

**CANALSIDE STRUCTURED PARKING GARAGE  
NORTH AUD BLOCK (PARCEL 1A)  
CONCEPTUAL STUDY REPORT**

**DRAFT**

**FEBRUARY 2, 2017**



Canalside Structured Parking Garage  
North Aud Block (Parcel 1), Buffalo NY  
Concept Design Report

**Introduction**

The purpose of this concept study was to investigate development strategies for providing structured parking as part of a mixed use redevelopment at the former Buffalo Memorial Auditorium or North Aud site (Parcel A1). The garage is intended to provide parking for new developments as well as the nearby Canalside and downtown area. Primary goals of this study are to provide garage design options that afford opportunities for future building development, a potential Amtrak station and vehicular traffic reductions while also providing parking that is attractive, safe, efficient, durable and cost effective both in initial construction and ongoing maintenance costs.

Two development strategy options will be reviewed in this study. The pros and cons of each option have been evaluated.



Erie Harbor Canalside, Buffalo, NY

Photo Credit: Joe Cascio

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### Parking Supply Options

Parking spaces can be provided in a number of ways each with a different associated cost. The cost per parking space increases correspondingly as the designs range from the simple to the more complex.

Parking lots are an economical way to accommodate vehicles when land is available. However, in dense, urban environments, surface lots are often under utilizations of land and detract from the density, walkability and sense of place of an area.



Example of a Parking Lot



Example of an open precast parking garage

A free standing, long span, open parking garage is a cost effective way to provide parking. A typical efficiency for an ideal garage of this type could be 325 SF/parking space. The cost effectiveness of this garage type is a function of this efficiency (less square footage to build), its structural system (precast) as well as not needing to be sprinklered or mechanically ventilated. Garages inherently are large buildings and care is required to provide an attractive design that minimizes its scale and is contextual with its surroundings. Parking garage facades can be enhanced to appear to be more building like instead of a utilitarian concrete structure.



Harbor Center, a garage podium w/ hotel & practice rinks above



Ex. underground garage beneath a building under construction

Parking garages can be designed as podiums for other building above. For example, the nearby Harbor Center parking garage has practice rinks as well as a hotel above it. Because of the other use groups above, a podium garage often has more structural columns coming through the parking garage unless expensive transfer beams are utilized. The additional columns result in a

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loss of efficiency. Less cars are able to be parked in a given area. It is not uncommon for parking garage podium efficiencies to be 375 to 400 SF/space range. Construction costs for podium garages are higher than free standing garages. The higher costs stem from higher structural costs, less efficiency (SF/space) and the need to provide sprinklers since the garage is located beneath other occupancy types. Careful coordination is required to optimize the different structural grids for the different occupancies in the mixed use project.

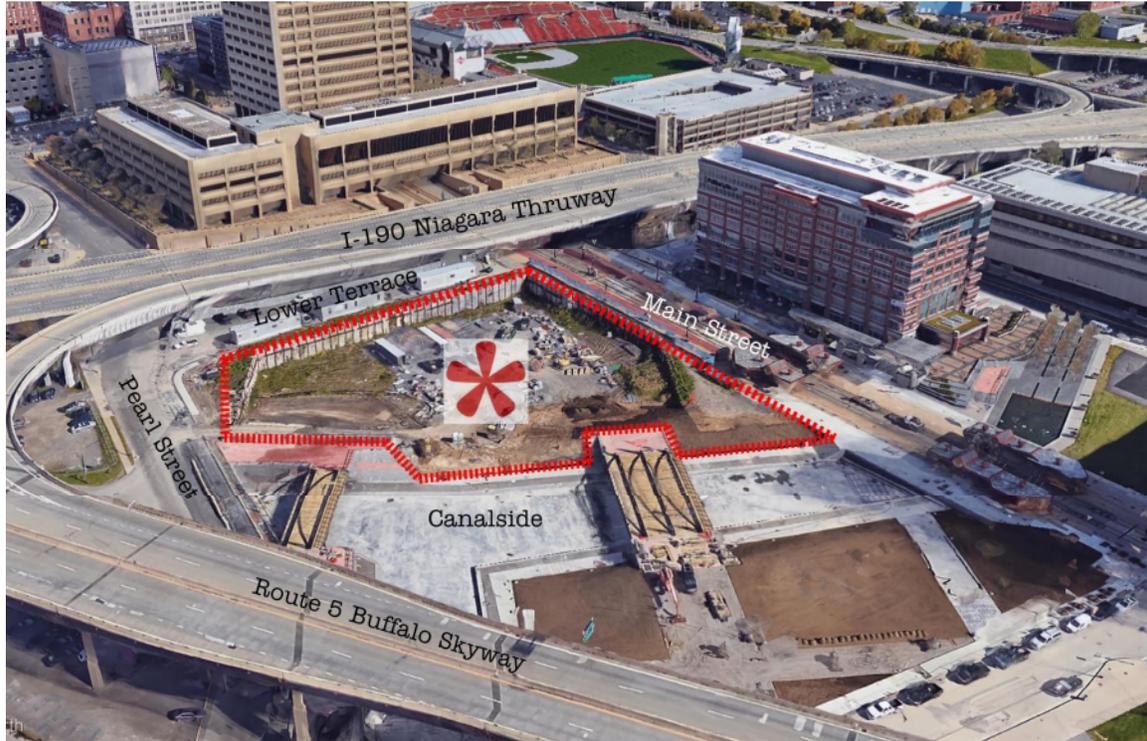
Underground parking beneath buildings is the most expensive way to provide parking. In markets with high land costs (Washington DC, New York City), it is routine to put parking below grade so as to maximize the buildable area above grade. In other markets, underground parking is prohibitively expensive and far less common. An underground parking garage beneath other buildings has all of the cost premiums associated with an above grade podium garage plus additional costs for excavation, perimeter retaining walls, waterproofing and mechanical ventilation. Like the podium garage type, typical efficiencies could be in the range of 375 to 400 sf/space or higher.



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## The Site

The existing triangular shaped North Aud Block site was once home to the Buffalo Memorial Auditorium. Originally, built in 1940, the Aud was demolished in 2009. The site is bounded by Lower Terrace on the north, Canalside on the south, Main Street on the east and Pearl Street on the west.



The parcel area is approximately 1.85 acres (80,545sf). The site slopes upward from the south to the north with approximately a 20 foot change in elevation. There is existing sheeting and shoring along portions of Pearl Street, Lower Terrace and Main Street with the majority of the site already excavated to an elevation consistent with the south end of the site beside the canal.

The South side of the parcel is clearly a major edge of the site as it fronts upon the Canalside public spaces. The south side of the site is situated along the canalside promenades. Two feature bridges over the canals terminate at this side of the site. The design of any buildings fronting on this major public space must be consistent with the unique sense of place that has been achieved thus far. It may not be appropriate for the parking garage portion of any mixed use development to prominently front along this major public people space.

The East side of the parcel along Main Street is also a prominent public edge for any proposed development. The street is important as a connection between the First Niagara Center, Harbor Center, One Canalside and downtown. Presently, the street is restricted to a light rail system, other vehicular traffic is not allowed. In the near future, the street will be opened up to vehicular traffic. Garage building facades, garage vehicular entry/exits and loading docks should not be located along this side of the site. The northeast corner of the site may be considered as a location for a new Amtrak station given its proximity to the railroad tracks that run along the

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north side of the site, depressed below grade. The waiting room could be accommodate at street level with stairs and elevator access to train platforms below.

The north side of the parcel is essential the back side of the site. It is tucked up against the elevated I-190 Niagara Thruway. This side of the site is not pedestrian friendly. The highway overpass acts as a wall between the Canalside area and the downtown. Connections between the two areas occur at the corners of the site via Pearl and Main Streets. This side of the parcel may be an appropriate location of the parking garage. It provides good locations for garage vehicular entry/exits. This side of the site also lends itself to the location of loading docks to serve the other building components of the development such as retail and residential. Proximity to the highway and its associated noise make the north side of the site the least desirable for the location of occupied spaces.

The west side of the site has limited street frontage along Pearl Street. There are no other buildings in the vicinity along Pearl Street. Most of Pearl Street on this side of the site is located beneath the Route 5 Buffalo Skyway, an elevated off ramp and the elevated I-190 Niagara Thruway. There is also a parking lot across the street. This side of the site is not as important as the south and east sides along Canalside and Main Street.

