FOUR FLOWS
THE EVOLUTION OF THE GARDINER EXPRESSWAY

COMPETITION TO DEVELOP INNOVATIVE DESIGN OPTIONS FOR THE GARDINER EXPRESSWAY AND
LAKE SHORE BOULEVARD RECONFIGURATION ENVIRONMENTAL ASSESSMENT

TORONTO, CANADA

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WATERFRONTtoronto

CONTENTS

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FOUR FLOWS: THE EVOLUTION OF THE GARDINER EXPRESSWAY

Adrian Smith + Gordon Gill Architecture LLP (AS+GG) is pleased to present our proposal for the reconfiguration of the Gardiner Expressway and Keating Channel Precinct. We've strived to create an innovative and economically-sound vision for the revitalization of this vital piece of Toronto's waterfront and infrastructure. AS+GG recommends removing the elevated Gardiner Expressway and replacing it with:

1. A new Gardiner Tunnel, serving through-traffic travelling north and south on the Don Valley Parkway, and;

2. A new Lake Shore Boulevard, an innovative and sustainable addition to Toronto's downtown roadway network.

We have entitled our design scheme **"Four Flows: The Evolution of Gardiner Expressway"**.

We have chosen these words carefully. The words "flow" and "evolution" imply definitive change, yet offer the possibility of a relatively seamless transition and a metamorphosis into something better. Our proposal offers these possibilities and much more to the people of Toronto. The "four flows" refer to four distinct elements that are integral to the reinvention of Gardiner: 1) People, 2) Transportation, 3) Natural Systems, and 4) Development. The harmonious "flow" of these elements throughout the site is basis of our design scheme and the linchpin to the creation of a sustainable, successful 21st century district for Toronto.

Flow 1: People. The seamless movement of people to the water's edge will create a vibrant waterfront district and enhance the quality of life for Toronto's citizens.

Flow 2: Transportation. Roads and transit systems must promote access to the new Gardiner Expressway while also providing the necessary capacity for those traveling through Gardiner as a central thoroughfare in the city.

Flow 3: Natural Systems. Environmental assets such as the waterfront, Don River and new public parks will create a rich landscape environment.

Flow 4: Development. An expanded tax base will encourage development that creates long-term benefits for the citizens of Toronto.

Finally, we use the word "evolution" to describe our proposed metamorphosis of the Gardiner Expressway. It is neither desirable nor possible to remove all vestiges of the Gardiner. As with all things, it is time for the Gardiner to move into the next phase of its existence, thus requiring an evolution into the Gardiner Tunnel.

INTEGRATED RESPONSE

Our "Four Flows" concept correlates directly with the four lenses described by Waterfront Toronto for the project evaluation:

Lens 1: Environment equals Flow 3: Natural Systems
Lens 2: Economics equals Flow 4: Development
Lens 3: Transportation equals Flow 2: Transportation; and
Lens 4: Urban Design equals Flow 1: People

AS+GG's proposal addresses Waterfront Toronto's four lenses with the following recommendations:

Lens 1: Environment

1. The citizens of Toronto will benefit from over 60,000 square meters (sm) of new parks within Keating Channel Precinct and over 170,000 sm of new public streets, providing unprecedented access to the waterfront.

2. We have succeeded in providing continuous north-south "green streets" every +/-100 meters, connecting neighborhoods directly to the water and offering innovative stormwater-cleansing techniques through bio-filtration swales.

3. The waterfront is completely connected and accessible from public streets along its entire length.

4. It is recommended that the Don River flood-control and landscape design be completed, further expanding the network of new parks at the Don River mouth.

Lens 2: Economics

1. We have created 30% more development land for the citizens of Toronto than the previous Keating Channel Precinct scheme, thus providing a long-and short-term source of capital for proposed infrastructure improvements.

2. Our proposal creates consolidated lakefront property, with no parcel more than 200 meters from the water. We believe the market desirability of this design will support densities of up to 8-10 floor-area-ratio for an average development block. This ratio, combined with the increased land area, has significant economic benefits.

3. The increase of the total development area in Keating Channel will allow a significant gain in tax revenue for this area. Further, much of the new development area occurs on publicly-owned land previously unavailable for development due to the existence of the Gardiner Expressway.

Lens 3: Transportation

1. At the east end of the project site, the Gardiner Tunnel would emerge from the ground at the East Portal and transition into a remarkable new Green Bridge, representing the next evolution of sustainable infrastructure, over the Don River. At the west end of the site, the Gardiner Tunnel would emerge at the West Portal and ramp back up to the elevated Gardiner Expressway.

2. Between the east and west tunnel portals, a new and vastly improved sustainable Lake Shore Boulevard, aligned directly above the Gardiner Tunnel, would set a new standard for innovative infrastructure in Toronto.

3. All existing Gardiner traffic and lane capacity can be maintained under the proposed design. Except for Lake Shore Boulevard, we have neither added nor removed lanes to any street in the project area (including the Gardiner), thus maintaining almost all current traffic capacity. Additionally, we have provided future capacity within Lake Shore Boulevard's right-of-way that could be used either for transit or an expanded lane design.

4. We have maintained and enhanced all public-transit plans currently in place, and have provided areas for transit expansion.

Lens 4: Urban Design

The defining characteristic of our urban design proposal is our focus on people: enabling Torontonians to "flow" to the lakefront. Our plan is designed to allow all citizens access to the water while providing both innovative and time-tested urban design concepts, including:

1. A system of appropriately-scaled development blocks between .75 and 1.5 hectares, enabling exceptional access through the development from north to south.

2. Incorporation of all current waterfront Toronto urban design plans that fit with the proposed design.

3. A major new waterfront park, "Queens Landing", to organize and focus development in Keating Channel.

4. Refined street cross-sections that a create pedestrian-friendly public-realm with 4 to 5-meter sidewalks.

Finally, we feel the 30% increase in new development land that will yield tremendous revenue for the city of Toronto. We feel this revenue will contribute significantly if not entirely to the cost of the Gardiner tunnel and bridge.

PLANNING FOR THE GROWTH OF ANY CITY IS ULTIMATELY ABOUT THE RESIDENTS AND WORKERS. IT IS THEIR QUALITY OF LIFE THAT SHOULD BE AT THE FOREFRONT OF ALL DECISIONS.

PEOPLE

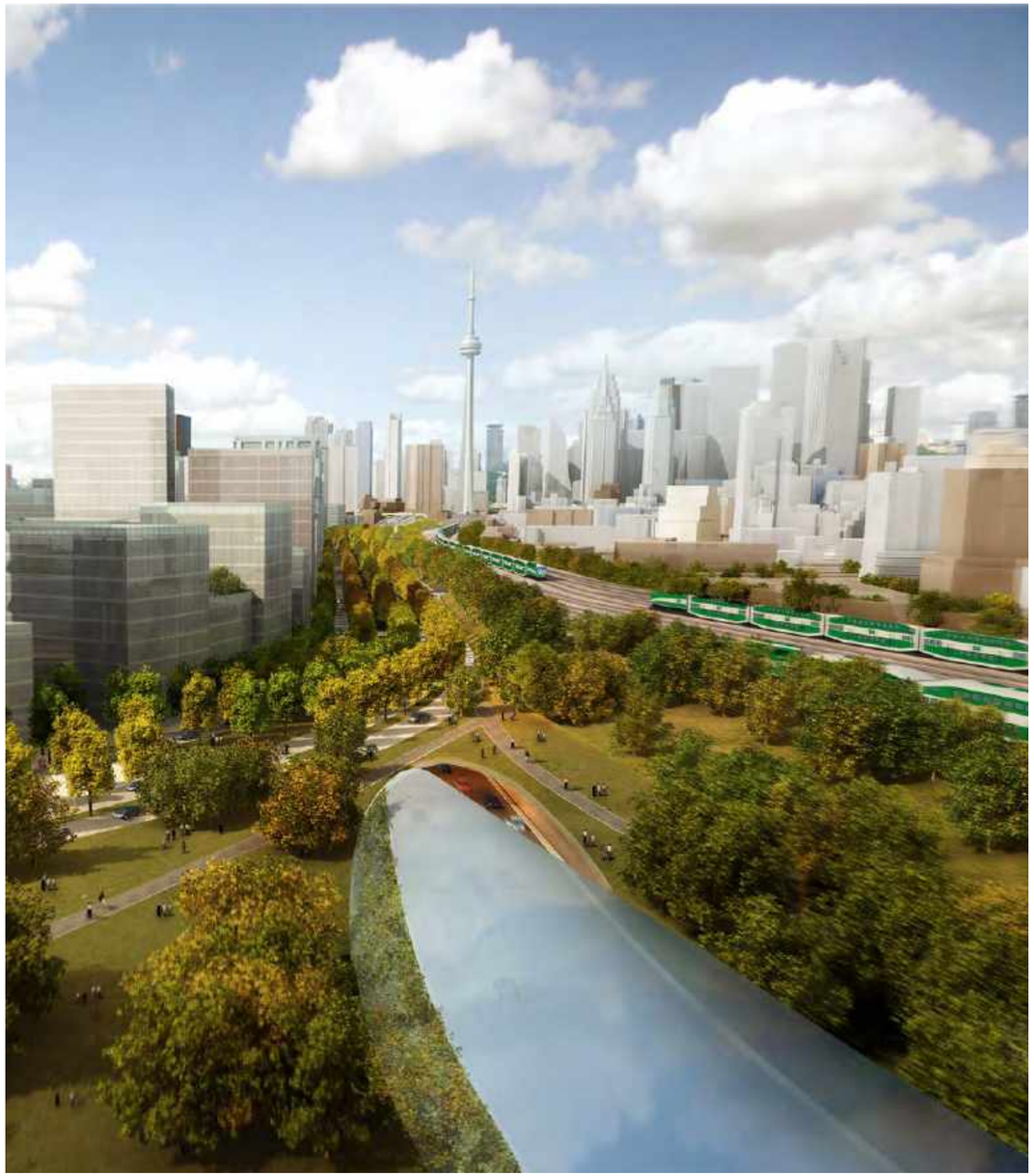
OVERALL VISION

AERIAL VIEW OF PROPOSED KEATING CHANNEL PRECINCT

The new Keating Channel District, Lake Shore Boulevard and proposed Gardiner Tunnel together will define a new future for the east end of the Toronto waterfront. Our design extends and strengthens the tremendous work that has been completed in the Don Lands and establishes a distinct vision for this unique precinct.

Planning for the growth of any city is ultimately about the people that will reside, visit, shop and work in the new district. It is their quality of life that should be at the forefront of all decisions. Infrastructure exists to serve their needs, rather than the inverse. We have kept these principles in mind as we have prepared our proposal. Thus, our first design principle is to ensure the flow of people to, within and from the Keating Channel District and the waterfront. All decisions have been made to this end.

AERIAL VIEW OF PROPOSED KEATING CHANNEL PRECINCT, FROM SOUTH



VIEW OF PROPOSED BOULEVARD, LOOKING WEST

THE FLOW OF PEOPLE
THE URBAN DESIGN OF THE KEATING CHANNEL PRECINCT

Our model for the planning of the Keating Channel Precinct is Battery Park City in New York, one of the most successful North American waterfront districts in the last 20 years. Incorporating some aspects of this precedent, the proposed AS+GG "Four Flows" scheme offers the following design recommendations that will ensure the flow of Toronto citizens to the lakefront.

- All north-south streets are aligned with current or proposed Toronto streets, ensuring complete and clear access to the waterfront.
- A focus on an active and positive pedestrian experience on all streets, with large sidewalks, extensive landscaping and safe, accessible travel routes.
- A signature new "Queens Landing" park, providing a clear focal point to the Precinct and around which transit and density can be organized.
- A hierarchy of streets, including 1) north-south "green finger" streets that lead residents to the water from northern neighborhoods; 2) Secondary, internal streets for service and local access; and 3) Two east-west boulevards (Queen's Quay and Lake Shore) to connect the Precinct to adjacent development and roadways.
- A completely accessible and continuous waterfront connecting to the new Don River Park to Parliament Slip.

We have designed the plan to ensure that people flow through the Keating Channel District, gathering at key civic places, strolling along the waterfront, biking through the new park and street system, and shopping, working and living in a mixed-use environment.

EYE LEVEL VIEW OF PROPOSED LAKE SHORE BOULEVARD, LOOKING EAST

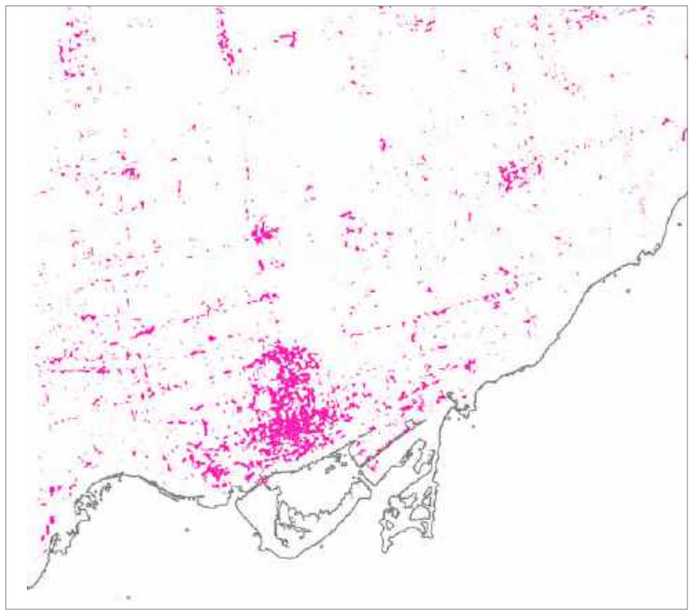
ILLUSTRATIVE PLAN

ILLUSTRATIVE PLAN

PRIMARY PLAN ELEMENTS

1 Queen's Quay Boulevard
2 Parliament Slip
3 School Park
4 Green Fingers
5 Queen's Landing Park
6 Waterfront Park
7 Don River Mouth Park
8 Don River Greenway
9 Lake Shore Boulevard
10 Boulevard Bikeway ("The Berm")
11 Tunnel Below Boulevard
12 'Green Bridge" – DVP Fly-over
13 Don Valley Parkway (DVP)
14 Elevated Gardiner Expressway
15 New Lake Shore Boulevard Bridge
16 Primary Green Streets
17 Secondary Green Streets
18 New bridge to Lower Don Lands

SYSTEM DIAGRAMS



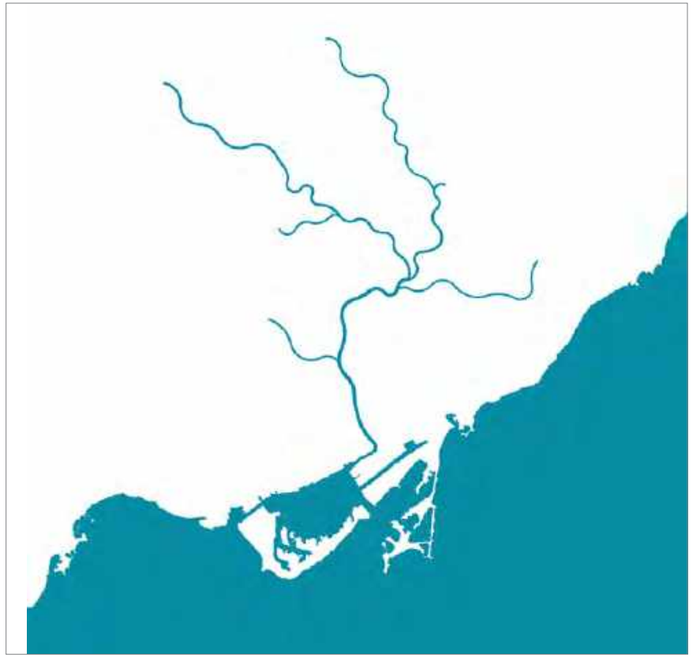
DEVELOPMENT SYSTEM DIAGRAM

TRANSPORTATION SYSTEM DIAGRAM

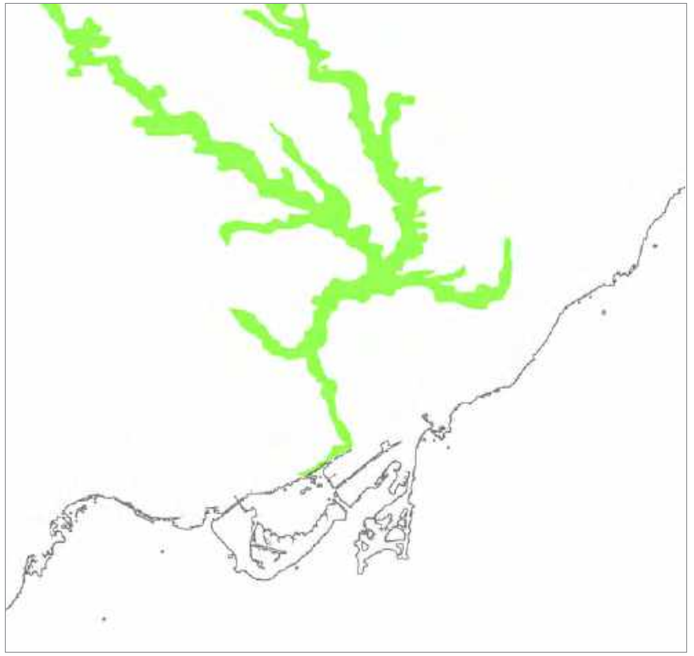
What is perhaps most compelling about the location of the Keating Channel District and the Lower Don Lands is their location within the development, transportation and natural systems of the eastern downtown area. The Don River ecosystem is the defining characteristic of this area, with its unique flora and hydrologic systems. We have studied these systems and brought the most appropriate elements forward in our recommendations. These include:

- An understanding that the Keating Channel District should be considered the eastern edge of the downtown core, and as such needs to have land uses that express this unique condition: both residential and commercial.

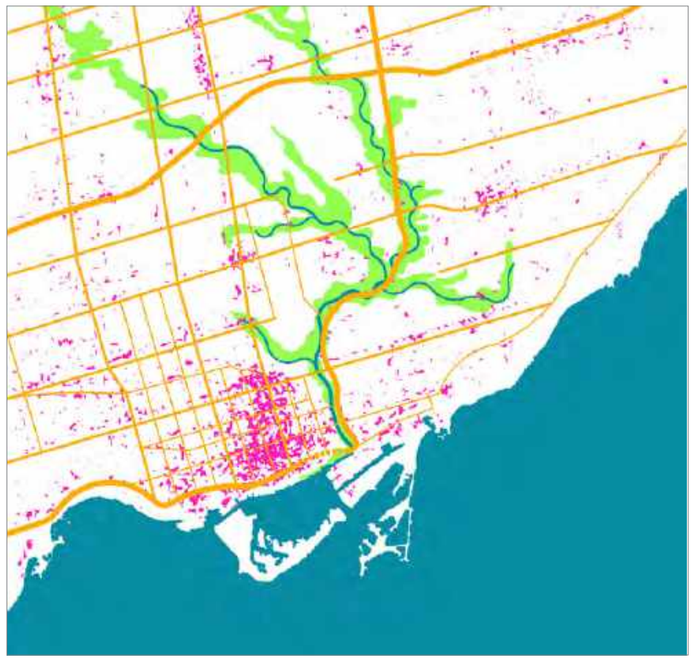
- The seasonal fluctuations of the Don River, as it passes the site, should be acknowledged through the creation of floodplains and plant species that thrive in these areas.



WATER SYSTEM DIAGRAM

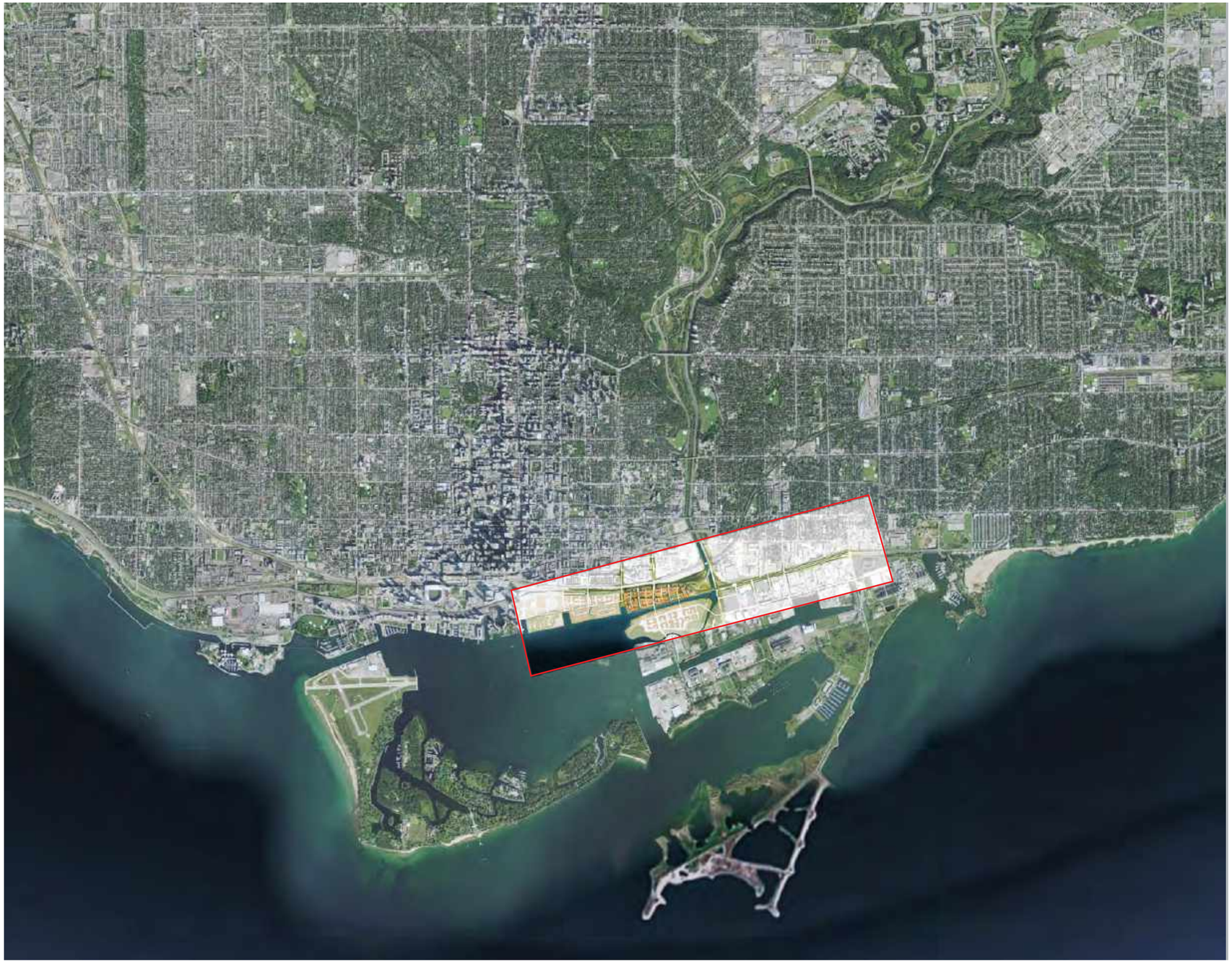


GREEN SYSTEM DIAGRAM



OVERLAYED SYSTEM DIAGRAM

CONTEXT PLAN



The context of the Gardiner Expressway and the Keating Channel presents a unique opportunity for Toronto. This site and transportation system is the eastern gateway for the downtown, and also the future start of the downtown waterfront. As one travels east, it is the departure point for the central business district and a gateway to the eastern neighborhoods of Toronto.
When these development aspects are combined with the exceptionally unique natural assets of the shoreline and the Don River, the result is a site of very strong civic importance.

