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Technical Memorandum 003

CEQR No. 85-253M[1]

Riverside South Parcel K2—The Collegiate School
Revised March 27, 2015[2]

A. INTRODUCTION

In 1992, the City Council approved a plan to develop a "general large-scale development" (GLSD) known as Riverside South, a major mixed-use and open space project, to be bounded by West 72nd Street and Riverside Park on the north, West 59th Street to the south; the Hudson River to the west; and buildings at the west ends of West 70th, 71st, 72nd, 66th through 62nd Streets, Freedom Place, and West End Avenue to the east. A GLSD is a development generally involving several zoning lots planned as a unit, which allows the distribution of floor area and dwelling units without regard to zoning lot lines or district boundaries, and can allow for design flexibility to achieve a superior site plan. The Riverside South development included 15 development parcels (Parcels A through O). These parcels were combined to form eight zoning lots (A/B, C/D, E/F, G/H, I, J/K, L/M/N, and O), each with its own zoning compliance and computations and urban design controls. The numerous actions required for this development—which included rezoning, City Map changes to create the street system and to map parkland, and special permits—required review under SEQRA and CEQR. An FEIS was prepared for the Riverside South project, which was accepted by the CPC, and SEQRA findings were issued on October 11, 1992. Subsequent to the completion of the FEIS, the City Council modified the project approvals to provide that future development on Parcel N would require the submission of revised plans and supplementary environmental analysis, and that such a revision would be deemed a major modification requiring new review under the City's Uniform Land Use Review Procedure (ULURP).

In October 2010, a Final Supplemental Environmental Impact Statement (FSEIS) was completed that addressed proposed modifications to the southernmost portion (Parcels L, M and N) of the previously approved Riverside South project. The modified project on Parcels L, M and N—known as Riverside Center—comprised a complex of five mixed-use buildings that would include residential uses (including market-rate and affordable housing), commercial uses (including hotel, retail, office, cinema, and automotive showroom and service uses), a public elementary and intermediate school, public parking, and

[1] See 14DCP124M for document repository.

[2] The revisions address updated modifications to the 1992 Riverside South Restrictive Declaration including a commitment to contribute $50 million to the New York City Housing Development Corporation intended for the development of affordable housing within Community Board #7; and minor schedule and design modifications including the establishment of maximum heights for the north exterior courtyard wall and the Freedom Place and West 61st Street exterior stone base and interior first floor.

approximately 2.76 acres of privately owned, publicly accessible open space. Following the publication of the FSEIS, the design of the project was refined by the project sponsor's architects, and further modifications were made by the City Planning Commission (CPC) in connection with its approval of the Proposed Project. To address the potential environmental effects of these changes, a Technical Memorandum was prepared (dated October 26, 2010) that concluded that the changes to the project would not result in any new significant adverse impacts that were not already identified in the FSEIS. The Riverside Center project was approved, with modifications by CPC on October 27, 2010. On December 20, 2010, the City Council adopted resolutions approving the proposed project with certain modifications. Further minor modifications were addressed in a Technical Memorandum dated March 10, 2011.

At the time of the Riverside Center approvals, Riverside South Parcels A through I and O had been built (consistent with the overall approvals granted following the 1992 FEIS), Parcel J was under construction, and Parcel K was in the planning stages. Parcel K (comprised of Parcels K1 and K2) was subject to the controls of zoning lot J/K, and was assumed to include residential, office, retail, and parking uses. For analysis purposes in the Riverside Center FSEIS and subsequent technical memoranda, the development programs for the built portions of Riverside South were updated to reflect final built conditions, and for those parcels still under construction or in the planning stages, an updated development program was used to form the basis of the "No Build" condition. This included Parcels K1 and K2, which were assumed to include 520 residential units (188 affordable) 4,581 gross square feet (gsf) of office use, 7,168 gsf of retail use, and 699 parking spaces.

Since the 2010 Riverside Center approvals, development of Parcel J has been completed pursuant to the 1992 approvals, and development of Parcel K1 is currently being constructed pursuant to the 1992 approvals. While Parcel K1 would continue to include residential, retail, office and parking uses, Parcel K2 is now being proposed as a potential relocation site for the Collegiate School, a 640-seat K through 12 private boy's school that is currently located on West 78th Street, between West End Avenue and Broadway. The proposed actions would therefore permit the allocation of approximately 124,000 zsf for community facility use on the previously approved Riverside South zoning lot J/K. No change in the total allowable zoning floor area (for the Riverside South project as a whole), or the maximum allowable community facility zoning floor area would occur as a result of the proposed modifications. The proposed modifications are intended to supplement, not replace, the restrictions set forth in the 1992 approvals. Prior to the application for a building permit for construction on Parcel K2, the applicant would be able to elect to construct either the Collegiate School, or a building as permitted by the original 1992 approvals. At such time, the applicant would notify the Department of City Planning of the building it is electing to construct, and the appropriate GLSD approval drawings would then become effective. Given the ability to elect either construction option, absent this new proposal, the applicant would proceed with a development on Parcel K2 consistent with the previous approvals.

Since both Parcels K1 and K2 have been analyzed together in previous environmental review documents (the 1992 FEIS and the 2010 Riverside Center FSEIS), and the program changes on both sites would be compared to those previously analyzed, this technical memorandum addresses those changes on both parcels.

The modified program for Parcels K1 and K2 combined would include 274 dwelling units (55 affordable), 2,892 gsf of office use, 7,233 gsf of retail use, 142 parking spaces, and a 640-seat private school. Buildings K1 and K2 are proposed to be approximately 375 feet and 149 feet (compared to approximately 410 feet 200 feet, respectively, as analyzed in the 2010 FSEIS). In the 1992 FEIS, the anticipated program for Parcels K1 and K2 were analyzed as part of the "Build" condition for the entire Riverside South Project, based on existing conditions at the time, and projections for known land-use proposals as part of the analysis of the future *without* the proposed project (No Build). The 2010 Riverside Center FSEIS updated the previous existing conditions analysis, and incorporated the most recent information available on known land-use proposals (including the un-built Parcels K1 and K2) into the No Build analysis. Since the 2010 FSEIS, it has been determined that absent a new proposal, the applicant would proceed with a development on Parcel K2 consistent with the previous approvals,

however the size of the development would be different than that analyzed as part of No Build conditions in the 2010 FSEIS. The analyses in this technical memorandum are based on these more current analysis conditions, and assess whether the proposed modifications to Parcel K2 would result in any new significant adverse impacts not already identified in either the 1992 Riverside South FEIS or the 2010 Riverside Center FSEIS and subsequent technical memoranda.

B. PROPOSED MODIFICATIONS

CRP/Extell Parcel K, L.P (the applicant) with The Collegiate School (the co-applicant), are seeking to add supplemental drawings to the 1992 approval drawings and to modify the Riverside South Restrictive Declaration to facilitate the construction of a 175,807 gross square foot (gsf) private school (Use Group 3) on Parcel K2. Specifically, the application seeks to modify Sheet Z-8R (Zoning Compliance and Computations) dated 12/15/2010 (Plans) to add 124,000 zsf of community facility use.

The application also seeks to modify Sheet Z-28 (Urban Design Controls-Zoning Lot J/K) of the Plans, specifically (1) to modify the Urban Design Control Notes for Parcel K2 pertaining to the Base Zone Controls for Streetwall Types B and C (ZSK-004) and the Recess Controls for Streetwall Types B and C (see ZSK-005) and eliminate the mandatory streetwall for streetwall type D as there will be no building in that zone, and (2) to change the "Mandatory Retail Frontage" area to an "Optional Retail Frontage" area on Sheet Z-28's "Ground Floor Controls Plan." These urban design control modifications are necessary to facilitate the design and programming of The Collegiate School, which, unlike a residential building with a retail base, will have fewer windows than a residential building to accommodate classrooms, will provide different recesses, and will not have ground floor retail (see attachment A). These modifications will supplement the current controls applicable to construction of a residential/retail building. The application also seeks to further modify the 1992 Riverside South Restrictive Declaration, as amended, to require a contribution of fifty million dollars ($50,000,000.00) to the New York City Housing Development Corporation that is intended to be used for the construction of a minimum of 55 units of affordable housing within the boundaries of Manhattan Community District 7. Such contribution will be required prior to the issuance of any building permits for new construction on Parcel K2.

As described above, the anticipated program for Parcels K1 and K2 was originally addressed as part of the Build condition for the 1992 Riverside South FEIS. For the 2010 FSEIS, since Parcels K1 and K2 had not yet been built, they were included as No Build projects in the analysis of the Riverside Center project (which addressed the proposed development on Parcels L, M, and N, just south of Parcels K1 and K2). As discussed above, since the 2010 FSEIS, the No Build assumptions for Parcel K2 have been updated to reflect current thinking.

Since the 2010 Riverside Center approvals, planning for Parcel K has progressed. Parcel K1 is under construction and would include approximately 274 residential units (55 affordable), 2,892 gsf of office use, 10,175 gsf of retail use and 142 parking spaces. Together, Parcel J (constructed) and K1 (under construction) will consist of a combined total of 1,543,228 gsf of development, comprised of 18,386 gsf of commercial use, 6,640 gsf of community facility use, 1,167,972 gsf of residential use (769 units), and 373 parking spaces). Absent the proposed modifications, the applicant would proceed with the development of Parcel K2 using the remaining development potential of Parcel K, which includes approximately 124,000 zsf, to consist of a 185,080 gsf mixed use building. The building on Parcel K2 would include 151 residential units (using a dwelling unit factor of 790), 8,354 gsf of ground floor retail, 8,354 of below-grade commercial use and 165 parking spaces. The height of Building K2 would be approximately 135 feet.

As described above, the proposed modifications would permit an allocation of zoning floor area for school use on Parcel K2 to support development of no more than 124,000 zsf (approximately 132,977 gsf above grade and 42,830 gsf below grade) for private school use.

Table 1 summarizes the program assumptions for Parcels K1 and K2 in the 1992 FEIS and 2010 FSEIS, the current updated No Build assumptions for K1 and K2, and the anticipated program with the proposed modifications (Build conditions).

Table 1
Developmenet Program for Riverside South Parcels K1 and K2

Use	1992 FEIS Assumptions (K1 and K2 in Build)	2010 FSEIS Assumptions (K1 and K2 in No Build)	Updated Assumptions (K1 and K2 in No Build)	Current Proposed Program with Modifications	Change
Residential (dwelling units)	603	520 (188 affordable)	425 (110 affordable)	274 (55 affordable) (K1)	-151
Office	14,175 gsf	4,581 gsf	4,581 gsf	2,892gsf (K1)	-1,689
Retail	10,070 gsf	7,168 gsf	15,587gsf	7,233 gsf (K1)	-8,354
Parking	458	699	307	142 (K1)	-165
Private School (seats)	0	0		640 (K2)	+640
* It is intended that the 55 affordable units from K2 (under the No Build Condition) will be constructed by the City of New York within the boundaries of Manhattan Community District 7.					

Buildings K1 and K2 would be located on the same sites as analyzed in both the 1992 FEIS and 2010 FSEIS. The proposed building massing, however, would be modified. Building K1, currently under construction, is to be approximately 375 feet (compared to 400 feet in the 2010 FSEIS) and Building K2 with the proposed modifications is proposed to be approximately 149 feet (compared to approximately 200 feet in the 2010 FSEIS).

C. ANALYSES

The 1992 FEIS and 2010 FSEIS examined in detail the potential for significant adverse impacts from the Riverside South and Riverside Center projects, respectively. Consistent with CEQR, areas of concern included: land use, zoning, and public policy; socioeconomic conditions; community facilities and services; open space; shadows; historic resources; urban design and visual resources; neighborhood character; natural resources; hazardous materials; waterfront revitalization program; infrastructure; solid waste and sanitation services; energy; traffic and parking; transit and pedestrians; air quality; noise; construction; and public health. The section below provides a screening analysis to determine which of the areas of concern would require further analysis based on the potential for the proposed modifications to affect the conclusions of either the 1992 FEIS or the 2010 FSEIS. As shown below, further analysis is provided in the areas of Transportation and Noise.

SCREENING

The 1992 FEIS and 2010 FSEIS examined in detail the potential for significant adverse impacts from the Riverside South and Riverside Center projects, respectively. Consistent with CEQR, areas of concern included: land use, zoning, and public policy; socioeconomic conditions; community facilities and services; open space; shadows; historic resources; urban design and visual resources; neighborhood character; natural resources; hazardous materials; waterfront revitalization program; infrastructure; solid waste and sanitation services; energy; traffic and parking; transit and pedestrians; air quality; noise; construction; and public health.