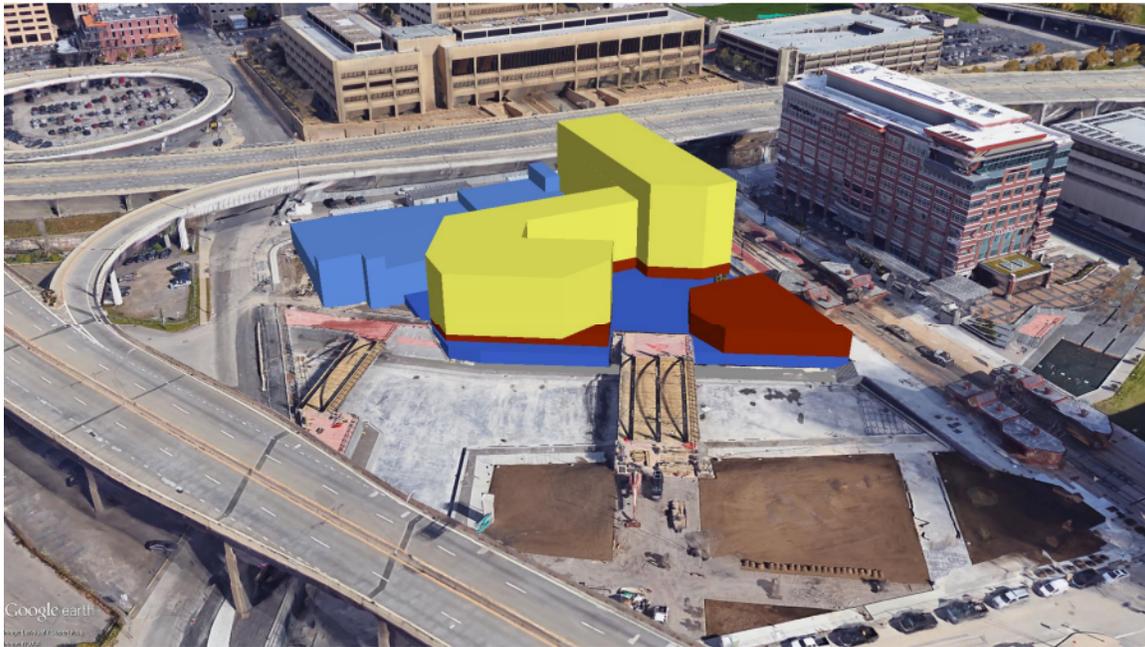
### **The Proposed Development Program**

It is envisioned that a mixed use development will be built on the site. The program for such a development would include structured parking, ground floor retail spaces, and residential building program above on the upper floors. How the various programmatic elements are assembled can have a big cost impact on the project's construction costs.

The development program may consist of a minimum of 300 parking spaces, 40,000 sf of ground floor retail and support spaces and 150,000 sf of residential program.

It has been contemplated that the design and construction of some of the program may be procured through a Public Private Partnership (3P) arrangement. A developer RFP could be issued by the Redevelopment Authority for the ground floor retail and residential components of the project. It is important to understand how each of the following different development strategies help or hinder the design and construction process for the different parts of the programs by different project teams. For purposes of this conceptual study, it is assumed that the parking garage would be built by the Erie Canal Harbor Development Corporation and the mixed use building would be developed by a private developer.

## Option 1: Parking Garage Beside Another Building

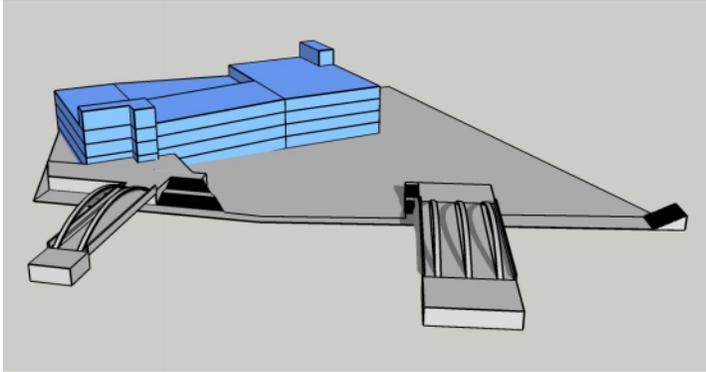


This design strategy involves subdividing the existing parcel into two separate development parcels and building a parking garage **beside** another building. On the northwest quadrant of the site, a free standing, long span, precast parking garage would be built. This garage would provide parking for the public. This garage would be located on the least desirable part of the site and act as a buffer from the noise of the highways to the north and west. The garage vehicular entry/exit lanes would be situated off of the north side of the site. This public garage will provide approximately 402 parking spaces. It will have two levels below grade and three levels above grade. The below grade levels will be considered enclosed and will be required to be sprinklered and mechanically ventilated. The upper above grade levels will be considered open and will not be required to be sprinklered or mechanically ventilated. A main elevator/stair tower would be located at the southwest corner of the site, garage and at the terminus of one of the Canalside pedestrian bridge spans. This would provide convenient access for the parking public from the garage to the Canalside public spaces.

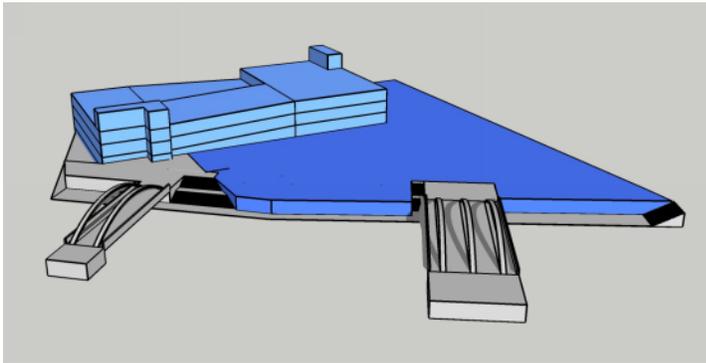
The remaining portion of the site would be available for a mixed use building comprised of a single underground level of private parking (92 spaces), ground floor retail along the canal and Main Street and residential apartments on the upper floors. This building would prominently front on both the canalside and Main Street sides of the site. The height of the building could be taller along Main Street to reflect the taller height of the One Canalside development across the street. The ground floor of the building at the northeast corner of the site would include a potential Amtrak station waiting room as well as a loading dock to serve the retail and residential parts of the building. If an Amtrak Station is not located in the ground floor corner space, a retail space could be provided instead. The underground parking level beneath the building will be a private parking area for residents in the apartment building. This nested parking area would be accessed from the adjacent free standing parking garage using its internal ramping system to access street level.

## Option 1: Precast Garage Beside Mixed Use Building

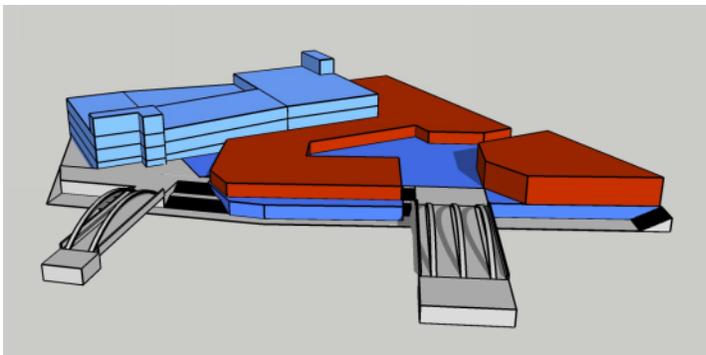
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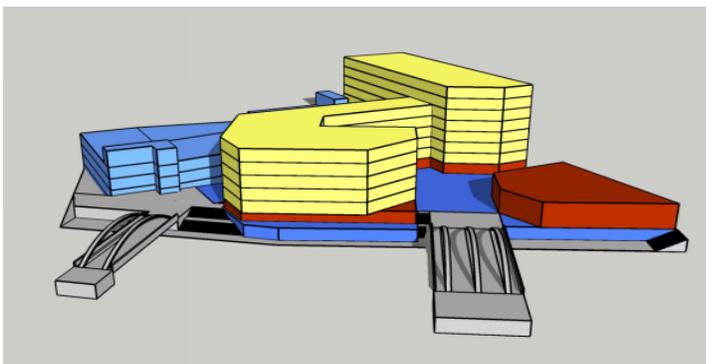
**Phase 1:** Free standing, long span, precast parking garage constructed on the northwest quadrant of the site for public parking. Main Elevator/stair tower from garage at end of a canal bridge.



**Phase 2:** A mixed use building by private developer constructed adjacent to the precast parking garage. The mixed use building consists of one level of private resident parking (shown in dark blue), ground floor retail and residential apartments on upper floors.



**Phase 2:** Ground floor retail spaces shown in crimson. Northeast corner of site could include an Amtrak station. Public spaces provided along canalside and at terminus of canal bridges.



**Phase 2:** Residential units provided on upper floors of mixed use building. The building wing along Main Street can be taller to correspond with the building across the street. Mixed use building screens the parking garage from public view.

