Transforming Johannesburg
Towards a low carbon and inclusive metropolis

Public Policies / Scenarios / Strategies

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The objectives of energy efficiency, climate change mitigation, economic growth & social inclusion are reinforcing and can be simultaneously achieved by compact, connected and resilient communities centered around the transit nodes of corridors of freedom.
Economic geography, Infrastructure and Urban Forms are the Major Policy Leverages for Urban Energy/GHG Decrease and Climate Mitigation

Economic Geography (trade, economic structure)

Income (consumption)

Technology: efficiency of energy end-use
(buildings, processes, vehicles, appliances)

Infrastructure and Urban Form
(energy supply infrastructure, transportation network, density, land use mix, accessibility)

Transportation modes and buildings
(choice of transport modes, building and site design)

Fuel substitution (imports)

Energy systems integration (co-generation, heat-cascading)

Urban renewables, urban afforestation

Decreasing order of impact

Increasing level of urban policy leverage

Adapted from GEA, 2013
When compared to sectoral policies, compact urban form is the most powerful leverage.

Adapted from GEA, 2013
Infrastructure costs of different urban forms
Low density induces high per capita infrastructure costs and car dependency

With a similar population, Atlanta is 6 times less dense than Berlin

Infrastructure costs are 6 times higher in Atlanta than in Berlin

95% of people use a car in Atlanta, 44% in Berlin
Which path for Joburg?
Low density increases infrastructure costs, energy consumption and carbon emissions

From Paris or Manhattan (~20,000 inhab/km²) to an average density of 5,000 inhab/km²:
- Road network investment cost per capita is multiplied by 4
- Water network investment cost per capita increases +40%
- Waste water network investment cost per capita is multiplied by 3
- Carbon emissions for transportation per capita are multiplied by 2.5
Impact of density on infrastructure costs

In the city of Johannesburg
15,343 km of roads
3.88 millions inhabitants

3.95 meters/cap

From a compact city (>15,000 inhab/km²) to Johannesburg (2,500 inhab/km²)

Road network investment length (and cost) per capita is multiplied by 6
Impact of density on infrastructure costs
Impact of density on infrastructure costs
The same holds for water and waste water networks

From a compact city (>15,000 inhab/km²) to Johannesburg (2,500 inhab/km²)

- Water network length and costs: +50%
- Waste water network length and costs: x 3.5
Joburg’s street network model implies huge investment needs per capita, much higher than in best practice cities.
Asphalt needs per km²

*Districts in orange are only partially asphalted

Asphalt needs (km² of asphalt per km²)

- Melrose Arch: 0.22
- Sandton: 0.10
- Dayn fern estate: 0.07
- North Riding: 0.08
- Houghton estate: 0.08
- Maboneng: 0.26
- Soweto: 0.13
- Alexandra: 0.11
- Bramshenville: 0.10
- Hillbrow: 0.27
Asphalt needs per inhabitant

*Districts in orange are only partially asphalted
Infrastructure needs increase when residential density decreases
The graph shows the relationship between residential density (inhab/km²) and road network per capita (length of way in meter per capita). The equation for the curve is:

\[ y = 3360.5x^{-0.749} \]

with an R² value of 0.8996.

The points on the graph represent different locations:
- Sandton
- Houghton estate
- Dayn fern estate
- North Riding
- Maboneng
- Bramfisherville
- Kya Sand
- Soweto
- Hillbrow
- Alexandra
Land economic productivity
Marginal productivity of land use has fallen dramatically in almost all Chinese cities between 2000 and 2010. What happened in Joburg?

Source: Chreod 20113
Energy consumption and carbon emissions are strongly affected by urban form and by the form of density distribution (hierarchy, entropy)
Articulated density with high variations reduces the emissions per capita and per unit of GDP.