AREAS OF NO PREVIOUS SIGNIFICANT ADVERSE IMPACT

Neither the 1992 Riverside South FEIS nor the 2010 Riverside Center FSEIS identified significant adverse impacts in the areas of land use, zoning and public policy, socioeconomic conditions, shadows, historic (architectural resources), urban design and visual resources, neighborhood character, natural

resources, infrastructure, solid waste and sanitation services, energy, noise and public health. As described below, the proposed modifications to the development program and building massing would not be expected to alter the conclusions of the 1992 FSEIS and 2010 FEIS of no significant adverse impacts in areas of analysis listed above.

Land use, Zoning, and Public Policy

The proposed modifications would alter the uses on Parcels K1 and K2 by reducing the residential, office, and retail components anticipated for the site and reallocating the development potential of Parcel K2 to a school use. The school use introduced to Parcel K2 as a result of the proposed modifications would be largely consistent with the educational uses anticipated for the project area in both the 1992 FEIS and the 2010 FSEIS. The proposed school on Parcel K2 would also be compatible with the high-density residential uses in the surrounding area, including the residential uses anticipated for Parcel K1, and would further the objective of the original Riverside South project of redeveloping the project area into a livable, mixed-use neighborhood.

The proposed school use on Parcel K2 would conform to existing zoning regulations, and would also be consistent with other public policies, such as the Local Waterfront Revitalization Program, that support the redevelopment of underutilized former industrial areas into more cohesive residential areas. Therefore, the proposed modifications would not result in significant adverse impacts related to land use, zoning, and public policy.

Socioeconomic Conditions

A project would trigger a CEQR socioeconomic conditions analysis by displacing a substantial residential or worker population (more than 500 residents or 100 employees), displacing a business or institution that is unique or has a critical social or economic role in the community, introducing substantial new development (more than 200 residential units or 200,000 square feet of commercial space) that could lead to indirect displacement, or affecting conditions within a specific industry.

Parcel K2 is currently vacant and does not contain any residential or commercial uses, therefore the proposed modifications would not directly displace a residential population or business. Similarly, the proposed modifications would not result in uses that are markedly different from existing uses or activities in the neighborhood, which is a predominantly residential area that also contains a number of educational facilities that serve both the local residential population and students from throughout the city. The proposed modifications would not introduce any additional residents or commercial space. Therefore, the proposed modifications do not meet the threshold for further analysis and would not alter the findings of the 1992 FEIS and the 2010 FSEIS relating to socioeconomic conditions.

Shadows

Neither the 1992 Riverside South FEIS nor the 2010 Riverside Center FSEIS identified significant adverse impacts in the area of shadows. The *CEQR Technical Manual* requires an analysis of potential impacts from shadows when a project would result in a new structure (or addition to an existing structure) of 50 feet or more or when a project is located adjacent to, or across the street from, a sunlight-sensitive resource. While Parcel K2 is located across the street from a sunlight-sensitive resource (the public open space located on Parcel O along Freedom Place), the proposed school would be approximately 51 feet shorter than the building anticipated for Parcel K2 as previously analyzed (approximately 149 feet compared to approximately 200 feet) and would not have the potential to result in incremental shadows on this resource. Therefore, the proposed modifications would not alter the findings of the 1992 FEIS and the 2010 FSEIS relating to shadows and would not result in any significant adverse shadows impacts.

Historic Resources

The 1992 FEIS concluded that the proposed Riverside South development would not result in any significant adverse impacts to architectural resources, with the implementation of the design controls of the project's General Large-Scale Development (GLSD) special permit and with construction protection measures put in place to protect certain architectural resources in proximity to the construction.

Since the 1992 FEIS, two additional architectural resources have been identified in the vicinity of Parcel K2. These are the Hudson River Bulkhead (State and National Register [S/NR] eligible) which runs along the Hudson River on the west side of Manhattan, and the NYCHA Amsterdam Houses (S/NR eligible) which occupy the superblock between Amsterdam Avenue, West 64th Street, West 61st Street, and West End Avenue (as identified in the October 2010 Riverside Center FEIS). The proposed development of Parcel K2 would have no adverse construction related impacts on architectural resources, including the Hudson River Bulkhead or the Amsterdam Houses, and previously identified resources such as the Consolidated Edison Power House, as these resources are located well beyond 90 feet of Parcel K2.

The proposed modifications, which apply only to Parcel K2 and include modification of design controls (base streetwall and recess controls and waiver of mandatory retail frontage), would result in a building of a lower height than originally analyzed in the 1992 FEIS and would have no adverse contextual impacts on the Amsterdam Houses. The Amsterdam Avenue Houses are located across West End Avenue with the building on Parcel O intervening. Therefore, the proposed modifications would not result in the isolation of the Amsterdam House from, or alteration of, their setting or visual relationships with the streetscape, would not alter the resource's visual prominence, and would not eliminate or screen public views to this resource. The Amsterdam Houses exist in a mixed context of newer and older construction, including the completed portions of Riverside South, and the proposed modifications would not alter that context or introduce incompatible visual, audible, or atmospheric elements to the Amsterdam Houses' setting.

Therefore, the proposed modifications would not alter the findings of the 1992 FEIS and the 2010 FSEIS relating to architectural resources.

Urban Design and Visual Resources

The 1992 FEIS and the 2010 FSEIS did not identify any significant adverse impacts on urban design and visual resources resulting from the development of a new structure on Parcel K2. The proposed modifications would not alter any streetscape orientation and the proposed school would be built at a smaller scale (approximately 51 feet shorter) than the building anticipated for the site under the previous analyses, resulting in a lesser effect on view corridors. The proposed modification of design controls would result in changes to the built form of the proposed school that reflect the change of uses on Parcel K2. The proposed school would be consistent with the buildings in the surrounding area, particularly the completed portions of Riverside South, that are largely of contemporary design. Therefore, the proposed modifications would not alter the findings of the 1992 FEIS and the 2010 FSEIS relating to urban design and would not result in any significant adverse urban design impacts.

Neighborhood Character

The 1992 FEIS and the 2010 FSEIS both found that the previous design would add a significant amount of building bulk, population, and economic activity to the project area, but would be consistent with the character of the surrounding area. The proposed modifications would result in a land use that is consistent with the predominantly residential area previously analyzed, and, by introducing a smaller structure than previously anticipated for Parcel K2, would result in decreased effects on character-defining elements. Therefore, the proposed modifications not would alter the findings of the 1992 FEIS or the 2010 FSEIS relating to neighborhood character and would not result in any significant adverse neighborhood character impacts.

Natural Resources

An assessment of natural resources is conducted when a natural resource is present on or near a development site and the proposed project may involve the direct or indirect disturbance of that resource. There are no known natural resources within or immediately adjacent to Parcel K2, and the proposed modifications would result in construction activities similar to those analyzed in the 1992 FEIS. Therefore, there would be no disturbance of natural resources as a result of the proposed modifications, and the proposed modifications would not alter the findings of the previous analyses relating to natural resources.

Water and Sewer Infrastructure

The 1992 FEIS and the 2010 FSEIS concluded that, with the construction of watermains and other infrastructure improvements, there would be sufficient water capacity throughout the project area and increased stormwater runoff would not overburden the sewer system. The proposed modifications would result in a lower level of development density on Parcel K2 than the residential uses previously analyzed in the 1992 FEIS and the 2010 FSEIS and decreased rates of water usage and sewage generation. The proposed modifications would also result in a built form for the site similar to the residential structure previously analyzed on Parcel K2 and would not result in a substantial increase in the amount of impervious surface. The proposed school would also comply with all regulatory requirements regarding stormwater management. Therefore, the proposed modifications would not alter the findings of the 1992 FEIS or the 2010 FSEIS and would not result in any significant adverse infrastructure impacts.

Solid Waste and Sanitation Services

The 1992 FEIS and 2010 FSEIS concluded that there was sufficient capacity within the municipal and private solid waste management systems to handle the solid waste generated on the project area. The proposed modifications would result in uses on Parcel K2 that generate a lower amount of solid waste than the residential uses previously analyzed for the site (up to 4 pounds per week per student, compared to 17 pounds per week per resident), therefore there would remain sufficient capacity within the solid waste management systems to handle the proposed school, and the proposed modifications would not alter the findings of the 1992 FEIS or the 2010 FSEIS.

Energy

The 1992 FEIS and the 2010 FSEIS concluded that there was sufficient energy generation capacity to supply the demand of new development in the project area. The proposed school is expected to require approximately 31,087 thousand MBTUs per year, an increase of approximately 13,800 thousand MBTUs compared to the residential uses previously analyzed for Parcel K2.[3] This additional demand is not expected to overburden the energy generation, transmission, and distribution system and would not result in a significant adverse energy impact, therefore the proposed modifications would not alter the findings of the 1992 FEIS or the 2010 FSEIS regarding energy.

Noise

Neither the 1992 FEIS nor the 2010 FSEIS predicted significant adverse impacts with respect to operational noise on Parcel K2. The proposed school would comply with all relevant noise attenuation regulations, therefore the proposed modifications would not result in significant adverse operational noise impacts. However, the proposed modifications would include outdoor play areas associated with the proposed school that were not included in either of the two previous studies. Therefore, an analysis of noise levels from these play areas on nearby sensitive receptors is also provided below.

Public Health

Neither the 1992 FEIS nor the 2010 FSEIS identified a significant adverse impact on public health. During construction activities in the project area, all public health related remediation measures and project components related to the environment as stipulated in the project's Restrictive Declaration would continue to be required with the proposed modifications. Therefore, the proposed modifications would not alter the findings of the 1992 FEIS or the 2010 FSEIS regarding public health.

[3] Estimates based on average annual usage of 250.7 MBTUs per square foot (institutional), 216.3 MBTUs per square foot (commercial) and 126.7 MBTUs per square foot (large residential) from Table 15-1 of the *CEQR Technical Manual.*

AREAS OF PREVIOUS SIGNIFICANT ADVERSE IMPACT

The 1992 Riverside South FEIS—for which Parcels K1 and K2 (located in the southern portion of the project area) were included in the "Build conditions" analysis—identified significant adverse impacts in the areas of community facilities (public elementary schools), historic and archeological resources during construction, traffic, subway, bus and pedestrians, hazardous materials, air quality (stationary sources) and construction noise. Mitigation measures were identified to either fully or partially mitigate the significant impacts identified. The 2010 FSEIS (addressing modifications to Parcels L, M and N, located directly south of Parcels K1 and K2) updated the 1992 analyses and environmental conditions in the southern portion of the original project area.

The proposed modifications to Parcels K1 and K2 would continue to require construction on the same parcels as analyzed in the 1992 FEIS, and therefore would not alter the conclusions or required mitigation with respect to historic and archeological resources[4] and hazardous materials during construction.

The 2010 FSEIS shows that with updated conditions in the study area (which includes Parcels K1 and K2), and the inclusion of a public school on Parcels L, M and N, the public elementary school impact identified in the 1992 FEIS would be eliminated. The proposed modifications for Parcels K1 and K2 would include a smaller residential component, which would decrease the utilization rate for school seats. Therefore, the proposed modifications would not alter the conclusion of the 2010 FSEIS; there would be no significant adverse impact with respect to schools.

With respect to air quality, the 1992 FEIS identified stationary source impacts of 24-hour SO_2 at elevated locations on several buildings, including K1 and K2. Mitigation measures included connecting one of the three boilers emitting through Stack No. 5 at the Con Edison 59th Street Station to Stack No. 1. However, since the 1992 FEIS was completed, Con Edison decommissioned Stack No. 5, eliminating the need to implement the air quality mitigation measures specified in the 1992 FEIS. The 2010 FSEIS found that there would be no significant adverse air quality impacts from the Con Edison 59th Street Station on Buildings K1 and K2. Both with the proposed modifications and under the updated assumptions in the No Build, the heights of Buildings K1 and K2 would be lower than those previously analyzed in the 2010 FSEIS. Since the previous air quality analyses predicted pollutant concentrations at various heights along the proposed building façades and found no significant adverse impacts at any of these heights, a smaller proposed building would fall within the already analyzed results, and the conclusion of no significant adverse air quality impacts from existing sources would remain.