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Some of the benefits of this development strategy of a free standing garage built beside another mixed use building are as follows:

- **Cost effective/Maximum Efficiency.** This arrangement allows for each building to be optimized without impacting or compromising each other. The free standing, long span precast parking garage can be of maximum efficiency. A precast structural system is durable and cost effective. The above grade portions of the garage do not have to be sprinklered or mechanically ventilated.
- **More Parking Spaces.** This garage design with some parking levels above grade allows for a greater number of parking spaces to be provided than if parking levels are limited to below grade only. The number of spaces is a function of how many levels above grade to provide. If too many levels are provided above grade, it will impact the views from the other building wing located along Main Street. The proposed design would provide approximately 402 public parking spaces in the public garage as well as potentially another 92 spaces of private parking underneath the building reserved for residents.
- **Future Vertical Expansion Capability.** The parking garage foundations and superstructure can be easily designed to accommodate for future vertical expansions. This provides flexibility for future parking demands.
- **Simple Concept, Limited Coordination with other Building.** This parking garage design strategy is not integrated with the adjacent building. There is minimal coordination needed between the two buildings. Both can be designed and built independently of each other. This will be helpful if each building is designed and constructed by different design teams.
- **Clear Ownership & Simple Cost Allocations.** Since this concept consists of two independent buildings built beside each other, ownership of each is clear and simple. Shared costs that need to be allocated amongst different parties are minimal to none. There will be no complex ownership or maintenance responsibilities to negotiate.
- **Independent Construction Schedules.** Since this strategy has two independent buildings beside each other, the delivery of each can occur on its own time table. The development of the site can occur in separate phases.
- **Construction Duration.** Precast parking garages have shorter construction durations than other parking garages with different structural systems. The schedule can be compressed in that the precast elements can be fabricated off site while the foundations are being constructed. The precast erection on site can occur quickly.

Some of the consequences of this development strategy of a free standing garage built beside another mixed use building are as follows:

- **Exposed Garage Facades Above Grade.** This option has portions of the parking structure as an above grade open garage. Some people find garages visually objectionable. Additional costs may be required to provide upgraded or aesthetically enhanced garage facades that are visible to the public. However, in this option, the garage is located on the less desirable, less pedestrian oriented side of the site which is adjacent to highway overpasses and parking lots. Aesthetic enhancements to the garage facades may not need to be as substantial compared to if the garage fronted on a more primary side of the site. The main stair/elevator tower that does front on the canalside will have some upgraded design elements such as glass backed elevator and lobbies enclosed with curtainwall.

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- **Potential for Time Delays Between Phases.** The garage may be design and constructed in an initial phase. Two of its side are intended to be obscured by the other mixed use building. If this second building is not built at the same time or is delayed for a period of time, an interim condition could result in two sides of the garage being unintendedly exposed to public view. If the time delay is substantial, then interim aesthetic improvement to the exposed garage sides may be implemented.



Example of a Parking Garage without planned building intended to wrap garage sides.

- **Foundations alongside the Other Building.** If the two buildings are designed at the same time, a shared foundation could be designed between the two buildings. If they are designed independently then the foundations of each would need to be designed as eccentrically loaded foundations. There is a cost premium associated with eccentrically loaded foundations.



58 PUBLIC SPACES  
 92 PRIVATE SPACES  
 EL580

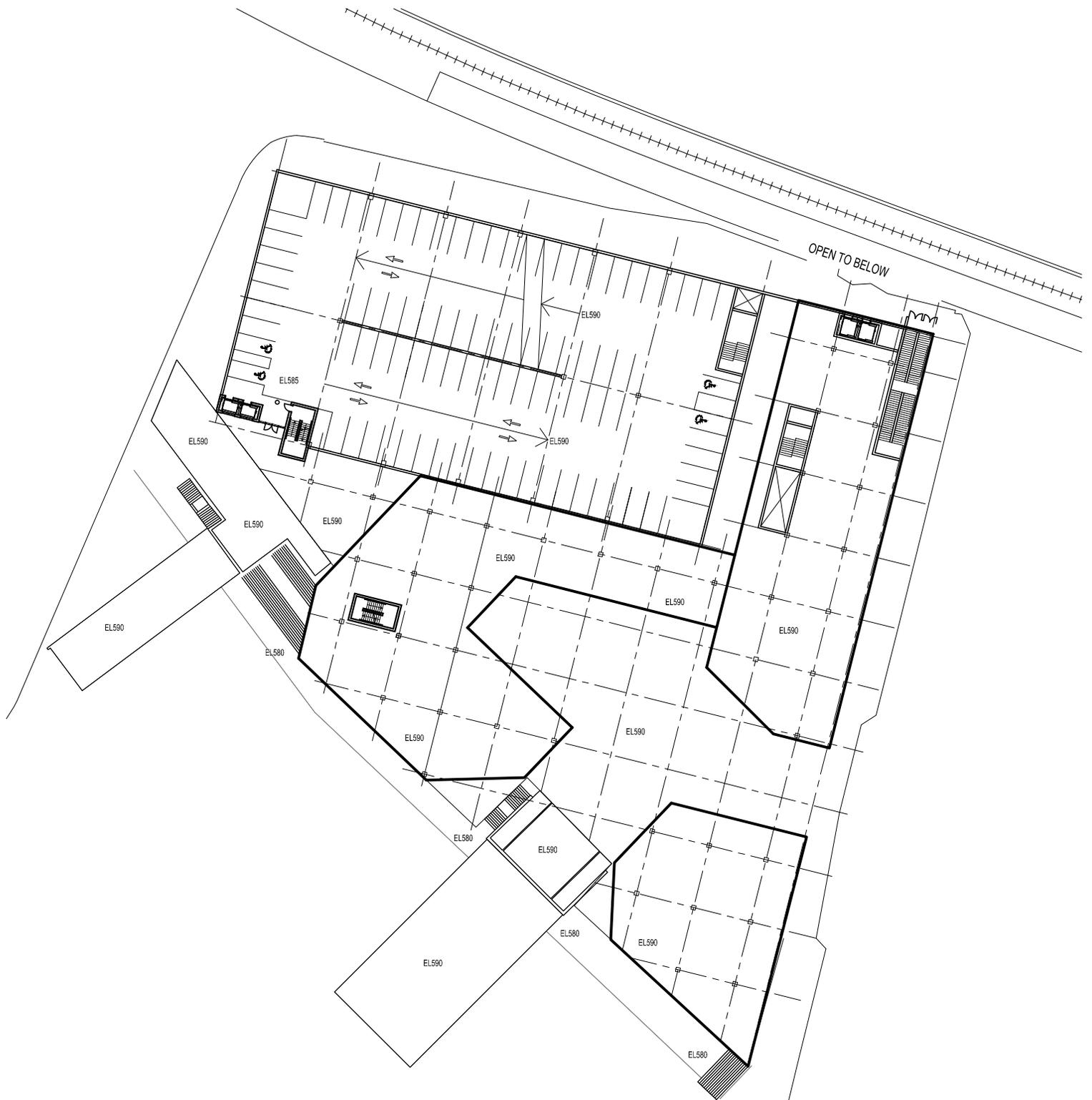
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**Proposed Mixed Use Development  
 Canalside Buffalo NY**

Option 1 - Stand Alone Garage  
 Parking Level B2 plan

Project No.	216119.00
No Scale	01/30/2017
WFK	EPM
<b>OPT1-01</b>	



89 PUBLIC SPACES  
EL590

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THG

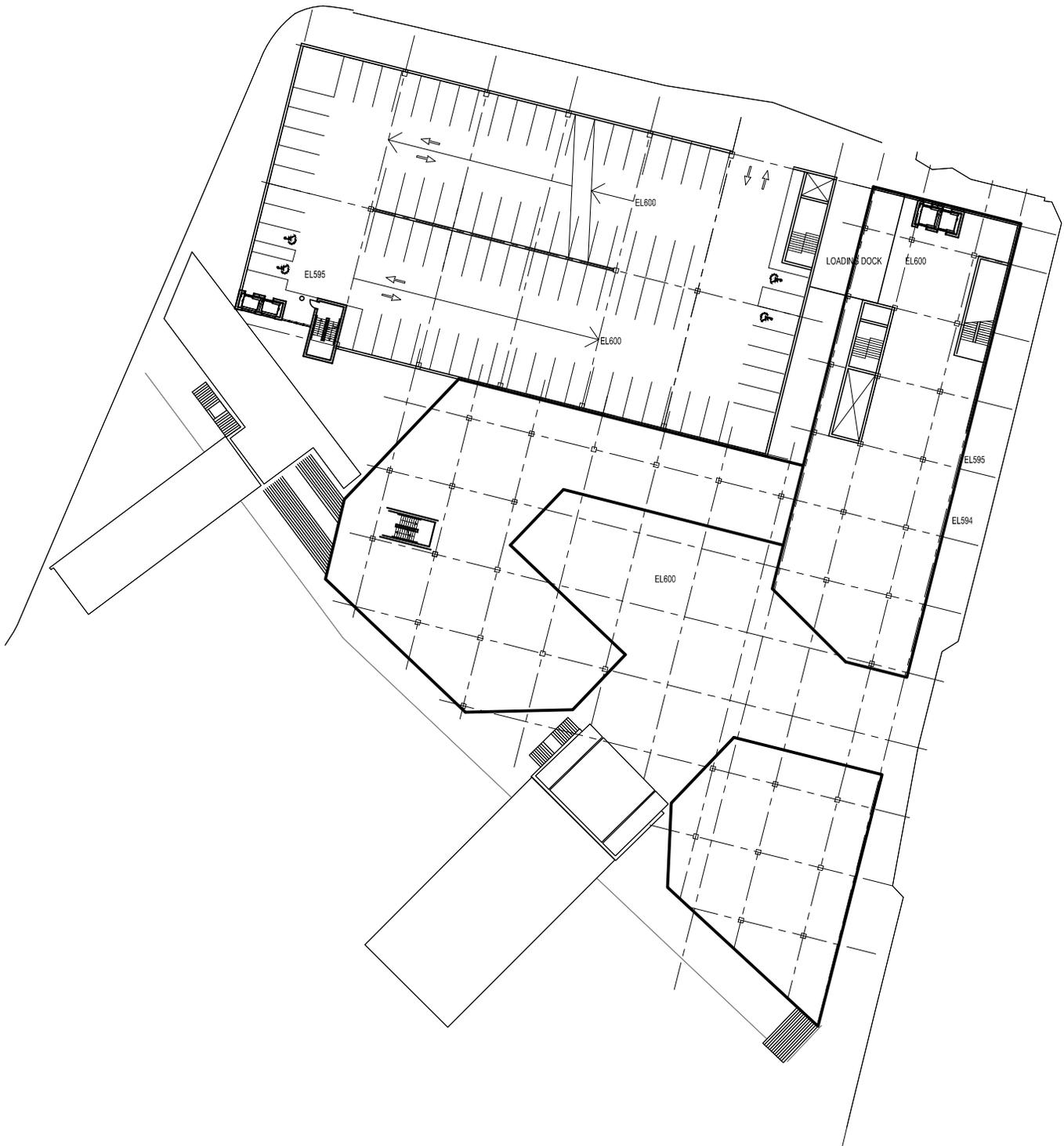
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Proposed Mixed Use Development  
 Canalside Buffalo NY

