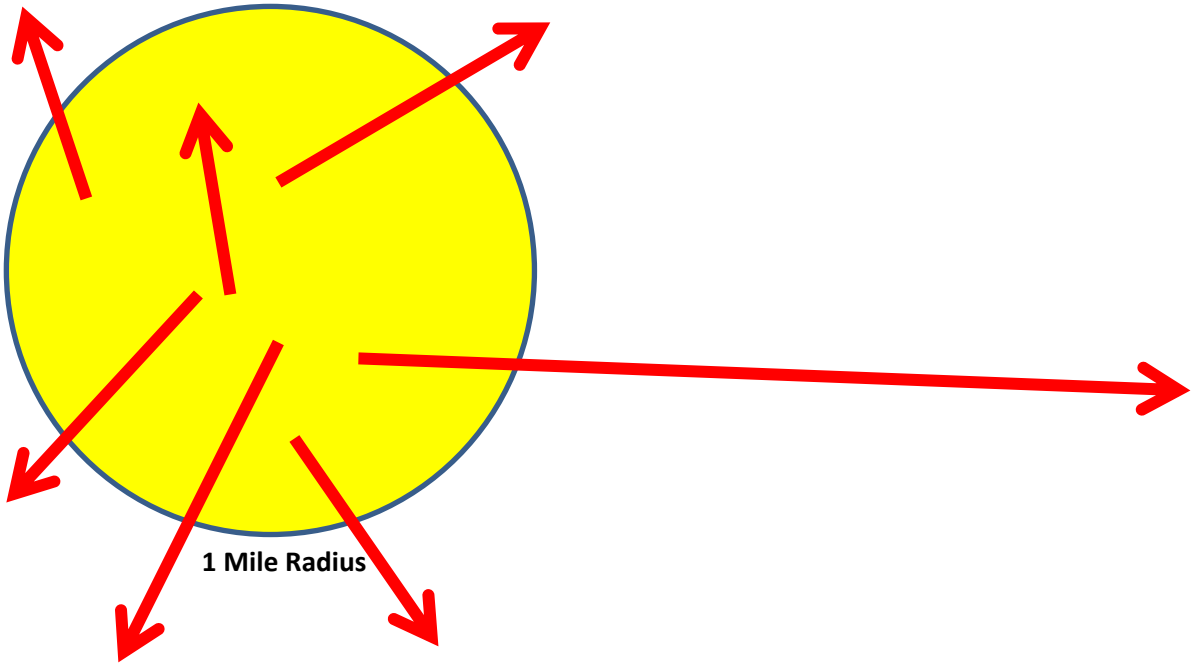
Strategies for Saving Energy

Typical Development

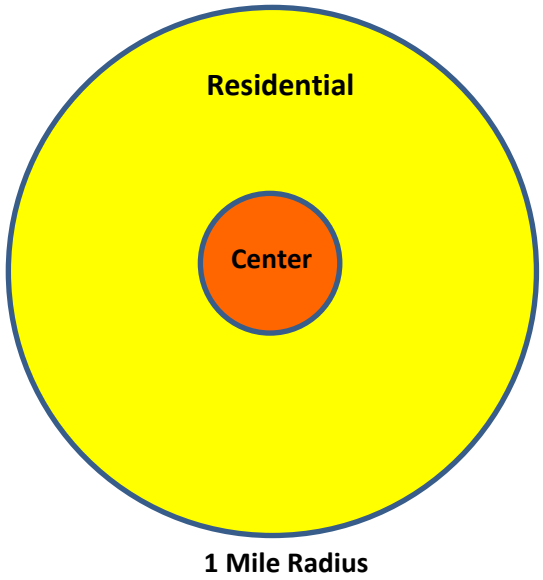


1 Mile Radius

Typical Development



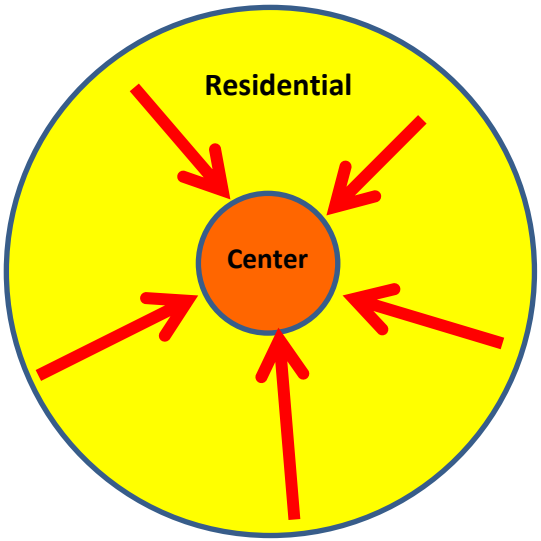
Center Development



Center

- Retail
- Commercial
- Government
- Recreation
- Public Open Space
- Transit

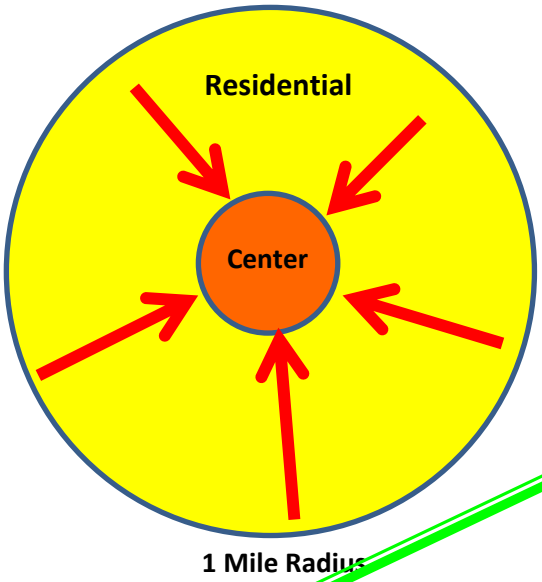
Center Development



Center

- Retail
- Commercial
- Government
- Recreation
- Public Open Space
- Transit

Center Development

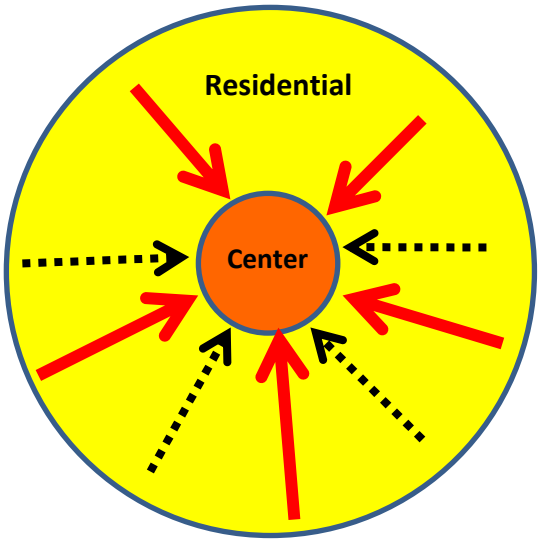


Center

- Retail
- Commercial
- Governm
- Rec
-

Fewer & Shorter Auto Trips

Center Development With Bike Lanes