- The Gardiner Expressway and its connection to the Don valley Parkway is a critical transportations corridor and must be maintained.

- The flora and fauna of both Lake Ontario and the Don River has been accommodated in our planning. We feel it is critical to reconnect these fractured ecosystems in a way that begins to strengthen the ecology of this unique area.

MEETING WATERFRONT TORONTO'S TEN REQUIRED DESIGN ELEMENTS

Element 1:
Beautiful and Effective Roadway Infrastructure
The plan creates a comprehensive and hierarchical roadway structure that allows complete access throughout the districts. The roads have been carefully sized relative to their position in the plan, and all have generous sidewalks for pedestrian movement. Street trees will be present on all streets, and many streets will be lined with retail shops or active uses.

Element 2:
Transform the Ground Plane
We have designed the ground plane carefully, considering not only soft surfaces, such as landscaping, but also hard surfaces and porous paving. What defines this plan is the integration of landscape and paved surfaces, each carefully balanced. Paved surfaces guide pedestrians to key focal points in the plan, while landscape surfaces provide areas for storm-water recovery and heat-island mitigation.

Element 3:
Increase Redevelopment Potential
The AS+GG design increases the land available for development by 30% over the previous plan. Further, due to the optimized waterfront parcels and access to transportation systems, the plan recommends the slightly increased density, resulting in over 600,000 sm gross floor-area of development (an average of 6 FAR on development parcels). When higher land values, property taxes, and other returns to the city are calculated, we feel strongly this plan will demonstrate significant long-term economic benefit to the city.

Element 4:
Complement Existing Plans
Our proposal incorporates all plans that correlate with our overall goals. These include: aligning new streets to connect to existing streets; Creating proposed streets where potential future connections may be desired; linking, via a new bridge, to the proposed Lower Don Lands Development; incorporating and extending transit lines; and creating a fully interconnected network of open space that enhances what is currently planned.

Element 5:
Enhance North-South Connectivity
The five primary north-south streets in our proposal align exactly with planned or existing streets in neighboring developments. This design allows connections that can be made today to be realized, and connections that may be desirable in the future to also be considered. Further, we have created a hierarchy in the street system where primary north-south streets, enhanced with landscaped parkways that guide people to the waterfront from northern neighborhoods. Even young children can safely ride their bikes to the waterfront without altering their route or losing their way...it is that clear.

Element 6:
Beautify the Rail Berm
We have proposed several options for beautifying the rail berm, but the primary strategy is two-fold: 1) to create a much richer landscape experience that protects and shelters bicyclists, and 2) to provide sustainable and public art opportunities. We recommend creating an undulating and stepped rail berm that can be heavily landscaped, allowing the berm to act as a CO_2 dispersal unit for the Tunnel. These stepped surfaces can also hold public art or LED signage that will provide information to motorists regarding traffic or weather conditions.

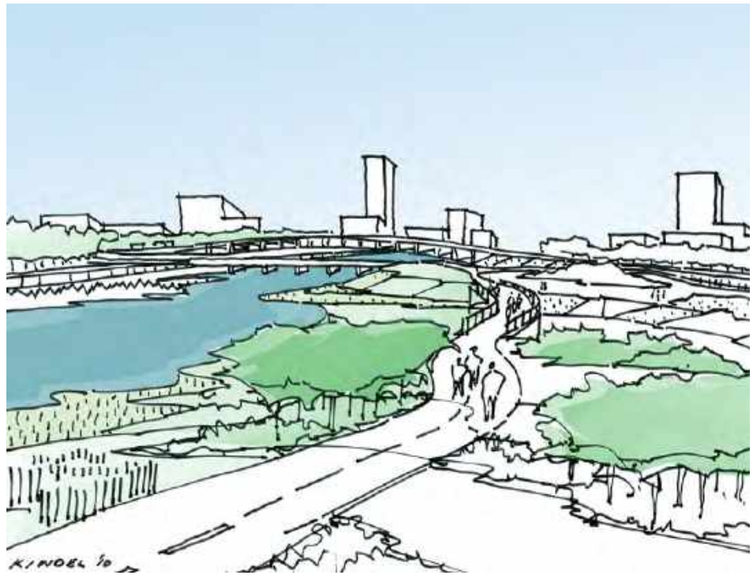
Element 7:
Strengthen View Corridors to Water
In addition to guiding people to the waterfront, the landscaped parks adjacent to north-south streets reinforce views to the water. Further, our proposal places no structures at the terminus of north-south streets. This strategy places the water view as the premium experience in the Precinct, an experience that every citizen, if this plan is adopted, will have.

Element 8:
Devise Elegant Connections to Existing Infrastructure
As the Gardiner Expressway joins the Gardiner Tunnel and then emerges to become the new Green Bridge across the Don River, we will join Toronto's 20th-century infrastructure to its 21st. This exciting bridge will create a new definition of infrastructure and elegantly connect the old to the new. Likewise, Lake Shore Boulevard will completely redefine the idea of what a boulevard can be, and all north-south streets will graciously connect to their counterparts north of the railroad.

Element 9:
Develop a Signature Don River Crossing
Perhaps the most striking aspect of our proposed plan is the new Don River crossing, which we have entitled the Green Bridge. This bridge is not like any other in the world, and will become an immediate landmark for Toronto. Its unique structural shape combined with its graceful arc over the river is both understated and highly innovative. Additionally, we propose several sustainable features for the bride, including landscaped screens and water-purification systems built into the bridge.

Element 10:
Promote Sustainability and Innovation
Many elements of this proposal are both sustainable and innovative, and those that are not make significant contributions to the civic life of Toronto. Starting with the core proposal of a Smart Boulevard that serves multiple sustainable functions while providing a gracious civic boulevard for the city, the plan includes green streets that manage storm-water, a new Don River Park that accepts river fluctuations, and a waterfront that cleanses water before releasing it into Lake Ontario. As the plan evolves, even more sustainable attributes can be imagined.

BEAUTIFUL AND EFFECTIVE ROADWAY INFRASTRUCTURE



COMPLEMENT EXISTING PLANS

STRENGTHEN VIEW CORRIDORS TO WATER

INCREASE REDEVELOPMENT POTENTIAL

TRANSFORM THE GROUND PLANE

DEVELOP A SIGNATURE DON RIVER CROSSING

THE NEW DON RIVER BRIDGE WILL BE A MODERN LANDMARK FOR THE CITY, GRACEFULLY ARCHING FROM THE GARDINER TUNNEL TO THE DON VALLEY PARKWAY.

TRANSPORTATION

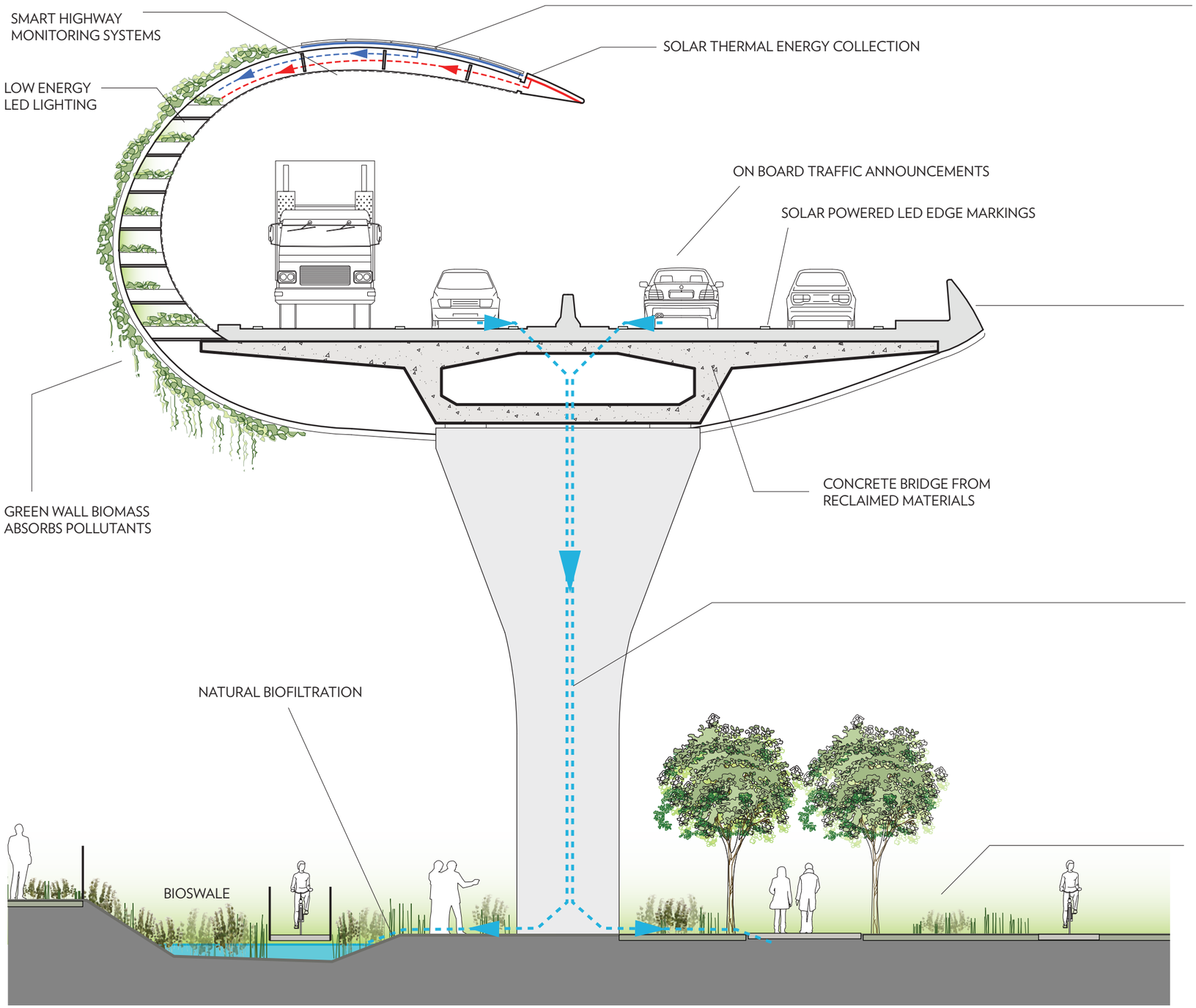
TRANSPORTATION

TRANSPORTATION

PRIMARY TRANSPORT ELEMENTS

1 West Lake Shore Boulevard
2 Boulevard Bikeway (“The Berm”)
3 Tunnel Below Boulevard
4 ‘Green Bridge” – DVP Fly-over
5 Don Valley Parkway (DVP)
6 Sloped transition to Gardiner Expressway
7 Elevated Gardiner Expressway
8 New Lake Shore Boulevard Bridge
9 North Green Streets
10 South Green Streets
11 Secondary Green Streets
12 Alley
13 Queen’s Quay Boulevard
14 New bridge to Lower Don lands
15 East Lake Shore Boulevard

A SUSTAINABLE "GREEN BRIDGE"



CANOPY

The canopy serves several purposes. It provides a support structure for the integrated photovoltaics, which will generate grid-connected electricity to offset the demands from the lighting and traffic management systems. The North face of the canopy will support a green wall structure that will absorb some of the wind energy from the North as well as attenuating rain and snowfall, providing shelter to traffic on the bridge. Although, it is only expected to a small amount, the greenwall biomass, in spring and summer will serve to absorb some of the pollutants and carbon dioxide from traffic on the bridge.

THE BRIDGE, STRUCTURE AND ROAD SURFACE

The bridge will be manufactured using as much reclaimed material (aggregate from crushed concrete, reclaimed asphalt for the pavement, recycled steel for reinforcement etc.) as possible. This will significantly reduce the environmental impact of constructing the new bridge and of demolishing the existing structures. Lighting of the road will be achieved using low energy traffic volume responsive luminaires, lane and edge markings will be via solar powered LED systems and traffic signage will also be illuminated using LEDs. The road shall include embedded heating elements to maintain an ice-free surface.

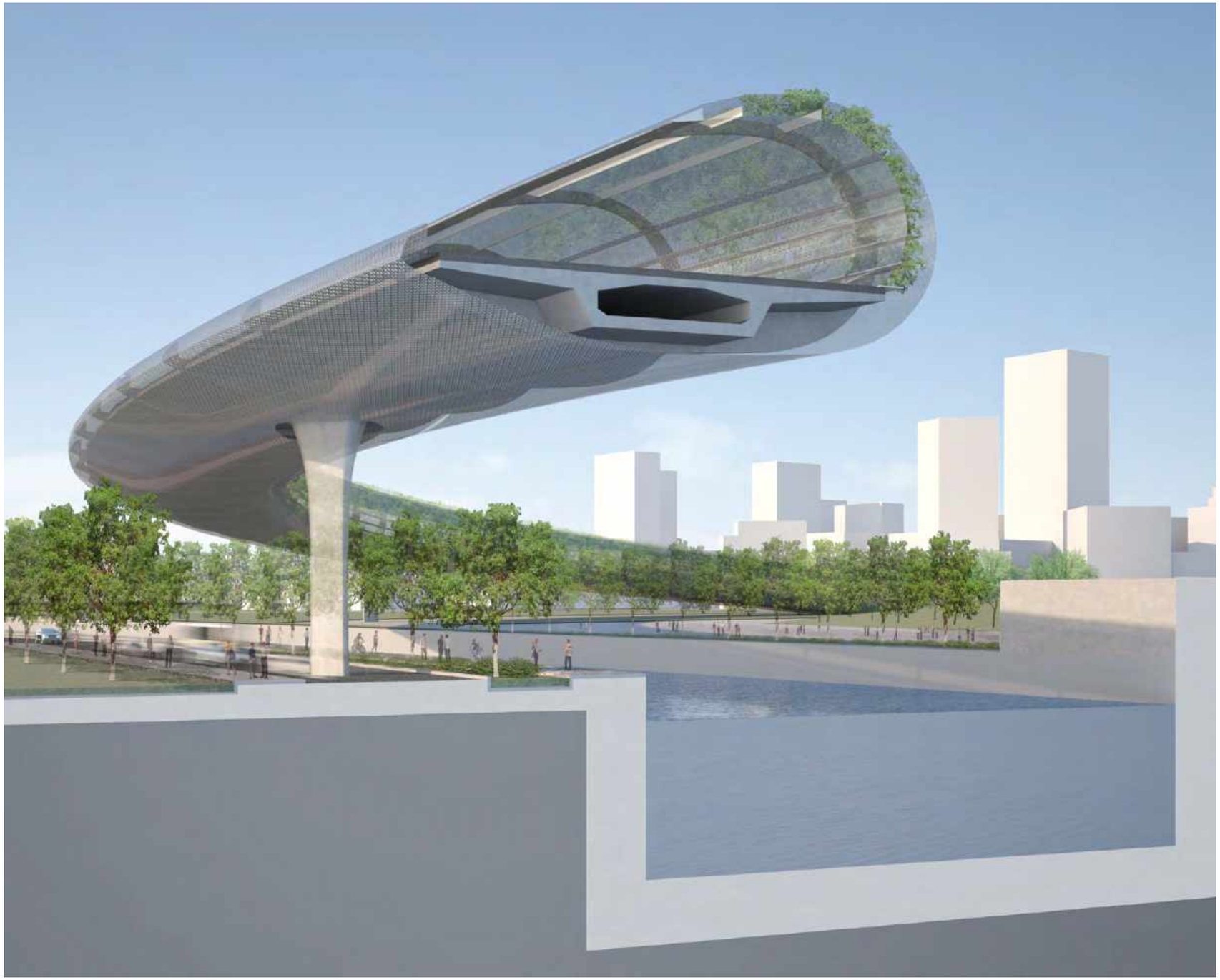
STORM WATER

Water will drain from the highest point of the bridge by gravity in a westerly direction and in a northerly direction. The northern flows will discharge (via sediment traps and Stormwater interceptors) into the Don River. The westerly flows will discharge via standing pipes at each column into bioswales within the wetland park. These bioswales will direct Stormwater into a reedbed on the edge of the river that will serve to reduce any pollutant load entering the channel.

THE GREEN PARK

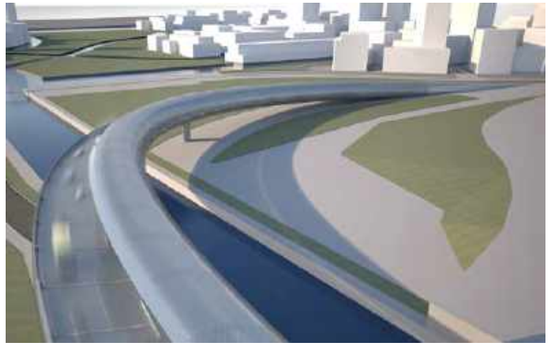
Although described in detail elsewhere in the document, it is worthwhile noting that a gently undulating topography will be introduced into the currently flat green park and this will be achieved using spoil material from the tunnel excavation – thus serving to further reduce the environmental impact of hauling spoil to a remote disposal site.

A NEW DON RIVER BRIDGE



The new Don River Bridge will be a modern landmark for the city, gracefully arcing from the Gardiner Tunnel to the Don Valley Parkway. The bridge is formed by a wing-shaped cross-section, providing structural rigidity while sheltering cars from prevailing northwest winds.

Open to the south and east, the bridge will offer views to Lake Ontario and to the city skyline. Plants may cover the wire-mesh screen above the roadway. The new landmark will provide adequate clearance over the CN rail lines and meet the north-bound DVP before the Richmond Street overpass.



THE SMART BOULEVARD

1. Restructured Railway Embankment

The railway embankment will be restructured using crushed concrete from the existing structures, backfilled with spoil from the tunnel excavation. It will be planted with evergreen trees to provide a visual barrier against the railway and also to assist in the management of Stormwater flows through infiltration.for the air intakes to the building. In this way the road and buildings work harmoniously to serve each other in reducing the overall energy demands of the district and therefore reducing carbon dioxide emissions resulting from power generation.

2. Cycle Path

The network of cycle pathways is described later; however, the pavement will be asphalt concrete manufactured from material reclaimed from the surfaces of the Gardiner and the Boulevard, combined with shredded tyres. The base course will manufactured using snow free technology – an asphalt mixture that has additional graphite added and contains embedded heating elements (resistors) to keep the pavement useable all year round. The energy used for these heating elements will be offset by energy produced using photovoltaics during the sunnier seasons. Lighting will be responsive solar powered LED lighting and the cycle path markings will be solar powered LED studs.

3. Ground Source Heat Pumps

Ground Source Heat Pumps are commonly used throughout Toronto and Canada to reduce the energy demand of heating and cooling. We have adapted this same principal and applied it to the Boulevard and adjacent buildings. In winter, the road will be kept free from ice through using heat that has been rejected from the adjacent building's HVAC systems coupled with ground sourced heat. In summer, the system can be applied in reverse; heat from the buildings being rejected deeper into the ground to mitigate the urban heat island effect as well as using the relatively cool soil to provide precooling for the air intakes to the building. In this way the road and buildings work harmoniously to serve each other in reducing the overall energy demands of the district and therefore reducing carbon dioxide emissions resulting from power generation.

4. The Boulevard

The boulevard will be driveable year round, without the need for expensive and environmentally polluting road salting, through being heated in winter using reject heating from the buildings. The pedestrian and signage lighting as well as lane delineation studs will be energy efficient LED, powered by photovoltaics. The pedestrian areas will be surfaced with permeable paving systems above modular rainwater infiltration chambers below grade. Trees will be selected from a palette of native species and will be planted in insulated containers to ensure that whilst the road adjacent is relatively warm in winter, the soil around the trees remains at a normal temperature to allow a natural spring - fall cycle for the vegetation. The surface of the boulevard will be constructed using crushed concrete (from demolished materials), reclaimed asphalt and will incorporate rubber from shredded tyres and potentially glass cullet.

