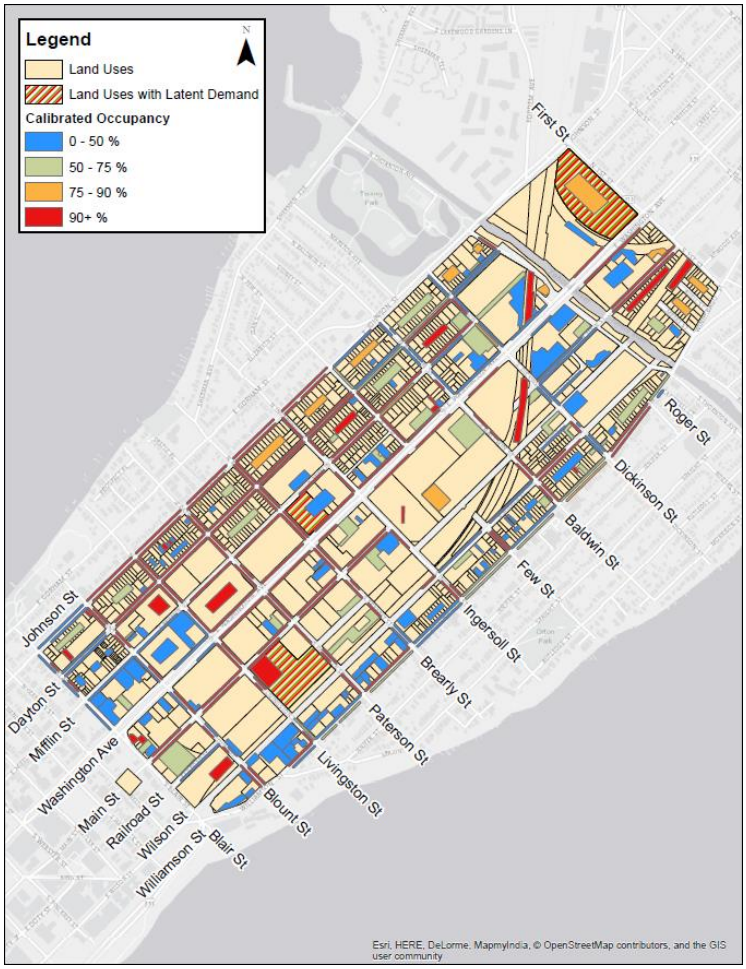
Capitol East Parking Study

PARK+ SCENARIO MEMORANDUM



DECEMBER 2015

PREPARED BY:

Kimley»Horn

INTRODUCTION

This memorandum is a summary of materials presented by Kimley-Horn on October 29, 2015 to the City of Madison and project stakeholders. This memorandum outlines the development of various Park+ scenarios that highlight the short-term (2015-2020), mid-term (2020-2030), and long-term (beyond 2030) development potential of the study area and the associated parking impacts.

For reference, the study area is shown in **Figure 1** below and is the area bound by Blair Street, Johnson Street, 1st Street, and Williamson Street.

Figure 1 – Study Area

Model Inputs

The scenarios presented in the following sections were developed based on data provided by the City, collected in the field, or provided by VanDewalle and Associates. The data used in this model includes:

- Land use information – provided by the City of Madison and representing the type of land use and it's intensity (e.g. 5,000 sf restaurant or 50 unit condominium)
- Parking information – provided by the City of Madison or collected in the field in the spring of 2015, including parking capacity, user type, restrictions, price, and occupancy by hour of day including 1,833 on-street spaces, 527 public off-street spaces, and 4,254 private off-street spaces.
- User information – assumptions were made based on knowledge of the area and conversations with the City and stakeholders regarding walking distances, modal split and user behavior characteristics. These assumptions were used as input values in the model.
- Scenario information – including projected developments and associated parking, provided by VanDewalle and Associates, in coordination with ongoing work they have been conducting with the City

Based on this data, a calibrated base model was developed that reflects the existing parking demands and patterns. The primary output of the model calibration was the creation of custom parking generation rates that were used to predict the generation characteristics of new development. The custom parking generation rates are shown in **Table 1** below.

Table 1. Park+ Calibrated Generation Ratios – Capitol East Parking Study

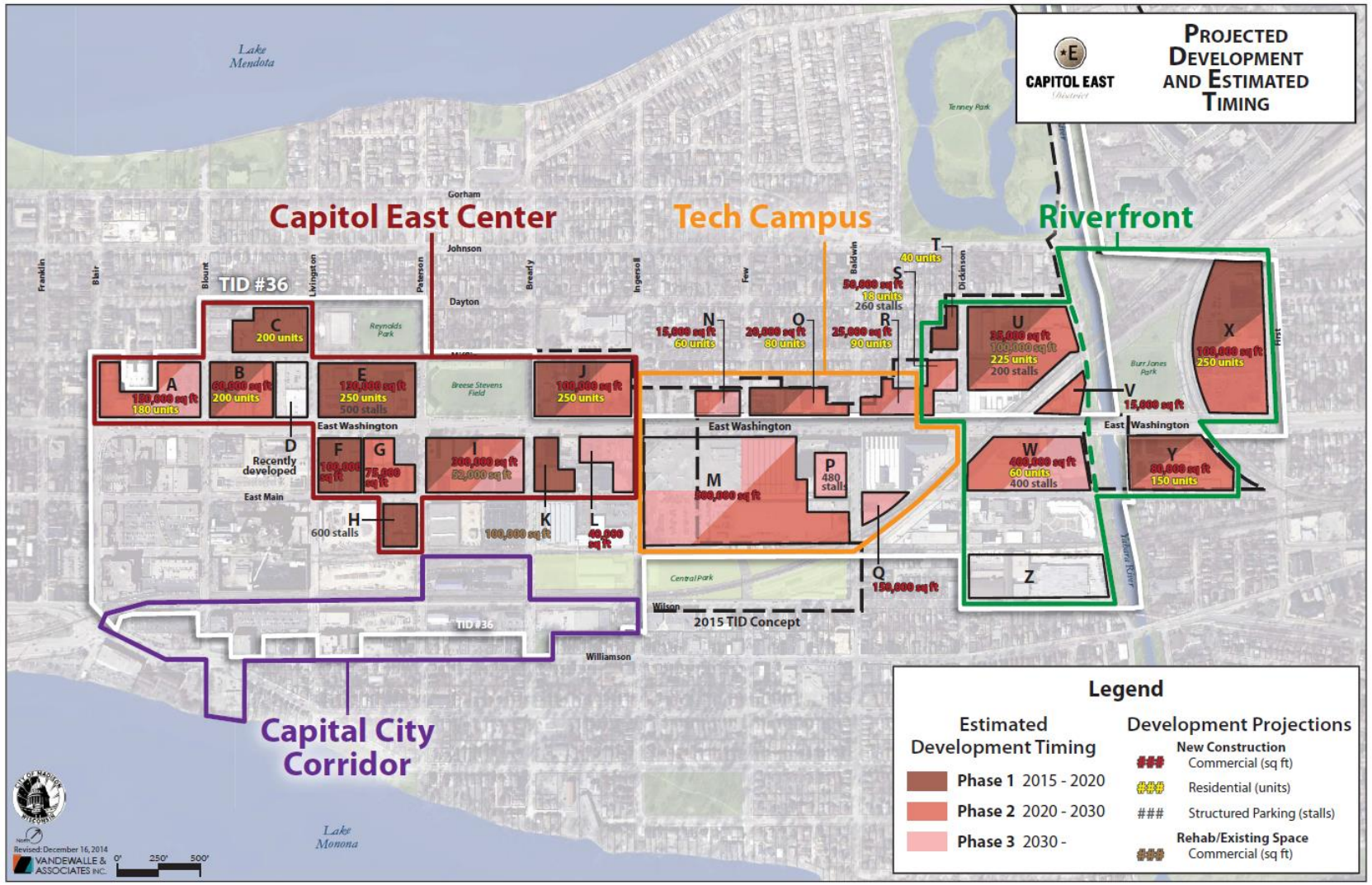
Land Use Type	Park+ Peak Demand Rate	ULI Parking Demand Rate
Residential	0.79 spaces per dwelling unit	1.65 spaces per dwelling unit
Commercial[1]	4.46 spaces per 1,000 SF	3.60 spaces per 1,000 SF for retail 16-18 spaces per 1,000 SF for lounge/restaurant
Office	1.73 spaces per 1,000 SF	2.80 spaces per 1,000 SF

[1] *Commercial land uses represent an aggregate of general retail and restaurant demands, to account for a mixed provision of this type of use in future development scenarios*

SCENARIO DEVELOPMENT

Once the model was calibrated to reflect existing parking demands, the custom parking generation rates created were used to predict short-term, mid-term, and long-term parking demands and patterns based on projected development plans. The information for these developments was provided by VanDewalle and Associates, in coordination with ongoing work they have been conducting with the City. **Figure 2** on the following page depicts the development areas for all three phases.

Figure 2 – Projected Development and Estimated Timing



As the map indicates, many of the developments are expected to be split across multiple phases. **Table 2** below provides a summary of the development levels included in each phase. The development levels are cumulative, meaning that if the same development levels appear in adjacent phases, that there was no development between phases.