1 Mile Radius

Center

- Retail
- Commercial
- Government
- Recreation
- Public Open Space
- Transit

Bike System

- On Street Bike Lanes (10% Mode Split)

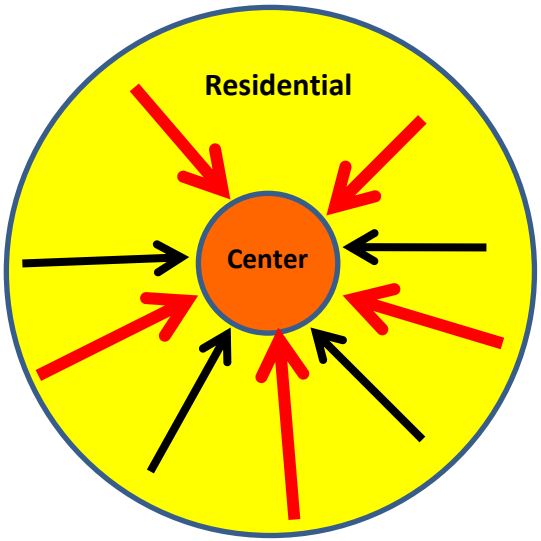
Typical Bike Lanes (Best case ridership, 10% of all trips)

Bicycle Use Comparison

		Daily Trips		
		Bike	Walk	Transit/ Auto
United States	(Typical)	1%	3%	96%

DO YOU SEE ME?
CAN I SEE YOU?
Make eye contact -
Make it a safe commute

Centered With Protected Bike Lanes



Center

- Retail
- Commercial
- Government
- Recreation
- Public Open Space
- Transit

Bike System

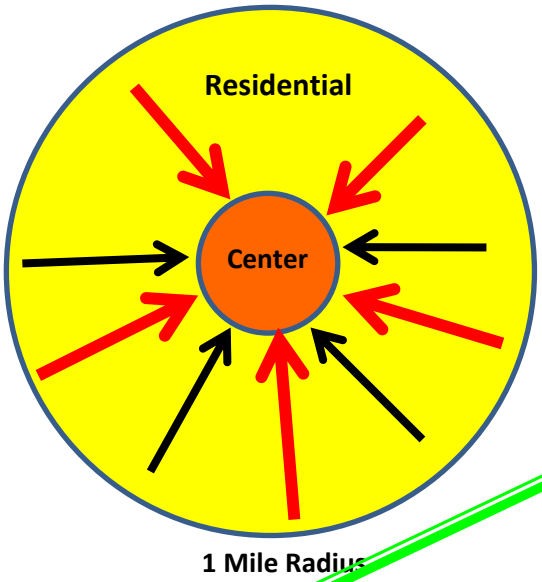
- Protected Bike Lanes (40% Mode Split)