THE SMART BOULEVARD

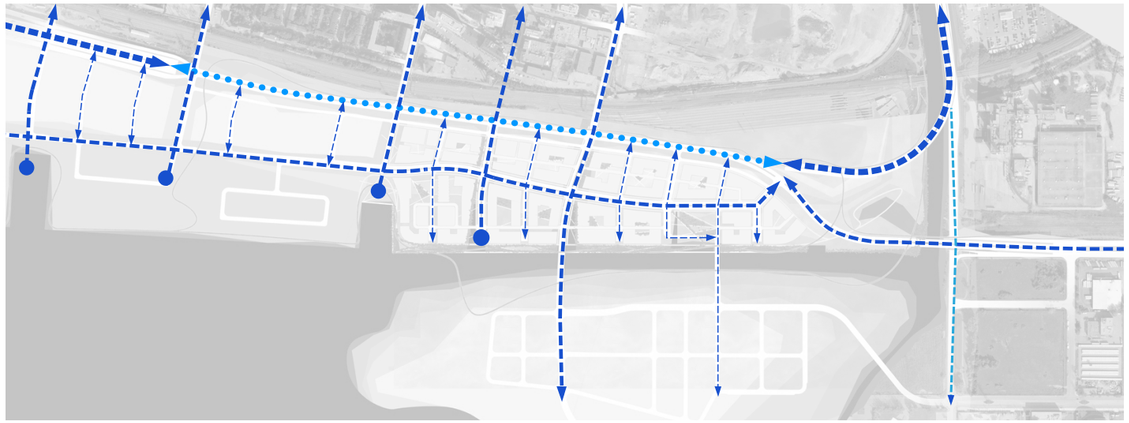
BOULEVARD SECTION-PERSPECTIVE

A new "smart" Lake Shore Boulevard is the technological and transportation foundation of our proposal. What makes it so smart? We have proposed a 45-meter (ROW) boulevard that not only is beautiful and functional but also provides many sustainable attributes, with the resulting combination raising this boulevard to truly new levels of intelligence.

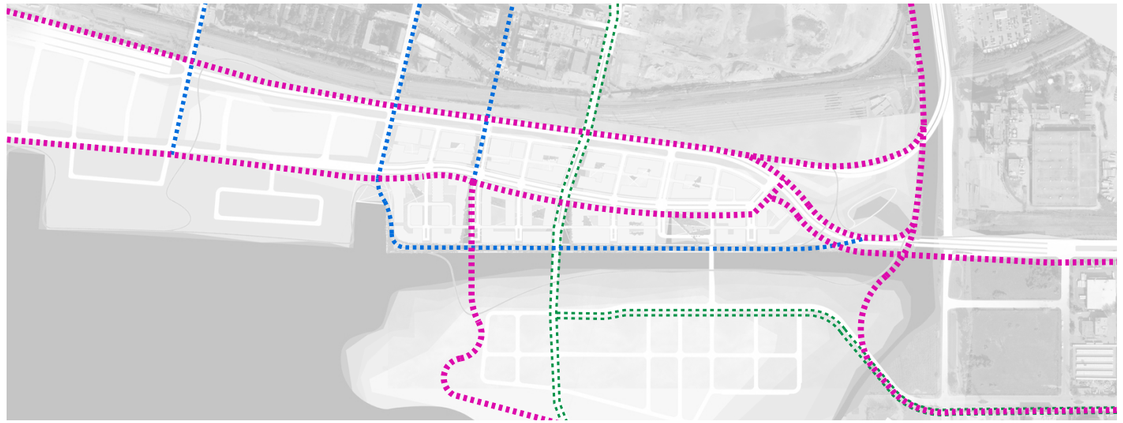
The Tunnel

The tunnel will be built to the greatest extent possible using recycled materials (concrete, asphalt etc.). As much as possible of the tunnel will be pre-cast to allow for the use of supplementary cementitious materials (such as blast furnace slag or fly ash cement) to reduce the embodied carbon of the built structure. Minimising the amount of excavation spoil is a priority, as the haulage, and treatment, in case of contamination, is both expensive and has an environmental impact. Opportunities to reduce this impact include re-use of spoil to build up the embankment, minimising the cross-sectional area of the tunnel and minimizing the depth below grade . The tunnel will be illuminated through a combination of light tubes (punched through the boulevard above) as well as LED lighting, sensors within the tunnel will ensure that the lighting intensity responds to traffic flows and natural lighting intensity, much in the way that smart lighting sensors work in offices. Ventilation will be driven by the air movement of traffic, carbon monoxide sensors will control mechanical ventilation systems so that energy consumption is minimized.

PRECINCT TRANSPORTATION



AUTOMOBIILE

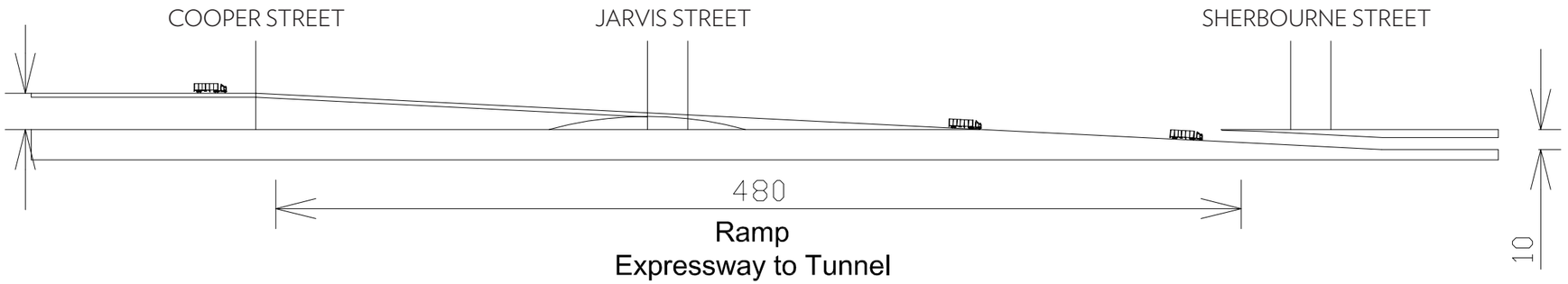


HISTORIC WALK

HISTORIC/ART WALK

TRANSIT

- HERITAGE PATH
- ARTS PATH
- MAIN ROAD SYSTEM
- SECONDARY ROAD SYSTEM
- TUNNEL
- PRIMARY REGIONAL BICYCLE TRAIL
- SECONDARY BICYCLE TRAIL
- COMMUTER BICYCLE TRAIL
- TRANSIT SYSTEM



PRECINCT TRANSPORTATION

The Precinct will be served by a comprehensive system of transportation routes and opportunities, including bike, car, bus, streetcar, light-rail, and pedestrian provisions. The compact network of streets provides a matrix on which many modes can operate and not conflict. For instance, bike lanes may be more suitable for smaller streets rather than larger streets, and can be positioned to not conflict with heavy automobile usage. Public transit will be primarily directed to the two east-west boulevards, where proper provisions can be made for their operation. We have positioned the new Queen's Landing Park as a major transit hub for the Precinct.

Highlights Include:

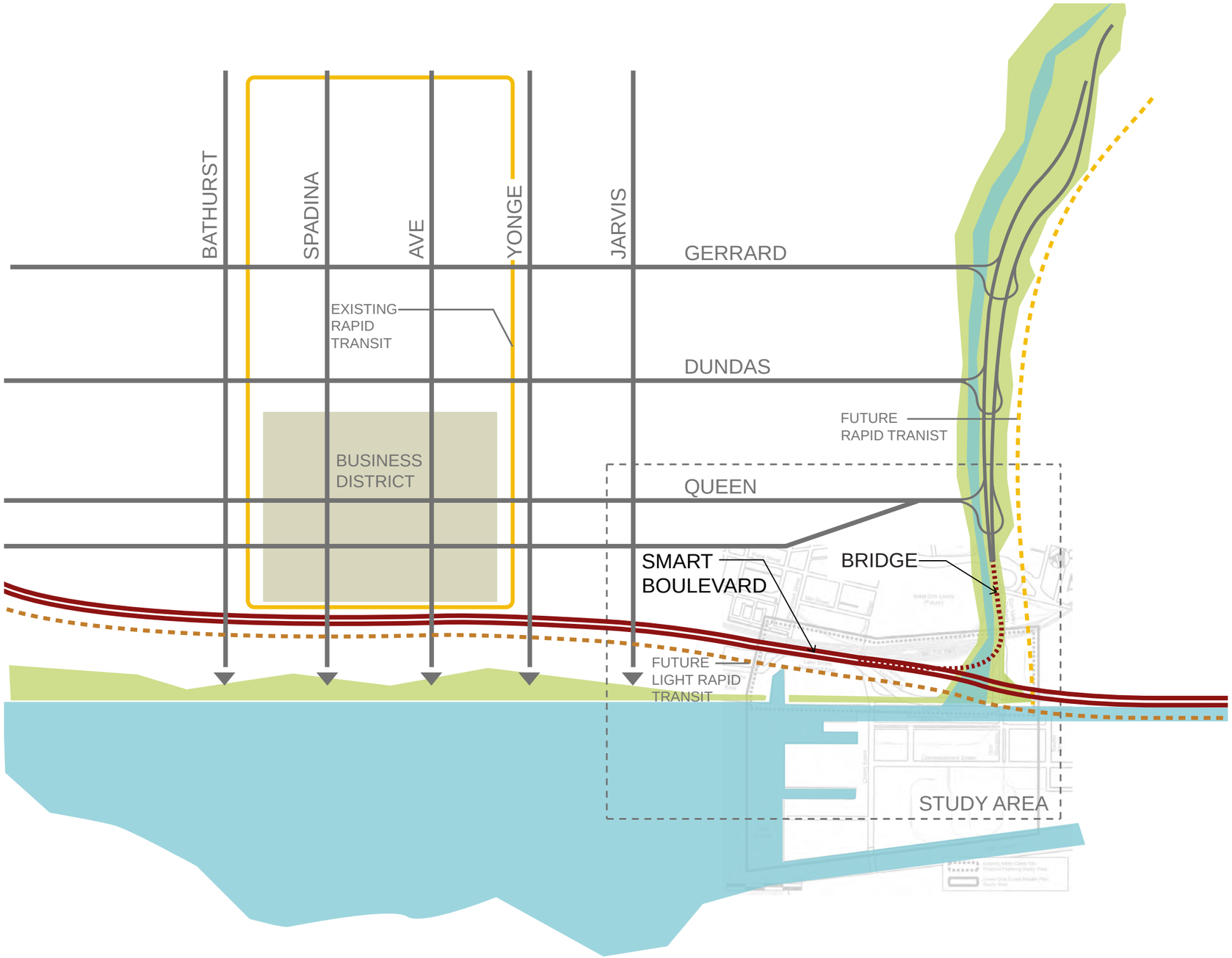
- No development parcel is more than 150 meters from planned transit routes.
- The entire district will be within a 5 minute walk of transit stations.
- Queens Quay light-rail can be extended to the new Queen's Landing Park, and beyond if desired.
- Lake Shore Boulevard has been designed to accommodate light rail or bus rapid-transit.
- Service access will be provided through a system of alleys, bisecting all blocks.

CITY TRANSPORTATION

The evolution of the Gardiner Expressway into the Gardiner Tunnel may have implications for city-wide transportation, though we have designed the system to carry the same number of lanes as currently serve the Don Valley Parkway. Regardless, as part of the "Smart Boulevard" concept we expect that certain technologies can be included in the project that will provide real-time information about traffic movements in other parts of the city. This self-correcting system of traffic management may provide Toronto with a more efficient utilization of their transportation infrastructure.

- For south- and west-bound traffic approaching the city, real-time information systems should provide updates on Don Valley Parkway traffic loads.
- Alternate routes from the DVP to the downtown core should be optimized.
- Mass-transit should continue to be enhanced and expanded. As the waterfront continues to evolve, transit routes will be more significant in a regional transportation plan.
- Connect neighborhoods, such as the Beaches, with supplemental transit alternatives such as water-taxis.

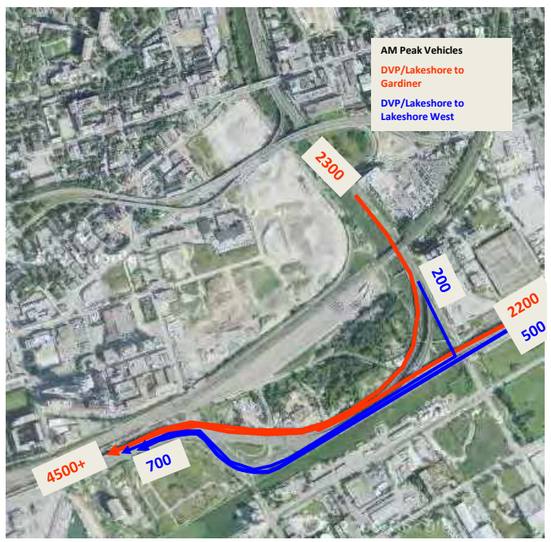
WATERFRONT TRANSPORTATION



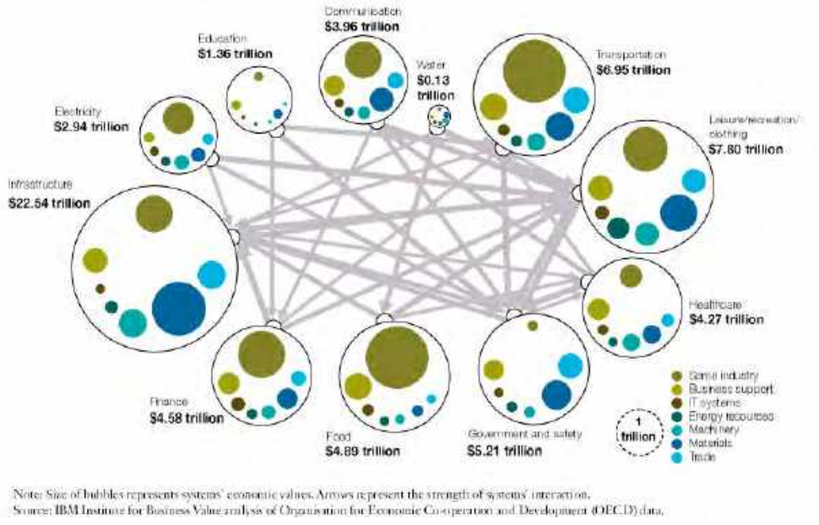
Consistent with the goals of Waterfront Toronto, we envision the precedents established with the new Lake Shore Boulevard to serve as models for future road and transit changes throughout the waterfront.

As the eastern-most precinct of the waterfront, Keating Channel Precinct serves as both the terminus and beginning point for waterfront transit. This will include the Queen's Quay light rail/tram system, bus routes and bikeways. It may also include future water taxi routes or other emerging concepts.

The key connective elements of the waterfront are the two boulevards running east-west, and as such they must be designed for flexibility and evolution in themselves. We believe we have illustrated a prototype for this flexible street design.



SMART GRID



Note: Size of bubbles represents systems' economic values. Arrows represent the strength of systems' interaction.
Source: IBM Institute for Business Value analysis of Organisation for Economic Co-operation and Development (OECD) data.

COMPLEX INTERCONNECTED AND DEPENDENT SYSTEM OF SYSTEMS

INFUSION OF INTELLIGENCE INTO THE WAY THE WORLD WORKS

...IT CREATES NEW OPPORTUNITIES ACROSS INDUSTRIES AND COUNTRIES

...OUR PLANET IS BECOMING SMARTER

THE SMART PRINCIPLE - ACCUMULATING REAL WORLD DATA CONTAINS VALUABLE INFORMATION ABOUT PATTERNS OF BEHAVIOR

Toll collection only- disconnected operational data

Transaction data from the management of payments

Little automated use is made of real-time traffic data

More granular charging by location

Analysis of traffic patterns to manage city congestion

Modeling traffic to predict and manage entire system

Dynamic and congestion-based pricing

Route planning and advice, shippers, concrete haulers, limo companies, theaters, taxis, etc.

City-wide, dynamic traffic optimization

SMART GRID

To improve roadway performance, experience and safety an intelligent roadway strategy is proposed. The strategy is based upon bidirectional sensing, traffic behavior prediction and optimization, safety management and other systems to improve the holistic performance of the roadway. The intelligent roadway achieves this through a ubiquitous network of wireless and wired sensors, cameras and feedback systems such as electronic signs and on-board vehicle communication technologies.

The intelligent roadway system extends beyond the motive infrastructure network, actively engaging the neighboring developments that take advantage of the roadway. Pricing signals can be sent to encourage commuters to take alternative forms of transportation to work and school, emergency response can be better coordinated and district scale low carbon energy solutions such as geothermal heat exchange and photovoltaic power can be intelligently managed. The definition of a smart roadway extends to the construction and operation management of the roadway as well. Computer based infrastructure lifecycle management tools can enable lower cost and environmental impact from operations, procurement and deconstruction at the end of life.

- HYDROLOGICAL & GROUNDWATER MODELING
- FLASH FLOOD FORECAST
- CATCHMENT ESTIMATION
- TRANSPORT OF SUBSTANCES (POLLUTANTS, ETC)
- LAND USE (WATERSHEDS, VEG RESTORATION)
- WATER MANAGEMENT, RESOURCE ALLOCATION OPTIMIZATION, PLANNING, ETC

MOBILITY SERVICES
- REDUCE TRAFFIC AND POLLUTION
- RETAIN AND ATTRACT TALENT
- CUT FACILITY COSTS/IMPACT

INTELLIGENT TRANSPORTATION SYSTEMS
- REDUCE TRAFFIC CONGESTION
- REDUCE CO_2 EMISSIONS
- INCREASE MASS TRANSIT USAGE
- IMPROVE ENVIRONMENT
- STOCKHOLM CASE STUDY: REDUCED TRAFFIC CONGESTION 25%, CARBON EMISSIONS 15%

INTELLIGENT UTILITY NETWORKS
- REDUCE ENERGY USAGE
- IMPROVE GRID MANAGEMENT, REDUCE OUTAGES
- U.S. CASE STUDY: 10% ENERGY USE REDUCTION, UP TO 50% REDUCED LOAD ON ELECTRIC GRID

ADVANCED WATER MANAGEMENT
- FLOOD AVOIDANCE
- REDUCE WATER USAGE
- IBM CASE STUDY: 27% REDUCED WATER USAGE, WITH 30% INCREASE IN MANUFACTURING OUTPUT, SAVING IN ENERGY AND WATER COST

SUSTAINABLE BUSINESS SOLUTIONS & SERVICES
- STRATEGY
- CORPORATE SOCIAL RESPONSIBILITY
- GREEN SIGMA TM
- BUSINESS OPERATIONS/SUPPLY CHAIN - SNOW
- SMARTER CITIES
- SMARTER BUILDINGS
- CAP AND TRADE SYSTEMS

ALTERNATIVE ENERGY RESEARCH
- IBM KNOW-HOW IN THIN FILMS, SEMICONDUCTORS, ADVANCED PHOTOVOLTAIC MATERIALS, APPLYING IT COOLING TECHNOLOGIES TO CONCENTRATOR PHOTOVOLTAICS, IT TO ET, NANOMEMBRANES FOR DESALINATION, ENERGY STORAGE, ETC.

APPLYING IBM GREEN INNOVATIONS (IBM.COM/GREEN)

	TRADITIONALIST	BOOMER	GEN X	GAMING GEN
TRAINING	The Hard Way	Too Much and I'll Leave	Required to Keep Me	Continuous and Expected
LEARNING STYLE	Classroom	Facilitated	Independent	Collaborative and Networked
COMMUNICATION STYLE	Top Down	Guarded	Hub and Spoke	Collaborative
PROBLEM-SOLVING	Hierarchical	Horizontal	Independent	Collaborative
DECISION-MAKING	Seeks Approval	Team Informed	Team Includes	Team Decides
LEADERSHIP STYLE	Command and Control	Get out of the Way	Coach	Partner
FEEDBACK	No News is Good News	Once Per Year	Weekly/Daily	On Demand
TECHNOLOGY USE	Uncomfortable	Unsure	Unable to Work Without It	Unfathomable if Not Provided
JOB CHANGING	Unwise	Sets Me Back	Necessary	Part of My Daily Routine

CHANGING DEMOGRAPHICS

THE RESTORATIVE POWER OF LANDSCAPE: REBUILDING WATERFRONT ACCESS, TRANSFORMING STREETS, AND CREATING AN URBAN OPEN SPACE NETWORK FOR THE PEOPLE OF TORONTO.

LANDSCAPE AND WATER

LANDSCAPE AND WATER

The landscape treatment of the project area derives inspiration from the flow of vegetation, traffic and water through the space. Each zone of the project will incorporate multi-use spaces that provide regenerative functions.

The Boulevard, located over the Gardiner Expressway Tunnel, will make a powerful statement of commitment to urban forestry. A robust landscape berm on the northern edge of the boulevard will provide screening of the railroad and focus the neighborhood toward the water.

North-South **Green Streets** reconnect the West Don Lands Precinct to the Keating Channel Precinct and the water's edge. These wide "green fingers" will provide public amenity space while conveying and filtering stormwater.

The Waterfront of the Keating Channel will be significantly transformed by removing the elevated expressway, creating opportunities for a new experience of the waterfront.

LANDSCAPE AND WATER

The nexus of the Don River and the Keating Channel provides an opportunity for a major piece of public space influenced by the **Don River Ecosystem** and also an exciting gateway experience for users of the expressway.

The new Keating Channel District, Lake Shore Boulevard and proposed Gardiner Tunnel together will define a new future for the east end of the Toronto waterfront. Our design extends and strengthens the tremendous work that has been completed in the Don Lands and establishes a distinct vision for this unique precinct.

Planning for the growth of any city is ultimately about the people that will reside, visit, shop and work in the new district. It is their quality of life that should be at the forefront of all decisions. Infrastructure exists to serve their needs, rather than the inverse. We have kept these principles in mind as we have prepared our proposal. Thus, our first design principle is to ensure the flow of people to, within and from the Keating Channel District and the waterfront. All decisions have been made to this end.

PRIMARY LANDSCAPE ELEMENTS

1 West Lake Shore Boulevard
2 Boulevard Bikeway (“The Berm”)
3 North Green Streets
4 South Green Streets
5 Secondary Green Streets
6 Queen’s Quay Boulevard
7 Parliament Slip Park
8 School Park
9 Green Fingers
10 Queen’s Landing Park
11 Waterfront Park
12 Don River Mouth Park
13 Don River Greenway
14 East Lake Shore Boulevard

THE BOULEVARD

The "Smart Boulevard" will extend eastward from Sherbourne Street and will be constructed at grade on top of the proposed expressway tunnel. East of the tunnel it will curve southward, on grade, towards the Lake Shore Boulevard Bridge, connecting to the Port Lands District.