- **Tokyo**: 4.9 tCO2e/cap, 146 ktCO2e/US$bn
- **Paris**: 5.2 tCO2e/cap, 112 ktCO2e/US$bn
- **Toronto**: 11.6 tCO2e/cap, 286 ktCO2e/US$bn
- **Beijing**: 10.1 tCO2e/cap, 1,107 ktCO2e/US$bn
- **Shanghai**: 11.7 tCO2e/cap, 1,063 ktCO2e/US$bn
- **Tianjin**: 11.1 tCO2e/cap, 2,316 ktCO2e/US$bn
Joburg shape has flattened
Radial density from Jobourg city center 1990 - 2000
Low density increases energy consumptions and carbon emissions per capita.

From a compact city (>15,000 inhab/km²) to Johannesburg (2,500 inhab/km²), energy and carbon emissions for transport are multiplied by 3.
<table>
<thead>
<tr>
<th>City</th>
<th>tCO2/cap</th>
<th>tCO2/$GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paris</td>
<td>5.2</td>
<td>112</td>
</tr>
<tr>
<td>Seoul</td>
<td>4.1</td>
<td>179</td>
</tr>
<tr>
<td>Tokyo</td>
<td>4.9</td>
<td>146</td>
</tr>
<tr>
<td>Johannesburg</td>
<td>9.9</td>
<td>432</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>13</td>
<td>249</td>
</tr>
<tr>
<td>Average Chinese city</td>
<td>10</td>
<td>1100</td>
</tr>
</tbody>
</table>

Johannesburg is already on an energy/carbon intensive pathway.
Urban landscapes are Paretian multifractals:

- Demography
- Energy
- Land prices
Rent values spatial distribution in London Source R Morphet CASA UCL
Rent values spatial distribution in London Source R Morphet CASA UCL
Do average values mean anything in urban studies?

Is the urban world Gaussian or Paretian?

In a Gaussian world 68% of the values are at one standard deviation from the average. Quite the opposite, a Paretian world is extremely inequal: a few extremely high values are juxtaposed to a “long tail” of very low values. In a Paretian world, series don’t converge. For an infinite series of values, average and standard deviation are infinite for the exponent values characteristic of urban systems.
The urban world is not Gaussian. It follows inverse power laws with extreme inequalities in intensities.

\[ \text{freq}_i = \frac{A}{l_i} \]

Power law scaling consists of universal properties that characterize collective phenomena that emerge from complex systems composed of many interacting units. Power law scaling has been observed not only in physical systems, but also in economic, financial and urban systems, shedding new light on economics, and, in recent years, has led to the establishment of a new scientific field bridging economics and physics.
Scaling and entropy of intra urban density

• Analysis of the intra urban density scaling and entropy on cells of 200 m side and derivation of a formula

An example of urban structure with a low scaling hierarchy (Stuttgart) and with a high scaling hierarchy (Barcelona). What are the consequences on transportation energy consumption?
Based on the study of 34 European cities

4 key factors impact on the transportation energy per inhabitant

- **The GDP per inhabitant** (elasticity 0.35)

- **The average density** (elasticity -0.14)

- **The entropy** of the density distribution, which corresponds to the degree of homogeneity in the distribution of the density (elasticity 0.86). The more a distribution of density is homogeneous, the more it requires transportation energy.

- **The hierarchy in the distribution of the density, captured by the exponent of a size-rank law** (elasticity -0.52). A weak value of this indicator reveals a weak hierarchy of the distribution. The highest the exponent, the highest is the hierarchy within the complex intra-urban order. A little number of cells concentrates the major part of the population.
Main result: the scaling exponent and the entropy of the distribution are the key drivers of urban transportation consumption.

ENERGI = 29073 - 9241 * RANGT
R2 = 0.19

Source: Le Néchet
Repetitive plots in Jobourg (see Soweto, Houghton estate…) are typically high entropy developments.