Protected Bike Lanes (ridership, 30% to 40% of all trips)

Bicycle Use Comparison

		Daily Trips		
		Bike	Walk	Transit/ Auto
United States	(Typical)	1%	3%	96%
Netherlands				
▪ Utrecht	(288,000)	31%	23%	46%
▪ Wageningen	(33,000)	41%	18%	41%

Center With Protected Bike Lanes



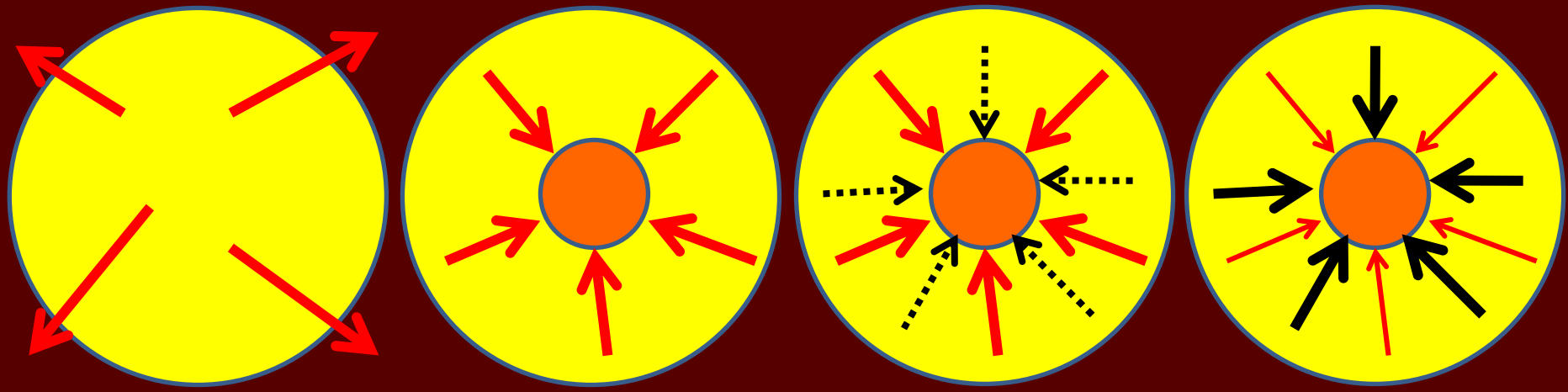
Center

- Retail
- Commercial
- Governm
- Rec
-

% Mode Split)

More Reduction in Auto Trips

Typical Development	Mixed Use Center	Center & Bike Lanes	Center & Protected Lanes

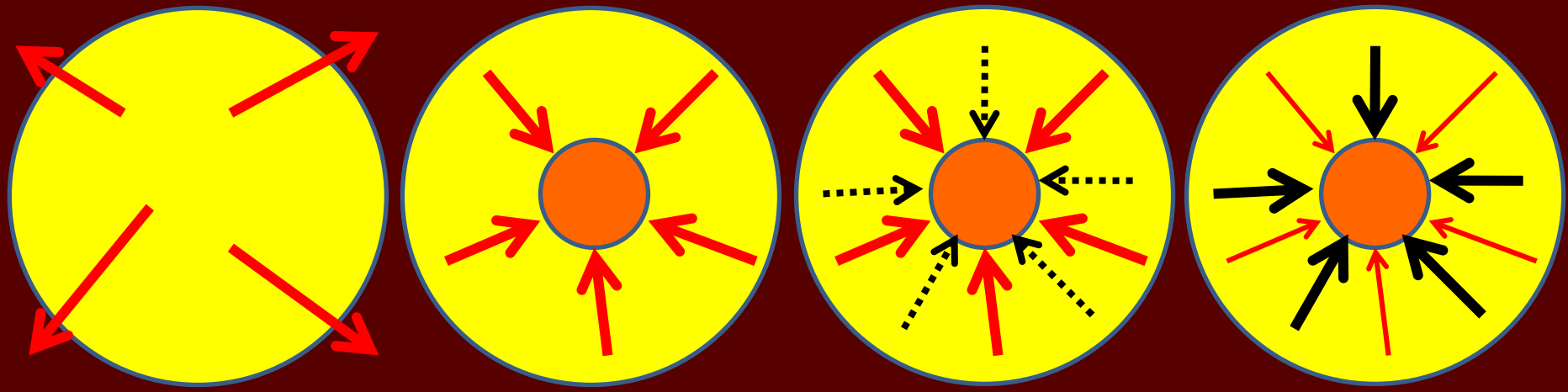


Household Gasoline Expenditure*

21,900 miles/yr	13,140 miles/yr	11,826 miles/yr	7,884 miles/yr
$4,380 /year	$2,628 /year	$2,365 /year	$1,577 /year