The boulevard plantings will incorporate a unique urban forestry approach: Fast growing trees will be planted between slower-growing trees to provide rapid tree canopy cover. As the slow growing trees reach maturity the fast growing trees will be harvested, allowing the longer-lived trees to thrive. (See diagram)

Construction of a landscaped berm at the North edge of the Boulevard will utilize excavated materials from the tunnel to expand the shoulder of the adjacent railroad right-of-way. The vertical South face of the berm will incorporate three treatments including terraces, climbing vines, and illuminated photovoltaic canopies linked to the IBM Smart Grid. The crest of the berm will be planted with evergreen trees to screen the railroad and rail yard.

Concept

- The Boulevard will be the most distinctive Street in Toronto.
- It will serve as a prototype for an urban forestry concept for the rest of the Gardiner expressway.
- The urban forestry palette includes varieties of "fast" and "slow" growing native trees to introduce diversity and shade canopy.
- The berm will screen the railroad to the North.
- Elements of the berm will interact with the IBM Smart Grid to interpret traffic flow conditions.

Acer rubrum /
Red Maple

Liriodendron tulipifera/
Tuliptree

Platanus acerifolia/
London Plane Tree

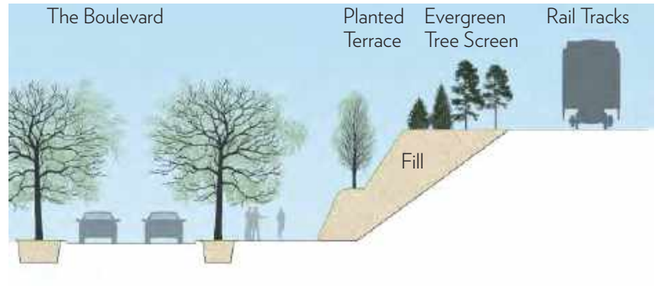
'FAST' GROWING TREES

Gymnocladus dioicus /
Kentucky Coffee Tree

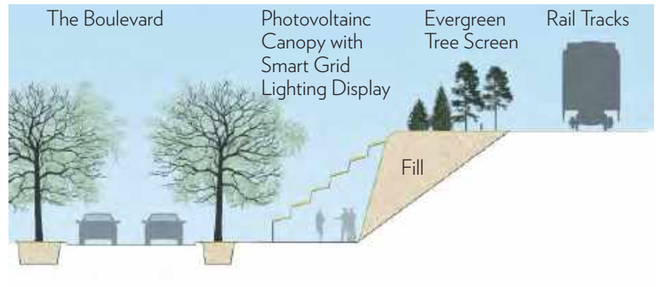
Tilia americana/
American Linden

Quercus macrocarpa /
Burr Oak

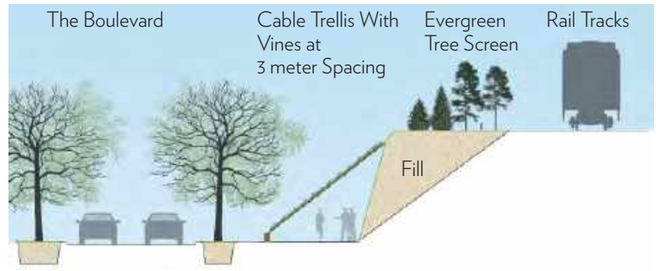
'SLOW' GROWING TREES



TERRACED BERMTREATMENT



BERM WITH PHOTOVOLTAIC CANOPY

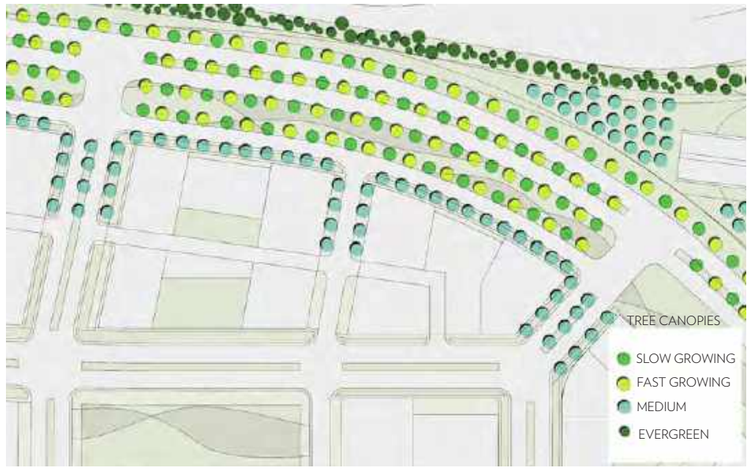


BERM WITH VINES ON CABLETRELLIS

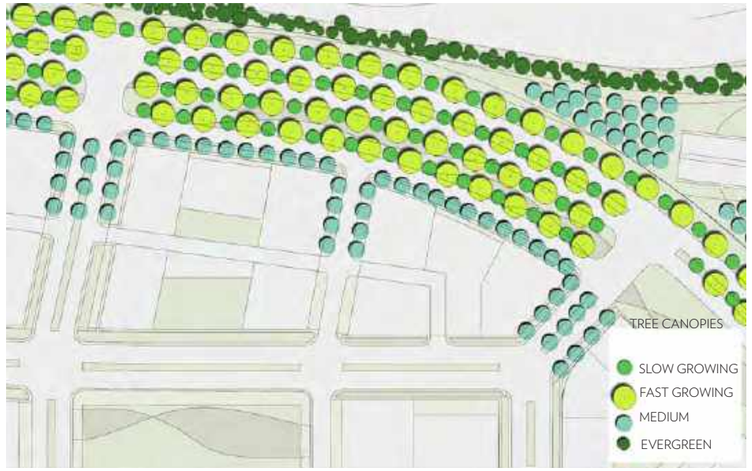
RAIL EMANKMENT BERM TREATMENTS

THE BOULEVARD

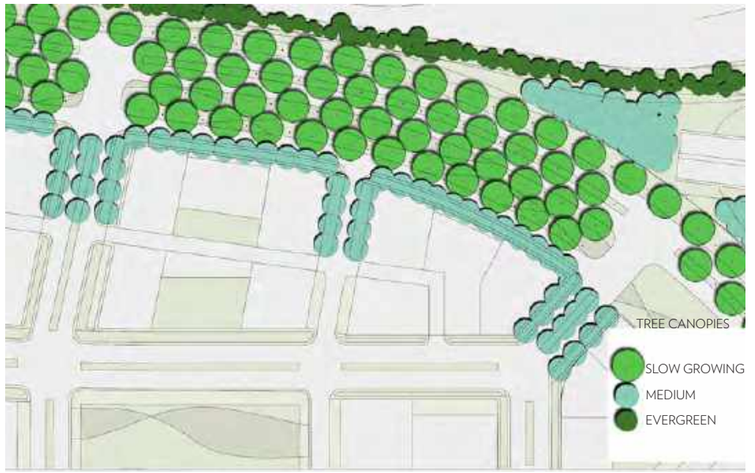
5 YEARS



15 YEARS



30 YEARS



SMART BOULEVARD URBAN FORESTRY STRATEGY

GREEN STREETS

Sherbourne Street, Parliament Street, Trinity Street, Cherry Street and Lawrence Street will become "Green Streets" that improve North-South connectivity and access to the water.

Generous setbacks will allow sufficient space for these green fingers to fulfil the important the functions of conveying, filtering and infiltrating stormwater as well as providing public space in the street environment. Green spaces will incorporate Best Management Practices for stormwater management—including permeable pavements, vegetated swales, flow-through planters and infiltration planters. Ample root zone soil volume will be provided to ensure street trees will develop large canopies.

Concept:

- Utilize the North-South neighborhood streets as green linear open space linking communities to the waterfront.
- The open spaces provide a stormwater function and reduce infrastructure costs.
- Green Streets will create a higher real estate values for North-South street addresses.

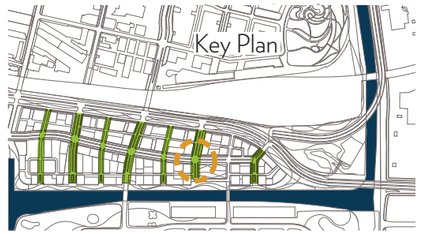
RUSH HOSPITAL, CHICAGO

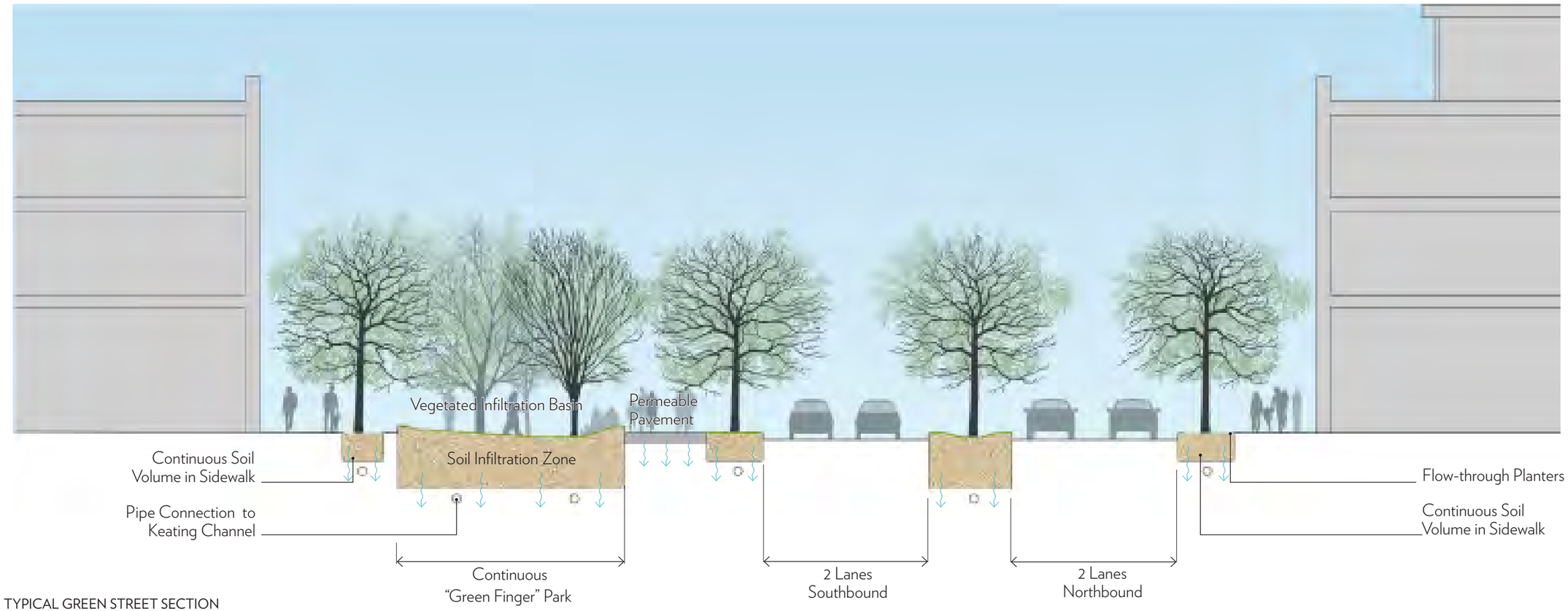
SEATTLE CIVIC CENTER

OREGON STREETSCAPE

12TH AVE GREEN STREET, SEATTLE WA

GREEN STREETS





TYPICAL GREEN STREET SECTION

DON RIVER ECOSYSTEM

The Don River Valley Parkway Landscape (see photo) is the inspiration for this significant "elbow" of open space at the confluence of the Don River and Keating Channel.

As well as proving recreational space with access to the shoreline and Don River, the park will form a natural visual terminus to the Smart Boulevard. It will also provide a rich experience for drivers entering and exiting the expressway tunnel and iconic Don River bridge.

Concept

- Drivers traveling east will exit the tunnel surrounded by a wooded prospect landscape and rise above the tree canopy on the bridge.
- After crossing the Don River bridge, drivers traveling west will glimpse a treetops of forested foreground screening the Sediment and Debris facility.
- Bike trails going north along the Don River will be re-aligned west around the tunnel ramp. To the south trails connect via Green Streets to the waterfront of the Keating Channel
- Plantings will be native to Southern Ontario with a diversity of deciduous trees for fall color, and some conifers for year round interest and permanent screening.
- The area of the park within the floodplain will be planted with native wetland and marginal plants in zones adapted to different flood levels and flooding frequencies. The result is a series of wetlands and food meadows.

EXISTING DON VALLEY PARKWAY

HONG KONG WETLAND PARK, JAPAN

KEATING CHANNEL PLAN PRECINCT PLAN
("Keating Channel Urban Design Guidelines" , 2009 Michael van Vaulkenburg Associates Inc, pg 77)

DON RIVER ECOSYSTEM

0 50 100 150 200 N

METERS

THE WATERFRONT

The absence of the massive structure on the top of the channel wall will create new opportunities for use and experience of the Keating Channel waterfront and would extend Toronto's waterfront potential the complete length of the Keating Channel all the way east to the Don River.

This dramatic change allows the addition of regenerative green features to the previous design for the Keating Channel Waterfront: Open rows of trees will mirror the waterfront planned at East Bay Front Precinct. Waterfront park space will visually connect to the Don River Flood Plain green open space by the introduction of infiltration strips of wetland, woodland and permeable pavement.

The waterfront space will merge into the "Green Street" North-South "fingers" at the terminus of each street.

Concept

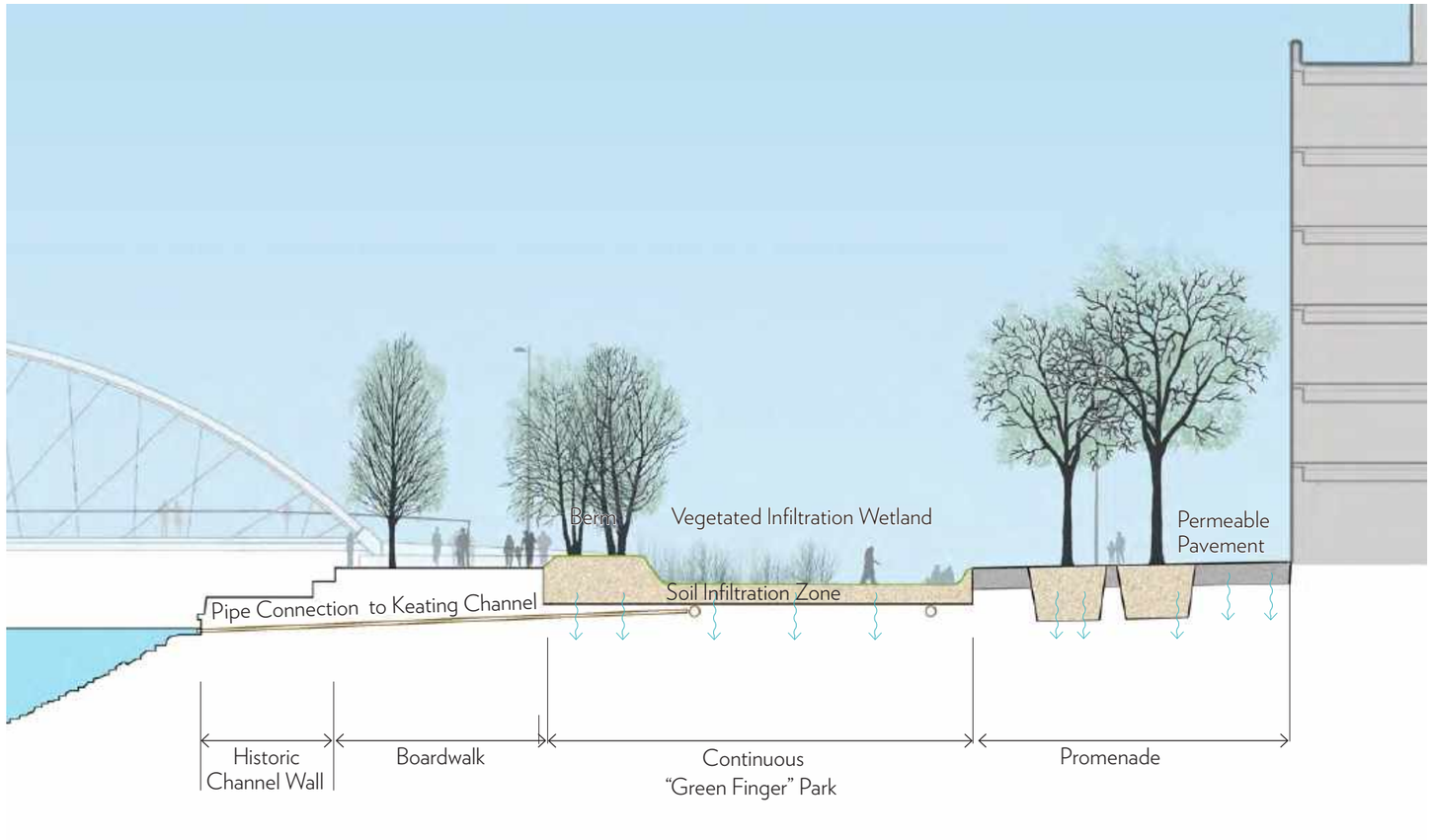
- Create generous public waterfront open space
- Echo native vegetation of the Don River ecosystem in the design of functional stormwater infiltration zones.
- Connect to flood plain open space at the confluence of the Keating Channel and Don River.

OIYMPIC SCULPTURE PARK, SEATTLE

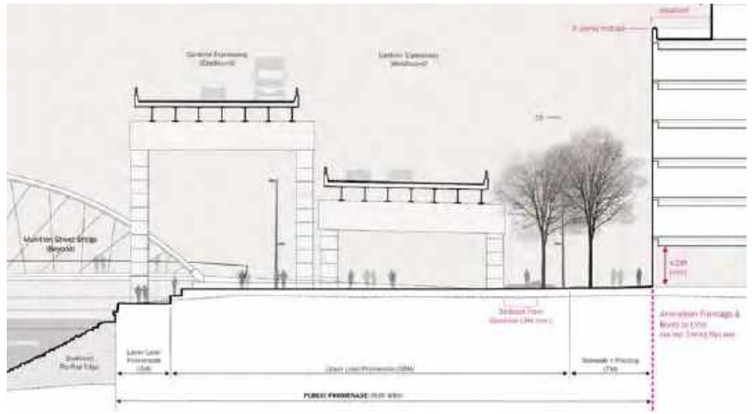
WAITANGI PARK, WELLINGTON, NEW ZEALAND

TIANJIN QIAOYUAN PARK, CHINA

TRINITY STREET
("Keating Channel Urban Design Guidelines" , 2009 Michael van Vaulkenburg Associates Inc, pg 77)



PROPOSED WATERFRONT EDGE



KEATING CHANNEL PROMENADE AND GARDINER COLONNADE
("Keating Channel Urban Design Guidelines" , 2009 Michael van Vaulkenburg Associates Inc, pg 77)

THE DEVELOPMENT CHARACTER OF THE KEATING CHANNEL PRECINCT IS PREDICATED ON WALKABILITY, APPROPRIATELY-SCALED INFRASTRUCTURE, AND A RICH MIX OF LAND USES.

DEVELOPMENT

DEVELOPMENT

DEVELOPMENT

The development character of the project will be one of variety at the street-level, enhanced with elegant consistency in the architecture. We recommend the development of simple, yet focused design guidelines to control the materials, massing and fundamental urban principles of the plan.

- Queens Quay should have a strong street-wall, and be positioned as a “main street”
- Larger floor-plate buildings should be located along Lake Shore Boulevard.
- Place tallest buildings around Queen’s Landing Park to maximize value of that investment.
- Given the 30% increase in land area many opportunities exist for land utilization.

DEVELOPMENT CHARACTER

The development character of the Keating Channel Precinct, as with all successful urban districts, is predicated on walkability, appropriately scaled infrastructure, and rich mix of land uses.

A modern and innovative design standard can be established that is consistent with the classic principles of great urbanism: holding street edges, a consistent materials palette, front doors on primary street, and service through alleys behind buildings. Toronto must be the beneficiary of a stable implementation of development of the highest character.