Table 2. Park+ Calibrated Generation Ratios – Capitol East Parking Study

Development Area	Short Term (2015-2020)	Mid-Term (2020-2030)	Long-Term (2030 and beyond)
A	NA	Residential – 90 units Commercial – 11,250 SF Office – 63,750 Sf Parking – 90 spaces	Residential – 180 units Commercial – 22,500 SF Office – 127,500 SF Parking -
B	Residential – 100 units Commercial – 4,500 SF Office – 25,500 SF Parking – 100 spaces	Residential – 200 units Commercial – 9,000 SF Office – 51,000 SF Parking – 200 spaces	Residential – 200 units Commercial – 9,000 SF Office – 51,000 SF Parking – 200 spaces
C	Residential – 200 units Parking – 200 spaces	Residential – 200 units Parking – 200 spaces	Residential – 200 units Parking – 200 spaces
E	Residential – 294 units Commercial – 77,500 SF Office – 55,000 SF Parking – 661 spaces	Residential – 294 units Commercial – 77,500 SF Office – 55,000 SF Parking – 661 spaces	Residential – 294 units Commercial – 77,500 SF Office – 55,000 SF Parking – 661 spaces
F	Commercial – 16,000 SF Office – 226,000 SF	Commercial – 57,000 SF Office – 339,000 SF	Commercial – 57,000 SF Office – 339,000 SF
G	NA	Commercial – 36,000 SF Office – 201,000 SF	Commercial – 36,000 SF Office – 201,000 SF
H	Parking – 600 spaces	Parking – 600 spaces	Parking – 600 spaces
I	Commercial – 17,500 SF Office – 100,000 SF	Commercial – 35,000 SF Office – 200,000 SF	Commercial – 50,000 SF Office – 285,000 SF
J	Residential – 392 units Commercial – 35,000 SF Office – 122,000 SF Parking – 710 spaces	Residential – 392 units Commercial – 35,000 SF Office – 122,000 SF Parking – 710 spaces	Residential – 392 units Commercial – 35,000 SF Office – 122,000 SF Parking – 710 spaces
K	Commercial – 15,000 SF Office – 8,5000 SF	Commercial – 15,000 SF Office – 8,5000 SF	Commercial – 15,000 SF Office – 8,5000 SF
L	NA	NA	Commercial – 6,000 SF Office – 34,000 SF
M	NA	Commercial – 37,500 SF Office – 212,500 SF	Commercial – 75,000 SF Office – 425,000 SF
N	NA	Residential – 30 units Commercial – 1,125 SF Office – 6,375 SF Parking – 30 spaces	Residential – 60 units Commercial – 2,250 SF Office – 12,750 SF Parking – 30 spaces
O	Residential – 40 units Commercial – 1,500 SF Office – 8,500 SF Parking – 40 spaces	Residential – 80 units Commercial – 3,000 SF Office – 17,000 SF Parking – 80 spaces	Residential – 80 units Commercial – 3,000 SF Office – 17,000 SF Parking – 80 spaces
P	NA	NA	NA
Q	NA	NA	Residential – 90 units Commercial – 22,500 SF

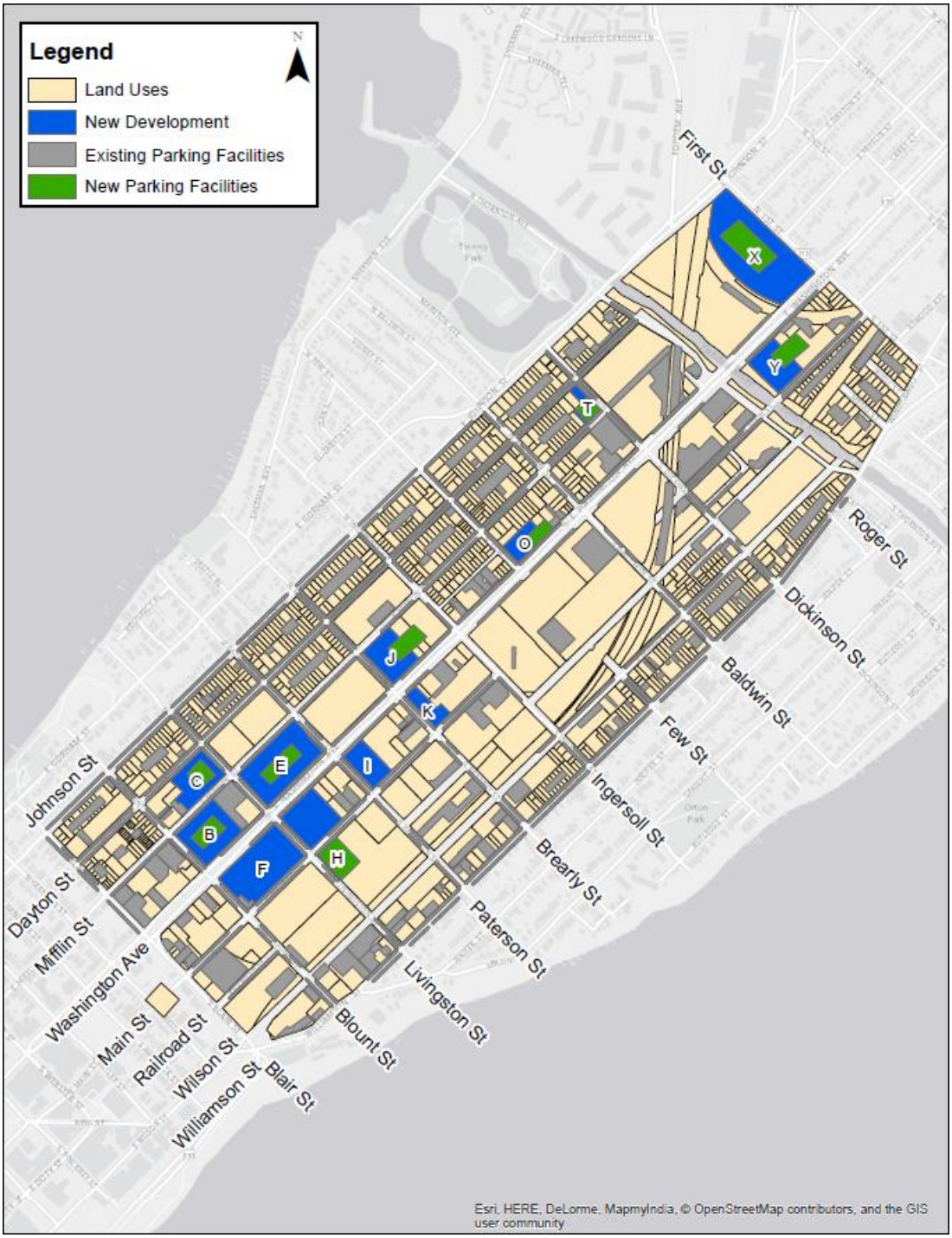
Development Area	Short Term (2015-2020)	Mid-Term (2020-2030)	Long-Term (2030 and beyond)
			Office – 127,500 SF Parking -
R	NA	Residential – 45 units Commercial – 1,875 SF Office – 10,625 SF	Residential – 90 units Commercial – 3,750 SF Office – 21,250 SF
S	NA	Residential – 13 units Commercial – 5,625 SF Office – 31,875 SF Parking – 195 spaces	Residential – 18 units Commercial – 7,525 SF Office – 42,500 SF Parking – 195 spaces
T	Residential – 40 units Parking – 40 spaces	Residential – 40 units Parking – 40 spaces	Residential – 40 units Parking – 40 spaces
U	NA	Residential – 225 units Commercial – 20,250 SF Office – 115,000 SF Parking – 200 spaces	Residential – 225 units Commercial – 20,250 SF Office – 115,000 SF Parking – 200 spaces
V	NA	Commercial – 2,250 SF Office – 12,750 SF	Commercial – 2,250 SF Office – 12,750 SF
W	NA	Residential – 30 units Commercial – 30,000 SF Office – 170,000 SF Parking – 200 spaces	Residential – 60 units Commercial – 60,000 SF Office – 340,000 SF Parking – 200 spaces
X	Residential – 250 units Commercial – 15,000 SF Office – 85,000 SF Parking – 250 spaces	Residential – 250 units Commercial – 15,000 SF Office – 85,000 SF Parking – 250 spaces	Residential – 250 units Commercial – 15,000 SF Office – 85,000 SF Parking – 250 spaces
Y	Residential – 241 units Commercial – 4,300 SF Office – 20,000 SF Parking – 340 spaces	Residential – 241 units Commercial – 4,300 SF Office – 20,000 SF Parking – 340 spaces	Residential – 241 units Commercial – 4,300 SF Office – 20,000 SF Parking – 340 spaces
Area 12[1]	NA	NA	Commercial – 30,000 SF Office – 170,000 SF

Scenario 1 – Short Term Development

The first scenario evaluated short term projects, which are anticipated to occur within the next five years (2015 to 2020). The previous table defined the intensity and types of projects that were occurring within the study area. The map below provides the locations of the developments used for modeling purposes.