Option 1 - Stand Alone Garage  
 Parking Level B1 Plan

Project No.	216119.00
No Scale	01/30/2017
WFK	EPM

OPT1-02



86 PUBLIC SPACES  
EL600

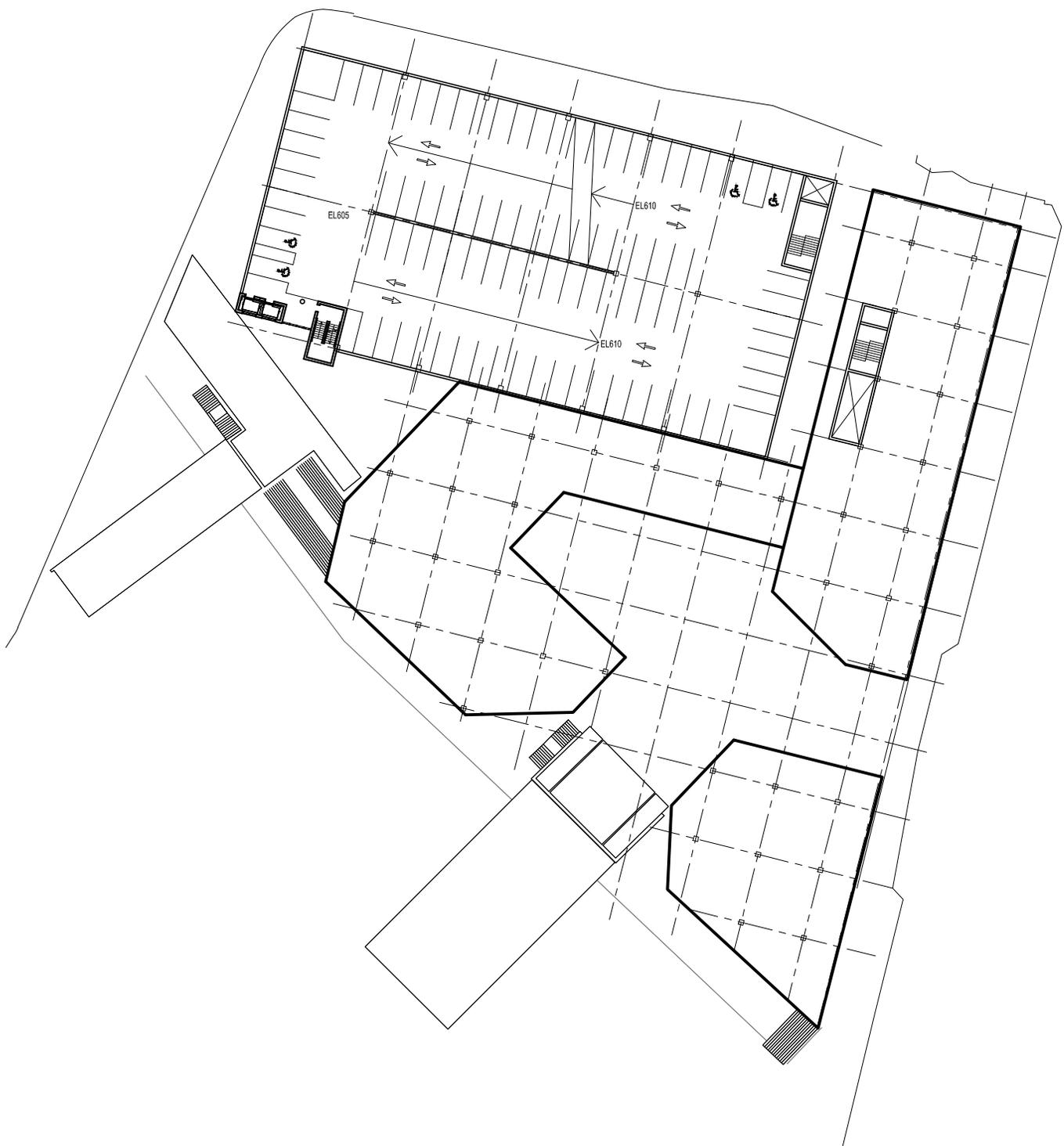
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**Proposed Mixed Use Development  
 Canalside Buffalo NY**

**Option 1 - Stand Alone Garage  
 Parking Ground Level Plan**

Project No.	216119.00
No Scale	01/30/2017
WFK	EPM
<b>OPT1-03</b>	



89 PUBLIC SPACES  
EL610

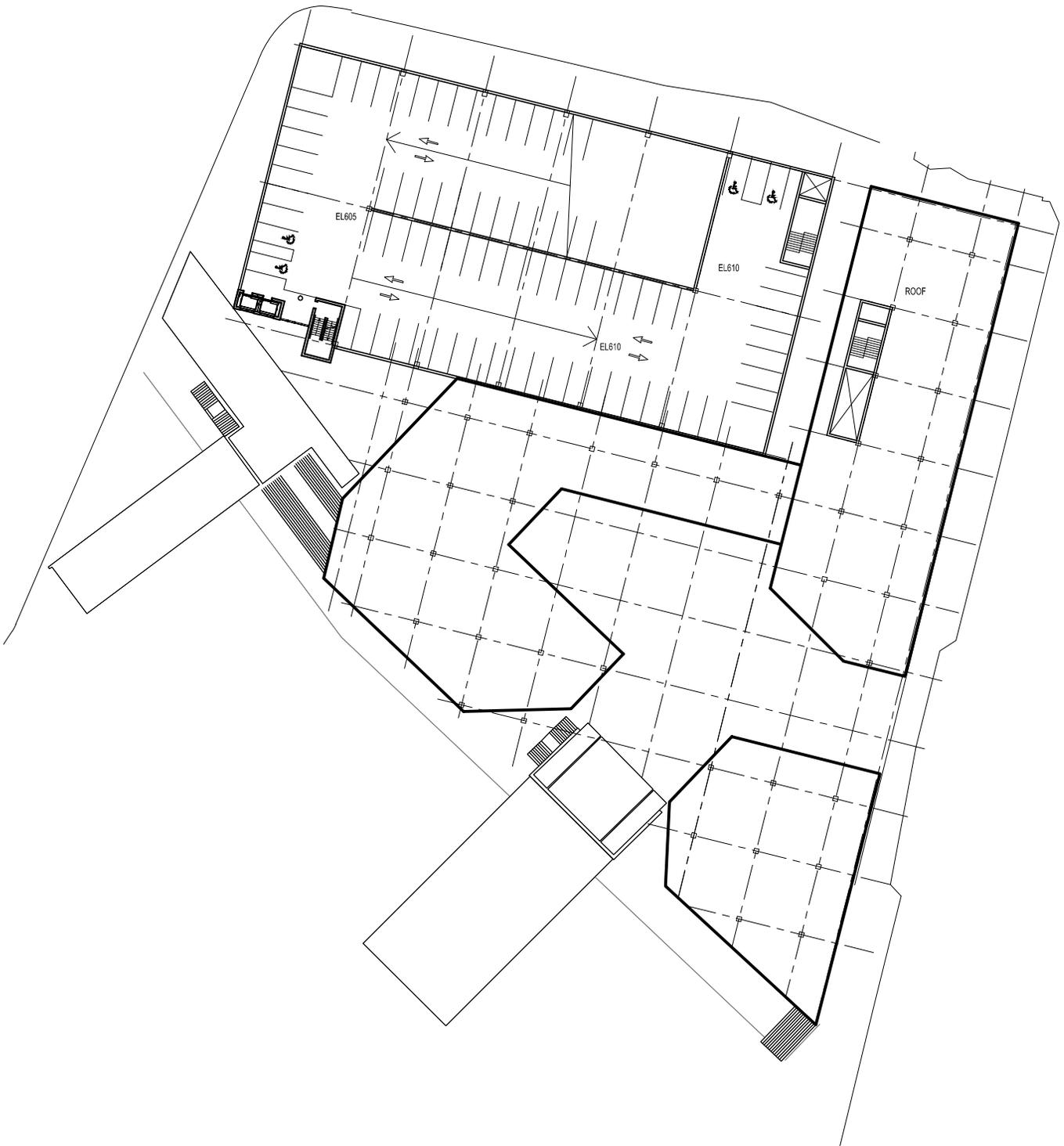
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**Proposed Mixed Use Development  
 Canalside Buffalo NY**