DEVELOPMENT CHARACTER

EXISTING CONDITIONS

CURRENT PLAN

PROPOSED PLAN

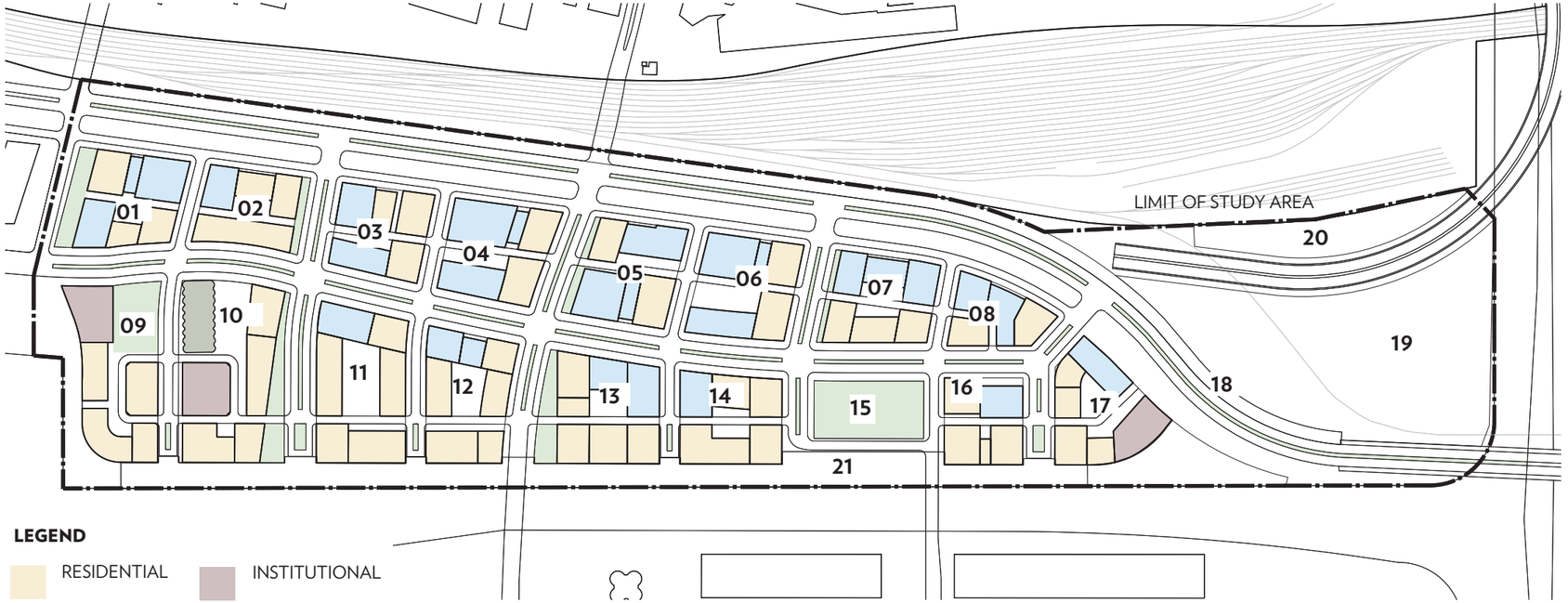
CURRENT PLAN

PROPOSED PLAN

CURRENT PLAN

PROPOSED PLAN

LAND USE

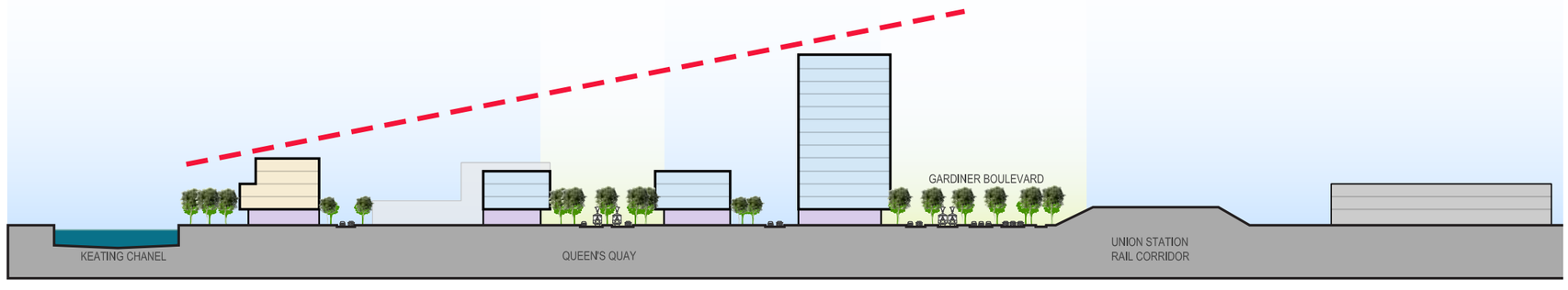


BATTERY PARK CITY

The land uses within the Keating Channel District are planned to ensure variety and flexibility as the project is implemented. We propose mixed-use blocks throughout the project. Mixed-use buildings may be appropriate in some areas. Our core land use distribution consists of approximately 25% office, 50% residential, 15% retail, and 10% civic and institutional. These uses have been distributed so that office and employment is primarily between Queens Quay and Lake Shore Boulevard, giving access to transit. Residential development will be placed throughout the Precinct, with a heavy emphasis on waterfront sites and water views.

- Queen's Quay will form the primary retail streets, though some retail will be support from pedestrian movement along north-south streets.
- Restaurant and entertainment uses will be focused around Queen's Landing Park, providing an entertainment nexus.
- Business addresses will be primarily along Lake Shore Boulevard.

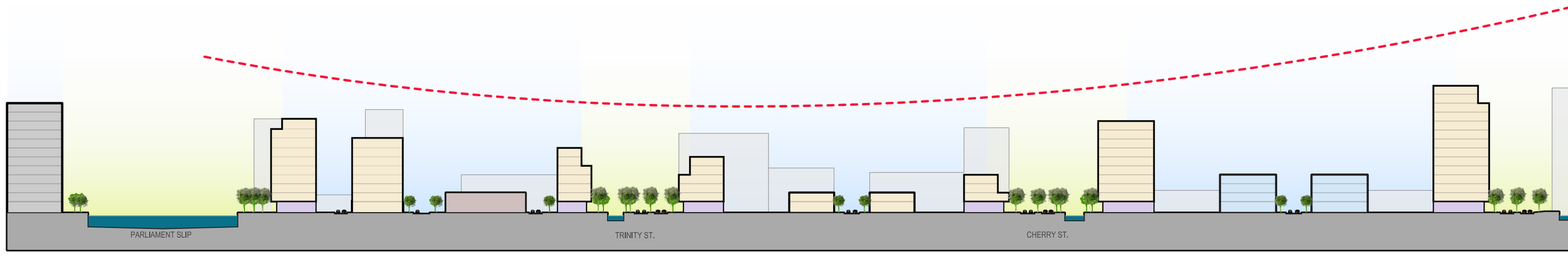
MASSING CONCEPTS



TYPICAL NORTH/SOUTH SECTION, LOOKING WEST

Additional massing concepts include:

- Queens Quay should be strongly reinforced with a consistent streetwall.
- Some building setbacks may be appropriate to provide variety and create more intimate spaces along streets.
- Building heights will be lowest at the water's edge and increase in height towards Lake Shore Boulevard.
- North-South Streets will have taller buildings, emphasizing these important corridors.



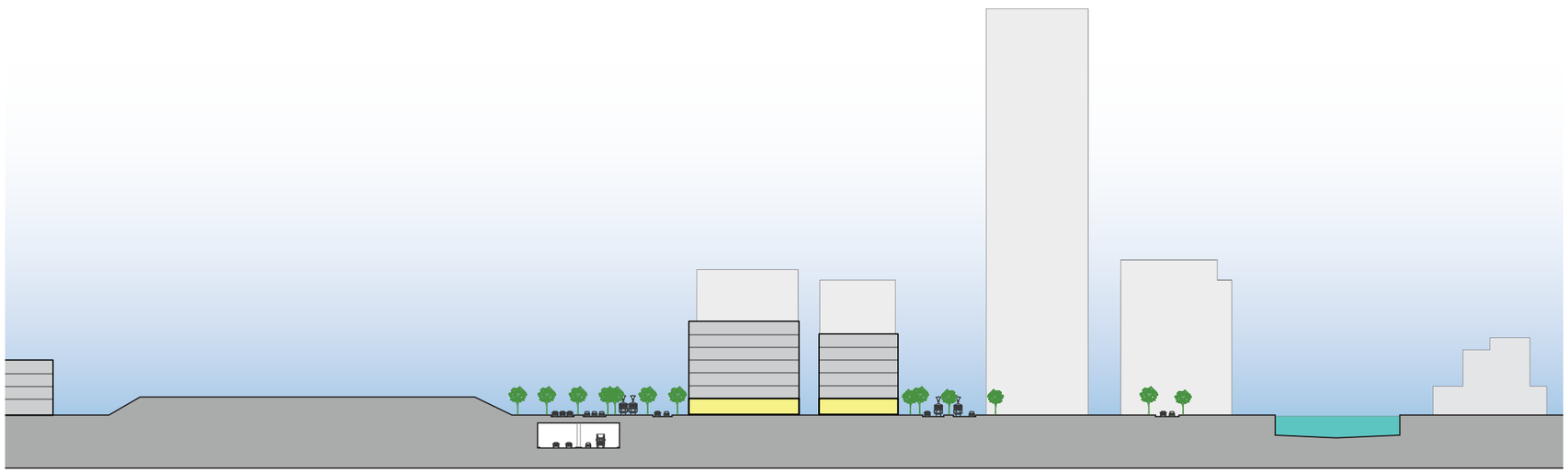
EAST/WEST SECTION

MASSING CONCEPTS

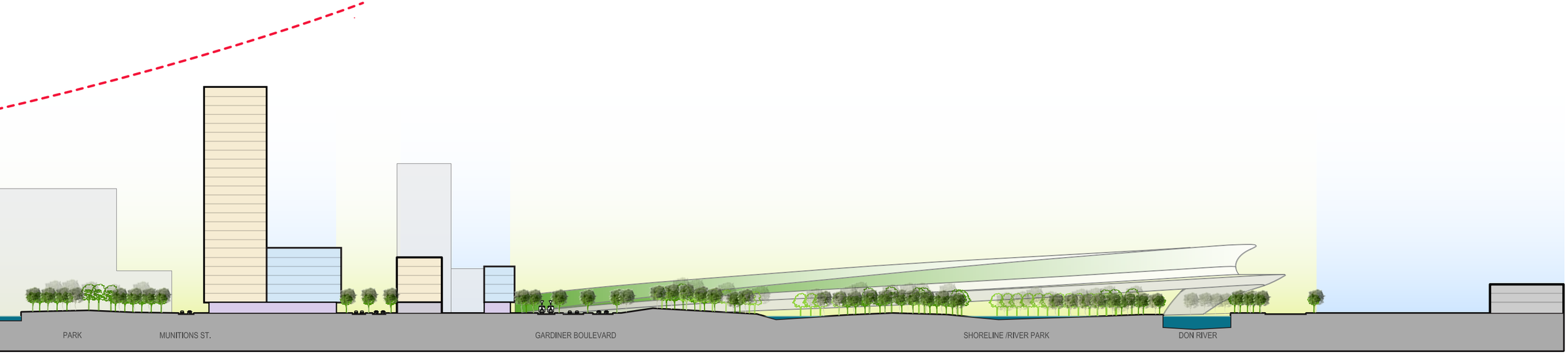
Water views and water frontage have been carefully considered, as they will generate higher land values and greater chance of timely implementation. Therefore, our proposal for the massing of buildings within the Precinct consists of several key principles:

- Place lower buildings closer to the water, and increase height as buildings move away from the water.

- Tallest buildings should be along Lake Shore Boulevard, where they can maintain water views and have access to transit.



TYPICAL NORTH/SOUTH SECTION, LOOKING EAST THROUGH QUEEN'S LANDING PARK



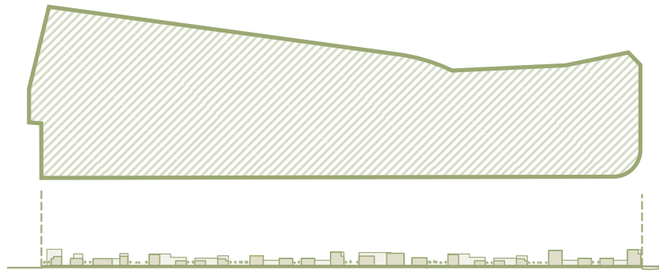
ECONOMIC SUMMARY

LOCATION PLAN OF STUDY AREA

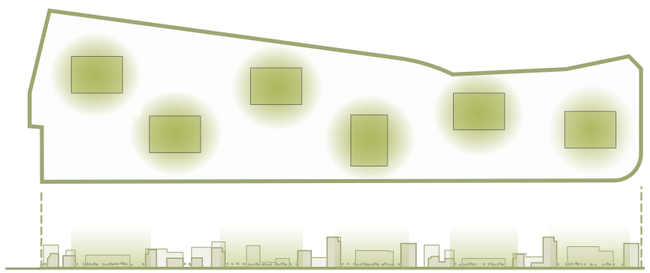
BASE SCHEME:
INCREASED DEVELOPMENT SITES BY 30 %

30% INCREASE IN DEVELOPMENT SITES SHOWN IN GREEN TONE

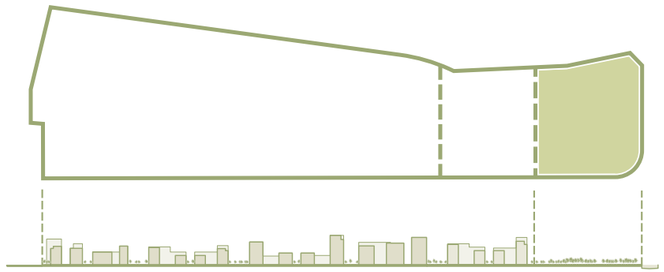
BASE SCHEME



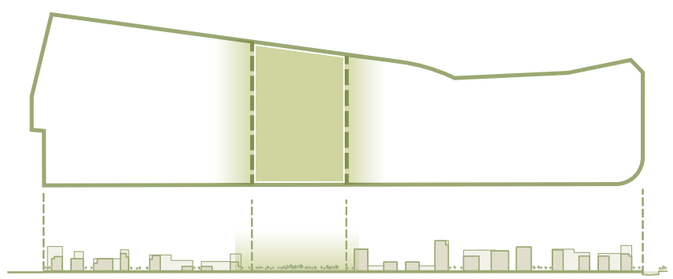
A.1 MAINTAINS BASE GFA, LOWER BASE DENSITY



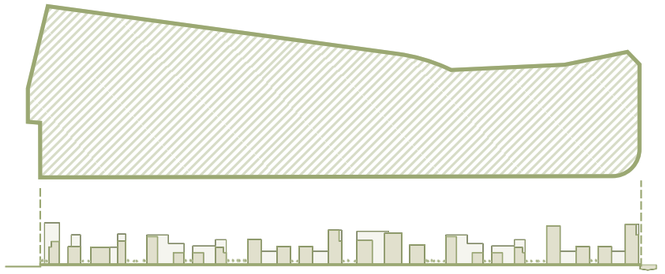
A.2 MAINTAINS BASE GFA, INCREASES OPEN SPACE, INCREAS-ES PARCEL VALUE



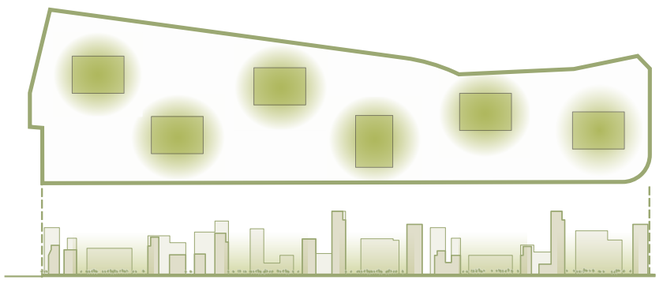
B.1 INCREASES BASE GFA BY 15%, MAINTAINS BASE DENSITY



B.2 INCREASES BASE GFA BY 15%, INCREASES OPEN SPACE, INCREASES PARCEL VALUE



C.1 INCREASES BASE GFA BY 30%, INCREASED DENSITY



C.2 INCREASES BASE GFA BY 30%, INCREASES OPEN SPACE, INCREASES PARCEL VALUE

In addition to creating a practical solution to the replacement of the Gardiner Expressway, the design proposal substantially increases the land value of parcels in the immediate area, primarily located within the Keating Channel Precinct. This is achieved without deviating from the vision that has already been established in the Keating Channel Precinct Plan- we believe our design proposal further advances its principles.

By eliminating the Gardiner Expressway and relocating Lake Shore Boulevard, the design proposal achieves a number of financial benefits. Of primary importance, approximately 30% more developable land is created within the precinct with the proposed AS+GG design. Most of this additional land is on public property and thus directly contributes to Toronto's revenue stream as parcels are sold. Additionally, the reorganization of these thoroughfares enables a contiguous district that is not bisected by a large, elevated expressway which generates noise, reduces access to daylight and is a physical and visual obstruction. This results in a substantial improvement to the quality of the public realm, which in turn adds supplementary value to the adjacent parcels. Our research suggests that the qualitative improvements can increase the value of land by an additional 30%.

When combined, the increase in land quantity and quality provides up to approximately 60-70% more value when compared to the plan currently in place. In addition to these benefits, the City can expect an increase to tax revenues on an annual basis due to the increase in land and gross floor area, and qualitative improvements. Over a 25 year period, we estimate that this district could yield significant additional cumulative tax revenues. While more study is needed to determine the precise costs of infrastructure changes and the consequential financial benefits, we believe the revenues from the 30% development increase will significantly contribute to the cost of the proposed tunnel and bridge

Finally, our research also projects that commercial and residential rents, as well as housing sales will increase in the order of 25% - 35% due to qualitative improvements provided in the design proposal. This may also contribute to higher land values.

Due to the size of the project, we expect that it will be phased and constructed over a number of years. The additional land and gross floor area afforded by the design proposal will provide a development cushion and allow future flexibility to adjust the district development as portions come online. In other words, later development phases can respond to actual trends in real estate demand, parking requirements and traffic.

The values provided herein, particularly those related to tax revenues, should be considered preliminary. They are projections based on previous trends and can be influenced by many factors beyond our control.

PHASING

Phasing of the proposed AS+GG plan will need to be carefully considered, as any disruption in traffic movements may present logistical and political challenges. However, we believe any short-term inconveniences will be mitigated by the long-term benefits of the plan. Generally, phasing for the development sites will occur from west to east. A suggested phasing plan may consist of:

PHASE 1: 0-3 Years

Transportation: Develop alternate access routes from Gardiner Expressway to the Don valley Parkway. These may include temporary widening of Lake Shore Boulevard or identification of alternate routes to the north of the Precinct. Begin demolition of Gardiner from Jarvis to DVP.

Development: Clear western sites, initiate construction on appropriate streets.

PHASE 2: 3-6 Years

Transportation: Initiate construction of the Gardiner Tunnel, Lake Shore Boulevard and new Green Bridge. Create alternate route for Lake Shore Boulevard Bridge.

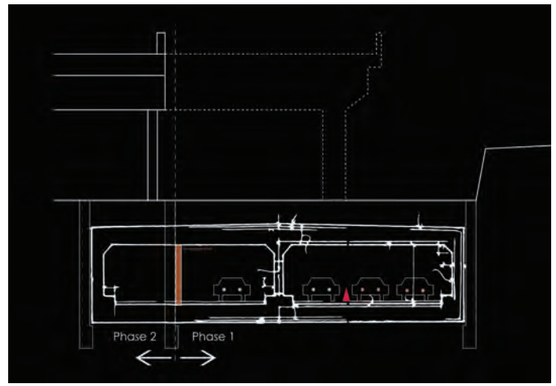
Development: Clear central sites, initiate construction on appropriate streets. Initiate construction on western sites, finish appropriate streets and parks.

INITIAL TECHNICAL PHASING CONCEPTS

PHASE 3: 6-9 Years

Transportation: Finalize construction of the Gardiner Tunnel, Lake Shore Boulevard and new Green Bridge. Re-build Lake Shore Boulevard Bridge.

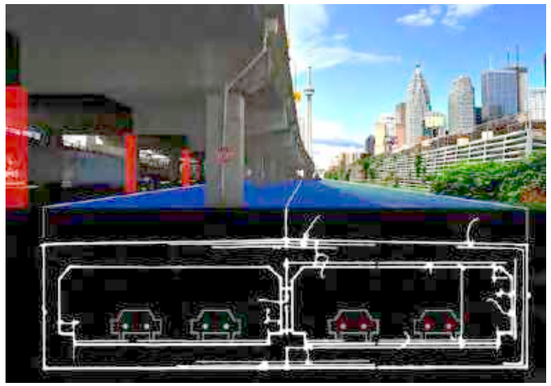
Development: Clear eastern sites, initiate construction on appropriate streets. Initiate construction on central sites, finish appropriate streets and parks. Finalize construction on western sites.



PHASE 4: 9-12 Years

Transportation: Complete transit and light-rail systems, as required.

Development: Initiate construction on eastern sites, finish appropriate streets and parks. Finalize construction on central sites.