Jobourg is an heterogenous puzzle of homogenous areas.
GDP, density, entropy and hierarchy
Impact on energy consumption for transport

\[
\text{Energy per cap} = C \cdot \text{GDP}_{\text{cap}}^{0.35} \cdot \text{density}^{-0.14} \cdot \text{hierarchy}^{-0.52} \cdot \text{entropy}^{0.86}
\]

Much more than GDP/cap, much more than average density, what really matters is the way density is distributed.

Structured and articulated density (low density, high hierarchy) is a powerful lever to decrease transportation needs and associated energy consumption.
Energy consumption and carbon emissions: alternative scenarios for 2040
Modal split in Joburg

- Car: 33%
- Minibus: 50%
- Taxi: 50%
- Walk: 8%
- Train: 0%
- BRT/Bus: 3%

Energy | Carbon
Time-Bomb
3 factors influence travel modes:
safety | travel time | travel cost

- Safety: 50%
- Travel time: 17%
- Travel cost: 15%
- Flexibility: 4%
- Accessibility: 3%
- Driver's attitude: 3%
- Security: 8%
- Accessibility: 3%
safety

67% of the people find minibuses unsafe with regard to accidents
60% of the people do not trust the roadworthiness of minibuses

travel time

<table>
<thead>
<tr>
<th>Mode</th>
<th>Average commuting time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus</td>
<td>68 min</td>
</tr>
<tr>
<td>Mini-bus</td>
<td>50 min</td>
</tr>
<tr>
<td>Taxi</td>
<td>34 min</td>
</tr>
</tbody>
</table>

Money only still restrains a massive switch from minibuses to private cars

travel cost

Low income

Medium income
Business as usual scenario | Transportation in Joburg

Modal shares

- Medium scenarios predict a yearly 1.6% demographic growth
- The number of private cars increases by 3.7% every year: doubling every 20 years
Business as usual scenario

Transportation in Joburg and Carbon emissions

Carbon emissions for transport
+150% by 2040

Carbon emissions for transport per capita
+50% by 2040
Density trends and energy consumption

Final energy consumption for transport

- Before 2008
- Urban sprawl
- Dense scenario
- Urban sprawl and modal transfer


Energy consumption levels: 0, 100, 200, 300, 400, 500, 600, 700, 800, 900
Worse congestion issues are to be expected

Congestion in Joburg during the peak period
TOD
Urban form strategies

Articulating public transit with housing, jobs, activities and amenities
While making the best of investment capacities

On the city scale
On the district scale
Articulating density on the city scale
Transects along corridors of freedom are different from American sprawl transects and from traditional transects.
**Sector Mapping**

To identify the logical places for TOD retrofit, the mapping of the city should integrate analysis of projected economic and demographic growth, existing transportation, infrastructure, commercial nodes, natural resources, housing, and jobs concentration. The resulting sector map identifies targets for TOD retrofit.

The targets will be the logical places for private development and public investment in services, utilities and green (open space and natural elements) and grey infrastructure (manmade infrastructure), as well as financial and permitting incentives.
Complete communities consist of distinct corridors, districts, and neighborhoods.
TOD retrofit steps at city scale

STEP 1: DETERMINE TOD RETROFIT DOMAINS
The domains for TOD retrofit are chosen for their potential to become mixed-use and transit-connected nodes for the city.

STEP 2: DELINEATE PRESERVATION AND CONSERVATION AREAS
Portions of open space networks that should have been preserved, but are damaged and in need for repair and restoration, will be allocated to the preservation areas.

STEP 3: PRIORITIZE THE COMMERCIAL AND EMPLOYMENT NODES
Commercial nodes and employment clusters are identified as they will become the neighborhood centers.

STEP 4: PRIORITIZE THE POTENTIAL TRANSIT AND INFRASTRUCTURE NETWORKS
Adapting auto-oriented thoroughfare networks to rational, multimodal transportation systems is fundamental to TOD retrofit.