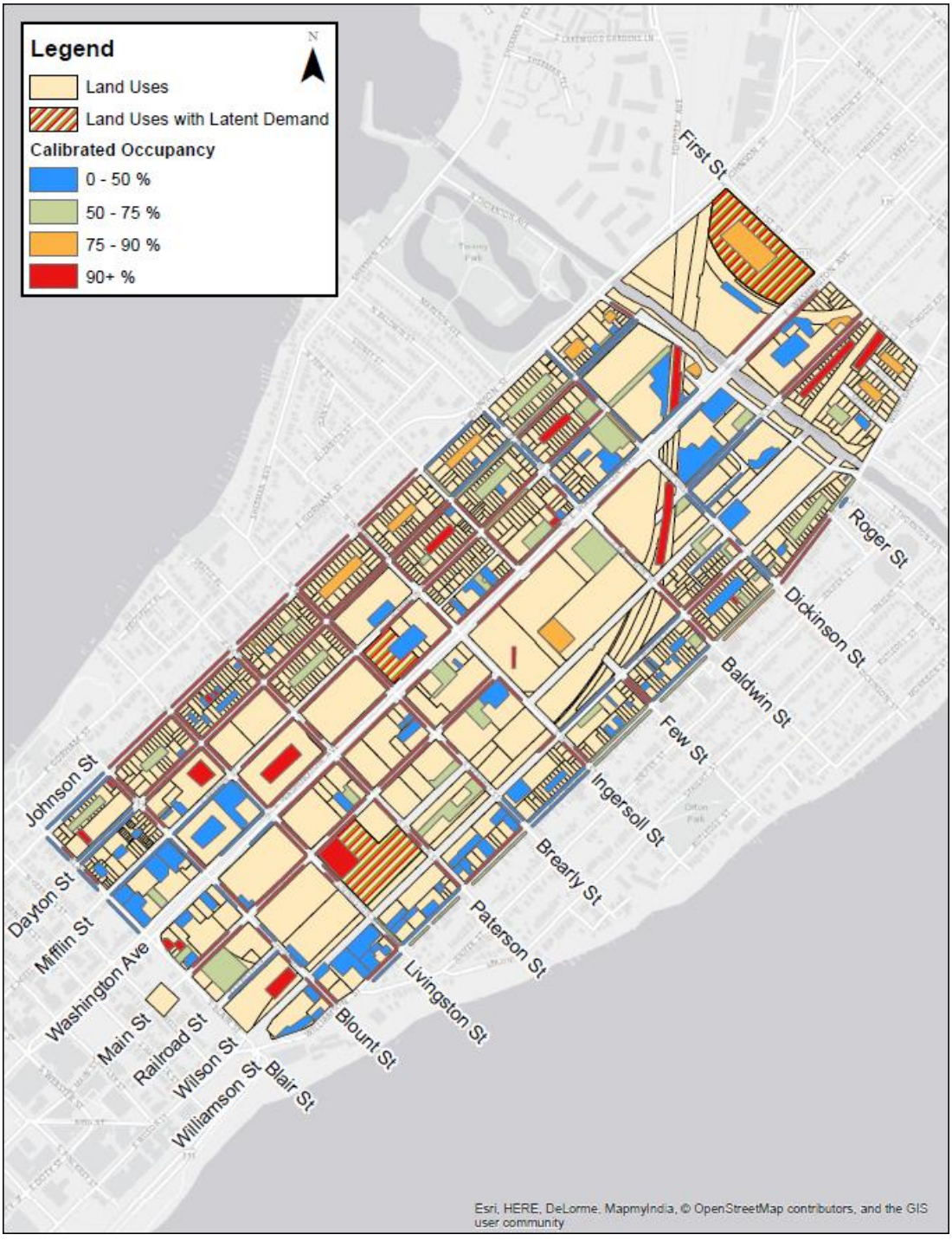
[1] Area 12 was added as part of the scenario development exercise and is not shown on the map on the previous page, which was developed as part of the previous work conducted by VanDeWalle

Figure 3 – Short Term Development Projects

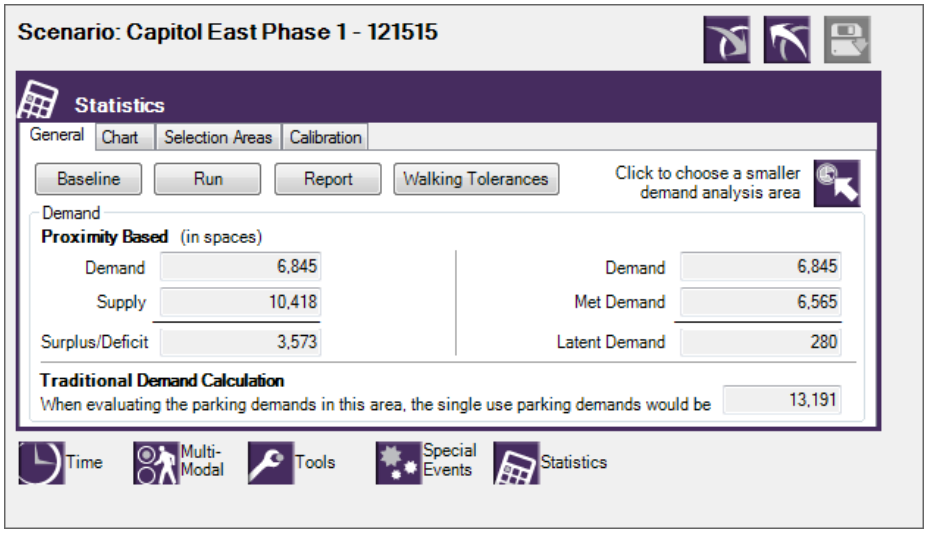


Based on the proposed developments (and their intensities highlighted previously) the model generated a parking demand output map shown in **Figure 4** illustrating the projected parking occupancies for the parking facilities in the study area. This map represents the peak conditions in the study area, which is 9am.

Figure 4 – Short Term Peak Parking Occupancy



The overall parking supply and demand for the study area was 6,642 spaces of demand versus a supply of 10,202 spaces, leaving a surplus of 3,560 spaces. The image below provides a representation of the Park+ output interface from this scenario.



In addition to the projected supply and demand, the study area exhibits a latent demand of 280 spaces. Latent demand is a measure of how much demand cannot be met within the study area, and can be identified at the business or development level. In this particular instance, the latent demands are largely site specific, where private parking assets (serving residential or office uses) are not being shared with the public demand generated by a site. This latent demand can likely be mitigated through shared parking within the development or in adjacent sites.

In addition to the overall supply and demand for the study area, the model was also used to predict the individual supply/demand for each of the short term developments, which are summarized in **Table 3** below.

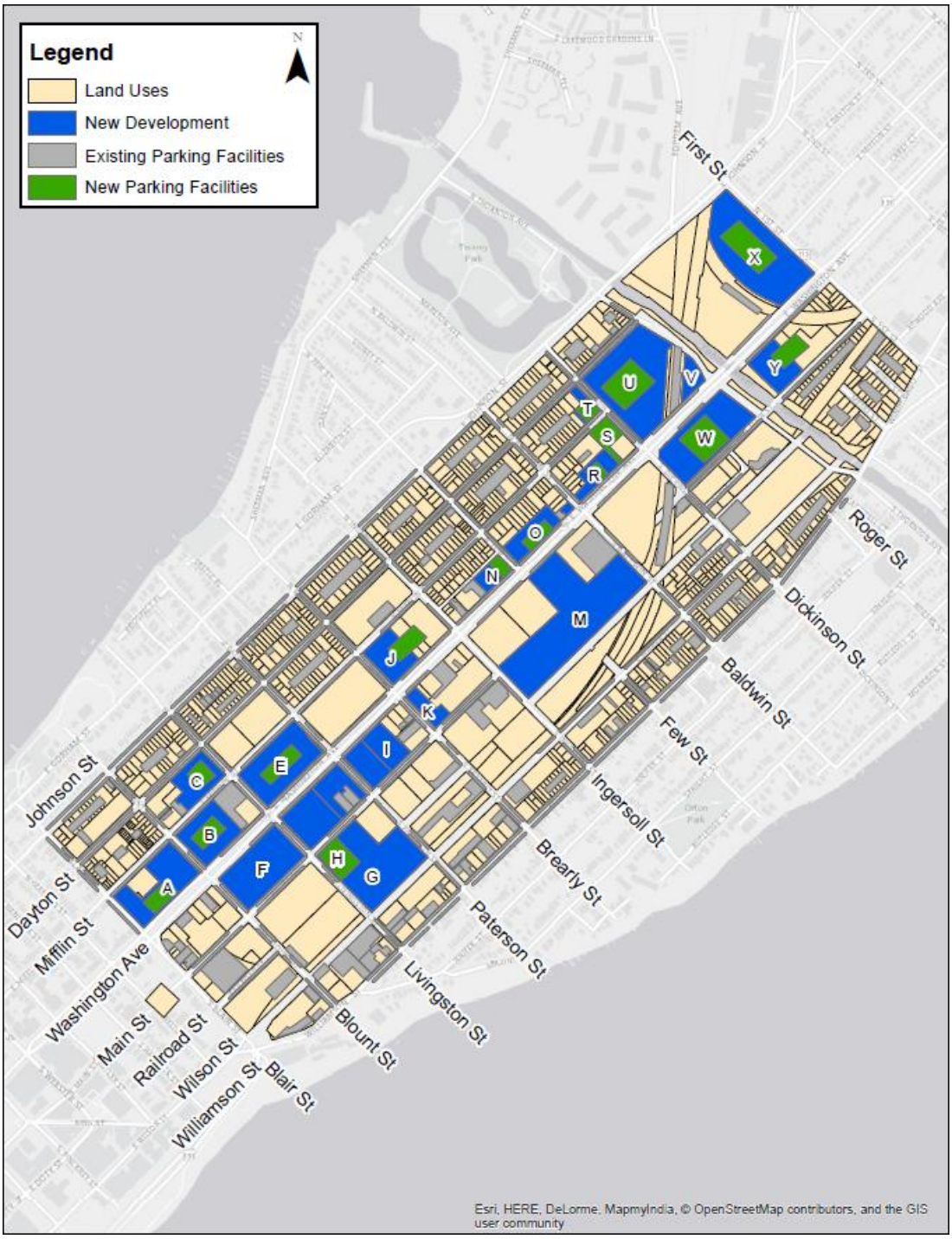
Table 3. Short Term Development Area Parking Demands