The 1992 FEIS did not identify any significant adverse impacts associated with stationary sources from K2. With the proposed modifications, K2 would have a similar development size and height compared to the updated assumptions in the No Build. However, since Building K2 would be shorter in height compared to the height used in the 2010 FSEIS, a screening analysis was performed to determine the potential for significant adverse air quality impacts from stationary sources associated with the building's heating and hot water systems. The screening analysis was performed using the methodology described in Section 322.1 of Chapter 17 of the 2014 *CEQR Technical Manual*. This methodology determines the threshold of development size below which the action would not have a significant impact. The screening procedure utilizes information regarding the type of fuel to be burned, the maximum development size, and the heating and hot water system exhaust stack height, to evaluate whether or not a significant impact is possible. Based on the distance from the development to the nearest building of similar or greater height, if the maximum development size is greater than the threshold size in the *CEQR Technical Manual*, then there is the potential for significant air quality impacts and a refined dispersion modeling

[4] As per the 1992 FEIS, archaeological documentary studies identified areas of potential precontact sensitivity between 59th Street and 62nd Street, including a portion of Parcel K2. To determine if archaeological resources are present, Phase 1B archaeological testing will be carried out in these archaeologically sensitive areas. The commitment to undertake the archaeological testing is provided in the December 17, 1992 Restrictive Declaration, Article III (c) (ii).

analysis would be required. Otherwise, the source passes the screening analysis and no further study is required. Any nearby development of similar or greater height was analyzed as a potential receptor. The design for the site assumes that exhausts for heating and hot water systems would be ducted to the 11th floor roof of the proposed tower. The future Riverside Center Building 1 was used as a receptor location for the screening analysis. This building was used since it would be the closest building of a similar or greater height, with a minimum distance of approximately 92 feet. The maximum proposed development floor area for Building K2 with the proposed modifications was used as input for the screening analysis (approximately 176,000 gross square feet). It was assumed that natural gas would be used in the heating and hot water systems, based on the proposed building design. The primary pollutant of concern is NO_2 from natural gas combustion. The exhaust stack would be located on the 11th floor roof of the proposed building at a height of approximately 147 feet, based on an assumed height of 3 feet above the roof. Burning natural gas would not result in any significant stationary source air quality impacts because the Building K2 with the proposed modifications is below the maximum development size shown in Figure 17-8 of the Air Quality Appendix of the *CEQR Technical Manual*. Therefore, the proposed modifications would not result in any new significant adverse air quality impacts on existing or planned developments with respect to stationary sources of emissions.

The proposed modifications are not expected to significantly alter traffic conditions previously analyzed in the 2010 FSEIS. The modified traffic conditions would result in a maximum predicted net increment of 292 vehicle trips during the weekday AM peak hours in the study area. However, the maximum hourly incremental traffic from the proposed modifications would not exceed the 2012 *CEQR Technical Manual* carbon monoxide (CO) screening threshold of 170 peak hour trips at any of the intersections in the study area, or the threshold of 140 peak hour trips at intersections at or below West 61st Street. Therefore, no CO analysis is required. At the intersections with the highest number of project-generated trips, the particulate matter (PM) emission screening thresholds discussed in Chapter 17, Sections 210 and 311 of the 2012 *CEQR Technical Manual* would not be exceeded. Furthermore, at these and other locations, additional traffic associated with the proposed modifications would not be expected to result in any significant adverse impacts due to $PM_{2.5}$ emissions, for the following reasons: 1) The 2010 FSEIS included a $PM_{2.5}$ mobile source analysis at two intersection locations within the study area with much higher predicted vehicle increments and the resulting maximum predicted $PM_{2.5}$ increments were well below the applicable $PM_{2.5}$ significant impact criteria. 2) Since the 2010 FSEIS was completed, the City has revised the criteria used to evaluate impacts of $PM_{2.5}$, and the basis for evaluating 24-hour average impacts is now less stringent. 3) The trips generated by the proposed modifications are almost entirely automobiles, which have lower PM emissions than other types of vehicles. 4) The additional vehicle trips generated by the proposed modifications are associated with weekday drop-offs; at other times of the day, the number of vehicle trips would be much lower, and comparable or lower than the as—of-right development. Therefore, since this level of traffic will not have the potential to significantly change air quality conditions, a quantified assessment of on-street mobile source emissions is not warranted.

As mentioned above, the 1992 FEIS also identified significant adverse impacts with respect to construction noise. It should be noted that advanced construction methods and the availability of newer, quieter equipment since the 1992 would likely reduce the noise levels predicted in the 1992 FEIS for the construction of Parcels K1 and K2. These updated assumptions were incorporated into the 2010 FSEIS and cumulative construction impacts were analyzed from the construction of Buildings K1 and K2 together with construction on portions of Parcels L, M and N. The proposed modifications to Buildings K1 and K2 would not materially change the assumptions used in the 2010 FSEIS for the construction of these buildings.

The 2010 FSEIS—for which Parcels K1 and K2 were included in the "No Build" conditions analysis—identified significant adverse impacts in the analysis areas of community facilities (child care), open space (active), traffic, transit, pedestrians, construction traffic and construction noise.

The modifications proposed for Parcels K1 and K2 would not affect the conclusions of the analyses presented in the 2010 FSEIS in the areas of child care and open space. While the amount of residential

component would decrease in the No Build condition with the proposed modifications, these decreases would not be large enough to eliminate the identified significant adverse impacts in the Build condition in these areas. Therefore, the proposed mitigation identified in the 2010 FSEIS would continue to be required. In addition, the proposed modifications to the building massings for Parcels K1 and K2 would not affect the assumptions used in the 2010 FSEIS construction analyses, and therefore, similar construction traffic and noise impacts would be expected, and proposed mitigation implemented.

With respect to transportation, the proposed modifications to Parcels K1 and K2 would result in different transportation-related conditions than those analyzed in the 2010 FSEIS. Therefore, an updated analysis in this area is provided below.

Also, as discussed above, while neither the 1992 FEIS nor the 2010 FSEIS predicted significant adverse impacts with respect to operational noise, the proposed modifications would include outdoor play areas associated with the proposed school that were not included in either of the two previous studies. Therefore, an analysis of noise levels from these play areas on nearby sensitive receptors including the immediately adjacent K1 parcel is also provided below.

TRANSPORTATION

The proposed modifications would support the development of a 640-seat school, which would generate trips only in the weekday AM and PM peak periods. Therefore, the transportation analyses presented in this memorandum focus on weekday AM and PM peak hours, and do not include a weekday midday analysis period. The traffic analysis focuses on intersections along West End Avenue and Riverside Boulevard in the vicinity of the project site (Parcel K2), the transit analysis focuses on the 59th Street-Columbus Circle subway Station and various bus routes in the study area, and the pedestrian analysis focuses on pedestrian elements along West 60th Street between Broadway and West End Avenue. These analysis locations and transit services are expected to experience the largest increases in incremental trip-making resulting from the proposed modifications.

PREVIOUSLY APPROVED TRANSPORTATION ANALYSES FINDINGS

1992 Riverside South FEIS Findings

Traffic

The 1992 Riverside South FEIS analyzed an extensive traffic network consisting of 54 intersections extending from West 55th Street to the south to West 79th Street on the north, and from Central Park West/Eighth Avenue on the east to Twelfth Avenue/West Side Highway to the west. In addition to the development program, the analysis presented in the 1992 FEIS assumed construction of an on-site roadway system of streets extending westward generally along the Manhattan grid to a new 45-foot-wide extension of north-south Riverside Drive running from West 59th Street to West 72nd Street. It was also assumed that the new roadway system would include street connections to the external grid at West 61st, West 63rd, West 64th, West 66th and West 70th Streets, all providing access to/from West End Avenue. Furthermore, the proposed street system included an additional north-south street—Freedom Place South—connecting to West 61st and West 64th Streets and providing internal circulation for the site.

The 1992 Riverside South FEIS determined that activities generated by the proposed project would result in the potential for significant adverse impacts at nine locations along West End Avenue in the vicinity of Parcel K2 from West 56th Street in the south to West 65th Street to the north. To mitigate these significant adverse traffic impacts, measures including signal timing adjustments, parking prohibition and lane restriping were proposed. The 1992 FEIS analyzed traffic capacity conditions per the *1965 Highway Capacity Manual (HCM)* using the Creighton Hamburg, Inc. (CHI) methodology. It should be noted that both the 1965 HCM and CHI methodology are now obsolete and are no longer used in traffic capacity analyses.

Transit

The 1992 Riverside South FEIS analyzed the potential for impacts at three subway stations: 59th Street-Columbus Circle (A, B, C, D, No. 1 lines), 66th Street (No. 1 line), and 72nd Street (No. 1, 2, 3 lines).

The 1992 FEIS analysis determined that the existing entrance stair on the north side of Columbus Circle between Broadway and Central Park West would be significantly adversely impacted in the both the weekday AM and PM peak hours. Subsequent to the 1992 FEIS, this entrance was extensively reconstructed and expanded.

The analysis of subway line haul conditions in the 1992 FEIS identified a significant adverse AM peak hour impact to southbound IRT local service (then provided by the Nos. 1 and 9 trains and currently provided by the No. 1 train). As system-wide changes to subway service are under the jurisdiction of the MTA, no project-sponsored mitigation was proposed to address this impact.

The analysis of local bus conditions in the 1992 FEIS identified significant adverse impacts on a total of five NYCT local bus routes—the M5 in the AM peak hour and the M11, M57, M66 and M104 in both the weekday AM and PM peak hours. To improve bus transit access to the project site, adjustments to the M66 and M72 bus services were proposed that would provide direct access to the proposed project by relocating the turn-around points for these routes to within the project site itself.

Pedestrians

The analysis of pedestrian conditions in the 1992 FEIS identified a significant adverse impact to the south crosswalk on Broadway at West 60th Street in the weekday PM peak hour. To mitigate this potential impact, it was proposed to re-stripe the crosswalk to a width of 15 feet. The crosswalk was subsequently re-striped to this width.

2010 Riverside Center FSEIS Findings

Traffic

The 2010 FSEIS analyzed traffic conditions at 55 intersections in an extensive study area for the 2018 future "Build" year—the year when the proposed Riverside Center is expected to become operational.

To establish the future 2018 No Build conditions, the Riverside Center FSEIS accounted for an increase in traffic volumes resulting from the future development projects. These projects included the full build-out of Parcels I, J, and K as part of the Riverside South project, in addition to an annual background growth rate per *CEQR* criteria. For the future 2018 Build condition, trips expected to be generated by the proposed changes, including the changes in traffic patterns resulting from the proposed extensions of Freedom Place South and West 60th Street into the site, were overlaid on to the 2018 No Build traffic network to develop the 2018 Build traffic volumes.

The 2010 Riverside Center FSEIS determined that activities generated by the proposed project (the development proposed on Parcels L, M and N) would result in the potential for significant adverse impacts at five locations (4 signalized and 1 unsignalized) in the vicinity of Building K2 during one or more peak periods, including:

- 12th Avenue at West 57th Street;
- 12th Avenue at West 59th Street;
- West End Avenue at West 66th Street;
- West End Avenue at West 59th Street; and
- 11th Avenue at West 57th Street.

To mitigate these significant adverse traffic impacts, measures including signal timing adjustments, parking prohibition and new traffic signal installation were proposed.

Transit

The 2010 FSEIS analyzed the A, B, C, D, and No. 1 train services and the 59th Street-Columbus Circle subway station located approximately ½ mile to the east of the Riverside Center project site. The analysis of 2018 conditions with the Riverside Center project at the 59th Street-Columbus Circle subway station indicated that all of the analyzed stairs would continue to operate at acceptable levels of service during

both the weekday AM and PM peak hours, and adjacent fare arrays (turnstiles and exit gates) would continue to operate with available capacity in these peak hours.

The 2010 FSEIS also found that all subway routes serving the 59th Street-Columbus Circle subway station would continue to operate within available peak direction capacity at their maximum load points during both the weekday AM and PM peak hours, and the proposed project would be expected to add no more than one additional peak direction passenger per car to any of these routes in either period.

The 2010 FSEIS also analyzed the M11, M31 and M57 local bus routes during the weekday AM and PM peak hours and found that the eastbound M31 and M57 buses (away from the project site) would experience capacity shortfalls equivalent to 11 passengers and 143 passengers, respectively, during the weekday AM peak hour. During the weekday PM peak hour, northbound M11 and westbound M31 and M57 buses (toward the project site) would experience capacity shortfalls equivalent to 36, 95, and 207 passengers, respectively. While NYCT routinely monitors changes in bus ridership and would make the necessary service adjustments where warranted, service adjustments to alleviate capacity shortfalls are subject to the agencies' fiscal and operational constraints and, if implemented, are expected to take place over time.