STEP 5: IDENTIFY THE TOD RETROFIT TARGETS
The targets selected for TOD retrofit are the ones where transit and job potential overlap, with the possibility for achieving residential density to support transit.

STEP 6: TRANSFER OF DEVELOPMENT RIGHTS

STEP 7: SECTOR MAP ASSEMBLED
Step One: Determination of sprawl repair domains

- Freeway
- Arterial
- Collector
- Local
- Cul-de-sac

- Identify the regional domain with its geographical boundaries and its potential growth areas.
- Identify the sprawl repair sector as a target for regional redevelopment.

Step Two: Delineation of preservation and reservation areas

- Preservation Area
- Reservation Area

- Identify areas where development should not occur.
- Analyze open space for potential watershed restoration, daylighting of bodies of water, and other rerouting strategies.

Step Three: Classification of retail types and ranking of priority for sprawl repair

- Convenience Store
- Convenience Centre
- "Neighborhood Centre"
- Community Centre
- Regional Centre
- Power Centre
- Employment Centre

- Analyze the existing system of commercial and employment nodes, including service areas.
- Identify the high-priority targets for redevelopment and repair: employment hubs and regional shopping centers that can be transformed into regional urban centers and town centers.
- Identify the moderate-priority nodes for redevelopment and repair: strip shopping centers and office parks that can be transformed into main streets and neighborhood centers.
- Identify targets to be given low priority for redevelopment and repair: convenience stores, gas stations, subdivision entrances that can be transformed into corner stores.

Step Four: Future transit and infrastructure networks prioritized

- Heavy Rail Line
- Light Rail Line
- Rail Stop
- Intermodal Facility
- Bus Rapid Transit (BRT)
- Transit / Circulator Bus Route
- Park & Ride / Regional Park
- Shared Use / Sub-Regional Destination
- Trail System / Pedestrian and Bike Paths

- Analyze the existing thoroughfare and transit network.
- Propose new connections and new thoroughfares that would help to complete the service network and accommodate BRT and circular buses.
- Propose possible routes for heavy and light rail system based on density and destinations.
- Propose possible routes for biking and pedestrian trail networks.
- Analyze and prioritize other operational infrastructure networks.
Step Five: Sprawl repair targets identified

- Neighborhood Center
- Town Center
- Regional Urban Core

- Commercial Node
- Employment Hub

Identify locations for sprawl repair targets in the form of neighborhood centers, town centers, and regional urban cores to coincide with commercial and transit nodes.

Step Six: Transfer of development rights

- Preservation and Reservation Areas

Transfer development rights from the reservation areas to the sprawl repair sector - specifically to the town centers and regional urban cores.

Reservation areas become preservation areas once they are protected.

Step Seven: Sector map assembled

- Neighborhood Center
- Town Center
- Regional Urban Core
- Commercial Node
- Employment Hub
- Sprawl

- Heavy Rail Line
- Light Rail Line
- Rail Stop
- Intermodal Facility
- Bus Rapid Transit (BRT)
- Train / Circulator Bus
- Circulator Bus Stop
- Sub-Regional Shared Stop

Assemble the sector map with neighborhood centers, town centers, regional urban cores, transit networks, and preservation areas.

Set aside areas that are not designated for preservation and not targeted for repair. These may remain as sprawl or devolve into agricultural lands or natural open space.
Pedestrian sheds and intervals of transit stops

- 1/4 mile Pedestrian Shed: A shuttle bus can stop every 1/8–1/4 mile.
- 1/2 mile Pedestrian Shed: A tram/circulator bus can stop every 1/2 mile.
- 1 mile Pedestrian Shed: Light rail can stop every mile.
- 2 mile Pedestrian Shed: Heavy rail can stop every two miles.
The sprawl repair method uses pedestrian sheds to delineate neighborhoods and town centers, which should be connected by transit.
Corridors of Freedom
How to implement a successful Transit Oriented Development Strategy?