Area	*Supply*	*Demand*	*Surplus/ Deficit*
B	100	124	-24
C	200	157	43
E	661	529	132
F	0	170	-170
H	600	0	600
I	0	182	-182
J	710	570	140
K	0	192	-192
O	40	47	-7
T	0	31	-31
X	250	349	-99
Y	400	253	147

Scenario 2 – Mid-Term Developments

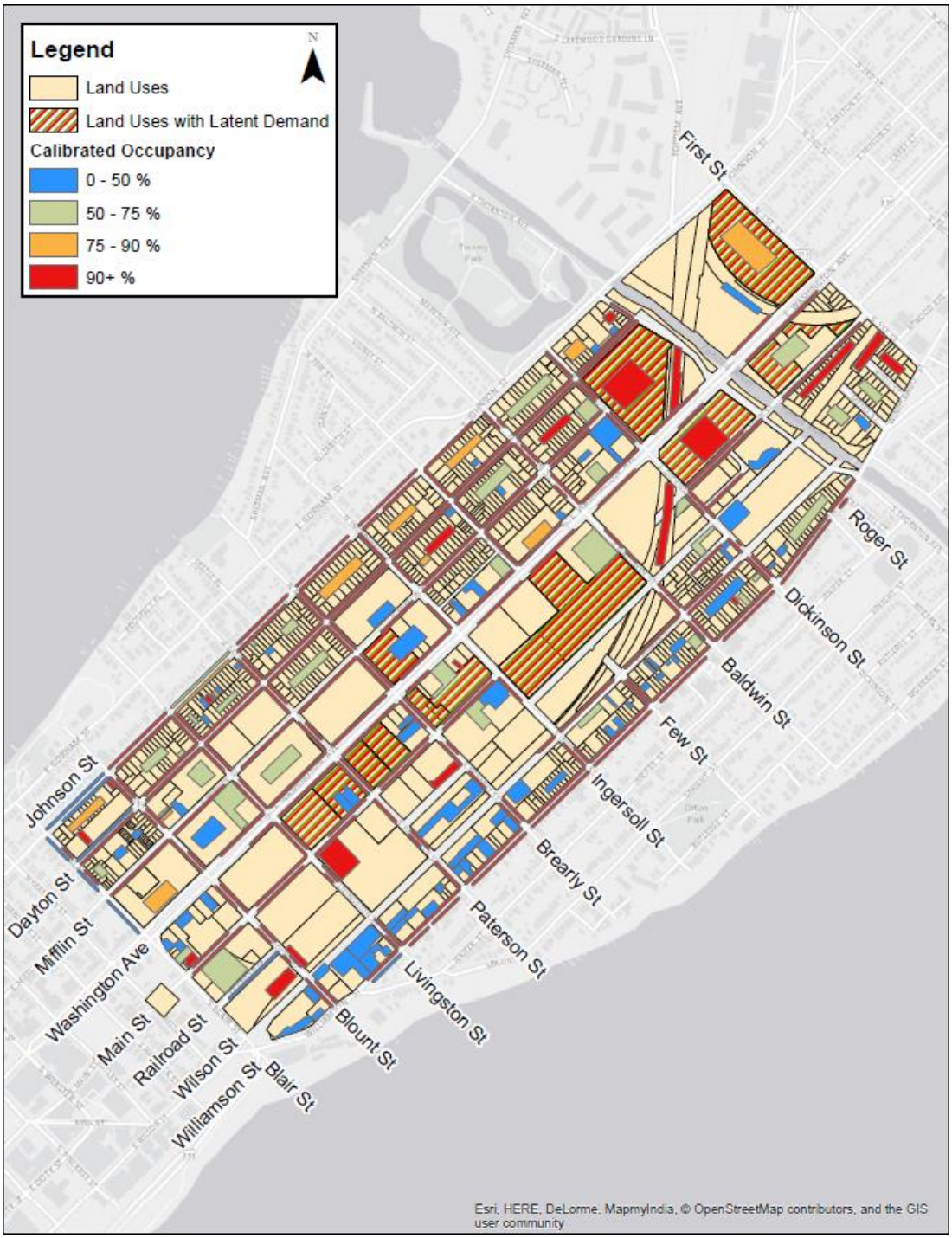
The second scenario evaluated mid-term projects, which were anticipated to occur within the next 15 years (between 2020 and 2030), using the development intensities defined in Table 2. The map below provides the locations of the developments used for modeling purposes. The development projects included in the short term scenario are also carried forward into this scenario.

Figure 5 – Mid-Term Development Projects



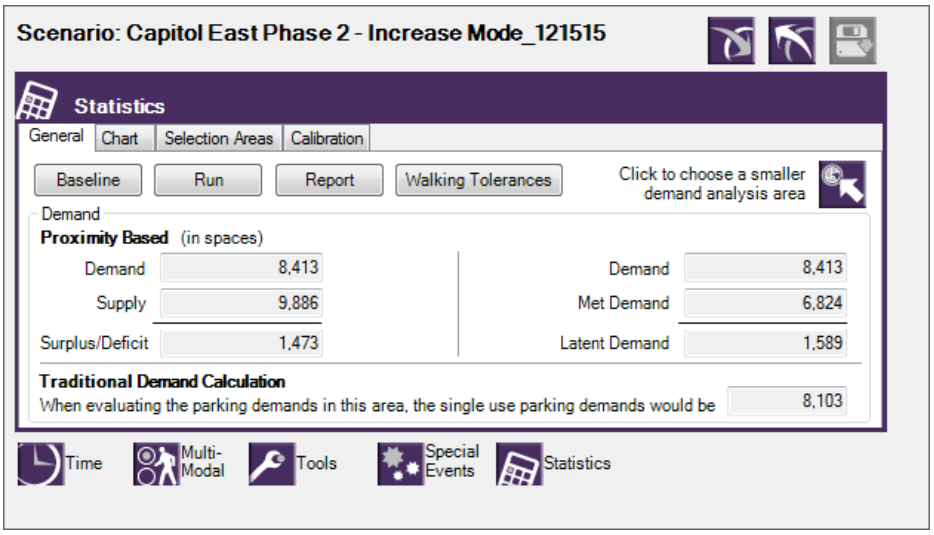
In addition to the proposed developments included in this scenario, study area transit ridership was also increased by 5%, to represent a shift in non-automotive trips into the study area. Based on those proposed developments (and their intensities highlighted previously) the model generated a parking demand output map shown in **Figure 6** illustrating the projected parking occupancies for the parking facilities in the study area. This map represents the peak conditions in the study area, which is 9am.

Figure 6 – Mid-Term Peak Parking Occupancy



The overall study area supply and demand was 8,413 spaces of demand versus a supply of 9,886 spaces, leaving a surplus of 1,473 spaces. This surplus represents an overall 15% surplus within the study area. Within the parking industry, the threshold for overall parking system effectiveness is usually set at 10 to 15% surplus (referred to as effective capacity). This threshold is used to maintain a system that has enough available spaces to serve users even with loss of spaces for weather, construction, or other impacts. When parking demands begin to exceed this threshold, patrons begin to become frustrated with the experience of parking and the overall effectiveness of the system is impacted. Additionally, it is often the case that the majority of this surplus is likely found in private spaces, meaning that the public serving parking system is at its capacity.

The image below provides a representation of the Park+ output interface from this scenario.



In addition to the projected supply and demand, the study area exhibits a latent demand of 1,589 spaces. Most of this latent demand is distributed amongst the new developments, which are impacted by the lack of additional public parking. The individual supply/demand, surplus/deficit, and latent demand for each of the mid-term developments, are summarized in **Table 4** below.