Pedestrians

The pedestrian demand from the program analyzed in the 2010 FSEIS was expected to be most concentrated on sidewalks and crosswalks immediately adjacent to the Riverside Center project's entrances on West End Avenue and West 59th Street, and along West 60th Street, which would serve as the most direct route between the project site and the 59th Street-Columbus Circle subway station.

The 2010 FSEIS found that no analyzed sidewalks or corner areas would be significantly adversely impacted by project-generated pedestrian traffic. However, five crosswalks would be significantly adversely impacted in one or more peak hours. At the intersection of West 60th Street and Amsterdam Avenue, the north crosswalk would be significantly impacted during the AM and PM peak hours and the south crosswalk would be impacted during the AM, PM, and Saturday midday peak hours. The north and south crosswalks on Columbus Avenue at West 60th Street would be significantly impacted during the AM, PM, and Saturday midday peak hours, with the south crosswalk also being impacted during the weekday midday. At the intersection of West 59th Street and West End Avenue, the north crosswalk would be significantly impacted during the AM, PM, and Saturday midday peak hours. To mitigate these significant adverse traffic impacts, crosswalk widening measures were proposed.

ANALYSIS FRAMEWORK

To determine if the proposed modifications to Parcels K1 and K2 would result in significant adverse impacts not previously identified in the 1992 Riverside South FEIS and the 2010 Riverside Center FSEIS, an assessment of transportation conditions was performed. This assessment began with a comparison of travel demand associated with the residential and community facility development previously approved for Building K2 (per the 1992 Riverside South FEIS) and the proposed modifications consisting of a new private school.

With the proposed modifications, 151 residential units, approximately 1,689 gsf of office space, and 8,354 gsf of retail space planned for Building K2 would be replaced by The Collegiate School, which will house approximately 640 students (in grades 1 through 12) and will be staffed by approximately 110 faculty and administrative personnel.

Travel Demand Estimates

A comparison of travel demand was conducted to determine whether the proposed Collegiate School would result in additional trips to those identified for the residential units and office/retail space that would be replaced by the school. For this comparison, transportation planning factors from the 2012 *CEQR Technical Manual* along with the updated modal splits from the 2007-2011 American Community Survey (ACS) census estimates were used to estimate trip generation activities for the residential and office components (see **Tables 2** and **3**).

For the private school component, the overall student population and the number of faculty/staff provided by the proposed school operator—The Collegiate School—were used in estimating trip generation activities (see **Tables 5 and 6**). Temporal distributions of 90 percent for the weekday AM peak hour and 10 percent for the weekday PM peak hour for both students and faculty/staff were also based on the information provided by The Collegiate School. The proposed school will not hold regular classes on weekends; thus, trip generation estimates for Saturday conditions were not applicable for travel demand comparison. Directional distributions of 100 percent "in" and 100 percent "out" during all three peak hours were assumed for student drop-off and pick-up activities. Student modal splits and vehicle occupancy were also based on the information provided by The Collegiate School. For faculty/staff, the modal splits and vehicle occupancy were obtained from reverse-journey-to-work data from the 2010 U.S. Census Database, adjusted for staff travel patterns provided by The Collegiate School.

Preliminary Analysis Methodology

The *CEQR Technical Manual* describes a two-tier screening procedure for the preparation of a "preliminary analysis" to assess the travel demand characteristics of a project. The preliminary analysis begins with a trip generation analysis (Level 1) to estimate the volume of person and vehicle trips attributable to a project. Based on CEQR guidelines, if a project is expected to result in fewer than 50 peak hour vehicle trips and fewer than 200 peak hour transit or pedestrian trips, further quantified analyses are not warranted. When these thresholds are exceeded, detailed trip assignments (Level 2) are performed to estimate the incremental trips that could be incurred at specific transportation elements and to identify potential locations for further analyses. If the trip assignments show that a project would generate 50 or more peak hour vehicle trips at an intersection, 200 or more peak hour subway trips at a station, 50 or more peak hour bus trips in one direction along a bus route, or 200 or more peak hour pedestrian trips traversing a pedestrian element, then further quantified analyses may be warranted to assess the potential for significant adverse impacts.

Table 2
Travel Demand Factors - Residential Component

Residential	151					
	(dwelling units)					
Daily Person Trip Rate[1]	8.075					
	Person Trips (/dwelling unit)					
Person Trip Temporal & Directional Distribution[1,2]	**AM**			**PM**		
	10.0%			11.0%		
	In	**Out**	**Total**	**In**	**Out**	**Total**
	16.0%	84.0%	100%	67.0%	33.0%	100%
Modal Split	**AM[3]**			**PM[3]**		
Auto	9.0%			9.0%		
Taxi	7.0%			7.0%		
Subway	46.0%			46.0%		
Railroad	2.0%			2.0%		
Bus	15.0%			15.0%		
Walk	21.0%			21.0%		
Total	100.0%			100.0%		
Vehicle Occupancy						
Auto[3]	1.22					
Taxi[2]	1.40					
Daily Delivery Trip Rate[1]	0.06					
	(/dwelling unit)					
Delivery Trip Temporal & Directional Distribution[1]	**AM**			**PM**		
	12.0%			2.0%		
	In	**Out**	**Total**	**In**	**Out**	**Total**
	50.0%	50.0%	100.0%	50.0%	50.0%	100.0%
Peak Hour Person Trip	**AM**			**PM**		
	In	**Out**	**Total**	**In**	**Out**	**Total**
Auto	2	9	11	8	4	12
Taxi	1	7	8	6	3	9
Subway	9	47	56	41	20	61
Railroad	0	2	2	2	1	3
Bus	3	15	18	13	7	20
Walk	4	22	26	19	9	28
Total	19	102	121	89	44	133
Peak Hour Vehicle Trip	**AM**			**PM**		
	In	**Out**	**Total**	**In**	**Out**	**Total**
Auto	1	8	9	7	3	10
Taxi	6	6	12	4	4	8
Delivery	1	1	2	0	0	0
Total	8	15	23	11	7	18

Source:
1. 2012 *CEQR Technical Manual*
2. *Riverside Center SEIS*, 2010
3. U.S. Census 2007-2011 American Community Survey 5-Year Estimates (Census Tract 151)

Table 3
Travel Demand Factors - Office Component

Office	1,689 square feet					
Daily Person Trip Rate[1]	18.0 Person Trips (/1,000 sf)					
Person Trip Temporal & Directional Distribution[1,2]	**AM** 12.0%			**PM** 14.0%		
	In	**Out**	**Total**	**In**	**Out**	**Total**
	95.0%	5.0%	100%	15.0%	85.0%	100%
Modal Split	**AM[3]**			**PM[3]**		
Auto	19.0%			19.0%		
Taxi	3.0%			3.0%		
Subway	52.0%			52.0%		
Railroad	7.0%			7.0%		
Bus	10.0%			10.0%		
Walk	9.0%			9.0%		
Total	100.0%			100.0%		
Vehicle Occupancy						
Auto[3]	1.14					
Taxi[2]	1.40					
Daily Delivery Trip Rate[1]	0.32 (/1,000 sf)					
Delivery Trip Temporal & Directional Distribution[1,2]	**AM** 10.0%			**PM** 2.0%		
	In	**Out**	**Total**	**In**	**Out**	**Total**
	50.0%	50.0%	100.0%	50.0%	50.0%	100.0%
Peak Hour Person Trip	**AM**			**PM**		
	In	**Out**	**Total**	**In**	**Out**	**Total**
Auto	1	0	1	0	1	1
Taxi	0	0	0	0	0	0
Subway	2	0	2	0	2	2
Railroad	0	0	0	0	0	0
Bus	0	0	0	0	0	0
Walk	0	0	0	0	0	0
Total	3	0	3	0	3	3
Peak Hour Vehicle Trip	**AM**			**PM**		
	In	**Out**	**Total**	**In**	**Out**	**Total**
Auto	1	0	1	0	1	1
Taxi	0	0	0	0	0	0
Delivery	0	0	0	0	0	0
Total	1	0	1	0	1	1

Source:
1. 2012 *CEQR Technical Manual*
2. Riverside Center SEIS, 2010
3. U.S. Census 2010 Census Transportation Planning Package (Census Tract 151)

Table 4
Travel Demand Factors - Retail Component

Retail	8,354 square feet					
Daily Person Trip Rate[1]	205.00 Person Trips (/1,000 sf)					
Linked Trip	25%					
Daily Person Trip Rate with Linked Trip[1]	153.75 Person Trips (/1,000 sf)					
Person Trip Temporal & Directional Distribution[1,2]	**AM** 3.0%			**PM** 10.0%		
	In	**Out**	**Total**	**In**	**Out**	**Total**
	50.0%	50.0%	100%	50.0%	50.0%	100%
Modal Split	**AM[2]**			**PM[2]**		
Auto	2.0%			2.0%		
Taxi	3.0%			3.0%		
Subway	6.0%			6.0%		
Railroad	0.0%			0.0%		
Bus	6.0%			6.0%		
Walk	83.0%			83.0%		
Total	100.0%			100.0%		
Vehicle Occupancy						
Auto[2]	1.65					
Taxi[2]	1.40					
Daily Delivery Trip Rate[1]	0.35 (/1,000 sf)					
Delivery Trip Temporal & Directional Distribution[1]	**AM** 8.0%			**PM** 2.0%		
	In	**Out**	**Total**	**In**	**Out**	**Total**
	50.0%	50.0%	100.0%	50.0%	50.0%	100.0%
	AM			**PM**		
Peak Hour Person Trip	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Auto	0	0	0	1	1	2
Taxi	1	1	2	2	2	4
Subway	1	1	2	4	4	8
Railroad	0	0	0	0	0	0
Bus	1	1	2	4	4	8
Walk	16	16	32	53	53	106
Total	**19**	**19**	**38**	**64**	**64**	**128**
	AM			**PM**		
Peak Hour Vehicle Trip	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Auto	0	0	0	1	1	2
Taxi	0	0	0	1	1	2
Delivery	0	0	0	0	0	0
Total	**0**	**0**	**0**	**2**	**2**	**4**

Sources:
1. 2012 *CEQR Technical Manual*
2. *606 West 57th Street DEIS* (2013)

Table 5
Travel Demand Factors - Students

Students	640		
Student Vehicle Occupancy [1]	1.23		
School Bus/Van Occupancy [1]	12		
Absentee rate	0%		
AM Peak Hour Temporal	90%		
PM Peak Hour Temporal	10%		
Travel Mode	**Modal Split** [1]	**Person Trips**	**Vehicle Trips**
AM Peak Hour			
Auto (drop-offs/pick-ups) *	30%	173	141
School Bus/Van *	8%	47	4
Subway	25%	144	NA
Bus	25%	144	NA
Walk	12%	68	NA
PM Peak Hour			
Auto (drop-offs/pick-ups) *	30%	19	15
School Bus/Van	0%	0	0
Subway	26.5%	17	NA
Bus	26.5%	17	NA
Walk	17%	11	NA

Notes:
(1) Based on information provided by Collegiate School
* Both inbound and outbound vehicle trips take place during the same peak hour

Table 6
Travel Demand Factors - Staff

Staff	110		
Staff Vehicle Occupancy [1]	1.3		
Taxi Occupancy [1]	1.3		
Absentee rate	0%		
AM Peak Hour Temporal	90%		
PM Peak Hour Temporal	10%		
Travel Mode	**Modal Split** [2]	**Person Trips**	**Vehicle Trips**
AM Peak Hour			
Auto (Drive)	15%	15	12
Taxi	5%	5	4
Subway	50%	49	
Bus	15%	15	
Walk	15%	15	
PM Peak Hour			
Auto (Drive)	15%	2	2
Taxi	5%	1	1
Subway	50%	4	
Bus	15%	2	
Walk	15%	2	

Notes:
(1) Vehicle occupancy and modal splits based on 2000 U.S. Census Reverse-Journey-To-Work data (Census Tract 151), adjusted for staff travel pattern information provided by Collegiate School.
(2) For a conservative estimate, taxi occupancy is assumed to be the same as auto occupancy.