Create a hierarchy of Transit-Oriented Centers
_All the hubs and nodes do not have the same potential for TOD_

Focus on urban environment
_Create compact, mixed use, walkable environments_
_Plan civic spaces and urban amenities_

Leverage investment opportunities
_Land use reforms, public-private partnerships, land value capture_
TOD design challenge
The conflict between places and nodes

Place

Community Hub
Modern-day “Agora”

Attractive Milieu
Comfortable, Memorable, Accent on Aesthetics & Amenities, Connectivity, Legibility, Natural Surveillance

Design Perspective
Architecture/Planning
TOD design challenge
The conflict between places and nodes

Node

Logistical Points
Interchange for Train, Bus, Taxi, Bikes, Scooters, parking, delivery, pedestrians

Conflict points
Safety

Design Perspective
Engineering
A successful regional transit oriented development

Portland Case Study

A model for Joburg?

Or should be completed by social inclusion priorities?
Comparison of Portland and Los Angeles station areas based on intensity and land use mix

Los Angeles vs Portland Station Matrix
Intensity & Land Use Mix

Station References
- Downtown Portland
- Non-Downtown Portland
- Non-Downtown LA
- Downtown LA

INENSITY
(Residents+workers per half mile)

HOUSING

MIX (ratio of workers to residents)

EMPLOYMENT
A series of metrics to reshape the metropolis

**Transit Connectivity**
- Proximity to Light Rail
- Proximity to Frequent Bus

**Pedestrian and Bicycle Connectivity**
- Intersection Density
- Proximity to Trails
- Low Traffic Streets
- Dedicated Bicycle Lanes
- Sidewalk Density
- Overall Pedestrian and Bicycle Safety at Intersection Crossings

**Land Use Characteristics**
- Presence of Key Retail Amenities
- Presence of Grocery Stores
- Population Density
- Building Height and Massing
- Vegetation
Transit orientation scores in Portland

Resting upon the series of metrics
Transit orientation scores in Portland

Resting upon the series of metrics
Transit orientation scores in Portland

Resting upon the series of metrics
Local metrics around the transit stations
Small blocks increase walkability
Local metrics around the transit stations
Land value helps leveraging investment opportunities
Local metrics around the transit stations
Jobs and employment
Local metrics around the transit stations
Jobs and employment

Jobs accessed by foot within 20 minutes from a major CBD metro station

New York: 1,739,500
London: 352,800
Beijing: 157,200
Joburg: ?

Combining Transit Orientation with Market Strength

TOD Station Area Typology

Stations with highest TOD Potential

Real Estate Market Strength
3 differentiated strategies
infill+enhance | catalyze+connect | plan+partner
3 differentiated strategies
infill+enhance | catalyze+connect | plan+partner
TOD Execution
Local implementation

Proto-types/Pilot-Demos
Station-Area Plans
Implementation
Evaluation/adjustments
TOD
Urban form strategies

Infill, connectedness, and higher density development
Creation of more walkable, livable neighborhoods

On the district scale

How to complete these strategies for American transects by specific strategies for Townships and for informal settlements?
TOD retrofit steps at neighborhood scale

STEP 1: ANALYSE SITE FEASIBILITY
- A survey of the ownership structure
- Demographic analysis and other marketing studies
- A void analysis of the local market identifies the uses required to rebalance the existing ones
- The potential for new job creation
- Analysis of the existing building stock includes determining which buildings will be retained, renovated, and repurposed, and which will be partially or entirely demolished. The goal should be a range of flexible and affordable building types that can easily adapt to a variety of uses and activities as market changes
- Analysis of thoroughfare connectivity, street and traffic patterns
- Develop a new parking strategy
- Decontamination and remediation procedures

STEP 2: APPLY URBAN DESIGN TECHNIQUES
Johannesburg urban developments exhibit a range of shared defects such as car dependence, lack of neighborhood structure and mixed use, lack of connectivity and block organization, and scarcity of defined public realm
The summary of the main deficiencies and the remedial urban design techniques are as follows:
Deficiency: Single Building type and use  
Remedial technique: Introduce new building types to accommodate a mix of uses

Deficiency: Lack of walkable neighborhood structure  
Remedial technique: Introduce a finer grain connective street network inside and across neighborhoods.