INITIAL TECHNICAL PHASING CONCEPTS

Innovative Design Competition
Master Plan Summary Table

TEAM: AS+GG

ALTERNATE 1: 6.6 FAR (SAME GFA)

SUMMARY

A	B	C	D	D.1	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Block Number	**Block Description**	**Block Type**	**Site Area (Hectares)**	**Site Area (meters 2)**	**Maximum Block Height (m)**	**Average Block Height (m)**	**Maximum Building Storeys**	**Total (GFA m^2)**	**Office %**	**Office (GFA m^2)**	**Retail %**	**Retail (GFA m^2)**	**Residential %**	**Residential (GFA m^2)**	**Other %**	**Other (GFA m^2)**	**Phase #**	**District Area (Hectares)**	**Notes**
	District Area																	28	
01	Development Site	Ds	0.64	6,366.68	70	36	22	47,750	35%	16,713	10%	4,775	50%	23,875	5%	2,388	1		
02	Development Site	Ds	0.48	4,769.23	47	30	11	35,769	35%	12,519	10%	3,577	50%	17,885	5%	1,788	1		
03	Development Site	Ds	0.48	4,817.15	47	27	11	36,129	35%	12,645	10%	3,613	50%	18,064	5%	1,806	1		
04	Development Site	Ds	0.58	5,852.41	58	29	18	43,893	35%	15,363	10%	4,389	50%	21,947	5%	2,195	2		
05	Development Site	Ds	0.61	6,080.13	60	28	18	45,601	30%	13,680	15%	6,840	50%	22,800	5%	2,280	2		
06	Development Site	Ds	0.60	5,960.75	40	23	12	44,706	30%	13,412	15%	6,706	45%	20,118	10%	4,471	2		
07	Development Site	Ds	0.57	5,679.17	64	33	20	42,594	30%	12,778	15%	6,389	50%	21,297	5%	2,130	3		
08	Development Site	Ds	0.33	3,337.11	35	31	10	25,028	40%	10,011	10%	2,503	45%	11,263	5%	1,251	3		
09	Development Site	Ds	0.84	8,383.31	40	25	12	50,300	0%	0	5%	2,515	70%	35,210	25%	12,575	1		School located in this block
10	Development Site	Ds	1.16	11,594.00	52	30	16	69,564	0%	0	5%	3,478	70%	48,695	25%	17,391	1		Silos located in this block
11	Development Site	Ds	0.82	8,242.00	35	22	9	41,210	5%	2,061	10%	4,121	75%	30,908	10%	4,121	1		
12	Development Site	Ds	0.65	6,465.00	34	18	8	32,325	15%	4,849	15%	4,849	65%	21,011	5%	1,616	2		
13	Development Site	Ds	0.76	7,657.00	41	19	13	38,285	10%	3,829	15%	5,743	70%	26,800	5%	1,914	2		
14	Development Site	Ds	0.55	5,482.80	55	27	17	27,414	10%	2,741	15%	4,112	65%	17,819	10%	2,741	2		
15	Park	Pa	0.38	3,836.46	0	0	0	0		0		0		0	100%	0	3		Park
16	Development Site	Ds	0.41	4,138.00	100	41	33	37,242	10%	3,724	5%	1,862	80%	29,794	5%	1,862	3		
17	Development Site	Ds	0.60	6,023.00	67	31	21	48,184	15%	7,228	5%	2,409	65%	31,320	15%	7,228	3		
18	Park	Pa	1.03	10,342.00	0	0	0	0		0		0		0	100%	0	3		Park
19	Park	Pa	2.46	24,638.00	0	0	0	0		0		0		0	100%	0	3		Park
20	Park	ls	0.50	5,017.00	0	0	0	0		0		0		0	100%	0	3		Park
21	Park	Pa	1.98	19,726.73	0	0	0	0		0		0		0	100%	0	2		Park
	Street Areas	ST	11.60																
			28.02	164,407.93				665,994		131,552		67,881		398,803		67,757		28.02	
										19.8%		10.2%		60%		10.2%		100.0%	

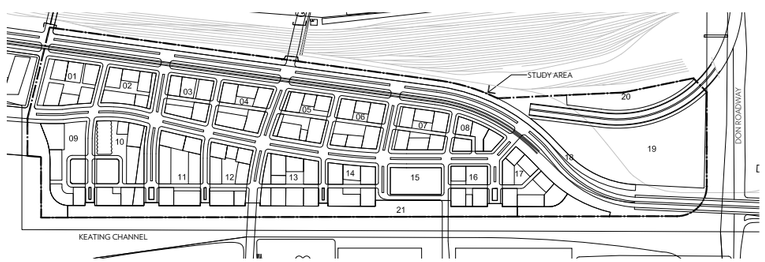
PHASES

A	B
Description	**Phase Number**
West Sub-Precinct	1
Central Sub-Precinct	2
East Sub Precinct	3

MASTER PLAN SUMMARY TABLE

Total GFA	**665,994**	sm	
Study Area	28.02	ha	280,249 sm
Development sites	10.07	ha	100,743 sm
Parks	6.35	ha	
Streets	11.60	ha	
GROSS FAR	**2.4**		(Against total study area)
NET FAR	**6.6**		(Against development blocks only)

Approximate Residential Population
11,964
Approximate Units
3,988



MASTER PLAN KEY MAP

DEVELOPMENT QUANTITIES: OPTION 2

Innovative Design Competition

Master Plan Summary Table **TEAM:** AS+GG

ALTERNATE 2: 7.5 FAR (+15% GFA)

SUMMARY

A	B	C	D	D.1	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Block Number	**Block Description**	**Block Type**	**Site Area (Hectares)**	**Site Area (meters 2)**	**Maximum Block Height (m)**	**Average Block Height (m)**	**Maximum Building Storeys**	**Total (GFA m^2)**	**Office %**	**Office (GFA m^2)**	**Retail %**	**Retail (GFA m^2)**	**Residential %**	**Residential (GFA m^2)**	**Other %**	**Other (GFA m^2)**	**Phase #**	**District Area (Hectares)**	**Notes**
	District Area																	28	
01	Development Site	Ds	0.64	6,366.68	70	36	22	54,117	30%	16,235	10%	5,412	55%	29,764	5%	2,706	1		
02	Development Site	Ds	0.48	4,769.23	47	30	11	38,154	30%	11,446	10%	3,815	55%	20,985	5%	1,908	1		
03	Development Site	Ds	0.48	4,817.15	47	27	11	40,946	30%	12,284	10%	4,095	55%	22,520	5%	2,047	1		
04	Development Site	Ds	0.58	5,852.41	58	29	18	46,819	30%	14,046	10%	4,682	55%	25,751	5%	2,341	2		
05	Development Site	Ds	0.61	6,080.13	60	28	18	51,681	30%	15,504	15%	7,752	50%	25,841	5%	2,584	2		
06	Development Site	Ds	0.60	5,960.75	40	23	12	50,666	30%	15,200	15%	7,600	45%	22,800	10%	5,067	2		
07	Development Site	Ds	0.57	5,679.17	64	33	20	45,433	30%	13,630	15%	6,815	50%	22,717	5%	2,272	3		
08	Development Site	Ds	0.33	3,337.11	35	31	10	26,697	30%	8,009	10%	2,670	55%	14,683	5%	1,335	3		
09	Development Site	Ds	0.84	8,383.31	40	25	12	58,683	0%	0	5%	2,934	70%	41,078	25%	14,671	1		School located in this block
10	Development Site	Ds	1.16	11,594.00	52	30	16	81,158	0%	0	5%	4,058	70%	56,811	25%	20,290	1		Silos located in this block
11	Development Site	Ds	0.82	8,242.00	35	22	9	49,452	10%	4,945	10%	4,945	75%	37,089	10%	4,945	1		
12	Development Site	Ds	0.65	6,465.00	34	18	8	38,790	10%	3,879	15%	5,819	70%	27,153	5%	1,940	2		
13	Development Site	Ds	0.76	7,657.00	41	19	13	45,942	10%	4,594	15%	6,891	70%	32,159	5%	2,297	2		
14	Development Site	Ds	0.55	5,482.80	55	27	17	32,897	10%	3,290	15%	4,935	65%	21,383	10%	3,290	2		
15	Park	Pa	0.38	3,836.46	0	0	0	0		0		0		0	100%	0	3		Park
16	Development Site	Ds	0.41	4,138.00	100	41	33	41,380	10%	4,138	5%	2,069	80%	33,104	5%	2,069	3		
17	Development Site	Ds	0.60	6,023.00	67	31	21	54,207	15%	8,131	5%	2,710	65%	35,235	15%	8,131	3		
18	Park	Pa	1.03	10,342.00	0	0	0	0		0		0		0	100%	0	3		Park
19	Park	Pa	2.46	24,638.00	0	0	0	0		0		0		0	100%	0	3		Park
20	Park	Is	0.50	5,017.00	0	0	0	0		0		0		0	100%	0	3		Park
21	Park	Pa	1.98	19,726.73	0	0	0	0		0		0		0	100%	0	2		Park
	Street Areas	ST	11.60																
			28.02	**164,407.93**				**757,022**		**135,331**		**77,201**		**469,072**		**77,891**		28.02	
										17.9%		**10.2%**		**62%**		**10.3%**		100.3%	

PHASES

A	B
Description	**Phase Number**
West Sub-Precinct	1
Central Sub-Precinct	2
East Sub Precinct	3

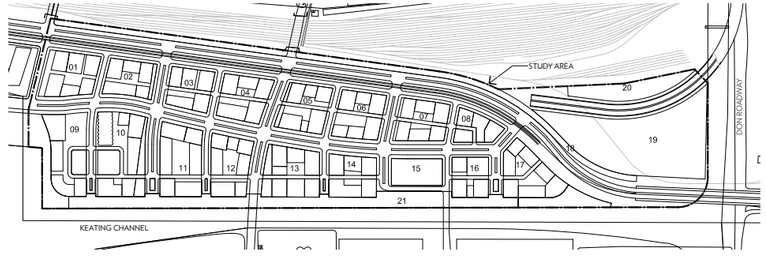
Total GFA	**757,022**	sm	
Study Area	28.02	ha	280,249 sm
Development sites	10.07	ha	100,743 sm
Parks	6.35	ha	
Streets	11.60	ha	
Gross FAR	**2.70**		(Against total study area)
Net FAR	**7.51**		(Against development blocks only)

Approximate Residential Population

14,072

Approximate Units

4,691



MASTER PLAN KEY MAP

ADRIAN SMITH + GORDON GILL ARCHITECTURE

DEVELOPMENT QUANTITIES: OPTION 3

Innovative Design Competition
Master Plan Summary Table

TEAM: AS+GG

ALTERNATE 3: 8.5 FAR (+30% GFA)

SUMMARY

A	B	C	D	D.1	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Block Number	**Block Description**	**Block Type**	**Site Area (Hectares)**	**Site Area (meters 2)**	**Maximum Block Height (m)**	**Average Block Height (m)**	**Maximum Building Storeys**	**Total (GFA m^2)**	**Office %**	**Office (GFA m^2)**	**Retail %**	**Retail (GFA m^2)**	**Residential %**	**Residential (GFA m^2)**	**Other %**	**Other (GFA m^2)**	**Phase #**	**District Area (Hectares)**	**Notes**
	District Area																	28	
01	Development Site	Ds	0.64	6,366.68	70	36	22	57,300	30%	17,190	10%	5,730	55%	31,515	5%	2,865	1		
02	Development Site	Ds	0.48	4,769.23	47	30	11	42,923	30%	12,877	10%	4,292	55%	23,608	5%	2,146	1		
03	Development Site	Ds	0.48	4,817.15	47	27	11	43,354	30%	13,006	10%	4,335	55%	23,845	5%	2,168	1		
04	Development Site	Ds	0.58	5,852.41	58	29	18	52,672	30%	15,802	10%	5,267	55%	28,969	5%	2,634	2		
05	Development Site	Ds	0.61	6,080.13	60	28	18	54,721	30%	16,416	15%	8,208	50%	27,361	5%	2,736	2		
06	Development Site	Ds	0.60	5,960.75	40	23	12	53,647	30%	16,094	15%	8,047	45%	24,141	10%	5,365	2		
07	Development Site	Ds	0.57	5,679.17	64	33	20	51,113	30%	15,334	15%	7,667	50%	25,556	5%	2,556	3		
08	Development Site	Ds	0.33	3,337.11	35	31	10	30,034	30%	9,010	10%	3,003	55%	16,519	5%	1,502	3		
09	Development Site	Ds	0.84	8,383.31	40	25	12	75,450	0%	0	5%	3,772	70%	52,815	25%	18,862	1		School located in this block
10	Development Site	Ds	1.16	11,594.00	52	30	16	81,158	0%	0	5%	4,058	70%	56,811	25%	20,290	1		Silos located in this block
11	Development Site	Ds	0.82	8,242.00	35	22	9	49,452	10%	4,945	10%	4,945	75%	37,089	10%	4,945	1		
12	Development Site	Ds	0.65	6,465.00	34	18	8	51,720	10%	5,172	15%	7,758	70%	36,204	5%	2,586	2		
13	Development Site	Ds	0.76	7,657.00	41	19	13	61,256	10%	6,126	15%	9,188	70%	42,879	5%	3,063	2		
14	Development Site	Ds	0.55	5,482.80	55	27	17	43,862	10%	4,386	15%	6,579	65%	28,511	10%	4,386	2		
15	Park	Pa	0.38	3,836.46	0	0	0	0		0		0		0	100%	0	3		Park
16	Development Site	Ds	0.41	4,138.00	100	41	33	49,656	10%	4,966	5%	2,483	80%	39,725	5%	2,483	3		
17	Development Site	Ds	0.60	6,023.00	67	31	21	60,230	15%	9,035	5%	3,012	65%	39,150	15%	9,035	3		
18	Park	Pa	1.03	10,342.00	0	0	0	0		0		0		0	100%	0	3		Park
19	Park	Pa	2.46	24,638.00	0	0	0	0		0		0		0	100%	0	3		Park
20	Park	Is	0.50	5,017.00	0	0	0	0		0		0		0	100%	0	3		Park
21	Park	Pa	1.98	19,726.73	0	0	0	0		0		0		0	100%	0	2		Park
	Street Areas	ST	11.60																
			28.02	**164,407.93**				**858,548**		**150,358**		**88,346**		**534,696**		**87,620**		28.02	
										17.5%		**10.3%**		**62%**		**10.2%**		100.3%	

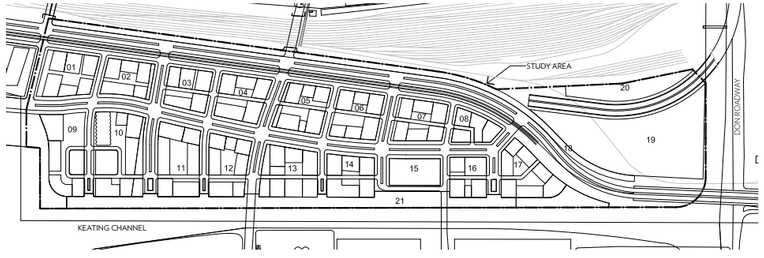
PHASES

A	B
Description	**Phase Number**
West Sub-Precinct	1
Central Sub-Precinct	2
East Sub Precinct	3

Total GFA	**858,548**	sm	
Study Area	28.02	ha	280,249 sm
Development sites	10.07	ha	100,743 sm
Parks	6.35	ha	
Streets	11.60	ha	
Gross FAR	**3.06**	(Against total study area)	
Net FAR	**8.52**	(Against development blocks only)	

Approximate Residential Population
16,041
Approximate Units
5,347
Potential Tax Revenue Per Year

$42,927,393	20	$858,547,860
$ PER YEAR	YRS	TOTAL



MASTER PLAN KEY MAP

ADRIAN SMITH+GORDON GILL
ARCHITECTURE

APPENDIX

CBRE TECHNICAL SUMMARY

CBRE
CB RICHARD ELLIS

145 King Street West
Suite 600
Toronto, ON M5H 1J8
416 362 2244 Tel
416 362 8085 Fax

Date: June 23, 2010

To: Jonathan Orlove

From: Gavin Yeung

Re: Keating Channel District Opinion of Value

PRELIMINARY RESEARCH

Based on preliminary discussions with CBRE's Research Department and comparable sales of properties within surrounding the Keating Channel District, CBRE has determined the current average value of properties in and around the Keating Channel District.

Property Type	$/Acre
Land	$720,000
Office	$2,300,000
Industrial	$1,500,000

Additional Land

Although averages provide an idea of the current range in values of such properties, they may be misleading, as most land traded in the Keating Channel area are smaller parcels. Below is an estimate of the total value of development sites contained in the City's Development Plan as well as the Master Plan developed by Adrian Smith + Gordon Gill Architecture LLP ("AS+GG").

Plan	Average Parcel (Acres)	Total Land (Acres)	Estimated Value per Acre	Estimated Total Value
City's Gardiner Future Development Plan	0.84	19.41	-	$48,525,000
AS+GG Master Plan	1.57	25.14	-	$62,850,000
Current Keating Channel District	0.47	-	$2,500,000	-

Note: the above chart includes only development sites within the district boundary as defined by AS+GG

Given normal market conditions, land as parceled according to the Master Plan developed by AS+GG creates additional value of approximately $14,325,000 through an increase in the total land available for development.

Additional Add-Value Benefits

In addition to increasing value through an increase in the total amount of land, value is also created through:

1) The consolidation of land into larger average parcels that would allow for higher density development
2) The removal of the Gardiner Expressway, thus removing:
    a. physical barriers to development
    b. a visual eyesore to the public and potential investors
    c. air, noise and light pollution

    and allowing:
    d. increased visibility of Lake Ontario
    e. increased rental rates
    f. flexibility to consolidate parcels of land
    g. increased green space
3) Opportunity for increased development investment interest

Studies of similar projects involving the tear down of a freeway and replacement with an underground tunnel show that the market-adjusted value of properties adjacent to the freeway increased relative to those of comparable properties not adjacent to the freeway. Our initial discussions with experts from similar projects shows that lands adjacent to the Gardiner Expressway tear down can expect a further increase in value between 20-30%.

Total Value Increase

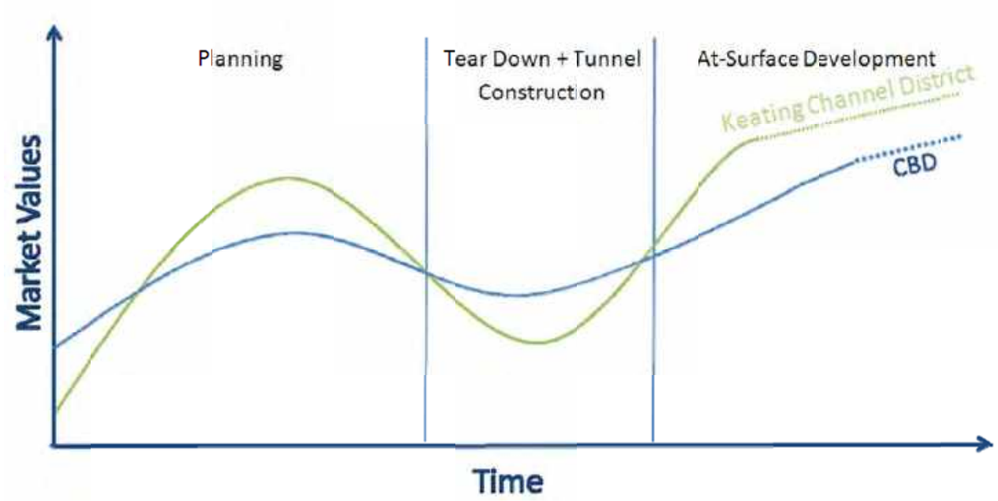
Our preliminary estimates indicate that adjacent lands to the Gardiner Expressway in the Keating Channel District will likely experience an approximate increase between 155% to 168%. This increase is a function of the combination of increased land available from the AS+GG Master Plan and and additional value-add benefits as a result of the Gardiner Expressway teardown.

Furthermore, it is worth noting that our research shows commercial rents for properties adjacent to similar projects have experience substantial gains. We expect commercial rents of properties adjacent to the Gardiner project to increase ~25%-35%.

FURTHER RESEARCH

We expect the planning, construction and at-surface development for the AS+GG Master Plan to be completed in approximately 1 market cycle. Following construction, we expect there to be significant investor interest in the Keating Channel District due to many of the factors listed above. We expect increased investor interest to drive three factors affecting value:

1) Amount of density: High-rise density creates greater land value than low-rise density
2) Type of density: Commercial, retail, residential and mixed-use typically each create different value
3) Quality of density: Location, efficiencies, and amenities will drive the quality of each type of density



Relative Market Value: the above shows the cyclical nature of real estate and the relative performance of the Keating Channel District, post-construction, in comparison with the Central Business District (CBD)

Additional Tax Revenues

The AS+GG Master Plan would yield a substantial increase in tax revenues as compared with the Keating Channel Precinct Master Plan. A further study by CBRE upon award of the contract would seek to accurately measure this increase.

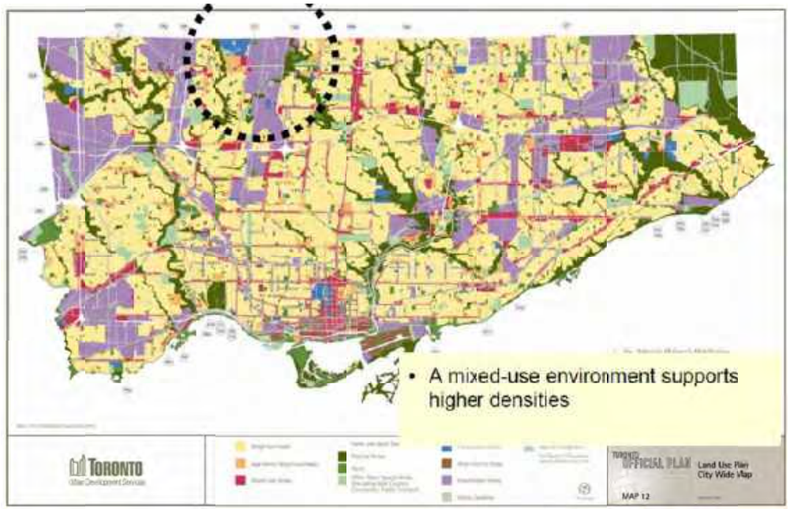
Following Studies

Following the preliminary research completed above the next steps upon awarding the contract are to further measure and confirm the impact on the value of development sites adjacent and surrounding the East Gardiner from Don Valley to Parliament.

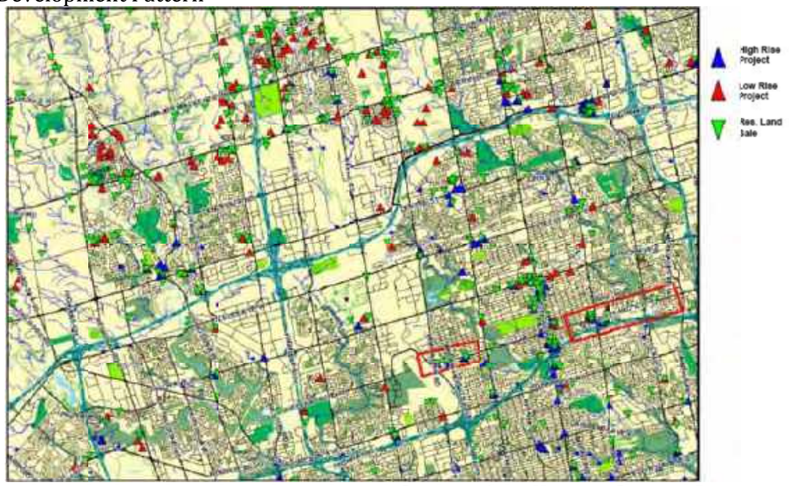
1) Assess the zoning and land use requirements of the Keating Channel District
2) Current land development pattern of areas in and around the Keating Channel District
3) Measure net new development potential
4) Assessing market feasibility of development opportunities
5) Phasing of development

Below are some examples of work done previously by CBRE to assess the impact on value for transit oriented development.