Level 1 Screening Assessment

2010 Riverside Center FSEIS Program for Parcels K1 and K2

The total person and vehicle trips generated by the residential, retail, and office components of the 2010 FSEIS K1 and K2 program (the 2010 FSEIS program) are summarized in **Table 7**. In total, the residential, retail and office components of the 2010 FSEIS program would result in approximately 24 and 23 vehicle trips during the weekday AM and PM peak hours, respectively. With regards to total person trips, the 2010 FSEIS program would result in 162 and 264 person trips during the weekday AM and PM peak hours, respectively. With regards to transit use, the 2010 program is estimated to result in 62

and 74 subway (subway and rail combined) trips and 20 and 28 bus trips during the weekday AM and PM peak hours, respectively. In terms of walk-only trips, the residential, retail, and community facility components of the 2010 FSEIS program are estimated to result in 58 and 134 walk-only trips during the weekday AM and PM peak hours, respectively.

Table 7
Trip Generation Summary
2010 FSEIS K1 and K2 Program (Residential, Retail, and Office Components)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Peak Hour Person Trips						
Auto	3	10	12	9	6	15
Taxi	2	8	10	8	5	13
Subway	12	48	60	46	26	71
Railroad	1	2	2	2	1	3
Bus	4	17	20	17	11	28
School Bus	0	0	0	0	0	0
Walk	20	38	58	72	63	134
Total	**41**	**121**	**162**	**153**	**111**	**264**
Peak Hour Vehicle Trips						
Auto	2	8	10	8	5	13
Taxi	6	6	12	5	5	10
Delivery	1	1	2	0	0	0
School Bus	0	0	0	0	0	0
Total	**9**	**15**	**24**	**13**	**10**	**23**

The Proposed Modifications—The Collegiate School

The total number of person and vehicle trips expected to be generated by the proposed Collegiate School are summarized in **Table 8**. In total, The Collegiate School would generate approximately 310 and 34 vehicle trips during the weekday AM and PM peak hours, respectively. With regards to total person trips, the private school component is estimated to result in 675 and 75 total person trips during the weekday AM and PM peak hours, respectively. With regard to transit use, the private school component is estimated to result in 193 and 21 subway trips and 159 and 19 bus trips during the weekday AM and PM peak hours, respectively. In terms of walk-only trips, the private school component is estimated to result in 83 and 13 walk-only trips during the weekday AM and PM peak hours, respectively. Additionally, the private school component is estimated to result in 47 and 0 total school bus trips during the weekday AM and PM peak hours, respectively.

Table 8
Trip Generation Summary
The Proposed Modifications -- The Collegiate School

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Peak Hour Person Trips						
Auto	188	0	188	0	21	21
Taxi	5	0	5	0	1	1
Subway	193	0	193	0	21	21
Railroad	0	0	0	0	0	0
Bus	159	0	159	0	19	19
School Bus	47	0	47	0	0	0
Walk	83	0	83	0	13	13
Total	**675**	**0**	**675**	**0**	**75**	**75**
Peak Hour Vehicle Trips						
Auto	153	141	294	15	17	32
Taxi	4	4	8	1	1	2
Delivery	0	0	0	0	0	0
School Bus	4	4	8	0	0	0
Total	**161**	**149**	**310**	**16**	**18**	**34**

Net Incremental Trips

As presented in **Table 9**, the proposed modifications would result in net increments of approximately 292 and 13 vehicle trips during the weekday AM and PM peak hours, respectively. With regard to person trips, the proposed modifications are estimated to result in net increments of 513 and -189 total person trips during the weekday AM and PM peak hours, respectively. In terms of transit use, the proposed modifications are estimated to result in net increments of 131 and -53 subway (subway and rail combined) trips and 139 and -9 bus trips during the weekday AM and PM peak hours, respectively. As for the walk-only trips, the proposed modifications are estimated to result in net increments of 25 and -121 walk-only trips during the weekday AM and PM peak hours, respectively.

Table 9

Net Incremental Trips (2010 FSEIS Program vs. Proposed Modification)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Peak Hour Person Trips						
Auto	185	-9	176	-9	15	6
Taxi	3	-8	-5	-8	-4	-12
Subway	181	-48	133	-45	-5	-50
Railroad	0	-2	-2	-2	-1	-3
Bus	155	-16	139	-17	8	-9
School Bus	47	0	47	0	0	0
Walk	63	-38	25	-72	-49	-121
Total	**634**	**-121**	**513**	**-153**	**-36**	**-189**
Peak Hour Vehicle Trips						
Auto	151	133	284	7	12	19
Taxi	1	1	1	-3	-3	-6
Delivery	-1	-1	-2	0	0	0
School Bus	4	4	8	0	0	0
Total	**155**	**137**	**292**	**4**	**9**	**13**

Level 2 Screening Assessment (Weekday AM Peak Hour)

Traffic

As shown in **Table 9**, the proposed modifications are expected to result in 292 net incremental project-generated vehicle trips during the weekday AM peak hour. During the PM peak hour, the incremental vehicle trips would be below the threshold value of 50 vehicle trips. Based on the *CEQR* guidelines, a Level 2 traffic screening assessment was performed for the AM peak hour. A Level 2 screening assessment involves the distribution and assignment of projected vehicle trips to the roadway network and the determination of whether specific locations are expected to incur incremental trips exceeding the *CEQR* thresholds. If the results of this analysis show that the proposed modifications would generate 50 or more peak hour vehicle trips per intersection, further quantified analyses may be warranted to evaluate the potential for significant adverse traffic impacts. For the proposed modifications, incremental vehicle trips projected for the 2017 Build year were assigned to the area's roadway network. Vehicle trip assignments were developed by distributing project generated trips to surrounding intersections that would be most affected by the new trips.

Traffic assignments were performed for both the student and faculty/staff trips expected to be generated by the proposed Collegiate School. Student auto and school bus trips were assumed to pick-up and drop-off students in front of the school on West 61st Street and on Freedom Place. Faculty/staff auto and taxi trips were assigned to the project site block.

The assignment of school generated vehicle trips were conducted based on the information provided by The Collegiate School regarding the students and faculty/staff areas of residence in Manhattan and outer boroughs. These assignments were further "fine-tuned" based on the traffic assignment patterns presented in the 2010 Riverside Center FSEIS for non-residential uses. Given the location of the project site, a vast majority of school generated vehicle trips would approach the project site via West End Avenue and Riverside Boulevard. Based on this assessment, it was determined that seven intersections on West End

Avenue in the vicinity of project site, from West 57th Street to West 66th Street, would exceed the *CEQR* threshold of 50 peak hour project generated vehicle trips during the AM peak hour. In addition, three intersections on Riverside Boulevard and one intersection on Freedom Place would also exceed the *CEQR* threshold of 50 peak hour project generated vehicle trips during the AM peak hour. Therefore, as presented in **Figure 1**, a traffic study area consisting of 13 intersections was selected during the weekday AM peak hour for traffic capacity analysis purposes.

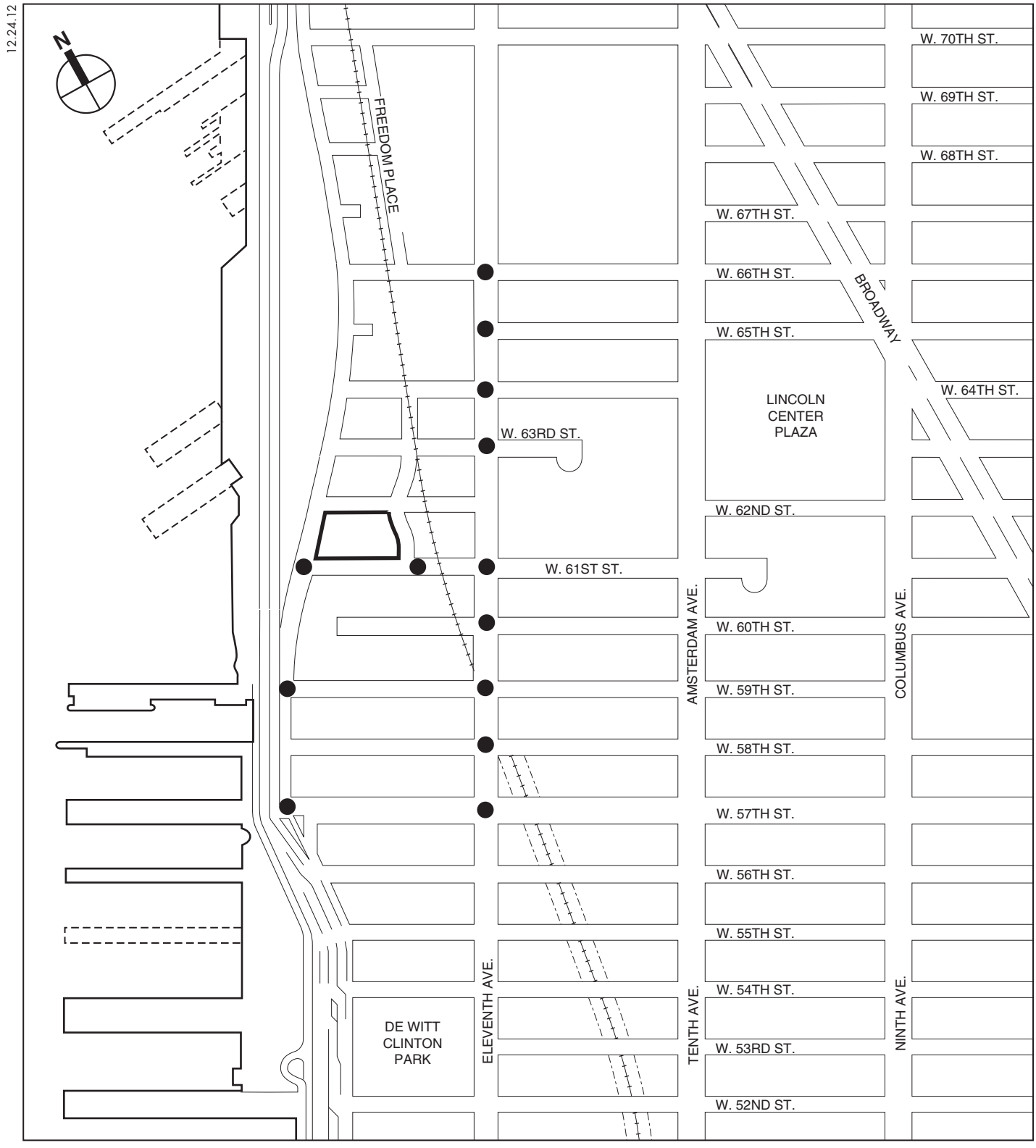
Transit

As shown in **Table 9**, the proposed modifications are expected to result in 133 net incremental project-generated subway trips during the weekday AM peak hour. Most of these subway trips would be expected to utilize the 59th Street-Columbus Circle Station, serving the A, B, C, D, and No. 1 lines. Most of these trips were assigned to enter and exit the station at the stairs located at West 60th Street and Broadway, specifically at two staircases on the northwest corner of the intersection, one staircase on the Broadway median just south of the intersection, and one staircase on the east side of Broadway. A number of subway trips to and from the 59th Street-Columbus Circle Station were assigned to bus transfers to the M31 and M57 bus routes, which run along West 57th Street. These bus transfers would enter and exit the subway station using the staircases at West 57th Street and Broadway. In addition, many of the subway trips originating north of the Collegiate School would be expected to utilize the 66th Street-Lincoln Center Station, serving the No. 1 line. However, for the purposes of this analysis, all subway trips were conservatively assigned to the 59th Street-Columbus Circle Station. The 2010 FSEIS found no significant adverse subway station or subway line-haul impacts associated with the previously analyzed program, with a total of 937 incremental subway trips during the weekday AM peak hour. The 2010 FSEIS concluded that all subway stairways and fare arrays continued to have significant available capacity in the analyzed Build condition. Since the proposed modifications' projected subway trips would be distributed to various entrances and fare arrays at the 59th Street-Columbus Circle Station, it is expected that no single subway station element would incur incremental peak hour subway trips that would cause any new significant impact. Similarly, the 2010 FSEIS found adequate subway line-haul capacity in the analyzed Build condition. In addition, because the majority of AM subway trips associated with the proposed modifications would be oriented toward the project site while the majority of AM subway trips from the area are oriented away from the project site as depicted in the 2010 FSEIS, any overlap in average additional passengers per subway car between what was analyzed in the 2010 FSEIS program and what the Collegiate School is expected to generate would be minimal. For the PM peak hour, the incremental transit trips would be below the threshold value for additional analyses of 200 transit trips. Therefore, the proposed modifications would not alter the conclusion of the 2010 FSEIS; there would be no significant adverse subway station or line-haul impacts.