Option 1 - Stand Alone Garage  
 Parking Level 2 Plan

Project No.	216119.00
No Scale	01/30/2017
WFK	EPM
<b>OPT1-04</b>	



80 PUBLIC SPACES  
EL620

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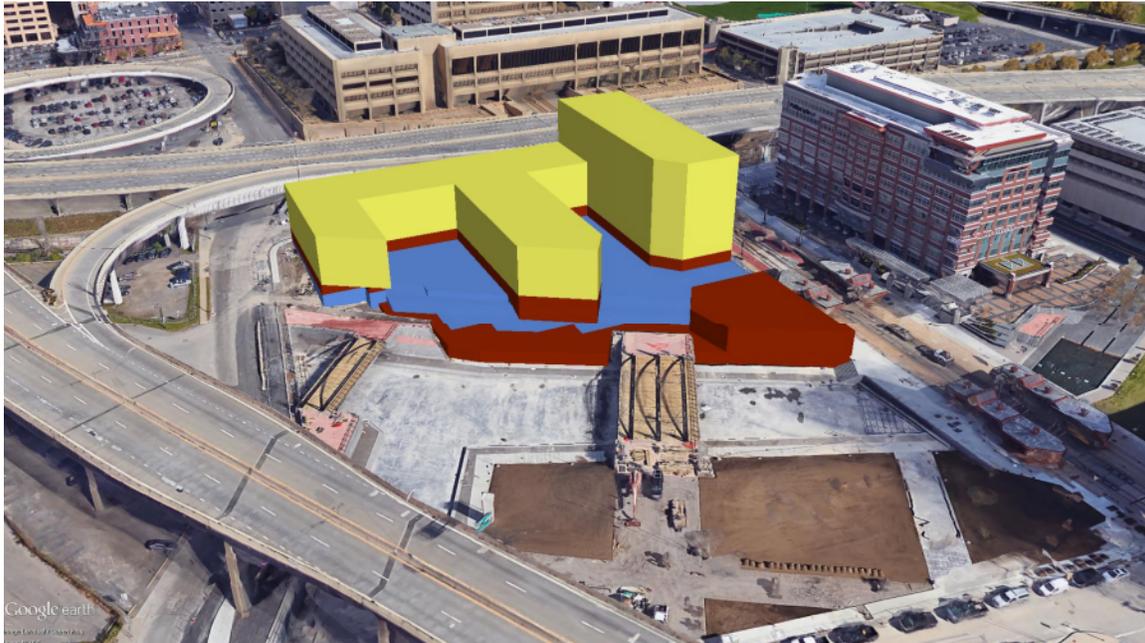
Proposed Mixed Use Development  
 Canalside Buffalo NY

Option 1 - Stand Alone Garage  
 Parking Level 3 Plan

Project No.	216119.00
No Scale	01/30/2017
WFK	EPM

OPT1-05

## Option 2: Parking Garage as Podium Beneath Another Building



This design strategy involves constructing a two level garage across most of the existing site to serve as a base or podium for other buildings and plaza to be built above it. Retail spaces would front along the canalside of the site. This below grade or underground parking garage will provide parking for approximately 294 spaces. It will be required to be fully sprinklered and mechanically ventilated. The garage structure would be designed to support the buildings above as well as the plaza spaces in between the building wings. The mixed use building or buildings above this garage podium would consist of ground floor retail spaces and residential apartment on the upper floors.

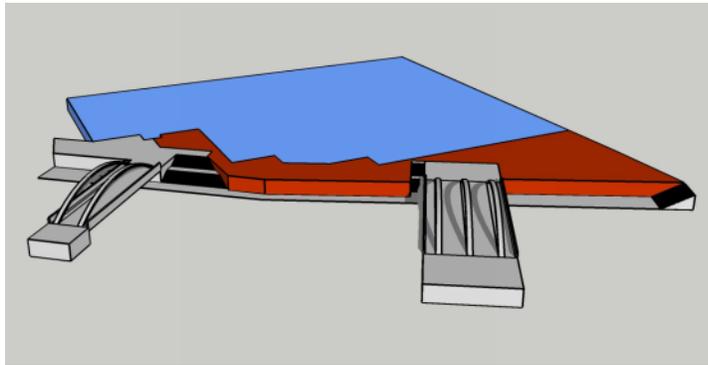
This building or buildings would have frontage on both the canalside and Main Street sides of the site. The height of the building could be taller along Main Street to reflect the taller height of the One Canalside development across the street. The ground floor of the building at the northeast corner of the site would include a potential Amtrak station waiting room as well as a loading dock to serve the retail and residential parts of the building. If an Amtrak Station is not located in the ground floor corner space, a retail space could be provided instead.

Some of the benefits of this development strategy of a garage podium built below other mixed use buildings are as follows:

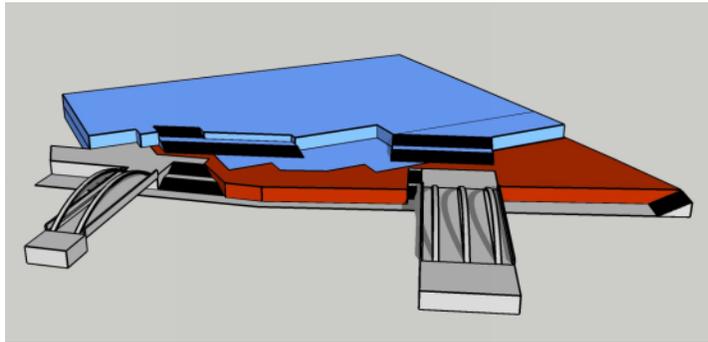
- **Parking Garage Hidden from Public View.** This arrangement locates all of the parking spaces underground. The only visible garage program would be a vehicular entry/exit

## Option 2: Parking Garage Podium with Buildings Above

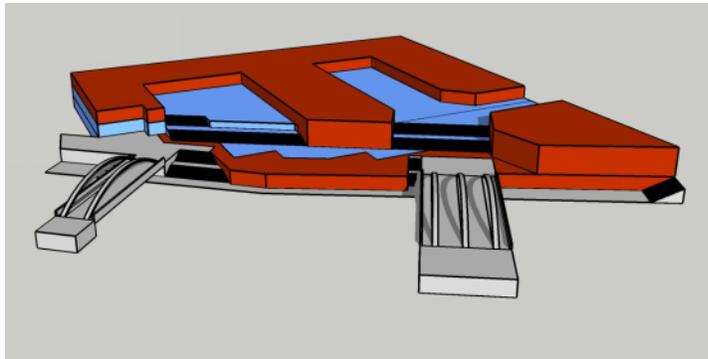
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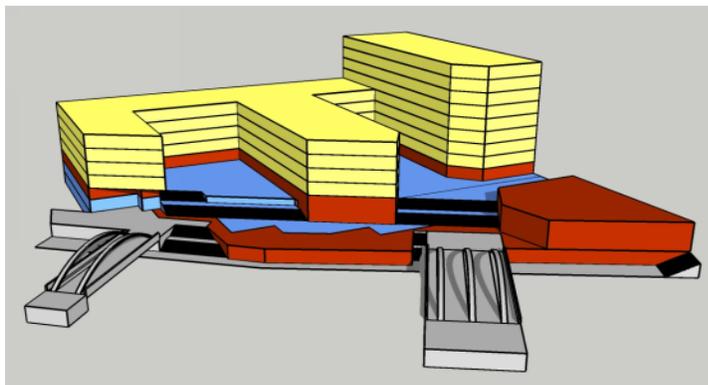
Parking garage B2 level (blue) constructed on majority of site. Retail spaces (crimson) provided along canalside.



Parking garage B1 level (blue) constructed on majority of site.



Ground floor retail spaces (crimson) constructed on top of parking garage. Public plaza spaces provide between building wings.



Residential built on upper floors. The building wing along Main Street can be taller.