Table 4. Mid-Term Development Area Parking Demands

Area	*Supply*	*Demand*	*Surplus/ Deficit*	*Latent Demand*
A	90	182	-92	0
B	200	246	-46	0
C	200	157	43	0
E	661	512	149	0
F	0	372	-372	213
G	61	148	-87	99
H	600	0	0	0
I	0	348	-348	266
J	710	560	150	187
K	0	184	-184	84
M	0	410	-410	293
N	30	56	-26	0
O	85	105	-20	0
R	45	54	-9	0
S	195	66	129	0
T	40	31	9	0
U	200	376	-176	157

Area	Supply	Demand	Surplus/ Deficit	Latent Demand
V	70	23	47	0
W	200	319	-119	16
X	250	344	-94	147
Y	340	265	75	25

SCENARIO 2 – WITH ADDITIONAL PUBLIC PARKING

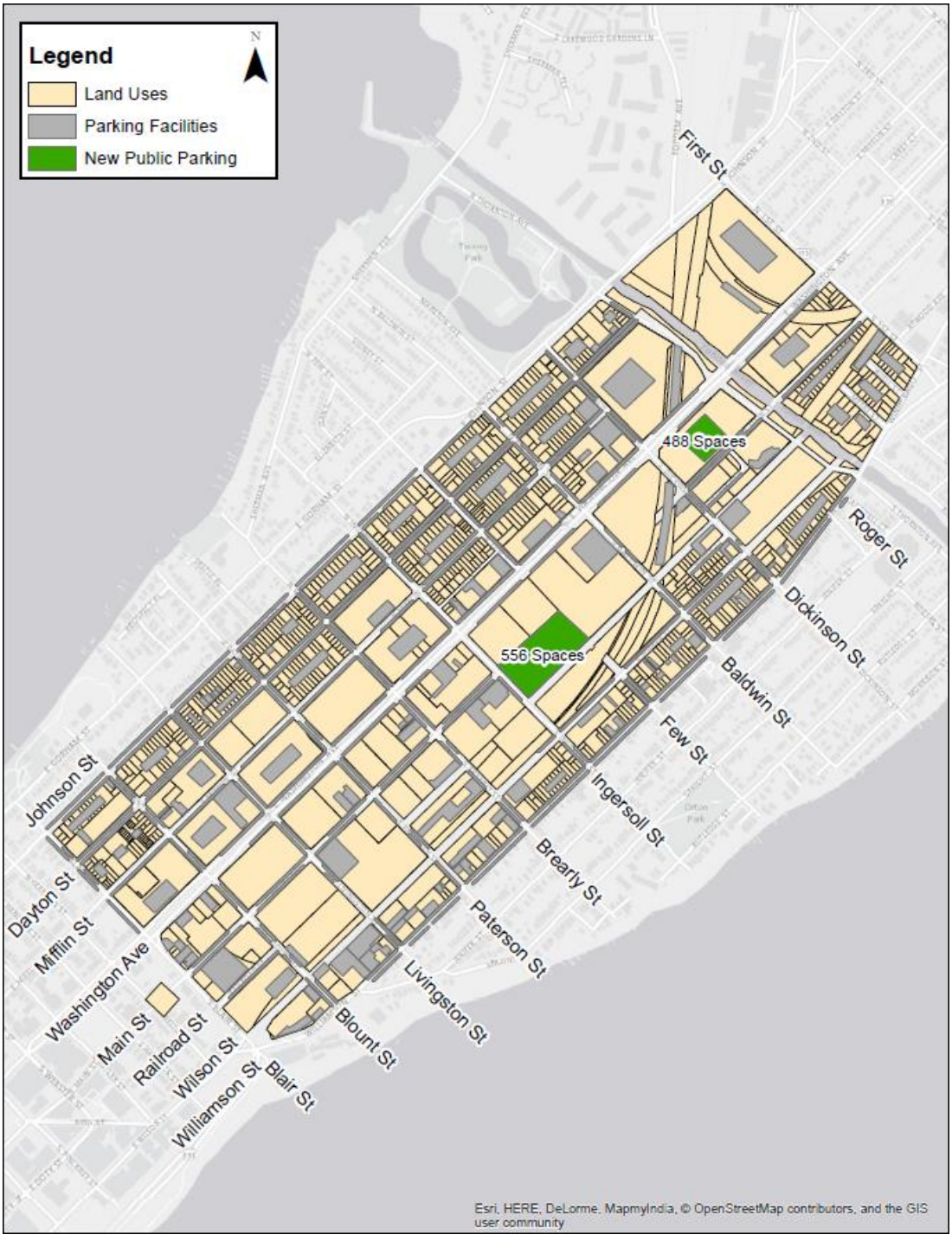
Based on the results from the first iteration of the mid-term analysis, the project team evaluated the implementation of public parking investment to support new developments and increased parking demands. In particular, the following public facilities were evaluated:

- 556 space parking facility along Ingersoll Street, in conjunction with development area M
- Expansion of proposed parking facility in Zone W by 288 spaces

These sites were chosen based on their proximity to deficiencies in the study area, including areas that had higher latent demands associated with their implementation. The proposed parking facilities were assumed to be no more than two floors, based on the configuration of the developments, with at least one of the floors below grade to minimize development and density impacts. Given the location of these parking facilities within the context of proposed developments, these could be viewed as potential public-private partnerships with private development.

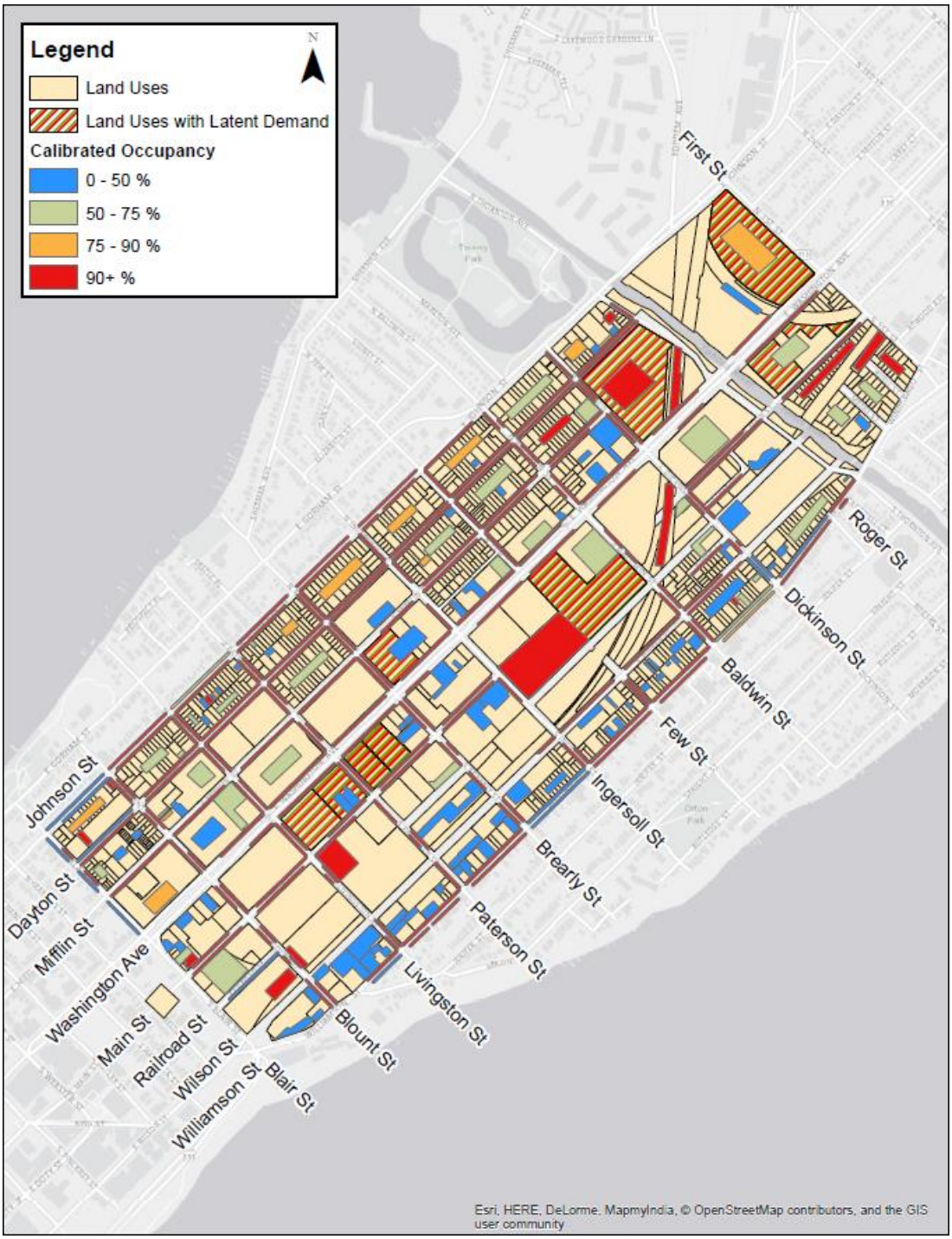
Figure 7 on the following page highlights the locations of these two facilities.

Figure 7 – Potential Mid-Term Peak Parking Investments

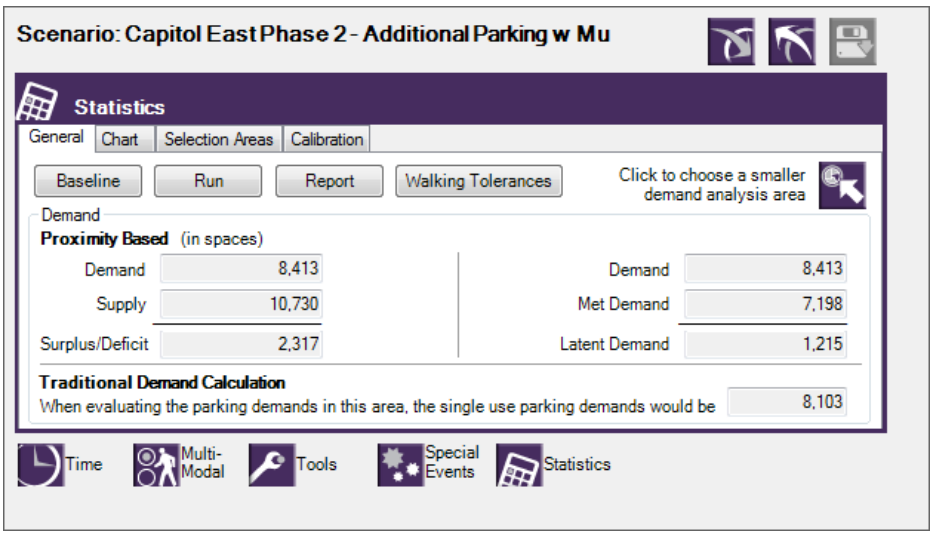


The projected demand with the proposed parking facilities is depicted in **Figure 8** below.