Deficiency: Residual open space/ Lack of civic space  
Remedial technique: Define open and civic space

STEP 3: INTRODUCE REGULATORY AND MANAGEMENT TECHNIQUES

STEP 4: SECURE INCENTIVES FOR IMPLEMENTATION
Conceptual representation of possible paths of sprawl repair and their effects on resource use and quality of life.

1. Direct process of sprawl repair
2. Phased process of sprawl repair
3. Indirect process of sprawl repair
Deficiencies

SINGLE FAMILY HOUSES TOD RETROFIT
1. New square
2. Green
3. Main spine
4. New connections
5. Arterial repaired into boulevard
**Deficiency:** Lack of walkable block structure

**Remedial Techniques:** Connect and repair thoroughfares

- Connect cul-de-sacs (see chapter five)
- Connect streets
- Introduce mews lanes
- Introduce alleys
- Introduce mid-block pedestrian passages
- Create external connections
- Repair thoroughfares (see chapter five)

**Outcome:** Walkable network and block structure
**Deficiency:** Residual open space

**Remedial Techniques:** Define open and civic space

- Create a neighborhood green/playground
- Repair the collector into an avenue
- Create a market square
- Locate a bus stop coordinated with municipality

**Outcome:** Hierarchy and spatial definition of public realm

**PHASING**

- Existing single-family subdivision
- Short-term repair: Creating an entry square
- Medium-term repair: Adding mixed-use blocks
- Long-term repair: Completing the urban fabric
DEFICIENCIES

Single building type and use

Lack of walkable block structure

Dispersed and exposed parking

Residual open space

MULTI-FAMILY SUBDIVISION TOD RETROFIT
TRANSFORMATION INTO A TOWN CENTER

Existing multifamily subdivision

Existing buildings

Dispersed and unstructured disposition of buildings in a multifamily subdivision

Proposed buildings

Existing buildings

The transit-oriented, high-density town center will be used by the surrounding communities

Multifamily subdivision redeveloped into a town center
Introduce new building types and mixed use
Re-connect street network

Deficiency: Lack of walkable block structure

Remedial Techniques: Connect and repair thoroughfares

- Repair existing thoroughfares (see chapter five)
- Create a main street
- Connect existing thoroughfares
- Create external connections

Outcome: Walkable network and block structure
Define open and civic space

Deficiency: Residual open space

Remedial Techniques: Define open and civic spaces

- Define semi-public interior block spaces
- Create a main street
- Create an entry square

Outcome: Hierarchy and spatial definition of public realm
Re-Zoning

Conventional single-use zoning
- Open Space
- R3 - Multifamily Residential
- Existing buildings

Transect-based zoning
- T3 - Sub-Urban zone
- T4 - General Urban zone
- T5 - Urban Center zone
- CS - Civic Space
- CB - Civic Building
- Existing and proposed buildings
Deficiencies

A SHOPPING CENTER TOD RETROFIT

Single building type and use
Lack of walkable block structure
Dispersed and exposed parking
Lack of civic space
TRANSFORMATION INTO A TOWN CENTER

Existing shopping center

Existing buildings

Parking lots dominating the public realm

Shopping center repaired into a mixed-use town center

Proposed buildings

Existing buildings

Parking lots redeveloped into mixed-use, walkable fabric
Deficiency: Single building type and use

Remedial Techniques:
Introduce new building types and mixed uses: residential, office, lodging, and civic.