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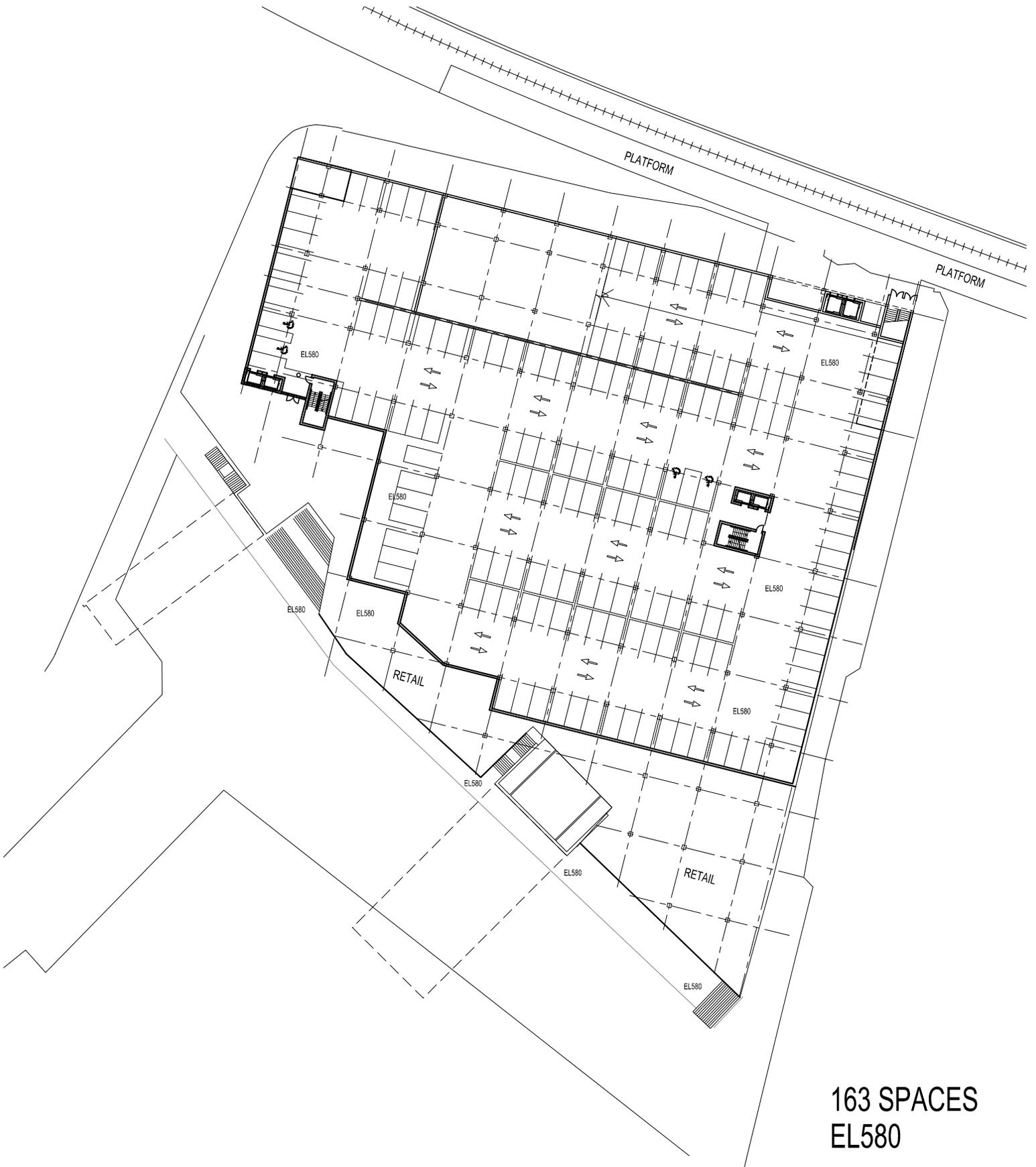
- portal from Pearl Street. A speed ramp would lead down to the lower parking levels from the street.
- **Maximizes Potential Non-Garage Development above Grade.** With all of the parking below grade, the maximum development envelope above grade can be dedicated to non-garage program such as retail and residential. Option 1 allocates some of this above grade square footage to parking garage area.

Some of the consequences of this development strategy of a garage podium built below other mixed use building are as follows:

- **Higher Construction Costs/Lesser Efficiency.** This arrangement requires a short span structural system where the column bay spacing (ex. 30ft x 30ft) is tighter than a long span structural system (ex. 36ft x 60ft). In a short span system, there will be rows of columns at the ends of parking stalls to support the buildings and plaza areas above the garage levels. The structure will likely be a cast in place concrete structure which costs more per SF than precast concrete construction. The additional columns, shear walls and elevator cores for the buildings above will result in a poorer parking efficiency than in Option 1. The square footage per parking space will be greater. In addition, for comparable concrete durability to precast concrete, the cast in place concrete structure should have an elastomeric traffic membrane on the supported floors but not the slab on grade. The entire garage area will also need to be sprinklered and mechanically ventilated since it is underground. Higher cost structural system, poorer efficiency (SF/parking space), traffic membrane, sprinklers and mechanical ventilation will result in higher construction costs per parking space for this parking garage design scenario.
- **Limited Number of Parking Spaces.** The maximum number of parking spaces with this design scenario is limited to how many will fit in the two underground parking levels. This will be approximately 294 spaces. Depending upon how much residential is built above, a significant number of the parking spaces may be reserved for the residents resulting in very few public spaces for visitors to the Canalside district.
- **No Future Vertical Expansion Capability.** Vertical expansion of the parking garage is prevented by the buildings that will be built atop the parking garage podium.
- **Complex Concept, Significant Coordination with other Buildings.** This parking garage design strategy integrates the garage design with the design of the building above. Design of both the garage levels and buildings above should occur at the same time given the amount of coordination required. The structure of the buildings above must be coordinated with the garage column grids. The foundations will need to be designed to carry the loads of both the garage and building above. It is essential to know the structural system of the buildings above as well as the number of floors. Designing the garage structure to have the flexibility to accommodate some future potential loads of another undetermined building will involve guesses and conservative assumptions that still may require considerable rework when actually built. Other coordination issues include MEP services, lateral systems for the building above, waterproofing between the garage and plazas above, building MEP penetrations into the garage (sanitary traps, etc.), fire separations, insulation or heated ceiling/soffit between garage and buildings above, etc.
- **Complex Delineation of Ownership & Complex Cost Allocations.** Since this option involves the integration of the garage with the buildings above, allocation of construction costs to multiple owners will be a challenging exercise. The following are some of the component costs that need to be proportionately allocated: foundations, superstructure,

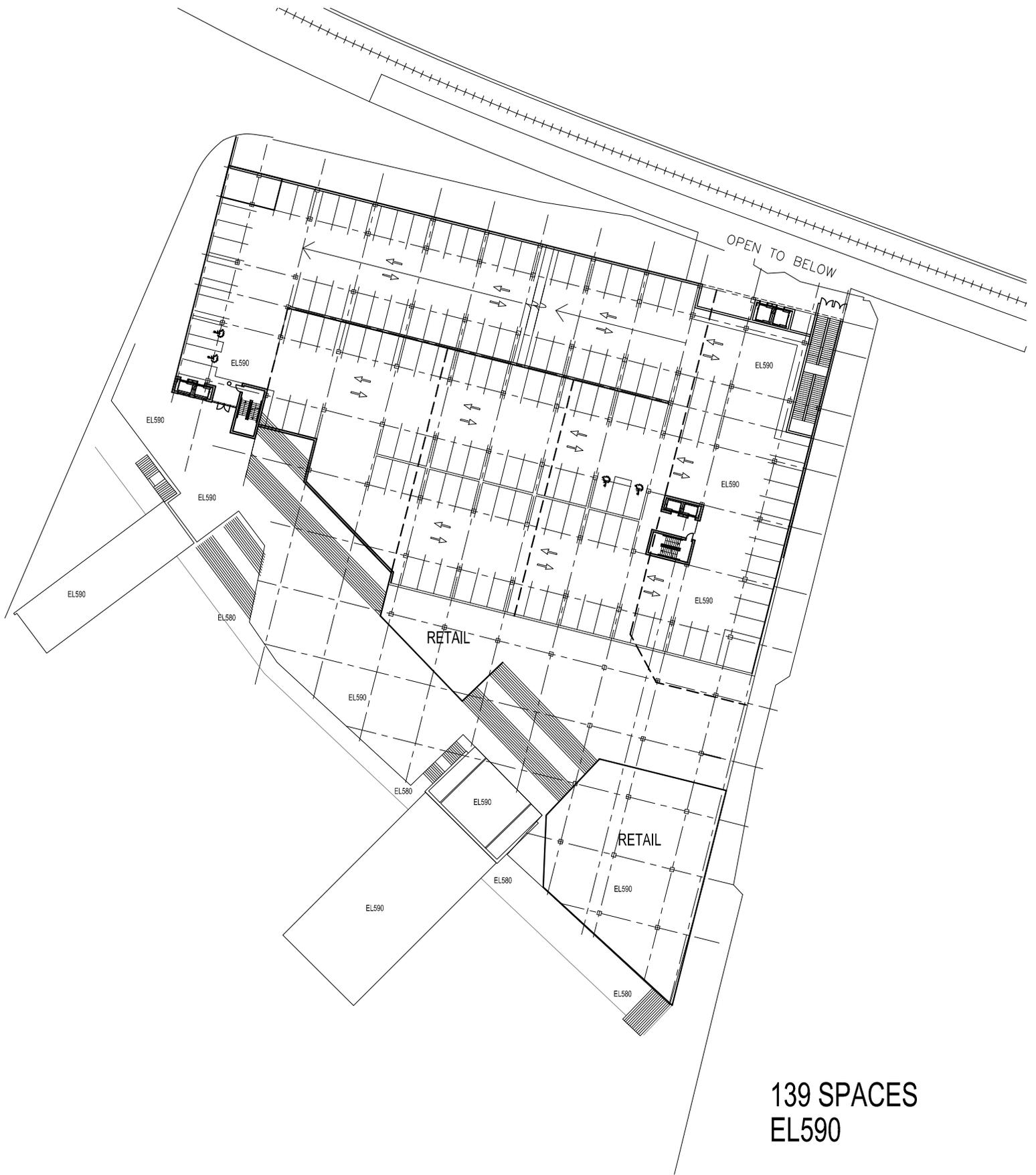
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- utility services, emergency generator, waterproofing, etc. There will be complex negotiations regarding ownership delineations and maintenance obligations and responsibilities between owners. For instance, who owns the ground floor structure between the garage and the building above? If it is part of the building, then who should pay for the plaza waterproofing which obviously benefits the parking garage below? What happens if there are leaks or when it comes time to replace the waterproofing and the plaza areas need to be torn up and disrupts access to the ground floor retail spaces?
- **Independent Construction Schedules.** Since this strategy integrates the garage with the buildings above, the delivery of each is intertwined with the other. The development of the project needs to occur simultaneously.
  - **Construction Duration.** The construction of this garage will take longer than the erection of a precast parking garage under Option 1. The integration of the garage and building will likely preclude the garage being constructed independently of the buildings above. Phasing of the different parts of the project is unlikely.
  - **Proximity to Noise of Highway.** This option places more development in closer proximity to the I-190 elevated highway on the northside of the site. The noise from this highway could impact the residential units that are closest unless special construction provisions are incorporated into the design.