Zoning and Land Use Requirements

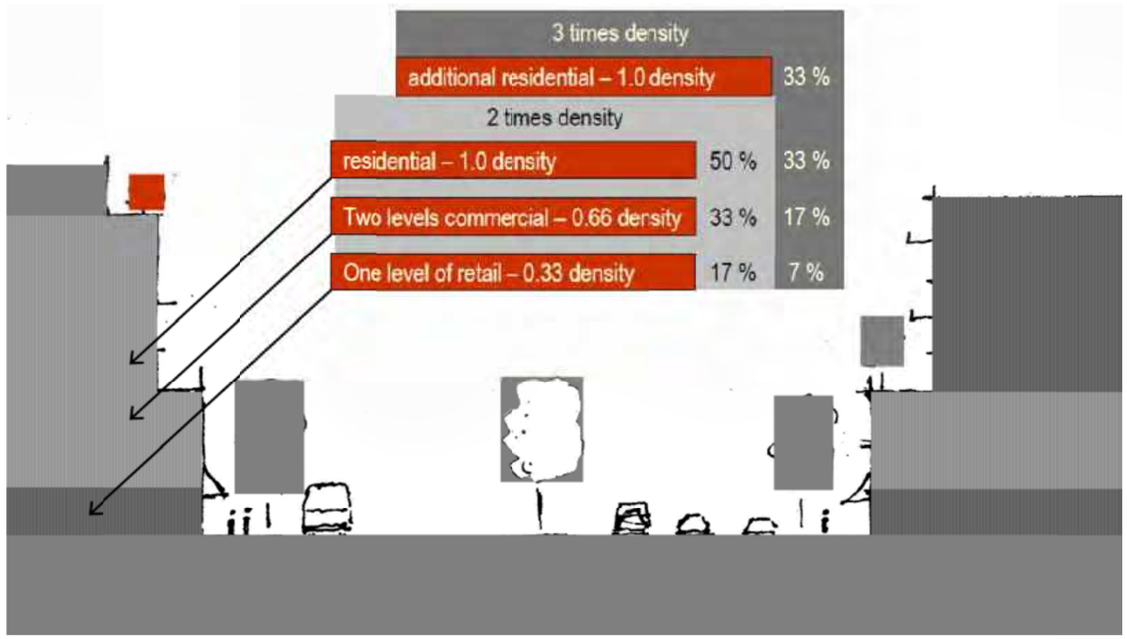


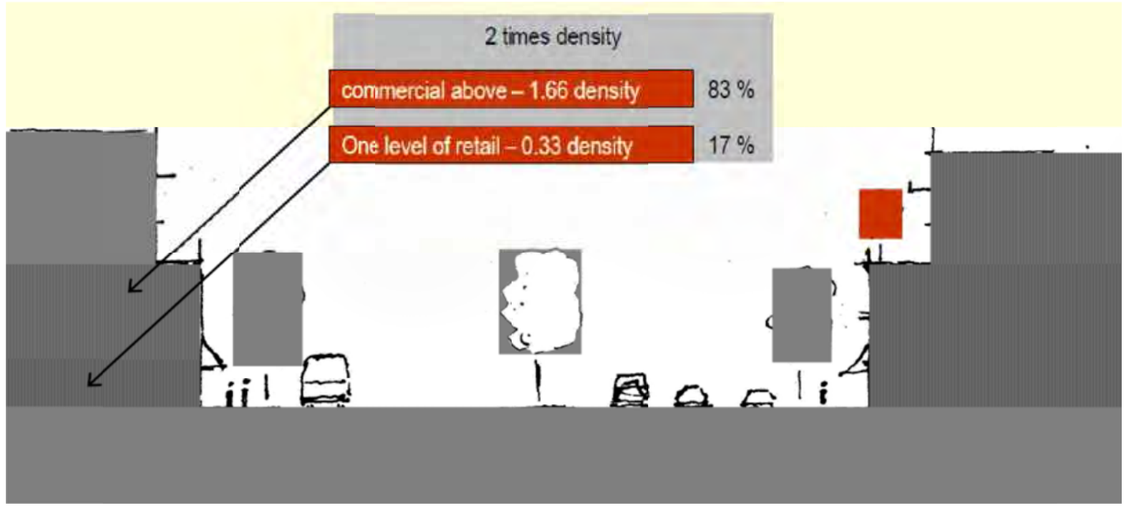
Current Land Development Pattern

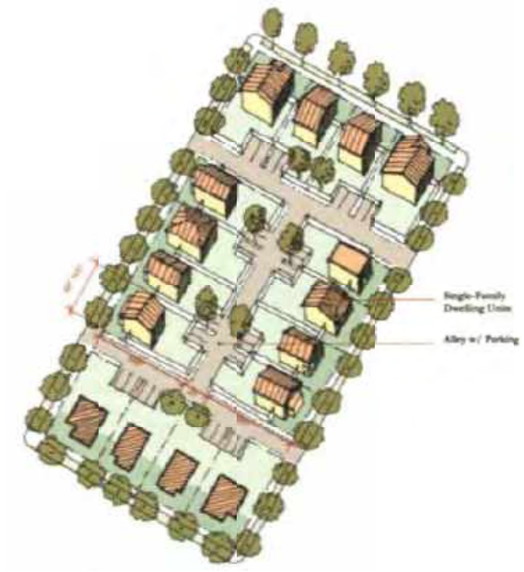


Note: The chart above deals exclusively with residential. Studies of the Keating Channel District and surrounding areas will deal with commercial, retail, residential and mixed use

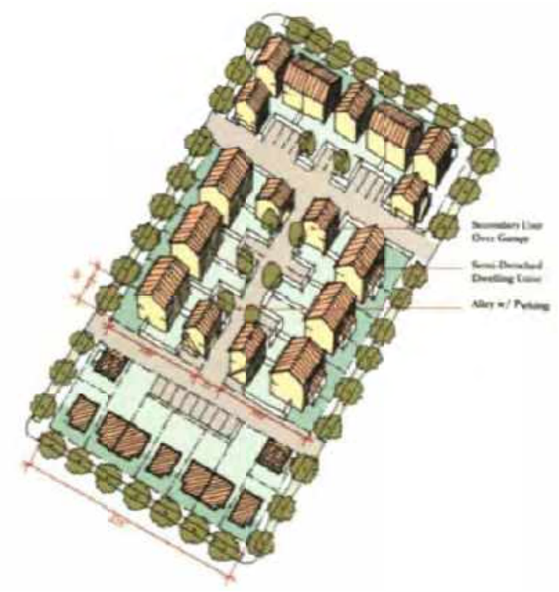
Measure Net New Development Potential



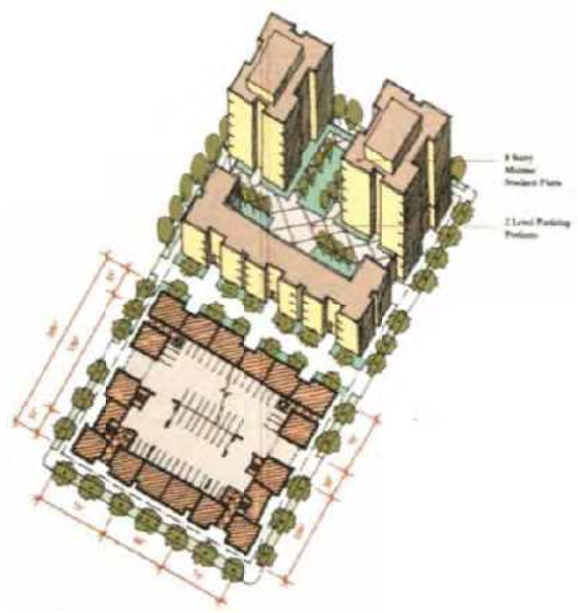




7 units/acre = 0.2 times density



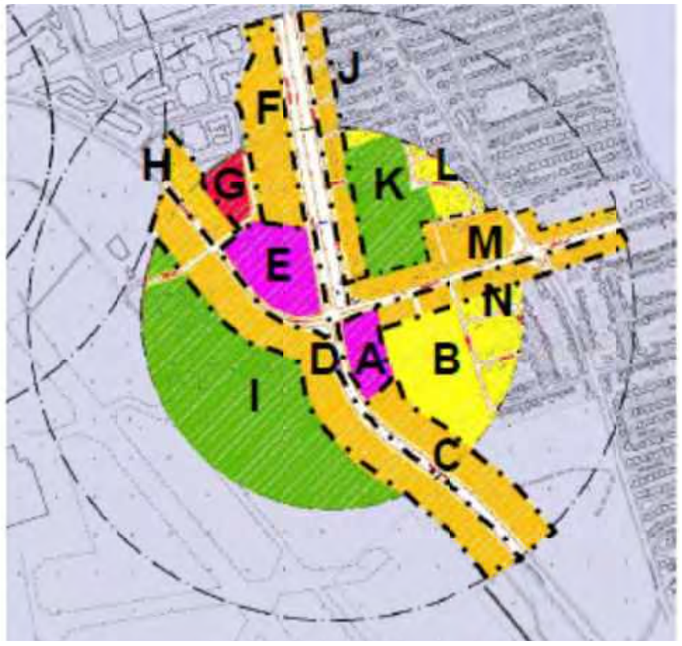
18 units/acre = 0.5 times density



75 units/acre = 2.0 times density

110 units/acre = 3.0 times density

CBRE TECHNICAL SUMMARY



										Moderate			Aggressive		
Zones	Area (acres)	Use	Coverage (%)	Coverage (acres)	Average Floors	Density	Existing Built Area (ft^2)	Projected Coverage	Projected Use	Projected Density	Projected Built Area (ft^2)	Net New Built Area (ft^2)	Projected Density	Projected Built Area (ft^2)	Net New Built Area (ft^2)
A	4.91	Station	0.25	1	1.5	0.4	80,681	0.75	Station	0.4	80,681	0	3.0	641,411	560,730
B	22.40	Park / Residential	0.05	1	1.5	0.1	76,822	0.50	Residential	0.3	243,918	167,096	0.5	487,837	411,015
C	11.59	under-utilized	0.00	0	0	0.0	0	0.50	Mixed-use	1.0	505,043	505,043	2.5	1,262,607	1,262,607
D	26.29	under-utilized	0.00	0	0	0.0	0	0.50	Mixed-use	1.5	1,718,033	1,718,033	3.0	3,436,066	3,436,066
E	10.84	Employment	0.15	2	2	0.3	150,867	0.50	Mixed-use	3.0	1,416,283	1,265,416	3.0	1,416,283	1,265,416
F	14.50	Employment	0.38	6	2	0.8	484,333	0.50	Mixed-use	1.5	947,391	463,058	2.0	1,263,188	778,855
G	3.71	Employment	0.34	1	1	0.3	54,821	0.50	Employment	1.0	161,609	106,789	2.0	323,219	268,398
H	4.34	Employment	0.40	2	1.5	0.6	113,070	0.50	Mixed-use	2.0	378,179	265,110	2.0	378,179	265,110
I	49.58	under-utilized	0.11	6	1	0.1	248,173	0.11	Park / Low Residential	0.1	248,173	0	0.1	248,173	0
J	6.53	Residential	0.29	2	2	0.6	167,164	0.50	Mixed-use	1.0	284,630	117,467	2.0	569,260	402,097
K	15.14	School	0.15	2	2.5	0.4	247,005	0.15	School	0.4	247,005	0	0.4	247,005	0
L	3.92	Residential	0.29	1	1.5	0.4	75,353	0.35	Residential	0.5	85,369	10,016	0.5	85,369	10,016
M	11.86	Residential	0.24	3	1.5	0.4	184,709	0.50	Mixed-use	1.0	516,571	331,862	2.0	1,033,142	848,433
N	6.93	Park / Residential	0.21	1	1	0.2	62,258	0.50	Mixed-use	1.0	302,066	239,809	2.0	604,135	541,877
Total	**193**			**28**			**1,945,254**				**7,134,953**	**5,189,699**		**11,995,873**	**10,050,619**

PHASING OF DEVELOPMENT

Assumptions

1. Phasing

All new density built in 3 phases over 25 Years

Phase 1	30.00%	5 Years
Phase 2	45.00%	10 Years
Phase 3	25.00%	10 Years

			Cumulative % each phase	Cumulative Overall Before Inflation	Cumulative Overall After Inflation
Phase 1	Yr 1	10%	10%	$2,651,607	$2,651,607
	Yr 2	15%	25%	$6,629,018	$6,728,454
	Yr 3	25%	50%	$13,258,037	$13,693,066
	Yr 4	25%	75%	$19,887,055	$20,831,794
	Yr 5	25%	100%	$26,516,073	$28,148,989
Phase 2	Yr 6	17%	17%	$33,158,349	$35,664,115
	Yr 7	17%	33%	$39,800,626	$43,367,119
	Yr 8	17%	50%	$46,442,902	$51,262,699
	Yr 9	8.3%	58%	$49,744,153	$55,284,953
	Yr 10	8.3%	67%	$53,045,404	$59,407,763
	Yr 11	8.3%	75%	$56,346,655	$63,633,643
	Yr 12	6.25%	81%	$58,832,537	$66,895,336
	Yr 13	6.25%	88%	$61,318,419	$70,238,571
	Yr 14	6.25%	94%	$63,804,301	$73,665,386
	Yr 15	6.25%	100%	$66,290,183	$77,177,872
Phase 3	Yr 16	17%	17%	$69,980,336	$82,522,315
	Yr 17	17%	33%	$73,670,490	$88,000,368
	Yr 18	17%	50%	$77,360,643	$93,615,373
	Yr 19	8.3%	58%	$79,194,672	$96,475,832
	Yr 20	8.3%	67%	$81,028,700	$99,407,802
	Yr 21	8.3%	75%	$82,862,729	$102,413,071
	Yr 22	6.25%	81%	$84,243,774	$104,732,650
	Yr 23	6.25%	88%	$85,624,820	$107,110,218
	Yr 24	6.25%	94%	$87,005,865	$109,547,226
	Yr 25	6.25%	100%	$88,386,910	$112,045,158

2. Inflation Rate

2.50%

3. NPV Discount Rate

6%

Moderate Phasing Schedule

Assumptions

1. Phasing

All new density built in 3 phases over 25 Years

Phase 1	30.00%	5 Years
Phase 2	45.00%	10 Years
Phase 3	25.00%	10 Years

			Cumulative % each phase	Cumulative Overall Before Inflation	Cumulative Overall After Inflation
Phase 1	Yr 1	10%	10%	$4,685,297	$4,685,297
	Yr 2	15%	25%	$11,713,243	$11,888,942
	Yr 3	25%	50%	$23,426,487	$24,195,168
	Yr 4	25%	75%	$35,139,730	$36,809,050
	Yr 5	25%	100%	$46,852,973	$49,738,279
Phase 2	Yr 6	17%	17%	$58,589,643	$63,017,244
	Yr 7	17%	33%	$70,326,313	$76,628,182
	Yr 8	17%	50%	$82,062,982	$90,579,394
	Yr 9	8.3%	58%	$87,896,178	$97,686,576
	Yr 10	8.3%	67%	$93,729,373	$104,971,438
	Yr 11	8.3%	75%	$99,562,568	$112,438,421
	Yr 12	6.25%	81%	$103,955,034	$118,201,717
	Yr 13	6.25%	88%	$108,347,500	$124,109,096
	Yr 14	6.25%	94%	$112,739,967	$130,164,159
	Yr 15	6.25%	100%	$117,132,433	$136,370,599
Phase 3	Yr 16	17%	17%	$123,652,805	$145,814,042
	Yr 17	17%	33%	$130,173,177	$155,493,571
	Yr 18	17%	50%	$136,693,549	$165,415,088
	Yr 19	8.3%	58%	$139,934,213	$170,469,418
	Yr 20	8.3%	67%	$143,174,877	$175,650,106
	Yr 21	8.3%	75%	$146,415,541	$180,960,311
	Yr 22	6.25%	81%	$148,855,800	$185,058,926
	Yr 23	6.25%	88%	$151,296,059	$189,260,006
	Yr 24	6.25%	94%	$153,736,318	$193,566,113
	Yr 25	6.25%	100%	$156,176,577	$197,979,873

2. Inflation Rate

2.50%

3. NPV Discount Rate

6%

Aggressive Phasing Schedule

Halcrow Transportation Demand Analysis for Gardiner Expressway and Lake Shore Boulevard Reconfiguration Environmental Assessment

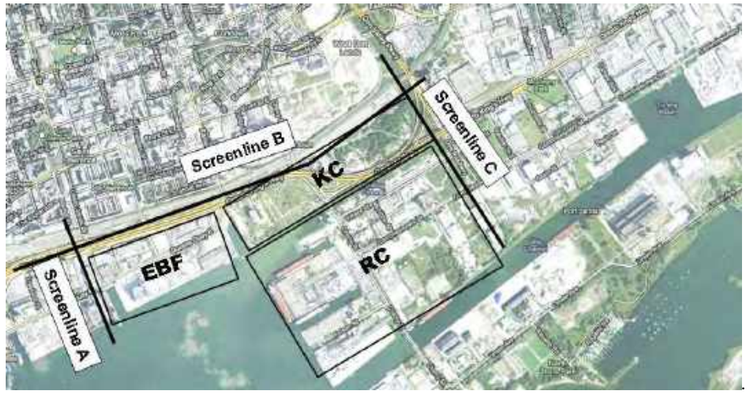
(Waterfront Toronto competition brief #2009-60).

1. Introduction

This document was prepared in support of the design proposal requirements for the competition to develop innovative design options for the Gardiner Expressway and Lake Shore Boulevard Reconfiguration Environmental Assessment (Waterfront Toronto competition brief #2009-60). It provides the required north-south and east-west screenline auto trip summaries, demonstrating the a.m. peak hour screenline traffic demand and capacity for "existing conditions", as well as for the "future base" scenario and the AS+GG "future with design" scenario..

Based on information provided in recent Waterfront Toronto and City of Toronto documents and associated data for the primary study area (including the East Bayfront and Lower Don Lands precincts) related to land use by parcels, coverage and floor space by land use type, dwelling unit and employment estimates were developed by Halcrow staff for two future scenarios. As documented herein, the land use activity related estimates were translated into estimates of auto driver trip rates for residential and commercial development within the primary study area and the resultant estimates of AM peak period vehicles were assigned to three screenlines shown in **Figure 1**.

Figure 1: Study area and Screenlines



EBF: East Bayfront
KC: Keating Channel Precinct (area of Lower Don Lands Precinct north of Keating Channel
RC: (area of Lower Don Lands south of Keating Channel)

2. Summary and Conclusions

Table 1 summarizes the results of the screenline analysis, showing the AM peak hour vehicle volumes in relation to the estimated roadway capacities for the 3 screenlines shown in Figure 1. Volume/Capacity ratios provide a convenient short-form indicator of changes in traffic conditions.

Table 1 – Summary of Findings
Gardiner Screenline Analysis (AM Peak Hour Vehicles and V/C Ratios)

	Dir	Existing	Future Base	Future with Design
Screenline A: Jarvis, from the Lake to rail line	EB	0.32	0.51	0.79
	WB	0.42	0.53	0.81
Screenline B: rail line, from Jarvis to Don River	NB	0.33	0.73	0.77
	SB	0.31	0.54	0.60
Screenline C: Don River, from rail line to Shipping Channel	EB	0.31	0.35	0.55
	WB	0.49	0.63	0.90

As shown in **Table 1**, estimated volume/capacity ratios for the existing situation (which reflects 2008-2009 traffic counts) shows that demands are equal to 31% to 49% of the available road capacity. These v/c ratios, as discussed in Section 3.2, suggest that there is substantial reserve capacity on the existing routes that serve the East Bayfront and Lower Don Lands precincts, particularly on the existing Lakeshore Blvd and the Gardiner Expressway.[1]

As shown in **Table 1**, for the Future Base, and discussed in Section 3.3, the Base Case transportation capacity assumptions (existing road network) appear to provide sufficient roadway capacity to support planned development within the primary study area (East Bayfront and Lower Don Lands Precincts). Volume/capacity ratios increase at all screenlines and in all directions for 2031, with the highest v/c ratio being associated with northbound traffic crossing Screenline B (the railway corridor), where a v/c ratio of .73 is estimated by 2031. With the future base scenario, substantial reserve roadway capacity appears to be available at Screenlines A and C.

The Future with Design Scenario, discussed in Section 3.4, reflects the both the reduced east-west roadway capacity in the Gardiner/Lakeshore Corridor and the increased development potential within the Keating Channel North Precinct associated with the AS+GG design proposal. The estimated v/c ratios for the Future with Design scenario all show further increases compared to the Base Case, with substantial increases in traffic congestion expected at Screenline A in both directions and westbound crossing screenline C. Despite the very substantial reductions in roadway capacity on the Gardiner Expressway, with the proposed replacement of the 6 to 8 lane elevated freeway with a four lane freeway tunnel through the primary study area, the proposed design appears to have sufficient capacity to accommodate vehicle travel to/from and through the East Bayfront and Lower Don Lands precincts, although the AM peak hour v/c ratio for westbound traffic at Screenline C is estimated to be .90 (which suggests congested conditions consistent with Level of Service D-E) .

The road network assumed under the Future with Design scenario will be able to accommodate anticipated traffic at all screenlines at congestion levels that are accepted within built up inner city areas where local residents and workers have competitive travel options to driving, including superior levels of accessible transit service.

[1] Halcrow's analysis reflects and is consistent with the information provided in recent detailed planning reports prepared for the general study area, including the Lower Don Lands Class Environmental Assessment Master Plan (Waterfront Toronto, Feb 2010) and associated documents including the February 17, 2010 Memo prepared by Delcan re Gardiner Expressway EA. Results of Bluetooth Origin / Destination Survey — Summary.

3. Technical Documention

3.1 Study Area and Screenlines

The general approach to assessment of future traffic demands within the primary study area can be described as follows: In order to assess the ability of existing and planned roads to accommodate current and future traffic demands in and out of a study area, screenlines were established near the boundaries of the primary study area.

Available traffic counts crossing the screenlines were compiled in order to understand the current level of traffic in and out of the area by direction. Capacity was calculated based on road type and number of lanes available for general traffic, by direction for the current situation and for the future (2031).