As shown in **Table 9**, the proposed modifications are expected to result in 139 net incremental project-generated bus trips during the weekday AM peak hour. These bus trips would be distributed to the M11, M31, M57, and M66 routes. Similar to the subway trips discussed above, the majority of AM bus trips associated with the proposed modifications would be oriented toward the project site while the majority of AM bus trips from the area, as depicted in the 2010 FSEIS, are oriented away from the project site, and any overlap in passengers per bus between what was analyzed in the 2010 FSEIS program and what the Collegiate School is expected to generate would be minimal. The AM bus line-haul analysis in the 2010 FSEIS addressed peak travel on the southbound M11 route, the eastbound M31 route, and the eastbound M57 route, whereas the majority of AM bus trips associated with the proposed modifications would be on the northbound M11 and westbound M57 routes, which were considered to be in the off-peak direction and were not analyzed in the 2010 FSEIS. Since the proposed modifications' projected bus trips would be distributed to various bus routes and would not add a substantial number of riders on any route in one direction, and because the Collegiate School bus trips would mostly be in the off-peak direction, the proposed modifications would not alter the conclusion of the 2010 FSEIS with respect to bus line-haul.

Pedestrian

As shown in **Table 9**, the proposed modifications are expected to result in 513 net incremental project-generated pedestrian trips during the weekday AM peak hour. During the PM peak hour, the incremental



RIVERSIDE SOUTH COLLEGIATE SCHOOL

Traffic Study Area
Figure 1

pedestrian trips would be below the threshold value of 200 pedestrian trips. In terms of Collegiate School AM peak hour pedestrian assignments, the majority of the auto, taxi, and school bus drop-offs would occur directly in front of the proposed school on West 61st Street and Freedom Place, and would not traverse any pedestrian elements beyond the sidewalks directly adjacent to the school. Staff auto trips would park at the nearest available public parking facilities and would walk to-and-from the project site along pedestrian elements primarily to the west of West End Avenue. Pedestrian walk-only trips would originate from the residential areas immediately surrounding the proposed school. Project-generated bus riders would use the M11, M31, M57, and M66 buses and would get on and off at the bus stops nearest to the project site, specifically at the southbound M57 stop along West End Avenue just north of the project site, the northbound M57 stop on West End Avenue at West 63rd Street, the M66 stop on West 66th Street at West End Avenue, the northbound M11 stop on Amsterdam Avenue at 62nd Street, and the M31 stop on West 57th Street at Eleventh Avenue. The above trips would traverse pedestrian elements primarily outside of the 2010 FSEIS pedestrian study area, and are not expected to exceed the *CEQR Technical Manual* threshold of 200 pedestrian trips per element requiring a Level 2 assessment of pedestrian conditions at any new location. However, as outlined above, all subway trips were conservatively assigned to the 59th Street-Columbus Circle Station, and therefore all of the incremental subway trips generated by the Collegiate School would traverse the West 60th Street corridor in a similar pattern to that depicted in the 2010 FSEIS. These trips would travel along the north and south sides of West 60th Street, from the 59th Street-Columbus Circle Station at Broadway and West 60th Street to the Collegiate School site. Some trips would follow a northerly path along Amsterdam Avenue to West 61st Street, and continue on that street to access the site. Further analysis of the effects of these subway trips on study area pedestrian elements is discussed below, in the "Pedestrian Analysis" section.

Traffic Operations – Analysis Methodology

The operation of study area intersections were assessed using methodologies presented in the *2000 Highway Capacity Manual (HCM)* using the *Highway Capacity Software (HCS+ 5.5)*. The *HCM* procedure evaluates the levels of service (LOS) for signalized and unsignalized intersections using average stop control delay, in seconds per vehicle, as described below.

Signalized Intersections

The average control delay per vehicle is the basis for determining levels of service for individual lane groups (grouping of movements in one or more travel lanes), the overall approaches to each intersection, and the overall intersection itself. Levels of service are defined in **Table 10**.

Table 10
LOS Criteria for Signalized Intersections

LOS	Average Control Delay
A	≤ 10.0 seconds
B	>10.0 and ≤ 20.0 seconds
C	>20.0 and ≤ 35.0 seconds
D	>35.0 and ≤ 55.0 seconds
E	>55.0 and ≤ 80.0 seconds
F	>80.0 seconds

Source: Transportation Research Board. *Highway Capacity Manual*, 2000.

- LOS A describes operations with low delays, i.e., 10.0 seconds or less per vehicle. This occurs when signal progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all.
- LOS B describes operations with delays in excess of 10.0 seconds up to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. Again, most vehicles do not stop at the intersection.

- LOS C describes operations with delays in excess of 20.0 seconds up to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. The number of vehicles stopping is noticeable at this level, although many still pass through the intersection without stopping.
- LOS D describes operations with delays in excess of 35.0 seconds up to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines.
- LOS E describes operations with delays in excess of 55.0 seconds up to 80.0 seconds per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios.
- LOS F describes operations with delays in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios with cycle failures. Poor progression and long cycle lengths may also contribute to such delays. Often, vehicles do not pass through the intersection in one signal cycle.

Based on *CEQR Technical Manual* guidelines, LOS A, B, and C are considered acceptable, LOS D is considered marginally acceptable up to mid-LOS D (45 seconds of delay for signalized intersections) and unacceptable above mid-LOS D, and LOS E and F indicate congestion. These guidelines are applicable to individual traffic movements and overall intersection levels of service.

Unsignalized Intersections

For unsignalized intersections, the average control delay is defined as the total elapsed time from which a vehicle stops at the end of the queue until the vehicle departs from the stop line. Level of service criteria for unsignalized intersections is summarized in **Table 11**.

For unsignalized intersections, LOS E is considered the limit of acceptable delay, while LOS F is considered unacceptable to most drivers. LOS F conditions exist when there are insufficient gaps of suitable size in a major vehicular traffic stream to allow side street traffic to cross safely.

Table 11
LOS Criteria for Unsignalized Intersections

LOS	Average Control Delay
A	≤ 10.0 seconds
B	>10.0 and ≤ 20.0 seconds
C	>20.0 and ≤ 35.0 seconds
D	>35.0 and ≤ 55.0 seconds
E	>55.0 and ≤ 80.0 seconds
F	>80.0 seconds

Source: Transportation Research Board. *Highway Capacity Manual*, 2000.

Significant Impact Criteria

The assessment of potential significant traffic impacts of a proposed action is based on significant impact criteria defined in the *CEQR Technical Manual.* No Action LOS A, B, or C conditions that deteriorate to unacceptable LOS D, E, or F in the future With Action condition are considered a significant traffic impact.

For future With Action LOS A, B, or C conditions that deteriorate to unacceptable LOS D, mitigation to mid-LOS D (45.0 seconds of delay for signalized intersections and 30.0 seconds of delay for unsignalized intersections) needs to be considered to fully mitigate the impact.

For a No Action LOS D, an increase of delay by five or more seconds in the With Action condition is considered a significant impact if the With Action delay meets or exceeds 45.0 seconds. For a No Action LOS E, the threshold is a four second increase in With Action delay; for a No Action LOS F, a three

second increase in delay in the With Action condition is significant. For unsignalized intersections, for the minor street to generate a significant impact, 90 passenger car equivalents (PCEs) must be identified in the With Action condition in any peak hour.

Traffic Operations Analysis – Procedures and Findings

The Build year for the collegiate school is 2017, which is one year before the completion of the planned Riverside Center development. However, the 2018 Build traffic volume networks from the 2010 Riverside Center FSEIS were conservatively used as the baseline to assess the potential significant adverse traffic impacts of the proposed modifications. The 2018 Future Build conditions in the 2010 FSEIS were analyzed by adding the trips generated by the proposed Riverside Center development on to the 2018 No Build traffic networks which accounted for the background growth, other potential development projects, and the trips generated by both the under-construction buildings as well as parcels slated for construction as part of the approved 1992 Riverside South project. To identify the changes in the traffic levels at the study area intersections with the proposed modifications, future Build traffic volumes were developed for the AM peak hour. These volumes were developed by:

- Netting out the trips generated by development program contemplated for Building K2 consisting of 151 residential units, 1,689 gsf of office space, and 8,354 gsf of retail space from the 2018 Build traffic volumes presented in the 2010 Riverside Center FSEIS; and,
- By overlaying the trips generated by the proposed modifications on top of the 2018 Build traffic volumes presented in the 2010 Riverside Center FSEIS.

Table 12 summarizes the results of traffic analysis for the 13 study area intersections during the weekday AM peak hour. Proposed mitigation measures at the intersection of West End Avenue and West 57th Street from the recently approved 606 West 57th Street FEIS have also been incorporated into the traffic analysis. Based on the analysis results, with adjustments to the mitigation measures[5] proposed in the 2010 FSEIS at the intersections of West End Avenue at West 57th Street and West 66th Street, no significant adverse impacts would occur. Specifically, the following mitigation adjustments would be proposed at these two intersections:

- Install an exclusive northbound phase with 7 seconds green, 3 seconds amber, and 2 seconds red at the intersection of West End Avenue and West 66th Street. The preliminary left-turn warrant analysis indicates that the exclusive northbound phase is warranted based on the projected traffic volumes. The northbound/southbound phase becomes 29 seconds green, 3 seconds amber, and 2 seconds red. The proposed signal timing/phasing adjustments and LOS analysis for the weekday midday and PM peak hours are presented in Attachment C; and
- Shift 1 second of green time from the eastbound/westbound phase to the northbound/southbound phase at the intersection of West End Avenue and West 57th Street.

With these mitigation adjustments in place, all 13 study area intersections would operate acceptably with no potential significant adverse traffic impacts due to the proposed Collegiate School modifications. The implementation of the above mitigation adjustments will be based on the results of the traffic monitoring plan discussed below. **Table 13** provides the level of service (LOS) for the intersections of West End Avenue at West 57th Street and West 66th Street during the weekday AM peak hour.

[5] Mitigation proposed at the selected study area intersections as part of the 2010 Riverside Center FSEIS were included in the traffic capacity analysis against which the potential impacts of the proposed modifications were evaluated.

Table 12
Level of Service Analysis
Comparison of 2010 FSEIS Conditions and Proposed Modifications

Intersection	AM Peak Hour							
	2010 FSEIS Conditions				Conditions with Proposed Modifications			
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
West End Ave @ W. 66th St								
Eastbound	LR	0.55	30.4	C	LR	0.57	31.1	C
Westbound	L	0.61	32.7	C	L	0.72	38.1	D
	LT	0.79	39.7	D	LT	0.84	44.2	D
	R	0.38	25.9	C	R	0.47	29.2	C
Northbound	L	0.84	71.2	E	L	0.87	78.5	E*
	T	0.36	16.8	B	T	0.38	17.0	B
Southbound	TR	0.66	17.6	B	TR	0.67	17.8	B
	Intersection		24.9	C	Intersection		26.8	C
West End Ave @ W. 65th St								
Eastbound	LTR	0.08	23.1	C	LTR	0.08	23.1	C
Northbound	L	0.14	17.2	B	L	0.15	17.8	B
	TR	0.71	24.1	C	TR	0.79	27.5	C
Southbound	L	0.75	26.1	C	L	0.81	33.3	C
	TR	0.57	7.2	A	TR	0.60	7.5	A
	Intersection		14.5	B	Intersection		16.5	B
West End Ave @ W. 64th St								
Eastbound	LTR	0.33	24.0	C	LTR	0.33	24.0	C
Northbound	TR	0.55	14.8	B	TR	0.60	15.8	B
Southbound	L	0.17	11.8	B	L	0.20	12.4	B
	T	0.60	10.8	B	T	0.64	11.3	B
	Intersection		12.8	B	Intersection		13.4	B
West End Ave @ W. 63rd St								
Westbound	LTR	0.06	20.0	C	LTR	0.06	20.0	C
Northbound	L	0.57	33.9	C	L	0.57	33.9	C
	TR	0.57	15.2	B	TR	0.63	16.3	B
Southbound	L	0.09	7.6	A	L	0.11	7.9	A
	T	0.89	20.6	C	T	0.89	20.6	C
	R	0.13	10.4	B	R	0.26	11.7	B
	Intersection		18.6	B	Intersection		18.7	B
West End Avenue @ W. 61st St								
Eastbound	LTR	0.21	21.9	C	LTR	0.44	26.0	C
Northbound	T	0.58	15.3	B	T	0.58	15.3	B
	R	0.12	10.4	B	R	0.12	10.4	B
Southbound	L	0.39	17.5	B	L	0.39	17.5	B
	TR	0.95	28.8	C	TR	0.95	28.6	C
	Intersection		22.5	C	Intersection		22.8	C
West End Avenue @ W. 60th St								
Eastbound	LTR	0.15	20.5	C	LTR	0.15	20.5	C
Northbound	TR	0.87	25.9	C	TR	0.87	25.9	C
Southbound	L	0.43	18.3	B	L	0.41	17.6	B
	T	0.79	15.8	B	T	0.80	16.1	B
	Intersection		20.7	C	Intersection		20.8	C
West End Avenue @ W. 59th St								
Eastbound	L	0.75	60.6	E	L	0.76	62.6	E
	R	0.18	23.7	C	R	0.18	23.7	C
Westbound	L	0.29	25.2	C	L	0.29	25.2	C
	TR	0.86	49.4	D	TR	0.87	50.2	D
Northbound	L	0.61	28.1	C	L	0.68	33.8	C
	T	0.59	13.8	B	T	0.59	13.8	B
Southbound	TR	0.81	14.4	B	TR	0.82	14.6	B
	Intersection		21.6	C	Intersection		22.1	C
11th Avenue @ W. 58th St								
Eastbound	LTR	0.46	30.1	C	LT	0.46	30.1	C
Northbound	TR	0.77	16.7	B	TR	0.78	16.9	B
Southbound	L	0.39	11.6	B	L	0.41	12.5	B
	T	0.70	9.0	A	T	0.71	9.2	A
	Intersection		14.1	B	Intersection		14.3	B