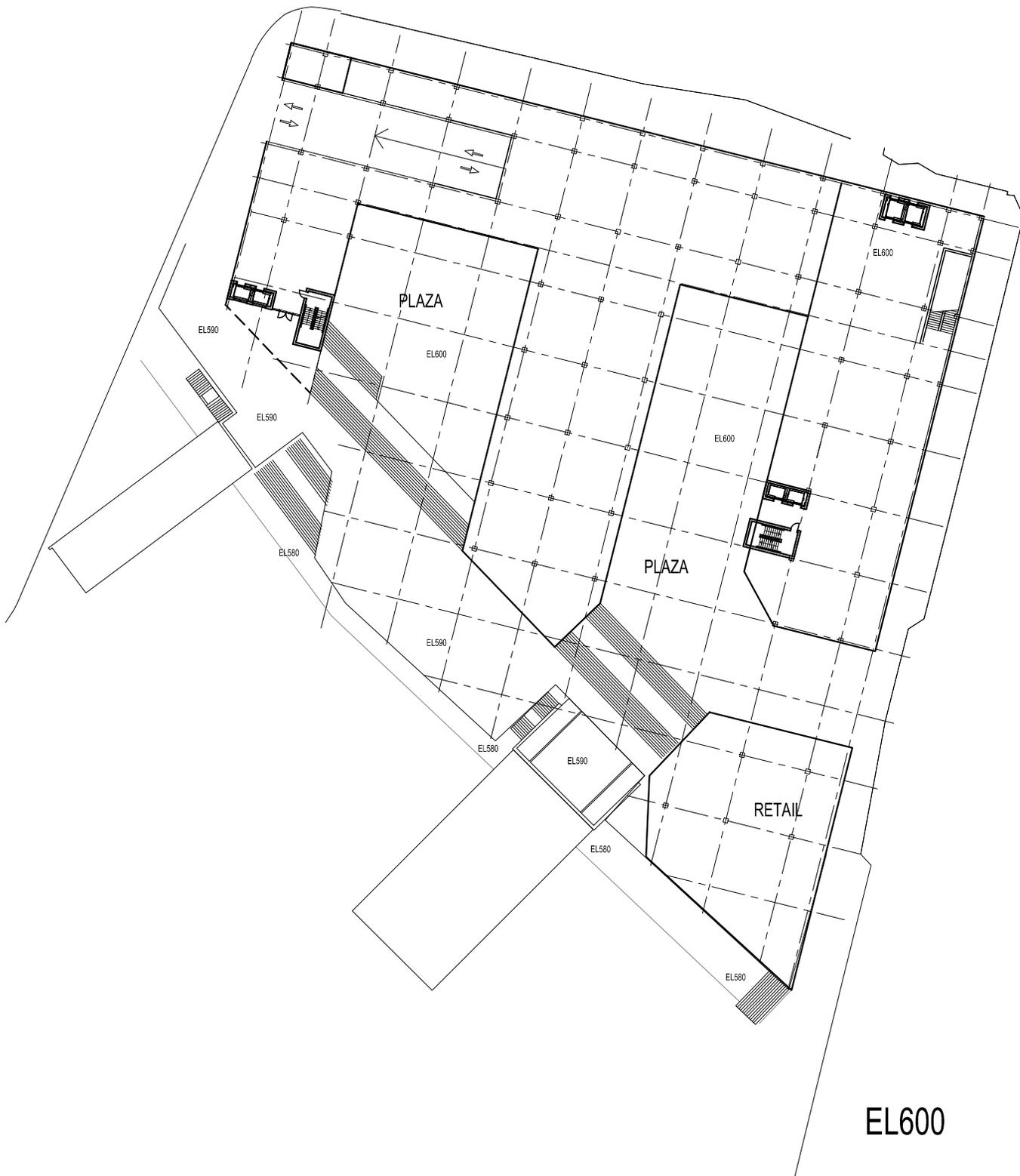
163 SPACES  
EL580

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	<b>Option 2 - Podium Garage w/ Mixed Use Above          Parking Level B2 plan</b>		No Scale	01/30/2017
WFK			EPM	
			<b>OPT2-01</b>	



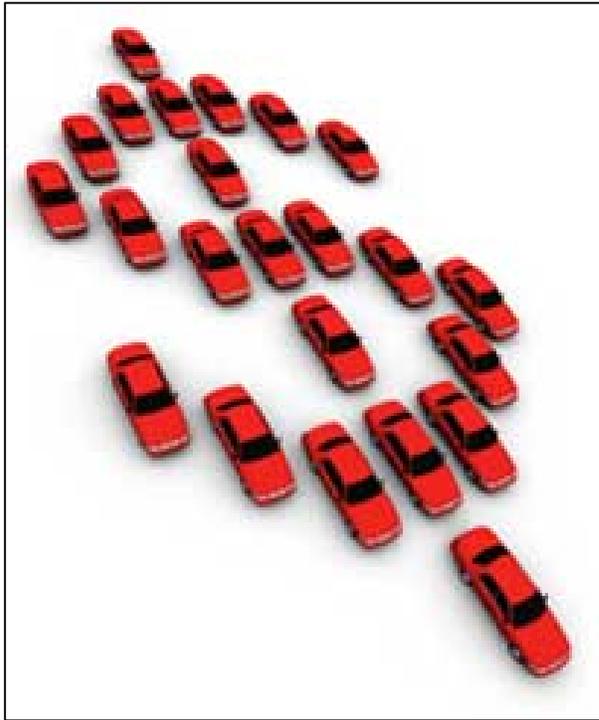
139 SPACES  
EL590

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	<b>Option 2 - Podium Garage w/ Mixed Use Above</b> <b>Parking Level B1 Plan</b>		No Scale	01/30/2017
WFK			EPM	
			<b>OPT2-02</b>	



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			No Scale	01/30/2017
Option 2 - Podium Garage w/ Mixed Use Above Plaza Level Plan			WFK	EPM
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### Order of Magnitude Construction Cost Estimate



As previously mentioned, how the various programmatic elements of a development are assembled or arranged can have a big cost impact on the construction costs of the project. The focus of this study was on the structured parking portion of a mixed use development on this site. It has been assumed that the public parking garage portion of any project would be developed by the Erie Canal Harbor Development Corporation and rest of the building program namely private parking, retail and residential would be delivered by a private developer. The following Order of Magnitude Construction Cost Estimates are only for the public parking garage portions of each option. The cost of the non-garage building(s) has not been estimated as part of this exercise.

The two development options presented in this report result in significantly different construction costs for the parking spaces. The Option 1 public garage provides approximately 402 parking spaces for approximately \$10.5 million which is about \$26,000 per parking space. This is exclusive of the potential 92 private parking spaces that could be built beneath the building.

The Option 2 garage provides approximately 294 parking spaces for approximately \$10.9 million which is about \$37,000 per parking space. Option 2 potentially may have additional garage costs as some of the scope of work items are allocated between the building above and the garage below. For instance, the ground floor of the building is also the ceiling or “lid” of the garage. Some of this structural cost and plaza waterproofing could be attributed to the garage scope.

The Option 2 cost per parking space could be at least \$11,000 more than the Option 1 scenario. This is equivalent to a 42% premium per parking space. For approximately the same construction cost (\$10.5 vs \$10.9 million), Option 1 provides about 108 more parking spaces.