Figure 8 – Peak Parking Demand with Mid-Term Peak Parking Investments



The overall study area supply and demand was 8,413 spaces of demand versus a supply of 10,730 spaces, leaving a surplus of 2,317 spaces. This surplus represents an overall 22% surplus within the study area. The image below provides a representation of the Park+ output interface from this scenario.



In addition to the projected supply and demand, the study area exhibits a latent demand of 1,215 spaces. Most of this latent demand is distributed amongst the new developments, which are impacted by the lack of additional public parking. The individual supply/demand, surplus/deficit, and latent demand for each of the mid-term developments, are summarized in **Table 5** below.

Table 5. Mid-Term Development Area Parking Demands

Area	*Supply*	*Demand*	*Surplus/ Deficit*	*Latent Demand*
A	90	182	-92	0
B	200	246	-46	0
C	200	157	43	0
E	661	512	149	0
F	0	369	-369	225
G	61	148	-87	101
H	600	0	0	0
I	44	369	-325	199
J	710	560	150	23
K	0	148	-148	0
M	556	410	146	169
N	30	56	-26	0
O	87	105	-18	0
R	45	54	-9	0
S	195	66	129	0
T	40	31	9	0
U	200	376	-176	63
V	70	23	47	0
W	488	319	169	0
X	250	344	-94	147
Y	340	265	75	11

Much of the latent demand exhibited in the previous iteration of scenario 2 was satisfied with the introduction of public parking assets. However, much of the latent demand remains, either because it is not able to use the public parking based on walkability standards in the model or because of insufficient on-site parking at the development. In these cases, shared parking opportunities should be considered with surrounding private parking (as available). Beyond that, developers should provide enough parking to satiate the demand on-site.

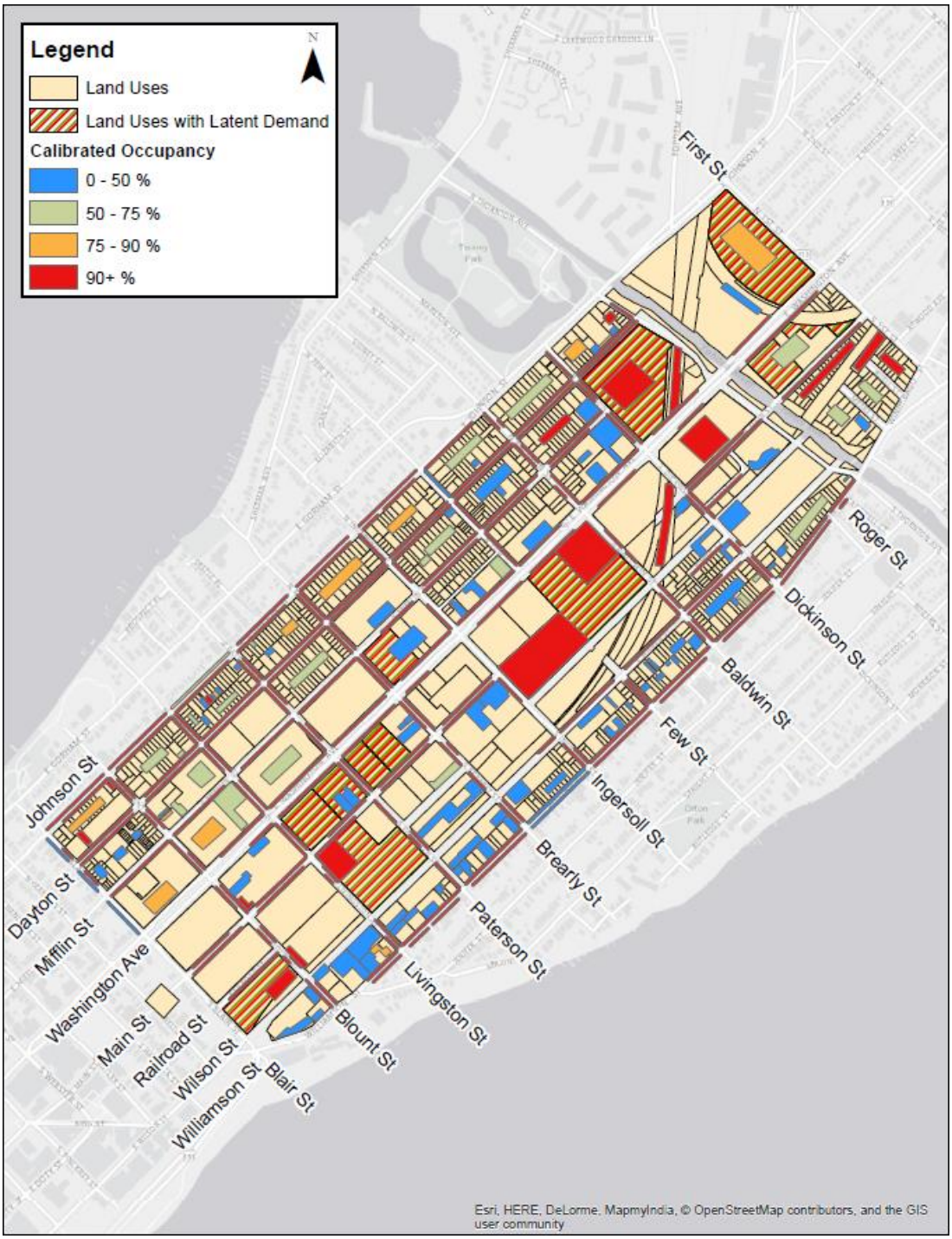
Scenario 3 – Long Term Developments

The third scenario evaluated long-term projects, which were anticipated to occur more than 15 years from now, using the previously defined development intensities. **Figure 9** below provides the locations of the developments used for modeling purposes. The development projects included in the short term scenario are also carried forward into this scenario.

Figure 9 – Long-Term Development Projects

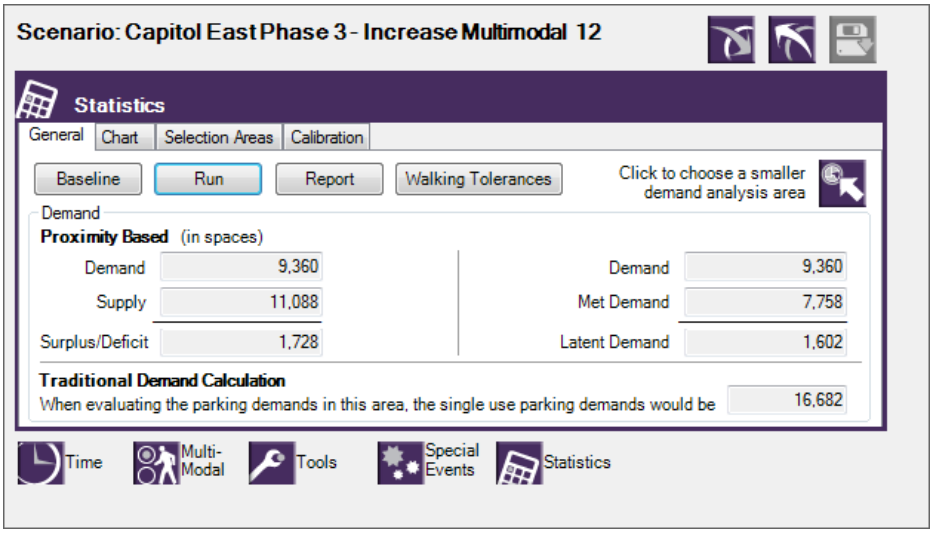
In addition to the proposed developments included in this scenario, study area transit ridership was also increased by 5%, in addition to the already increased mid-term levels, to represent a continued shift in non-automotive trips into the study area. Based on those proposed developments (and their intensities highlighted previously) the model generated a parking demand output map shown in **Figure 10** illustrating the projected parking occupancies for the parking facilities in the study area. This map represents the peak conditions in the study area, which is 9am

Figure 10 – Long-Term Peak Parking Occupancy



The overall study area supply and demand was 9,360 spaces of demand versus a supply of 11,088 spaces, leaving a surplus of 1,728 spaces. This surplus represents an overall 16% surplus within the study area, indicating that new demands are likely stressing the parking system to levels that will create patron frustration and localized deficiencies.

The image below provides a representation of the Park+ output interface from this scenario.



In addition to the projected supply and demand, the study area exhibits a latent demand of 1,602 spaces. Most of this latent demand is distributed amongst the new developments, which are impacted by the lack of additional public parking. The individual supply/demand, surplus/deficit, and latent demand for each of the mid-term developments, are summarized in **Table 6** below.