* 20 miles/gallon @ $4.00 per gallon = $0.20 per mile

Typical Development	Mixed Use Center	Center & Bike Lanes	Center & Protected Lanes



Household Gasoline Expenditure*

21,900 miles/yr	13,140 miles/yr	11,826 miles/yr	7,884 miles/yr
$4,380 /year	$2,628 /year	$2,365 /year	$1,577 /year

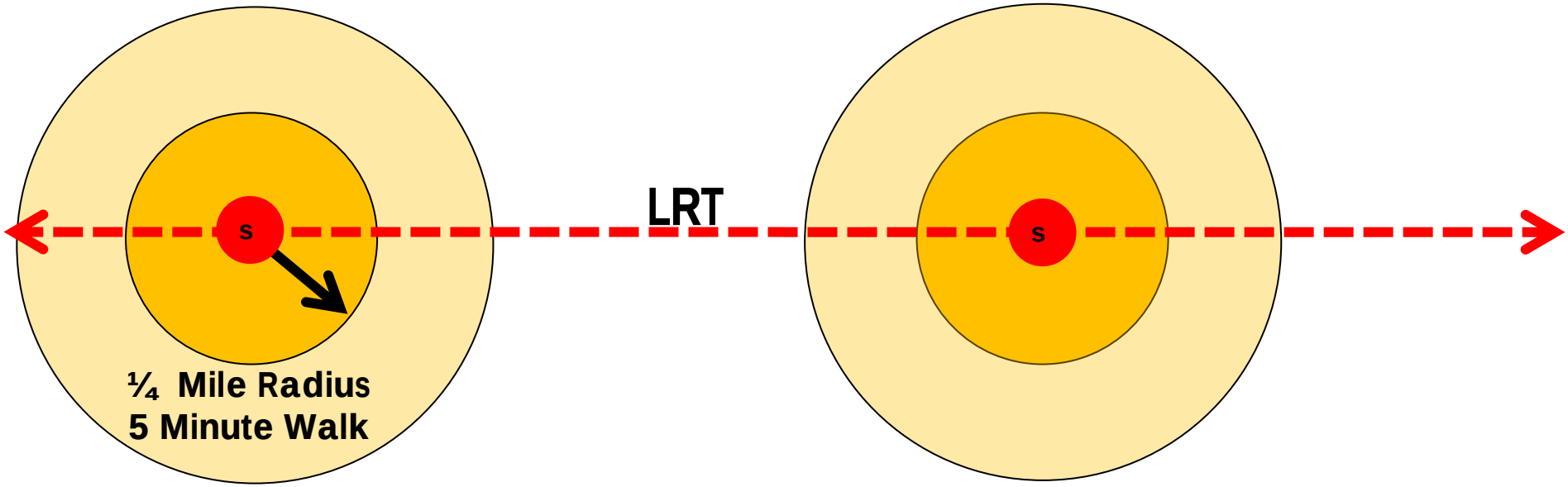
Economic Stimulus**

0 miles	60 million miles	76 million miles	122 million miles
0 stimulus	$27 million	$34 million	$55 million