**Option 1 - Order of Magnitude Construction Cost Estimate**

Free Standing, Long Span Precast Public Parking Garage beside Mixed Use Residential Building with private parking

	Level	SF	Spaces	
El 620	3	24,543	80	Open Garage
El 610	2	28,910	89	Open Garage
El 600	G	28,910	86	Open Garage
El 590	B1	28,910	89	Enclosed Garage
El 580	B2	21,653	58	Enclosed Garage
		<u>132,926</u>	<u>402</u>	330.7 sf/space

**Base Parking Garage**

Area of Precast	104,016 sf	
Precast Unit Cost	\$35.00 sf	Sidley Precast & High Concrete
Cost of Precast	\$3,640,560	50% of garage cost
<b>Total Cost of Base Garage</b>	<b>\$7,281,120</b>	2X precast cost
Total Cost per SF of Base Garage	\$54.78	
Cost per Parking Space	\$18,112	

**Site Preparation**

**New Sheeting/Shoring along Pearl St**

55ft x 20ft high =	1,100 sf
115ft x 15ft high =	1,725 sf
92ft x 10ft high=	920 sf
	<u>3,745 sf</u>

Sheeting/Shoring Unit Price	\$75.00 per SF
<b>Cost of New Sheeting/Shoring</b>	<b>\$280,875</b>

**New Excavation along Pearl Street**

Area	6,600 sf
Average Depth	15 ft
Volume	99,000 ft3
Volume	3,667 CY
Unit Price	\$50.00 per CY
<b>Cost of New Excavation</b>	<b>\$183,333</b>

**Wall Waterproofing**

Existing Shoring 184ft x 20ft high	3,680 sf
New Shoring	3,745 sf
<b>Total Shoring</b>	<b>7,425 sf</b>
Unit Price	\$10.00 per sf
<b>Cost of Waterproofing</b>	<b>\$74,250</b>

**Concrete Wall - One Sided**

Wall Area	7,425 sf
Unit Price	\$70.00 per sf
<b>Wall Cost</b>	<b>\$519,750</b>

**Site Preparation Total**

**\$1,058,208**

**Additional Garage Costs**

	SF	\$/SF	total
Sprinklers	50,563	\$4.00	\$202,252
Mechanical Ventilation	50,563	\$2.00	\$101,126
Enclosed Stairs at B1 & B2			\$50,000
Architectural Upgrade - thin brick	8,484	\$14.00	\$118,776 404lf x 7ft high x 3 levels
Architectural Upgrade -curtainwall			\$100,000 curtainwall at Canalside elevator/stair tower
			<b>\$572,154</b>

**Base Parking Garage**

\$7,281,120

**Site Preparation along Pearl Street**

\$1,058,208

**Additional Garage Costs**

\$572,154

	<b>\$8,911,482</b>	\$22,168	per space	\$67.04 per sf
<b>15% Contingency</b>	\$1,336,722			
<b>Total</b>	<b>\$10,248,205</b>	\$25,493	per space	\$77.10 per sf
<b>say</b>	<b>\$10,500,000</b>	<b>\$26,000</b>	<b>per space</b>	<b>\$78.99 per sf</b>

**ADD ALTERNATE: GREEN ROOF**

	SF	\$/SF	
Precast superstructure 100 psf Live Load	28,910	\$45	\$1,300,950
Thin Brick 404 lf x 7'-0" high	2,828	\$14	\$39,592
Elevator stops	3	\$20,000	\$60,000
Curtainwall	540	\$100	\$54,000
Waterproofing & Green Roof Assembly	28,910	\$50	\$1,445,500

**\$2,900,042 \$100.31 per sf**

**\$13,400,042 \$33,333 per space**

\$82.80 per sf

**Private Parking Underneath Building**

	SF	Spaces	
B2	37,101	90	412.2 sf/space

**Option 2 - Order of Magnitude Construction Cost Estimate**

Underground Short span, cast in place concrete, Parking Garage beneath Mixed Use Residential Building above

	Level	SF	Spaces		
EI 600	G	4,782	0	Enclosed Garage	CIP Conc Struct at ramp only
EI 590	B1	52,415	139	Enclosed Garage	CIP Concrete Structure
EI 580	B2	60,534	163	Enclosed Garage	slab on grade
		117,731	302		probably will be closer to 400 sf/space
		say	294		

**Base Parking Garage**

Area of Garage Superstructure	57,197 sf
CIP concrete unit price	\$50.00 sf
Cost of Garage superstructure	\$2,859,850
Balance of Garage Construction	\$30.00 per sf
Total Area of Garage	117,731
Cost of Garage without superstructure	\$3,531,930.00
<b>Total Cost of Base Garage</b>	<b>\$6,391,780</b>
Total Cost per SF of Base Garage	\$54.29
Cost per Parking Space	\$21,741

**Site Preparation**

**New Sheeting/Shoring at corners**

55ft x 20ft high =	1,100 sf
115ft x 15ft high =	1,725 sf
92ft x 10ft high=	920 sf
170ft x 12.5 ft high	2,125
	5,870 sf
Sheeting/Shoring Unit Price	\$75.00 per SF
<b>Cost of New Sheeting/Shoring</b>	<b>\$440,250</b>

**New Excavation at corners**

6,600sf x 15ft deep = 99,000ft3/27	3,667 CY
7,500 sf x 10ft high = 75,000 ft3/27	2,778 CY
	6,445 CY
Unit Price	\$50.00 per CY
<b>Cost of New Excavation</b>	<b>\$322,250</b>

**Wall Waterproofing**

Existing Shoring 265ft x 20ft high	5,300 sf
Existing Shoring 180 LF x 17.5ft high	3150
New Shoring	5,870 sf
<b>Total Shoring</b>	<b>14,320 sf</b>
Unit Price	\$10.00 per sf
<b>Cost of Waterproofing</b>	<b>\$143,200</b>

**Concrete Wall - One Sided**

Wall Area	14,320 sf
Unit Price	\$70.00 per sf
<b>Wall Cost</b>	<b>\$1,002,400</b>

**Site Preparation Total** **\$1,908,100**

Additional Garage Costs	SF	\$/SF	total
Sprinklers	117,731	\$4.00	\$470,924
Mechanical Ventilation	117,731	\$2.00	\$235,462
Enclosed Stairs at B1 & B2			\$50,000
Traffic Membrane on supported structure	57,197	\$7.00	\$400,379
			<b>\$1,155,092</b>

<b>Base Parking Garage</b>	<b>\$6,391,780</b>		
<b>Site Preparation along Pearl Street</b>	<b>\$1,908,100</b>		
<b>Additional Garage Costs</b>	<b>\$1,155,092</b>		
	<b>\$9,444,102</b>	\$32,123	per space
<b>15% Contingency</b>	\$1,416,615		\$80.27 per sf
<b>Total</b>	<b>\$10,860,717</b>	\$36,941	per space
say	<b>\$10,878,000</b>	<b>\$37,000</b>	<b>\$92.40 per sf</b>

**Garage Lid/Building Ground Floor**

Building Foundations	?
Building Lateral Systems	?
Structural Allowance for Coordination	?
Plaza Waterproofing	?
Loss of parking spaces	?
MEP coordination between building and garage	?

### **Construction Schedules**

Option 1 offers a simple, straight forward development strategy that can be realized fairly quickly. The public parking garage can be phased, completely independent from the other mixed use building. This precast parking garage could be designed and documented in 4 to 6 months, bid in 2 months and constructed in 12 months or less. Overall duration could be in the 18 to 20 month range comfortably. A slightly more aggressive schedule is possible. Precast concrete erection is less sensitive to impact from winter than on site, cast in place concrete construction.

Option 2 is a much more complex, integrated development strategy between the parking garage podium and the building(s) above. The design of the parking garage is intertwined and dependent upon the design of the buildings above. It is further complicated by the potential different ownership entities and potentially different design teams. The schedule for the design and construction of Option 2 could easily be twice as long as Option 1.

Canalside Structured Parking Garage  
North Aud Block (Parcel 1), Buffalo NY  
Concept Design Report

**Conclusion**

How the various programmatic elements of a development are assembled or arranged can have a big cost impact on the construction costs of the project. This is especially true for structured parking. The option 1 design strategy will result in an estimated cost of construction of about \$26,000 per parking space. The option 2 design strategy could be approximately \$37,000 per parking space or more. The benefits of Option 1 are numerous in addition to being more cost effective than Option 2.

The Option 1 strategy proposes a free standing, long span, precast parking garage beside a residential mixed use building. This garage configuration is cost effective due to its durable precast structural system, efficiency (sf/space) and reduced area that is required to be sprinklered and mechanically ventilated. In addition, it provides more parking spaces, potential for future vertical expansion, simplicity in design & construction, minimal coordination efforts, clear delineation of ownership and shortest schedule duration. Any potential opposition to above grade parking is minimized by where the garage is located on the site. The exposed garage facades front on the back sides of the site, that are adjacent to elevated highways, beneath an off ramp and across from a surface parking lot. The garage acts as a buffer between the highways and the other residential building and public spaces along Canalside and Main Street. Option 1 garage clearly has significantly more benefits than the Option 2 garage design strategy.