Table 6. Long-Term Development Area Parking Demands

Area	*Supply*	*Demand*	*Surplus/ Deficit*	*Latent Demand*
12	254	34	-220	0
A	180	349	-169	0
B	200	239	-39	17
C	200	157	43	0
E	661	492	169	0
F	0	347	-347	319
G	61	137	-76	128
H	600	0	0	0
I	44	457	-413	256
J	710	542	168	7
K	0	173	-173	0
L	0	84	-84	0
M	650	726	-76	483
N	61	94	-33	0
O	80	402	-322	0
P	650	0	650	0
Q	0	214	-214	0
R	90	105	-15	0
S	260	83	177	0
T	40	33	7	0
U	200	362	-162	111

Area	Supply	Demand	Surplus/ Deficit	Latent Demand
V	70	21	49	0
W	488	596	-108	0
X	250	333	-83	137
Y	340	265	75	23

SCENARIO 3 – WITH ADDITIONAL PUBLIC PARKING

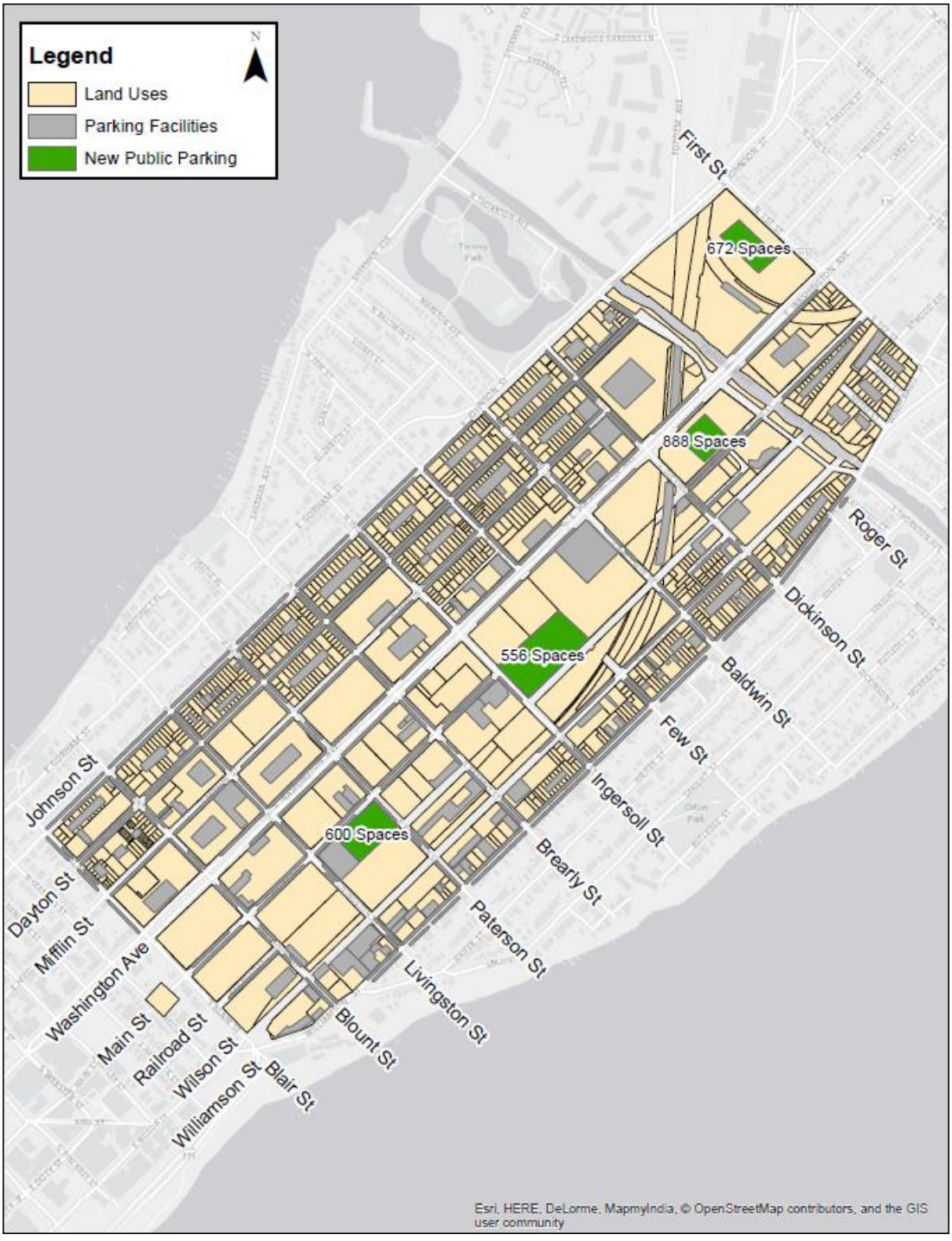
Based on the results from the first iteration of the long-term analysis, there appears to be a need to increase parking capacity in certain areas of the study area. The project team evaluated the implementation of public parking investment to support new developments and increased parking demands. In particular, the following public facilities were evaluated in addition to the public parking from mid-term (844 spaces):

- 672 space parking garage along First Avenue, in conjunction with development area X
- 600 space parking garage along Main Street, in conjunction with development areas F and G

These sites were chosen based on their proximity to deficiencies in the study area, including areas that had higher latent demands associated with their implementation. The proposed parking facilities were assumed to be no more than two floors, based on the configuration of the developments, with at least one of the floors below grade to minimize development and density impacts. Just as in the previous scenario, the location of these parking facilities within the context of proposed developments, these could be viewed as potential public-private partnerships with private development.

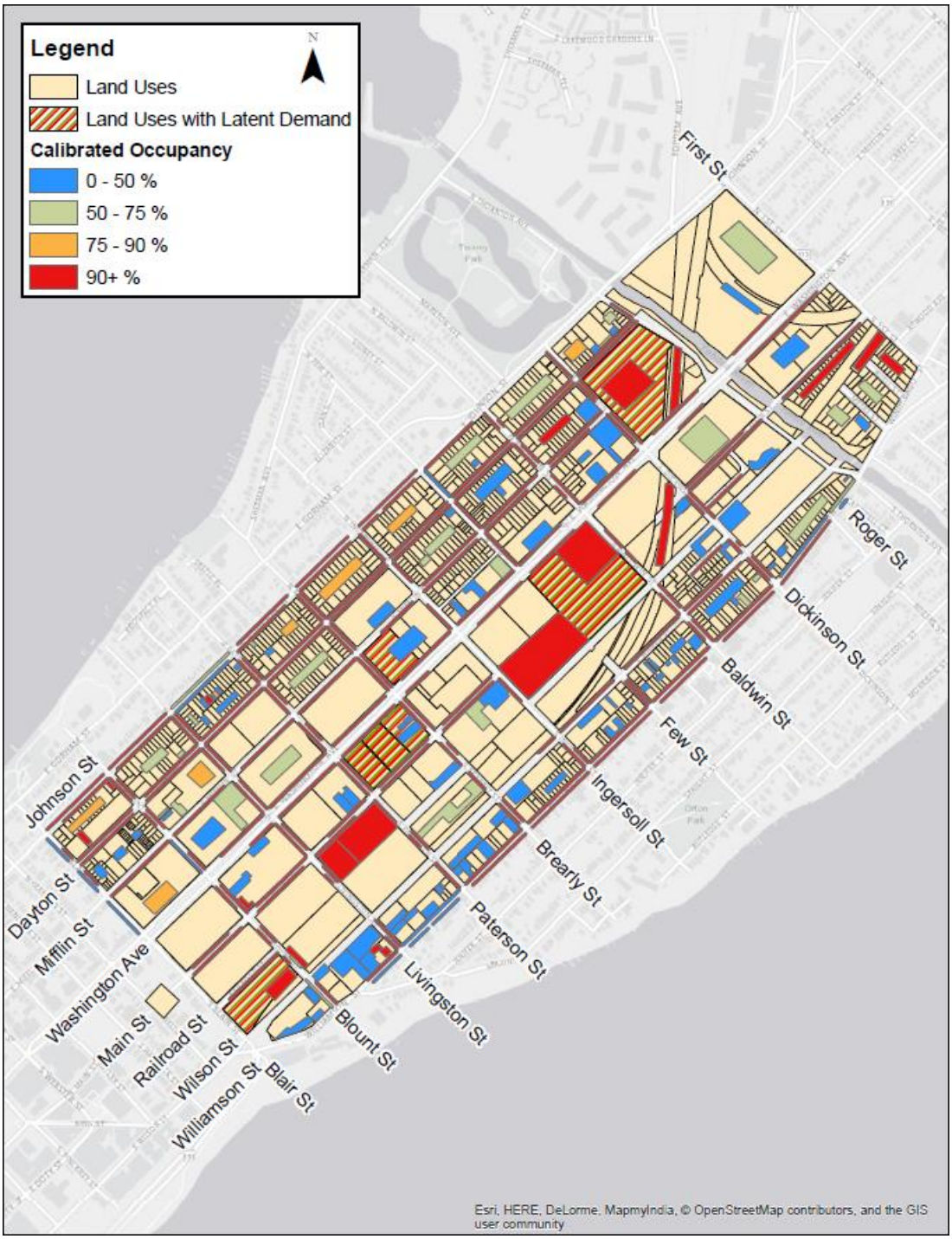
Figure 11 on the following page highlights the locations of these two facilities.