Table 12 (cont'd)
Level of Service Analysis
Comparison of 2010 FSEIS Conditions and Proposed Modifications

Intersection	AM Peak Hour							
	2010 FSEIS Conditions				Conditions with Proposed Modifications			
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
11th Avenue @ 57th Street								
Eastbound	L	0.68	30.1	C	L	0.69	30.6	C
	TR	0.67	31.0	C	TR	0.67	31.0	C
Westbound	L	0.72	32.7	C	L	0.72	32.7	C
	TR	0.73	33.9	C	TR	0.73	34.2	C
Northbound	L	0.43	27.2	C	L	0.44	27.6	C
	TR	0.64	22.6	C	TR	0.64	22.7	C
Southbound	L	0.94	73.6	E	L	0.99	87.8	F*
	TR	0.84	27.4	C	TR	0.85	27.8	C
	Intersection		30.7	C	Intersection		31.7	C
12th Avenue @ W.59th Street								
Eastbound	LT	0.04	20.4	C	LT	0.04	20.4	C
Westbound	TR	0.69	32.1	C	TR	0.70	32.6	C
Northbound	LTR	0.8	23.2	C	LTR	0.82	24.4	C
	Intersection		26.2	C	Intersection		27.1	C
12th Avenue @ 57th Street								
Westbound	R	0.39	33.3	C	R	0.40	33.4	C
Northbound	T	0.72	27.4	C	T	0.73	27.5	C
	Intersection		28.6	C	Intersection		28.7	C
Riverside Blvd @ W.61st Street (UNSIGNALIZED ALL-WAY STOP)								
Westbound	LR	-	9.59	A	RL	-	10.48	B
Northbound	TR	-	11.93	A	TR	-	13.57	B
Southbound	LT	-	9.94	A	LT	-	10.41	B
	Intersection		10.9	B	Intersection		12.02	B
Freedom Place @ W.61t Street (UNSIGNALIZED 2-WAY STOP)								
Eastbound	LTR	0	7.80	A	LTR	0.00	7.8	A
Westbound	LTR	0.05	8.10	A	LTR	0.05	8.1	A
Northbound	LTR	0.29	18.1	C	LTR	0.32	20.1	C
Southbound	LTR	0.02	11.0	B	LTR	0.41	19.7	C

Note: "*" indicates lane-group requiring mitigation adjustments.

Table 13
Level of Service Analysis
Comparison of 2010 FSEIS Conditions and Proposed Modifications with Minor Mitigation Adjustments

Intersection	AM Peak Hour											
	2010 FSEIS Conditions				Conditions with Proposed Modifications				2010 FSEIS Mitigation with Adjustments			
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
West End Ave @ W. 66th St												
Eastbound	LR	0.55	30.4	C	LR	0.57	31.1	C	LR	0.57	31.1	C
Westbound	L	0.61	32.7	C	L	0.72	38.1	D	L	0.72	38.1	D
	LT	0.79	39.7	D	LT	0.84	44.2	D	LT	0.84	44.2	D
	R	0.38	25.9	C	R	0.47	29.2	C	R	0.47	29.2	C
Northbound	L	0.84	71.2	E	L	0.87	78.5	E*	L	0.51	26.6	C
	T	0.36	16.8	B	T	0.38	17.0	B	T	0.38	17.0	B
Southbound	TR	0.66	17.6	B	TR	0.67	17.8	B	TR	0.95	44.2	D
	Intersection		24.9	C	Intersection		26.8	C	Intersection		36.9	D
11th Avenue @ 57th Street												
Eastbound	L	0.68	30.1	C	L	0.69	30.6	C	L	0.71	33.2	C
	TR	0.67	31.0	C	TR	0.67	31.0	C	TR	0.70	32.5	C
Westbound	L	0.72	32.7	C	L	0.72	32.7	C	L	0.74	35.4	D
	TR	0.73	33.9	C	TR	0.73	34.2	C	TR	0.77	36.3	D
Northbound	L	0.43	27.2	C	L	0.44	27.6	C	L	0.41	25.4	C
	TR	0.64	22.6	C	TR	0.64	22.7	C	TR	0.63	21.7	C
Southbound	L	0.94	73.6	E	L	0.99	87.8	F*	L	0.95	74.7	E
	TR	0.84	27.4	C	TR	0.85	27.8	C	TR	0.83	25.5	C
	Intersection		30.7	C	Intersection		31.7	C	Intersection		31.1	C

Note:
"*" indicates lane-group requiring mitigation adjustments.

Pedestrian Operations – Analysis Methodology

The adequacy of the study area's sidewalks, crosswalks, and corner reservoir capacities in relation to the demand imposed on them is evaluated based on the methodologies presented in the 2010 *HCM*, pursuant to procedures detailed in the *CEQR Technical Manual*.

Sidewalks are analyzed in terms of pedestrian flow. The calculation of the average pedestrians per minute per foot (PMF) of effective walkway width is the basis for a sidewalk LOS analysis. The determination of walkway LOS is also dependent on whether the pedestrian flow being analyzed is best described as "non-platoon" or "platoon." Non-platoon flow occurs when pedestrian volume within the peak 15-minute period is relatively uniform, whereas, platoon flow occurs when pedestrian volumes vary significantly with the peak 15-minute period. Such variation typically occurs near bus stops, subway stations, and/or where adjacent crosswalks account for much of the walkway's pedestrian volume.

Crosswalks and street corners are not easily measured in terms of free pedestrian flow, as they are influenced by the effects of traffic signals. Street corners must be able to provide sufficient space for a mix of standing pedestrians (queued to cross a street) and circulating pedestrians (crossing the street or moving around the corner). The *HCM* methodologies apply a measure of time and space availability based on the area of the corner, the timing of the intersection signal, and the estimated space used by circulating pedestrians.

The total "time-space" available for these activities, expressed in square feet-second, is calculated by multiplying the net area of the corner (in square feet) by the signal's cycle length. The analysis then determines the total circulation time for all pedestrian movements at the corner per signal cycle (expressed as pedestrians per second). The ratio of net time-space divided by the total pedestrian circulation volume per signal cycle provides the LOS measurement of square feet per pedestrian (SFP).

Crosswalk LOS is also a function of time and space. Similar to the street corner analysis, crosswalk conditions are first expressed as a measurement of the available area (the crosswalk width multiplied by the width of the street) and the permitted crossing time. This measure is expressed in square feet-second. The average time required for a pedestrian to cross the street is calculated based on the width of the street and an assumed walking speed. The ratio of time-space available in the crosswalk to the total crosswalk pedestrian occupancy time is the LOS measurement of available square feet per pedestrian. The LOS analysis also accounts for vehicular turning movements that traverse the crosswalk. The LOS standards for sidewalks, corner reservoirs, and crosswalks are summarized in **Table 14**. The *CEQR Technical Manual* specifies acceptable LOS in Central Business District (CBD) areas is mid-LOS D or better.

Table 14
Level of Service Criteria for Pedestrian Elements

LOS	Sidewalks		Corner Reservoirs and Crosswalks
	Non-Platoon Flow	Platoon Flow	
A	≤ 5 PMF	≤ 0.5 PMF	> 60 SFP
B	> 5 and ≤ 7 PMF	> 0.5 and ≤ 3 PMF	> 40 and ≤ 60 SFP
C	> 7 and ≤ 10 PMF	> 3 and ≤ 6 PMF	> 24 and ≤ 40 SFP
D	> 10 and ≤ 15 PMF	> 6 and ≤ 11 PMF	> 15 and ≤ 24 SFP
E	> 15 and ≤ 23 PMF	> 11 and ≤ 18 PMF	> 8 and ≤ 15 SFP
F	> 23 PMF	> 18 PMF	≤ 8 SFP

Notes: PMF = pedestrians per minute per foot; SFP = square feet per pedestrian.
Source: New York City Mayor's Office of Environmental Coordination, *CEQR Technical Manual*.

Significant Impact Criteria

The determination of significant pedestrian impacts considers the level of predicted deterioration in pedestrian flow or decrease in pedestrian space between the No Action and With Action conditions. For different pedestrian elements, flow conditions, and area types, the CEQR procedure for impact determination corresponds with various sliding-scale formulas, as further detailed below.

There are two sliding-scale formulas for determining significant sidewalk impacts. For non-platoon flow, the increase in average pedestrian flow rate (Y) in PMF needs to be greater or equal to 3.5 minus X divided by 8.0 (where X is the No Action pedestrian flow rate in PMF [$Y \geq 3.5 - X/8.0$]) for it to be a significant impact. For platoon flow, the sliding-scale formula is $Y \geq 3.0 - X/8.0$. Since deterioration in pedestrian flow within acceptable levels would not constitute a significant impact, these formulas would apply only if the With Action pedestrian flow exceeds LOS C in non-CBD areas or mid-LOS D in CBD areas. **Table 15** summarizes the sliding scale guidance provided by the *CEQR Technical Manual* for determining potential significant sidewalk impacts.