Preserve viable buildings
Add live-work units
Add liner buildings for incubating businesses
Introduce mixed-use, perimeter-block buildings with parking garages
Convert existing buildings for civic uses
Eliminate dysfunctional buildings

Outcome: Variety of building types and mix of uses to support a town center

Introduce new building types and mixed uses
**Deficiency:** Lack of walkable block structure

**Remedial Techniques:** Connect and repair thoroughfares; add streets in front of stores

1. Add streets in front of stores
2. Connect existing thoroughfares
3. Repair existing thoroughfares (see chapter five)
4. Improve complicated intersection with a square
5. Connect big boxes with a pedestrian-friendly retail loop

**Outcome:** Walkable network and block structure

Connect and repair thoroughfares
Rationalize parking

Deficiency: Underutilized and exposed parking

Remedial Techniques:
Rationalize parking; add garages

Add on-street parking
Add parking garages
Organize parking in backs of buildings

Outcome: Parking strategy to support higher density and mix of uses
Define open and civic space

Deficiency: Lack of civic space

Remedial Techniques: Define open and civic spaces

- Create a variety of civic spaces
- Create a square to improve intersection
- Define semi-public interior block space

Outcome: Hierarchy and spatial definition of public realm

Existing shopping center

Short-term repair: Transforming the intersection into a square

Medium-term repair: Creating a retail loop

Long-term repair: Completing the urban fabric
APPLICATION: RECLAIMING A SQUARE OUT OF PARKING LOTS

Car-oriented environment of a blighted shopping center

Public square as a traffic-calming and place-making device

Parking lots transformed into a town center
Deficiencies

BUSINESS PARK TOD RETROFIT

Single building type and use

Lack of walkable block structure

Dispersed and exposed parking

Lack of civic space
Transformation into a town center
Introduce new building types and mixed uses

Deficiency: Single building type and use

Remedial Techniques:
Introduce new building types and mix of uses: residential, retail, lodging, and civic

Outcome: Variety of building types and mix of uses to support a town center
Deficiency: Lack of walkable block structure

Remedial Techniques: Connect and repair thoroughfares; create urban blocks

- Repair existing thoroughfares (see chapter five)
- Connect existing thoroughfares
- Add new streets

Outcome: Walkable network and block structure

Connect and repair thoroughfares
Define open and civic space
Re-Zoning

Conventional single-use zoning

- Open Space
- C - Commercial
- Existing buildings

Transect-based zoning

- T4 - General Urban zone
- T5 - Urban Center zone
- T6 - Urban Core zone
- CS - Civic Space
- CB - Civic Building
- Existing and proposed buildings
The three most important deficiencies of a strip corridor are the lack of neighborhood structure, no variety of uses, and underutilized open space. The inefficient use of the land makes redevelopment efforts challenging.
Transformation into a nodal transit boulevard
Linear commercial corridors that encourage uncontrolled strip development.

Higher density at the intersections form transit-oriented nodes at every one-mile intersection.
Connect thoroughfares and accommodate transit

Introduce urban building types and mixed-use
Define open and civic space

Deficiency:
Underutilized open space

Remedial Techniques:
Define open and civic spaces

- Create small civic spaces, greens, and playgrounds
- Create transit stop plazas
- Create squares
- Define semi-public space in block interiors

Outcome: Mixed-use corridor of urban nodes and a variety of civic spaces
Next Steps

Design a strategic plan to guide future investment

• An evaluation of regional existing conditions influencing the ability of TOD as a strategy to achieve Metro’s 2040 Growth Concept goals.

• A typology framework that classifies station areas and corridors based on their “TOD readiness” and on their social inclusiveness potential.

• Guidelines for phasing of TOD Program activities based on this typology.
Strategies for maximizing TOD potential

- Contributing to local identity through multi-year investments in catalyst projects and place-making elements.

- Creating market for higher-density mixed-use development near transit and in centers.

- Cultivating developers with expertise in higher-density and mixed-use development in suburban settings.

- Building community acceptance of urban style building types in suburban communities.
Thank you for your attention