Figure 11 – Potential Long-Term Peak Parking Investments



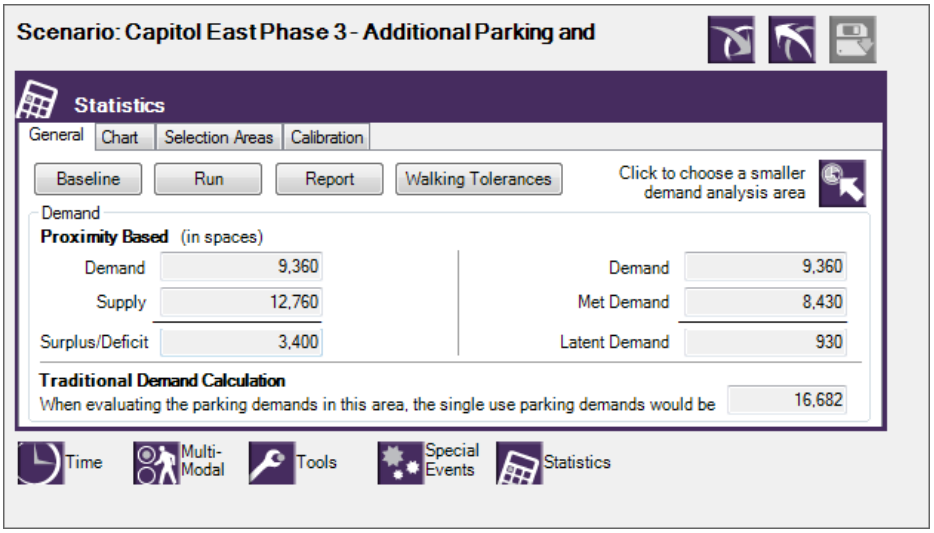
The projected parking demand with the proposed parking facilities is depicted in **Figure 12** below.

Figure 12 – Peak Parking Demand with Long-Term Peak Parking Investments



The overall study area supply and demand was 9,360 spaces of demand versus a supply of 12,760 spaces, leaving a surplus of 3,400 spaces. This surplus represents an overall 27% surplus within the study area. However, there are also 930 spaces of latent demand, which lessen this overall surplus and leave the effective cushion closer to 15 to 20%.

The image below provides a representation of the Park+ output interface from this scenario.



In addition to the projected supply and demand, the study area exhibits a latent demand of 930 spaces. Most of this latent demand is distributed amongst the new developments, which are impacted by the lack of additional public parking. The individual supply/demand, surplus/deficit, and latent demand for each of the mid-term developments, are summarized in **Table 7** below.

Table 7. Long-Term Development Area Parking Demands

Area	*Supply*	*Demand*	*Surplus/ Deficit*	*Latent Demand*
12	34	255	-221	0
A	180	349	-169	0
B	200	239	-39	0
C	200	157	43	0
E	661	492	169	0
F	0	347	-342	106
G	61	137	-76	0
H	600	0	0	0
I	44	457	-413	265
J	710	542	168	45
K	0	173	-173	0
L	0	84	-84	0
M	1,036	723	309	501
N	61	94	-33	0
O	80	402	-322	0
P	650	0	650	0
Q	0	214	-221	0
R	90	105	-15	0
S	260	83	177	0
T	40	33	7	0
U	200	362	-162	26
V	70	21	49	0
W	888	596	292	0
X	250	333	-83	0
Y	340	265	75	0

Much of the latent demand exhibited in the previous iteration of scenario 3 was satisfied with the introduction of public parking assets. However, some of the latent demand remains, either because it is not able to use the public parking based on walkability standards in the model or because of insufficient on-site parking at the development. In these cases, shared parking opportunities should be considered with surrounding private parking (as available). Beyond that, developers should provide enough parking to satiate the demand on-site.

Additional Considerations

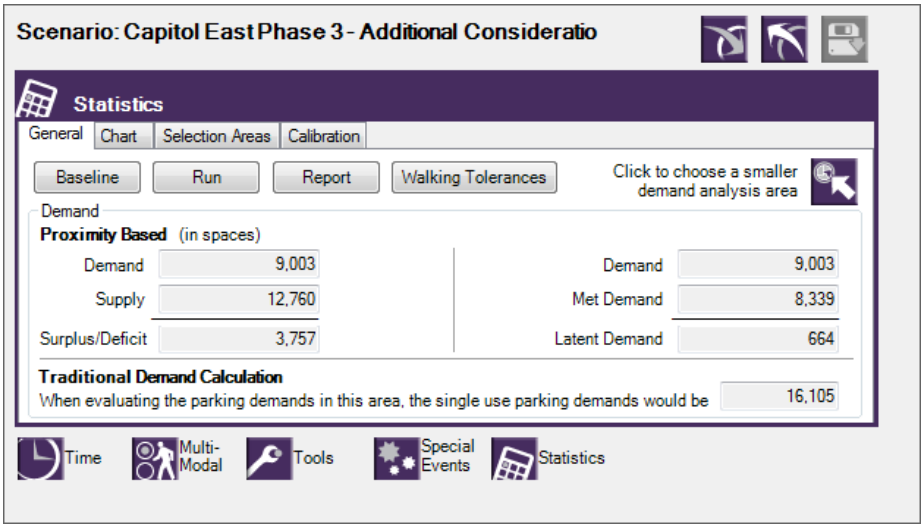
Beyond the three scenarios developed by the project team, two additional scenarios were considered, including:

1. How much of an increase in transit ridership would be needed to eliminate parking needs within the study area?
2. What does a slight (+/- 25%) variation in parking generation characteristics do to the overall demands within the study area?

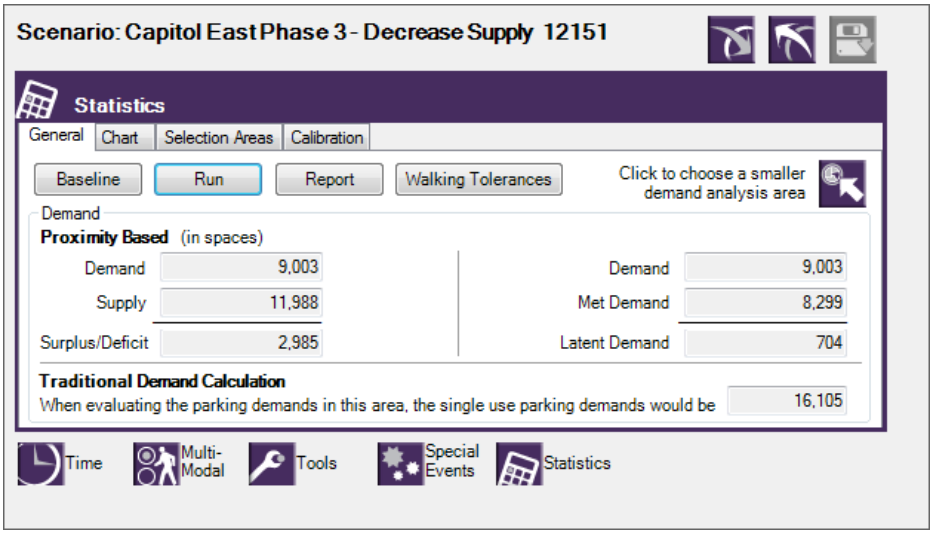
These two topics are covered in the following sections.

TRANSIT LEVELS TO SATISFY ALL DEMAND

Based on the projections of the third scenario (long-term development), the projected parking demand was approximately 9,370 spaces versus a supply of 12,760 spaces. The scenario also predicted approximately 1,602 spaces of latent demand (in areas not served by public garages or serving largely private driven demands). To fully eliminate any deficiencies (either capacity driven or latency driven), the project team iteratively adjusted the mode split variables associated with the study area. The goal was to minimize latent demand, while creating a suitable surplus of parking. The graphic below shows a result with a non-vehicular mode split of 40%.



From this result, the latent demand is nearly minimized and the surplus is increased to more than 4,000 spaces (representing 30% of the total supply). From this evaluation, the project team then adjusted parking supply downward by spaces in the proposed public parking facilities, which resulted in the following projections for the study area.



This projection showed a surplus of 2,985 spaces, which represents a 25% surplus throughout the study area. When considering the 704 spaces of latent demand, that surplus is lessened somewhat, which likely nets a realistic surplus in the 15 to 20% range, which is closer to the overall effective cushion that resembles a healthy parking system. This exercise illustrates that the adjustments in mode split upward (from 25% today to 40% in the future) would have the effect of reducing the overall parking need by 400 to 800 spaces.

SENSITIVITY ANALYSIS

The final analysis reviewed how slight variations in observed parking demands used for calibration would impact the projection of future parking space needs. This is an exercise that highlights how anomalies in the data collection process could impact the future planning projections. The data used to calibrate the Park+ model for the study area was collected in late spring and early summer 2015. Environmental and financial factors such as congestion, fuel prices, transit access, and walkability could dramatically alter the parking demands observed in the field. This analysis provides a summation of how those changes could increase projected demands.

For this analysis, the project team increased or decreased the calibrated parking generation characteristics for proposed developments only. The projected demands for existing land uses that did not redevelop were held constant. The adjustment used in this exercise was +/- 25%. The table below shows the range of demands, which vary by several thousand spaces based on the adjustment.

Table 8. Parking Demand Sensitivity Analysis

Scenario	Demand with Current Parking Ratios (Spaces)	Demand with 25% Parking Ratio Increase (Spaces)	Demand with 25% Parking Ratio Decrease (Spaces)
Short-Term Development	6,845	7,520	6,170
Mid-Term Development	8,413	9,665	7,161
Long-Term Development	9,360	10,938	7,783