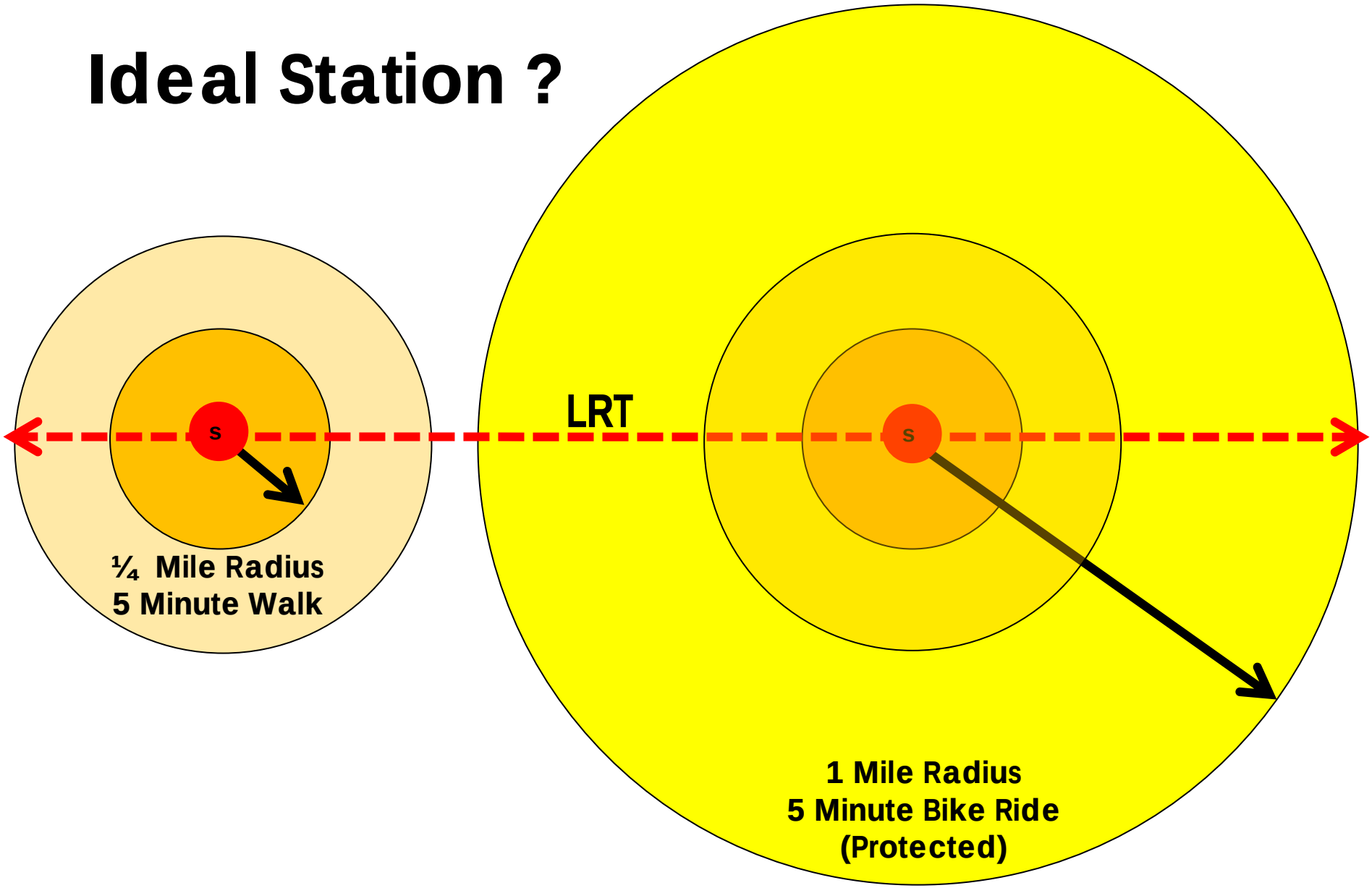
* 20 miles/gallon @ $4.00 per gallon = $0.20 per mile

** Total miles not driven times $0.45/mile

Ideal Station



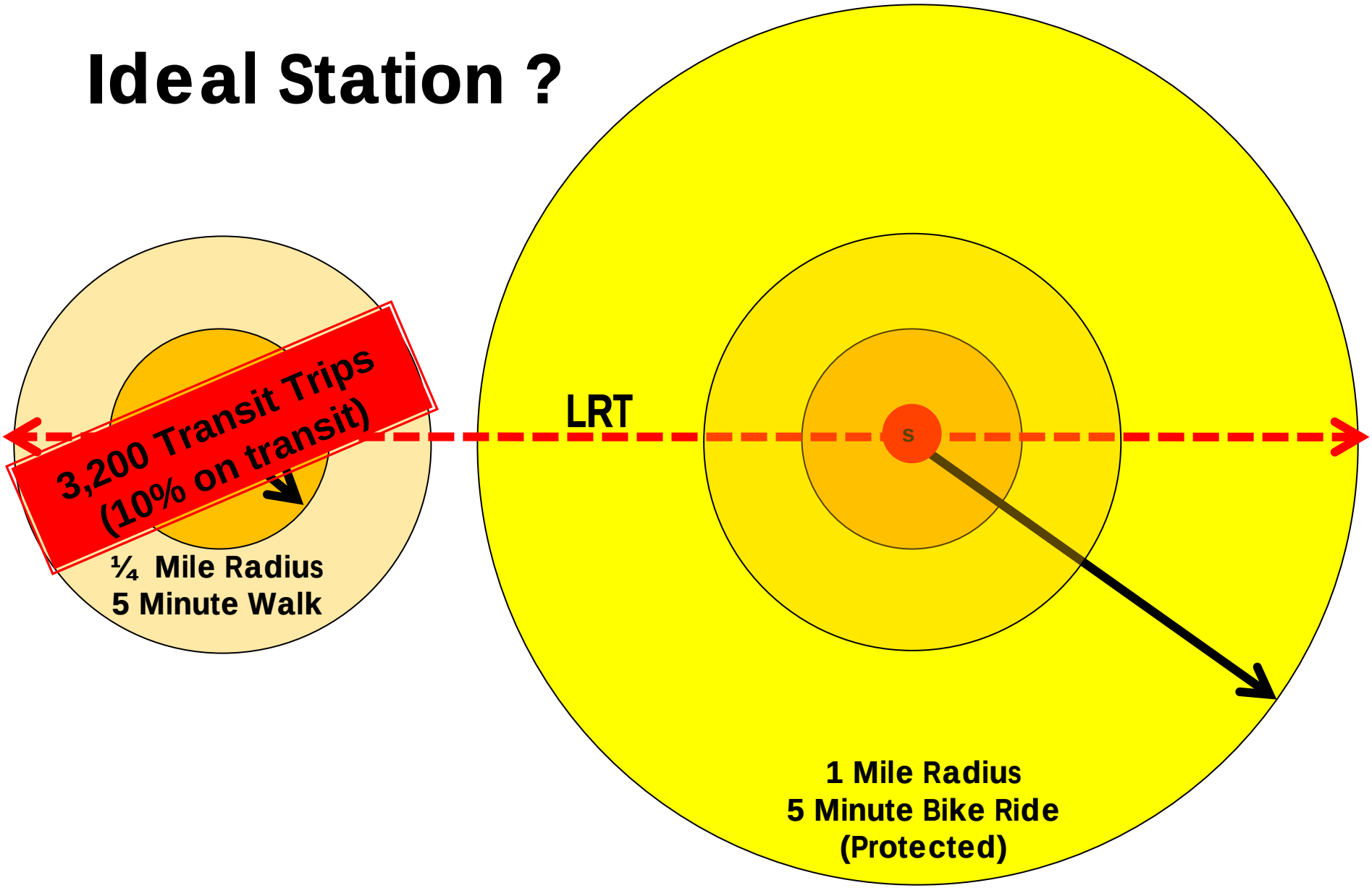
Ideal Station ?