Future traffic volumes crossing each screenline were then estimated using the methods detailed below considering existing traffic volumes, background traffic growth and new auto trip making that can be expected to result from planned development in the study area. Finally, the estimated traffic volumes were divided by the available or planned peak hour road capacity, to derive volume/capacity ratios (v/c ratios). These v/c ratios provide a convenient summary of the utilization of available or planned road capacity across each screenline.

The three screenlines were established to contain the key development parcels within the primary study area: Screenline A just west of Jarvis Street, Screenline B, immediately south of the Rail corridor north of Lake Shore Boulevard, and Screenline C, just west of the Don Roadway, as illustrated in **Figure 1**..

3.2 Existing Conditions

Existing traffic counts were extracted from the City of Toronto data provided to the competitors. No traffic data was available for the Commissioner Street at Screenline C. Given it is a low volume roadway, a nominal hourly volume of 100 vehicles was assumed. Per lane capacity assumptions are consistent with previous studies (reference).

As shown in **Table 2**, Existing Conditions, the analysis shows low v/c ratios of 0.31 to 0.49, which shows that current traffic volumes are well within the available road capacity at the 3 screenlines. The current road network provides sufficient capacity for observed inbound/outbound traffic at each screenline.

3.3. Future Base Conditions

To determine traffic volumes under future base (2031) conditions, estimates of annual traffic grow rate were applied to existing traffic on each link, to reflect some modest growth in through traffic at the 3 screenlines. These growth rates accommodate background traffic growth, but not traffic related to planned development within the primary study area (East Bayfront, Keating Channel and the rest of the Lower Don Lands).

The study area is located in a downtown setting where development is well established, and little growth is expected in auto traffic, as growth over the last 20 years has been associated with modal shifts to transit and walking. A rate of 0.5% per annum was applied to east/west traffic crossing the north/south screenlines A and C, and a rate of 0.25% per annum was applied to north/south traffic crossing the east/west screenline B. The slightly higher growth rate crossing screenlines A and C accommodates the connectivity of the east-west routes,

while links crossing screenline B are adjacent to the lake and have little traffic growth potential.

Table 2: Screenline Analysis – Existing Conditions

Screenline A: Jarvis, from the Lake to rail line

EB	Gardiner	Lakeshore	Queens Quay	Total
Lanes	4	3	2	
Capacity/lane	1800	700	700	
Capacity	7200	2100	1400	10700
Current AM Peak Hour volume	2390	495	486	3371
volume/capacity ratio	0.33	0.24	0.35	0.32
WB	Gardiner	Lakeshore	Queens Quay	Total
Lanes	4	3	2	
Capacity/lane	1800	700	700	
Capacity	7200	2100	1400	10700
Current AM Peak Hour volume	2854	954	643	4451
volume/capacity ratio	0.40	0.45	0.46	0.42

Screenline B: rail line, from Jarvis to Don River

NB	Jarvis	Sherbourne	Parliament	Cherry	Total
Lanes	2	1	2	1	
Capacity/lane	700	700	700	700	
Capacity	1400	700	1400	700	4200
Current AM Peak Hour volume	285	495	450	151	1381
volume/capacity ratio	0.20	0.71	0.32	0.22	0.33
SB	Jarvis	Sherbourne	Parliament	Cherry	Total
Lanes	2	1	2	1	
Capacity/lane	700	700	700	700	
Capacity	1400	700	1400	700	4200
Current AM Peak Hour volume	285	290	351	385	1311
volume/capacity ratio	0.20	0.41	0.25	0.55	0.31

Screenline C: Don River, from rail line to Shipping Channel

EB	DVP	Gardiner ramp	Lakeshore	Commissioner	Total
Lanes	2	2	3	1	
Capacity/lane	1800	1800	700	700	
Capacity	3600	3600	2100	700	10000
Current AM Peak Hour volume	1818	814	348	100	3080
volume/capacity ratio	0.51	0.23	0.17	0.14	0.31
WB	DVP	Gardiner ramp	Lakeshore	Commissioner	Total
Lanes	2	2	3	1	
Capacity/lane	1800	1800	700	700	
Capacity	3600	3600	2100	700	10000
Current AM Peak Hour volume	2253	1786	796	100	4935
volume/capacity ratio	0.63	0.50	0.38	0.14	0.49

To estimate future auto traffic volumes, it was necessary to estimate the traffic associated with new development proposed within the primary study area. In order to do this, data from the Master Plan Summary Table provided to competitors was used to estimate 2031 dwelling units and employment for three sub-areas, East Bay Front, Keating Channel and the remainder of the Low Don Lands Area (RC). These values were then used to estimate AM peak hour auto driver traffic generated by local residents (a function of dwelling units) and by local workers (a function of the number of employees). Transportation Tomorrow Survey data for 2001 and 2006 were used to estimate current and future auto driver trips for local residents, recognizing well established trends showing an increased proportion of local residents walking to work or taking transit, rather than driving, Similarly, auto driver trip rates to workplaces in the area east between Jarvis and the Don River, south of Queen Street have shown stability or declines and these trends were captures in the auto driver trip rates applied to estimates of future employment in the primary study area.

The estimated development potential, associated with the 2010-0414 Development Table provided by Waterfront Toronto, and related trip generation and distribution estimates for each subarea and screenline are summarized in **Tables 3 and 4**.

Table 3: Trip Generation Assumptions/Estimates for Future Base Case

Trip Generation

	Outbound (residential) Trips				Inbound (commercial) Trips			
	Residential GFA (m2)	Residential DU	AM peak hour auto trip rate (per DU)	AM peak hour auto trips	Commercial GFA (m2)	Employees	AM peak hour auto trip rate (per employee)	AM peak hour auto trips
EBF	187,144	5,294	0.11	582	360,954	12,633	0.125	1,579
KC	490,834	5,806	0.125	726	190,879	6,681	0.125	835
RC	692,845	8,195	0.15	1,229	269,439	9,430	0.125	1,179
Total	1,370,823	19,295		2,537	821,272	28,745		3,593

Peak hour demands = .5 of estimated AM Peak period demands

Table 4: Trip Distribution Assumptions/Estimates for Future Base Case

Trip Distribution

	Screenline A	Screenline B	Screenline C	Total
Outbound (Residential) Distribution	30%	65%	5%	
Outbound (Residential) Trips	761	1649	127	2537
Inbound (Commercial) Distribution	50%	25%	25%	
Inbound (Commercial) Trips	1797	898	898	3593

The trip generation and distribution assumptions developed by Halcrow were derived based on 2001 and 2006 Transportation Tomorrow Survey (TTS) and 2001 and 2008 Kings Travel Survey data documenting trip making behaviour by mode in the vicinity of our study area.

Halcrow's review of 1996-2006 travel trends for the Downtown Core area south of Queen shows that Auto Driver mode shares of total person trips declined from 29% to 22.5% over ten years. While Downtown Toronto continued to grow as both an employment area and a residential community, the TTS survey suggests that the total auto traffic destined for the Downtown during the AM peak period actually declined.

The 2008 King's Survey results provide an even more updated basis for assessing the auto demands.originating in new inner city residential areas such as the King-Parliament and King-Spadina communities. Between 2001 and 2008, the auto driver mode share from AM peak trips made by residents of the Kings communities declined from 35% to 23% for all trips, while the proportion of all AM peak trips made by walking increased from 29% to 40% while transit's share of total trips was stable at approximately 30%.

The typical AM peak auto driver trips per unit within the Kings area (approximately .33 trip/du reported in the 2001 TTS survey) were adjusted downward in lane with the modal shifts indicated in the January 2010 Kings Travel Survey Bulletin-Draft.

In assessing future auto traffic demands, Halcrow assumed that the East Bayfront area would have the highest walk/transit shares (consistent with the 2008 Kings Travel Survey Bulletin – Draft), while the Other Lower Don Lands will likely have somewhat lower transit/walk modal splits given the longer walk times to downtown jobs. Therefore, our assumed auto driver trip rates vary accordingly, as documented in **Table 3.**

Considering both the low future background traffic growth and reasonable estimates of the new AM peak auto driver trips associated with proposed developments for the primary study area, the analysis shows increases in volume/capacity (v/c) ratio for all screenlines, as shown in **Table 5**. The current road network would continue to provide sufficient capacity for inbound/outbound traffic at each screenline under future base conditions.

Table 5: Screenline Analysis – Future Base Conditions

Screenline A: Jarvis, from the Lake to rail line

EB	Gardiner	Lakeshore	Queens Quay	Total
Lanes	4	3	2	
Capacity/lane	1800	700	700	
Capacity	7200	2100	1400	10700
Current AM Peak Hour volume	2390	495	486	3371
Future background traffic growth	239	50	49	337
Development traffic				1797
Total traffic				5505
volume/capacity ratio				0.51
WB	Gardiner	Lakeshore	Queens Quay	Total
Lanes	4	3	2	
Capacity/lane	1800	700	700	
Capacity	7200	2100	1400	10700
Current AM Peak Hour volume	2854	954	643	4451
Future background traffic growth	285	95	64	445
Development traffic				761
Total traffic				5657
volume/capacity ratio				0.53

N/S growth per annum 0.25%
E/W growth per annum 0.50%

Screenline B: rail line, from Jarvis to Don River

NB	Jarvis	Sherbourne	Parliament	Cherry	Total
Lanes	2	1	2	1	
Capacity/lane	700	700	700	700	
Capacity	1400	700	1400	700	4200
Current AM Peak Hour volume	285	495	450	151	1381
Future background traffic growth	14	25	23	8	55
Development traffic					1649
Total traffic					3085
volume/capacity ratio					0.73
SB	Jarvis	Sherbourne	Parliament	Cherry	Total
Lanes	2	1	2	1	
Capacity/lane	700	700	700	700	
Capacity	1400	700	1400	700	4200
Current AM Peak Hour volume	285	290	351	385	1311
Future background traffic growth	14	15	18	19	51
Development traffic					898
Total traffic					2261
volume/capacity ratio					0.54

Screenline C: Don River, from rail line to Shipping Channel

EB	DVP	Gardiner ramp	Lakeshore	Commissioner	Total
Lanes	2	2	3	1	
Capacity/lane	1800	1800	700	700	
Capacity	3600	3600	2100	700	10000
Current AM Peak Hour volume	1818	814	348	100	3080
Future background traffic growth	182	81	35	10	308
Development traffic					127
Total traffic					3515
volume/capacity ratio					0.35
WB	DVP	Gardiner ramp	Lakeshore	Commissioner	Total
Lanes	2	2	3	1	
Capacity/lane	1800	1800	700	700	
Capacity	3600	3600	2100	700	10000
Current AM Peak Hour volume	2253	1786	796	100	4935
Future background traffic growth	225	179	80	10	493.5
Development traffic					898
Total traffic					6327
volume/capacity ratio					0.63

3.4 Future with Design Conditions

Site traffic for the Future with Design was increased in the area of the Lower Don Lands north of the Keating Channel by 30%, to reflect to added development potential associated with the AS+GG design proposal. Furthermore, the number of lanes on the Gardiner crossing Screenlines A and C was reduced to two per direction in line with the design concept.

Tables 6 and **7** summarize the changes in trip generation and trip distribution assumptions employed in estimating the expected Future with Design traffic volumes crossing the 3 screenlines. It is assumed that the proposed road network will result in some shifting of auto demands away from the Gardiner (which will no longer be able to accommodate the 4500 amphpd peak hour demands because of total east-west road capacity crossing screenline C will be reduced by about 1/3). Therefore, in estimating future traffic demands, it was assumed that approximately 400 cars destined for downtown south of Dundas from the DVP would use Richmond Street rather than DVP/Gardiner (bypassing the Gardiner/Lakeshore Corridor). and another 500-600 vehicles destined for the Downtown and points east coming from the Lakeshore East Corridor (and crossing Screenline C) would be expected to divert from Lakeshore Drive to other east-west streets such as Dundas, Queen-King and Eastern Avenue and enter the downtown or the primary study area crossing Screenline B.. . Based on these assumptions. Halcrows preliminary analysis suggests that the proposed replacement of the elevated Gardiner with a tunnel will be able to accommodate all of the expected locally generated auto driver demands, albeit at reduced roadway levels of service.

Table 6: Trip Generation Assumptions/Estimates for Future with Design

Trip Generation

	Outbound (residential) Trips				Inbound (commercial) Trips			
	Residential GFA (m2)	Residential DU	AM peak hour auto trip rate (per DU)	AM peak hour auto trips	Commercial GFA (m2)	Employees	AM peak hour auto trip rate (per employee)	AM peak hour auto trips
EBF	187,144	5,294	0.11	582	360,954	12,633	0.125	1,579
KC	638,084	7,548	0.125	943	248,143	8,685	0.125	1,086
RC	692,845	8,195	0.15	1,229	269,439	9,430	0.125	1,179
Total	1,518,073	21,037		2,755	878,535	30,749		3,844

Peak hour demands = .5 of estimated AM Peak period demands

Table 7: Trip Distribution Assumptions/Estimates for Future with Design

Trip Distribution

	Screenline A	Screenline B	Screenline C	Total
Outbound (Residential) Distribution	30%	65%	5%	
Outbound (Residential) Trips	827	1791	138	2755
Inbound (Commercial) Distribution	50%	30%	20%	
Inbound (Commercial) Trips	1922	1153	769	3844

Inbound through traffic (DVP-Gardiner to Downtown) reduced by 400 peak hour vehicles (which are assumed to use Richmond Street to reach downtown area because of reduced capacity and associated delays on Gardiner. Also, some traffic is assumed to shift from westbound crossing Screenline C to southbound crossing Screenline B (e.g. downtown traffic shifting from Lakeshore westbound to other east west routes such as Eastern Avenue, Queen/King and Dundas.

As shown in **Table 8**, the road network assumed under the Future with Design scenario will be able to accommodated anticipated traffic at all screenlines at congestion levels of service that are accepted within built up inner city areas where residents and workers have competitive travel options to driving, including superior levels of accessible transit service.

Table 8: Screenline Analysis – Future with Design (assuming 30% increase in development and demand within Keating Channel District)

Screenline A: Jarvis, from the Lake to rail line

EB	Gardiner	Lakeshore	Queens Quay	Total
Lanes	2	3	2	
Capacity/lane	1800	700	700	
Capacity	3600	2100	1400	7100
Current AM Peak Hour volume	2390	495	486	3371
Future background traffic growth	239	50	49	337
Development traffic				1922
Total traffic				5630
volume/capacity ratio				0.79
WB	Gardiner	Lakeshore	Queens Quay	Total
Lanes	2	3	2	
Capacity/lane	1800	700	700	
Capacity	3600	2100	1400	7100
Current AM Peak Hour volume	2854	954	643	4451
Future background traffic growth	285	95	64	445
Development traffic				827
Total traffic				5723
volume/capacity ratio				0.81

N/S growth per annum	0.25%
E/W growth per annum	0.50%

Screenline B: rail line, from Jarvis to Don River

NB	Jarvis	Sherbourne	Parliament	Cherry	Total
Lanes	2	1	2	1	
Capacity/lane	700	700	700	700	
Capacity	1400	700	1400	700	4200
Current AM Peak Hour volume	285	495	450	151	1381
Future background traffic growth	14	25	23	8	55
Development traffic					1791
Total traffic					3227
volume/capacity ratio					0.77
SB	Jarvis	Sherbourne	Parliament	Cherry	Total
Lanes	2	1	2	1	
Capacity/lane	700	700	700	700	
Capacity	1400	700	1400	700	4200
Current AM Peak Hour volume	285	290	351	385	1311
Future background traffic growth	14	15	18	19	51
Development traffic					1153
Total traffic					2515
volume/capacity ratio					0.60

Screenline C: Don River, from rail line to Shipping Channel

EB	DVP	Gardiner ramp	Lakeshore	Commissioner	Total
Lanes	2		3	1	
Capacity/lane	1800		700	700	
Capacity	3600		2100	700	6400
Current AM Peak Hour volume	1818	814	348	100	3080
Future background traffic growth	182	81	35	10	308
Development traffic					138
Total traffic					3526
volume/capacity ratio					0.55
WB	DVP	Gardiner ramp	Lakeshore	Commissioner	Total
Lanes	2		3	1	
Capacity/lane	1800		700	700	
Capacity	3600		2100	700	6400
Current AM Peak Hour volume	1853	1786	796	100	4535
Future background traffic growth	185	179	80	10	453.5
Development traffic					769
Total traffic					5757
volume/capacity ratio					0.90

Gardiner Expressway Reconfiguration – Construction Phasing

PHASING CONCEPT:
Alter existing traffic flows in order to:

- reduce the traffic volume on the existing Gardiner so that it can be reduced in width to two lanes in each direction between Jarvis and Parliament
- close the existing Sherbourne exist ramp from the westbound Gardiner to be closed.

This frees up area within which the new tunnel can be constructed adjacent to the rail lands. Refer to Image 1 and 2 showing this concept.

SITE PREPARATION
Implement Preparatory Traffic Diversions
Increase the capacity of the existing Richmond St exit from the DVP by upgrading it from a single lane ramp to a two lane ramp. This allows traffic that currently travels along the southbound DVP to the westbound Gardiner exiting at Sherbourne/Jarvis to be diverted to Richmond Street.

Divert some of the traffic on westbound Lakeshore such that it remains on Lakeshore rather than entering onto the westbound Gardiner and exiting at Sherbourne/Jarvis.

Demolish north half of existing Gardiner between Jarvis and Parliament, including the Sherbourne ramp
Some existing bents of the Gardiner structure contain more than two columns. In this situation, only some local reinforcement of the top girder at the central column may be required prior to removing the north half of the existing structure.

Where existing bents are supported by only two columns, use low clearance caisson rigs to install new foundations, and install temporary column supports below the existing girders such that the north half of the existing structure can be removed. Local reinforcement of the existing girders may be required at the new temporary column supports.

When temporary supports and girder reinforcement are in place, demolish the north half of the existing expressway deck, girders, and columns down to grade level. This will require temporary re-routing of the existing Lakeshore Blvd lanes directly below the demolition area.

TUNNEL CONSTRUCTION - OPTION 1
Install temporary excavation support and dewatering systems.
Install excavation support walls and dewatering systems along the north and south sides of the excavation area. The south excavation support wall will be located immediately north of the temporary column support foundations installed as part of Step xx above.

Note that, for the tunnel width currently envisioned, the north wall will intrude slightly into the railway lands east of Parliament St. The area affected is currently used only as a construction staging area for the railway – no rail lines will be affected. This intrusion is highlighted in red in Image 3 and shown in section in Image 4. This will require the City of Toronto to negotiate temporary access rights to this land area. After completion of the new tunnel section, the original

rail land boundary would be reinstated, together with an aesthetically improved retaining wall at the rail lands boundary.

The excavation support system installation will also include temporary support of existing below grade utilities than need to remain in service, as well as temporary traffic decking over the excavation at all north-south roadway intersections and detour areas along Lakeshore Blvd.

Construct the new below grade tunnel
Construction will commence with the invert slab. Once this slab is placed, the lowest level temporary horizontal struts supporting the shoring walls will be removed to permit placing of the tunnel walls. Once the roof slab is placed over the walls, the upper level temporary horizontal struts supporting the shoring walls can be removed where they are not required to support traffic decking. Once the tunnel structure is complete, tunnel utilities and ventilations systems can be completed.

TUNNEL CONSTRUCTION - OPTION 2
Install temporary excavation support and dewatering systems.
Install excavation support walls and dewatering systems along the north and south sides of the excavation area. If the City is unable to negotiate temporary access to the railway lands as described in Tunnel Construction Option 1 above, the tunnel will need to be constructed in two phases. The north shoring wall would need to be located immediately adjacent to the existing retaining wall at the southern limit of the railway lands. To construct the full width of the tunnel currently envisioned, more than half of the existing Gardiner structure would need to be demolished east of Parliament St. This conflict is highlighted in red in Image 5.

In this situation, the new tunnel will need to be constructed in two phases in order to maintain the required traffic flow on the existing Gardiner Expressway during the construction period. This two-phased approach is shown in section in Image 6. For Phase 1 construction, a line of shoring would be installed immediately north of the temporary column support foundations installed as part of Step xx above.

The excavation support system installation will also include temporary support of existing below grade utilities than need to remain in service, as well as temporary traffic decking over the excavation at all north-south roadway intersections and detour areas along Lakeshore Blvd.

Construct the new below grade tunnel
Phase 1 tunnel construction will commence with the invert slab. Once this slab is placed, the lowest level temporary horizontal struts supporting the shoring walls will be removed to permit placing of the tunnel walls. As part of the Phase 1 construction, a temporary wall will be required adjacent to the southern shoring line. Once the roof slab is placed over the walls, the upper level temporary horizontal struts supporting the shoring walls can be removed where they are not required to support traffic decking. Once the Phase 1 tunnel structure is complete, tunnel utilities and ventilations systems can be completed.

At this point, traffic can be diverted from the Gardiner Expressway to the new tunnel. This then permits the remaining portion of the existing gardiner to be demolished. After demolition, the second phase of the tunnel can be constructed. Once complete, the temporary dividing wall can be removed to achieve the final tunnel configuration.

CONSTRUCTION OF NEW BRIDE AND ELEVATED RAMPS
West end elevated ramp
At the west end of the new tunnel construction, a new ramp is to be built to connect the tunnel to existing Gardiner structure remaining to the west of our study area. This ramp structure is to be built simultaneously with the tunnel so that is it ready for operation at the same time the tunnel is finished.

East bridge construction
At the east end of the new tunnel construction, a new ramp and bridge structure is to be built to connect the tunnel to the existing Don Valley Parkway. The new bridge is not impacted by the existing Gardiner Expressway structure, and construction can be advanced eastward from the tunnel end portal without restriction to the bridge pier at the east bank of the Don River. Construction of the bridge section from this point will impact the Don Valley Parkway traffic flows as the new bridge is connected into the existing roadway system in the vicinity of the existing Richmond Street entrance ramp. This section of the bridge will be required to be constructed one half at a time, with DVP traffic flows restricted accordingly. This bridge structure is to be built simultaneously with the tunnel so that is it ready for operation at the same time the tunnel is finished.