TOD

BCD

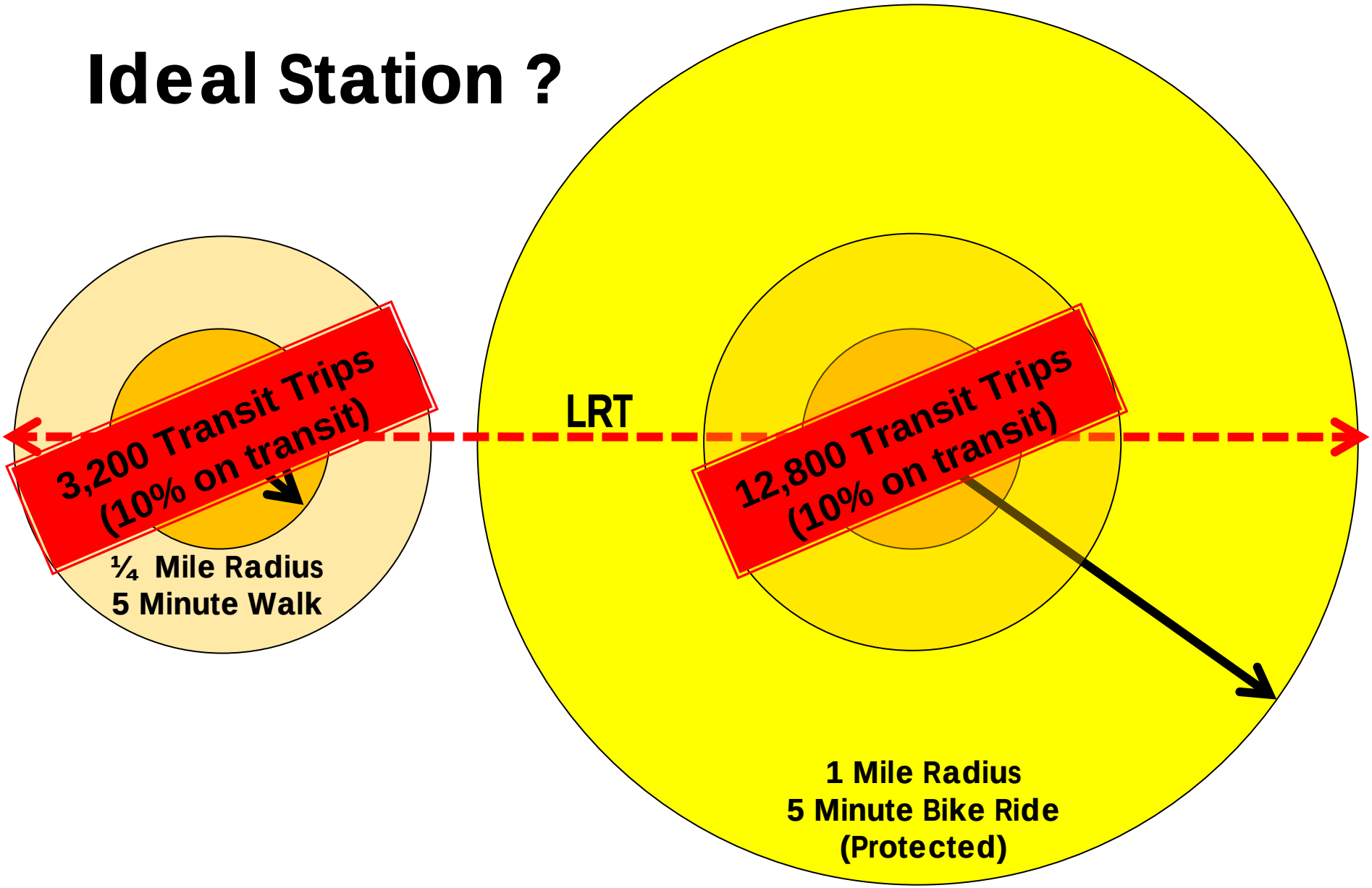
Ideal Station ?



TOD

BCD

Ideal Station ?



TOD **BCD**

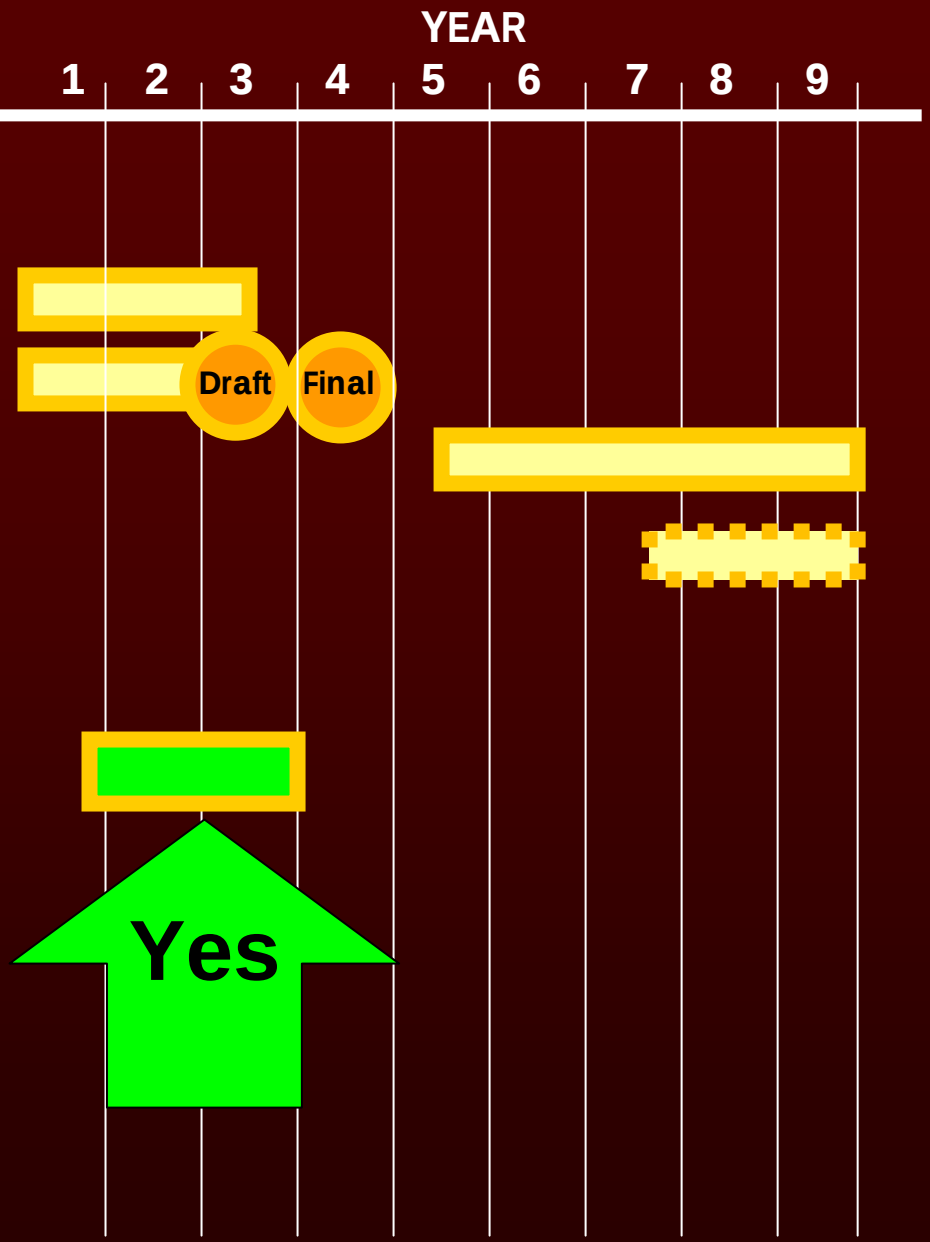
Alignment & TOD Design

Alternatives must consider:

1) **TOD potential**
2) **Stations safety**
3) **BCD potential (1 mile rad.) ?**

TOD Timing

Project Timeline

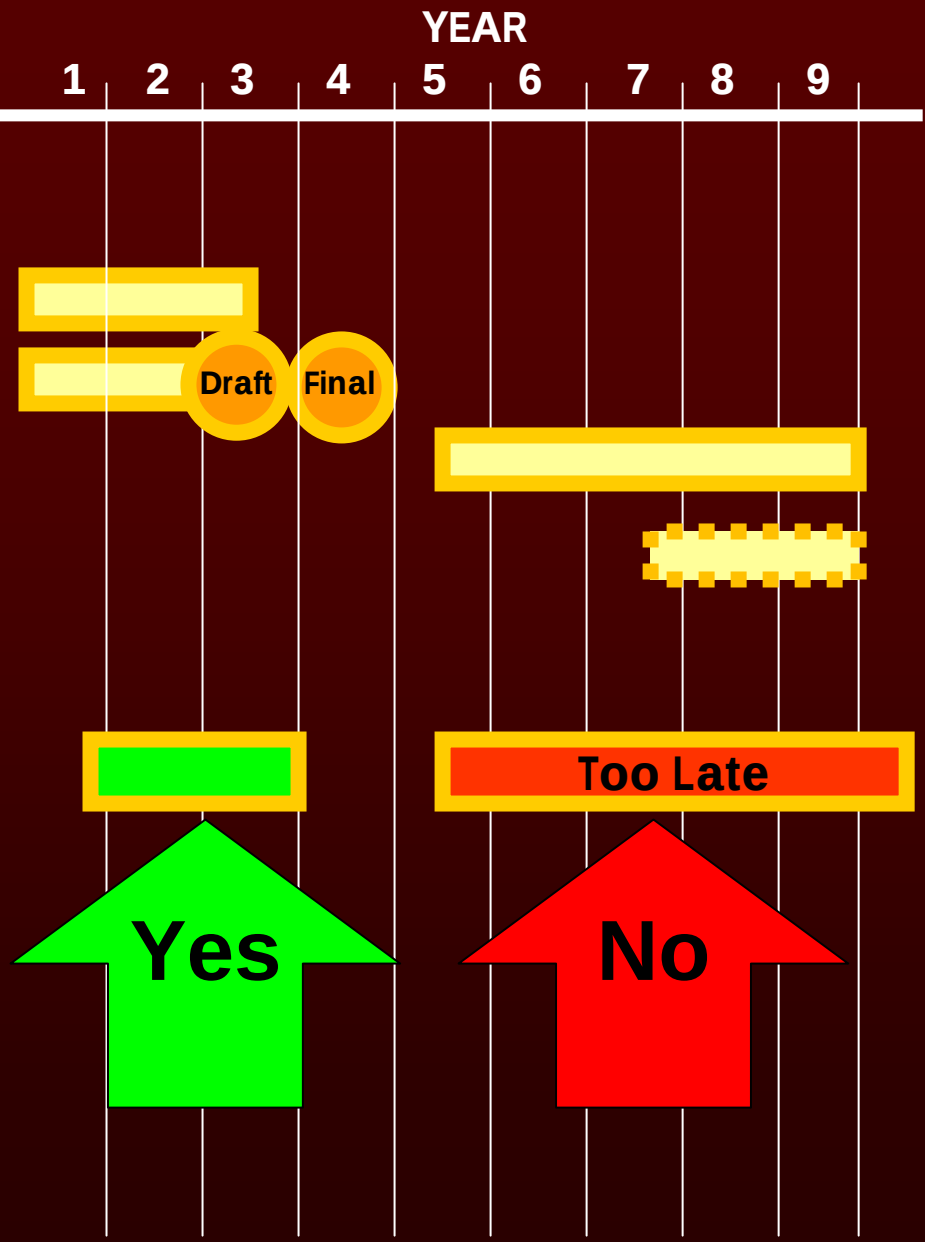


LRT Project

- Preliminary Engineering
- EIS
- Final Design
- Value Engineering

TOD Station Area Planning

Project Timeline



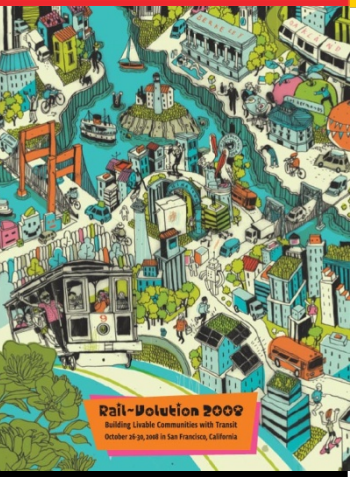
LRT Project

- Preliminary Engineering
- EIS
- Final Design
- Value Engineering

TOD Station Area Planning

Rail~Volution

Building Livable Communities with Transit



San Francisco
2008

Integrating Urban Design, Architecture and Engineering in Station Design

CRANDALL ARAMBULA

October 29, 2008