Table 15
Significant Impact Guidance for Sidewalks

Non-Platoon Flow				Platoon Flow			
Sliding Scale Formula: ***Y ≥ 3.5 – X/8.0***				**Sliding Scale Formula:** ***Y ≥ 3.0 – X/8.0***			
Non-CBD Areas		**CBD Areas**		**Non-CBD Areas**		**CBD Areas**	
No Action Ped. Flow (X, PMF)	**With Action Ped. Flow Incr. (Y, PMF)**	**No Action Ped. Flow (X, PMF)**	**With Action Ped. Flow Incr. (Y, PMF)**	**No Action Ped. Flow (X, PMF)**	**With Action Ped. Flow Incr. (Y, PMF)**	**No Action Ped. Flow (X, PMF)**	**With Action Ped. Flow Incr. (Y, PMF)**
7.5 to 7.8	≥ 2.6	–	–	3.5 to 3.8	≥ 2.6	–	–
7.9 to 8.6	≥ 2.5	–	–	3.9 to 4.6	≥ 2.5	–	–
8.7 to 9.4	≥ 2.4	–	–	4.7 to 5.4	≥ 2.4	–	–
9.5 to 10.2	≥ 2.3	–	–	5.5 to 6.2	≥ 2.3	–	–
10.3 to 11.0	≥ 2.2	10.4 to 11.0	≥ 2.2	6.3 to 7.0	≥ 2.2	6.4 to 7.0	≥ 2.2
11.1 to 11.8	≥ 2.1	11.1 to 11.8	≥ 2.1	7.1 to 7.8	≥ 2.1	7.1 to 7.8	≥ 2.1
11.9 to 12.6	≥ 2.0	11.9 to 12.6	≥ 2.0	7.9 to 8.6	≥ 2.0	7.9 to 8.6	≥ 2.0
12.7 to 13.4	≥ 1.9	12.7 to 13.4	≥ 1.9	8.7 to 9.4	≥ 1.9	8.7 to 9.4	≥ 1.9
13.5 to 14.2	≥ 1.8	13.5 to 14.2	≥ 1.8	9.5 to 10.2	≥ 1.8	9.5 to 10.2	≥ 1.8
14.3 to 15.0	≥ 1.7	14.3 to 15.0	≥ 1.7	10.3 to 11.0	≥ 1.7	10.3 to 11.0	≥ 1.7
15.1 to 15.8	≥ 1.6	15.1 to 15.8	≥ 1.6	11.1 to 11.8	≥ 1.6	11.1 to 11.8	≥ 1.6
15.9 to 16.6	≥ 1.5	15.9 to 16.6	≥ 1.5	11.9 to 12.6	≥ 1.5	11.9 to 12.6	≥ 1.5
16.7 to 17.4	≥ 1.4	16.7 to 17.4	≥ 1.4	12.7 to 13.4	≥ 1.4	12.7 to 13.4	≥ 1.4
17.5 to 18.2	≥ 1.3	17.5 to 18.2	≥ 1.3	13.5 to 14.2	≥ 1.3	13.5 to 14.2	≥ 1.3
18.3 to 19.0	≥ 1.2	18.3 to 19.0	≥ 1.2	14.3 to 15.0	≥ 1.2	14.3 to 15.0	≥ 1.2
19.1 to 19.8	≥ 1.1	19.1 to 19.8	≥ 1.1	15.1 to 15.8	≥ 1.1	15.1 to 15.8	≥ 1.1
19.9 to 20.6	≥ 1.0	19.9 to 20.6	≥ 1.0	15.9 to 16.6	≥ 1.0	15.9 to 16.6	≥ 1.0
20.7 to 21.4	≥ 0.9	20.7 to 21.4	≥ 0.9	16.7 to 17.4	≥ 0.9	16.7 to 17.4	≥ 0.9
21.5 to 22.2	≥ 0.8	21.5 to 22.2	≥ 0.8	17.5 to 18.2	≥ 0.8	17.5 to 18.2	≥ 0.8
22.3 to 23.0	≥ 0.7	22.3 to 23.0	≥ 0.7	18.3 to 19.0	≥ 0.7	18.3 to 19.0	≥ 0.7
> 23.0	≥ 0.6	> 23.0	≥ 0.6	> 19.0	≥ 0.6	> 19.0	≥ 0.6

Notes: PMF = pedestrians per minute per foot; Y = increase in average pedestrian flow rate in PMF; X = No-Action pedestrian flow rate in PMF.
Sources: New York City Mayor's Office of Environmental Coordination, *CEQR Technical Manual*.

The determination of significant corner and crosswalk impacts is also based on a sliding scale using the following formula: $Y \geq X/9.0 - 0.3$, where Y is the decrease in pedestrian space in SFP and X is the No Action pedestrian space in SFP. Since a decrease in pedestrian space within acceptable levels would not constitute a significant impact, this formula would apply only if the With Action pedestrian space falls short of LOS C in non-CBD areas or mid-LOS D in CBD areas. **Table 16** summarizes the sliding scale guidance provided by the *CEQR Technical Manual* for determining potential significant corner reservoir and crosswalk impacts.

Table 16
Significant Impact Guidance for Corners and Crosswalks

Sliding Scale Formula:	***Y ≥ X/9.0 – 0.3***		
Non-CBD Areas		**CBD Areas**	
No Action Pedestrian Space (X, SFP)	**With Action Pedestrian Space Reduction (Y, SFP)**	**No Action Pedestrian Space (X, SFP)**	**With Action Pedestrian Space Reduction (Y, SFP)**
25.8 to 26.6	≥ 2.6	–	–
24.9 to 25.7	≥ 2.5	–	–
24.0 to 24.8	≥ 2.4	–	–
23.1 to 23.9	≥ 2.3	–	–
22.2 to 23.0	≥ 2.2	–	–
21.3 to 22.1	≥ 2.1	21.3 to 21.5	≥ 2.1
20.4 to 21.2	≥ 2.0	20.4 to 21.2	≥ 2.0
19.5 to 20.3	≥ 1.9	19.5 to 20.3	≥ 1.9
18.6 to 19.4	≥ 1.8	18.6 to 19.4	≥ 1.8
17.7 to 18.5	≥ 1.7	17.7 to 18.5	≥ 1.7
16.8 to 17.6	≥ 1.6	16.8 to 17.6	≥ 1.6
15.9 to 16.7	≥ 1.5	15.9 to 16.7	≥ 1.5
15.0 to 15.8	≥ 1.4	15.0 to 15.8	≥ 1.4
14.1 to 14.9	≥ 1.3	14.1 to 14.9	≥ 1.3
13.2 to 14.0	≥ 1.2	13.2 to 14.0	≥ 1.2
12.3 to 13.1	≥ 1.1	12.3 to 13.1	≥ 1.1
11.4 to 12.2	≥ 1.0	11.4 to 12.2	≥ 1.0
10.5 to 11.3	≥ 0.9	10.5 to 11.3	≥ 0.9
9.6 to 10.4	≥ 0.8	9.6 to 10.4	≥ 0.8
8.7 to 9.5	≥ 0.7	8.7 to 9.5	≥ 0.7
7.8 to 8.6	≥ 0.6	7.8 to 8.6	≥ 0.6
6.9 to 7.7	≥ 0.5	6.9 to 7.7	≥ 0.5
6.0 to 6.8	≥ 0.4	6.0 to 6.8	≥ 0.4
5.1 to 5.9	≥ 0.3	5.1 to 5.9	≥ 0.3
< 5.1	≥ 0.2	< 5.1	≥ 0.2
Notes:	SFP = square feet per pedestrian; Y = decrease in pedestrian space in SFP; X = No-Action pedestrian space in SFP.		
Sources:	New York City Mayor's Office of Environmental Coordination, *CEQR Technical Manual*.		

Pedestrian Operations Analysis – Procedures and Findings

The 2010 Riverside Center FSEIS found significant pedestrian impacts in the Build analysis at five crosswalks: the north crosswalk at West 59th Street and West End Avenue, the north and south crosswalks at West 60th Street and Amsterdam Avenue, and the north and south crosswalks at West 60th Street and Columbus Avenue. Based on the methodologies presented in the 2010 *HCM*, pursuant to procedures detailed in the *CEQR Technical Manual*, these five crosswalks were further evaluated to assess any potential impacts as a result of the proposed modifications. Mitigation proposed as part of the 2010 FSEIS were included in the pedestrian capacity analysis against which the potential impacts of the proposed modifications were evaluated. In addition, elements that were found to be close to significantly impacted in the 2010 FSEIS Build condition were analyzed. These included the north crosswalk at West 60th Street and West End Avenue, the north crosswalk at Broadway and 60th Avenue, the north sidewalk along West 60th Street between Columbus Avenue and Broadway, and the south sidewalk along West 60th Street between Amsterdam Avenue and Columbus Avenue.

The Build year for the collegiate school is 2017, which is one year before the completion of the planned Riverside Center development. However, the 2018 Build pedestrian volume networks from the 2010 Riverside Center FSEIS were conservatively used as the baseline to assess the potential significant adverse pedestrian impacts of the proposed modifications. The 2018 Future Build condition in the 2010 FSEIS were analyzed by adding the trips generated by the proposed Riverside Center development onto the 2018 No Build pedestrian networks which accounted for the background growth, other potential development projects, and the trips generated by both the under-construction buildings as well as parcels slated for construction as part of the approved 1992 Riverside South project. To identify the changes in the pedestrian levels at the study area intersections with the proposed modifications, future Build pedestrian volumes were developed for the AM peak hour. These volumes were developed by:

- Netting out the trips generated by development program contemplated for Building K2 consisting of 151 residential units, 1,689 gsf of office space, and 8,354 gsf of retail space from the 2018 Build pedestrian volumes presented in the 2010 Riverside Center FSEIS; and,
- Overlaying the trips generated by the proposed modifications on top of the 2018 Build pedestrian volumes presented in the 2010 Riverside Center FSEIS.

Tables 16 and 17 summarize the results of the pedestrian analysis for the seven study area crosswalks and two sidewalks during the weekday AM peak hour. Based on the analysis results, all previously identified significant impacts in the 2010 FSEIS would continue to be mitigated with the same crosswalk widenings identified in the 2010 FSEIS. In addition, it was determined that the proposed modifications would not result in any additional significant adverse impacts on the study area's pedestrian elements.

Table 16
Comparison of 2010 FSEIS Conditions and Proposed Modifications: Sidewalk Analysis

Location	Sidewalk	Effective Width (ft)	Two-way Peak 15-Minute Volume	PMF	Platoon LOS
Weekday AM Peak Period					
2010 FSEIS Conditions					
West 60th Street between Columbus Avenue and Broadway	North	7.6	767	6.7	D
West 60th Street between Amsterdam Avenue and Columbus Avenue	South	4.1	434	7.1	D
Conditions with the Proposed Modifications					
West 60th Street between Columbus Avenue and Broadway	North	7.6	788	6.9	D
West 60th Street between Amsterdam Avenue and Columbus Avenue	South	4.1	455	7.4	D
Notes: PMF = pedestrians per minute per foot					

Table 17
Comparison of 2010 FSEIS Conditions and Proposed Modifications: Crosswalk Analysis

Location	Crosswalk	Crosswalk Length (ft)	Crosswalk Width (ft)	Two-way Peak 15-Minute Volume	SFP	LOS
Weekday AM Peak Period						
2010 FSEIS Conditions						
West End Avenue and West 59th Street	North	73.0	12.5	214	26.7	C
West End Avenue and West 60th Street	North	72.0	12.0	276	24.3	C
Amsterdam Avenue and West 60th Street	North	61.9	16.9	457	20.1	D
	South	60.2	15.3	403	22.4	D
Columbus Avenue and West 60th Street	North	67.0	17.6	761	16.2	D
	South	60.5	15.8	627	15.4	D
Ninth Avenue and W 57th Street	South	120.0	33.0	334	21.0	D
Conditions with the Proposed Modifications						
West End Avenue and West 59th Street	North	73.0	12.5	214	26.7	C
West End Avenue and West 60th Street	North	72.0	12.0	298	22.3	D
Amsterdam Avenue and West 60th Street	North	61.9	16.9	467	19.6	D
	South	60.2	15.3	425	21.1	D
Columbus Avenue and West 60th Street	North	67.0	17.6	783	15.6	D
	South	60.5	15.8	649	14.7	E
Ninth Avenue and W 57th Street	South	120.0	33.0	347	20.2	D
Note: SFP = square feet per pedestrian						

PARKING

The 2010 Riverside Center FSEIS determined that approximately 919 parking spaces would be available during the weekday midday peak hour within a broader ½-mile study area. This resulted in a parking utilization rate of approximately 93.4 percent during the weekday midday peak hour within a ½-mile

study area. As discussed above, the proposed modifications would result in a net loss of 557 planned parking spaces in the future conditions as compared to the 2010 FSEIS.

With a reduction in future parking supply due to the proposed modifications, there would still be sufficient parking spaces available in the ½-mile study area to accommodate the project's parking demand. Therefore, the loss of parking spaces with the proposed modifications would not result in a potential significant parking shortfall in the study area.

TRAFFIC MONITORING PLAN

Prior to the opening of the relocated Collegiate School, the co-applicant, The Collegiate School will perform and submit the following: Detailed plans will be submitted including site plans showing all entrances, sidewalk widths, proposed signs, adjacent street geometry (as per AASHTO, MUTCD and NYCDOT specifications), and walking routes to/from school etc. A survey of the existing Collegiate School will also be performed prior to opening of the new location to determine the origin/destination and modal split of students and staff separately (classified by grades K-2, 3-5, 6-8 and 9-12 separately), as well as arrival and departure patterns in 15-minute increments, and how many students are accompanied by parents. Based on the detailed plans to be provided and the findings of the survey, the locations to be analyzed will be selected. New ATRs, turning movement and pedestrian counts will be performed, as well as traffic and pedestrian analyses, and assess whether the traffic control devices require modification. An updated safety assessment will also be performed based on the new data. Once the school is built and occupied, The Collegiate School should perform follow-up counts and analyses to determine whether any traffic and pedestrian mitigation measures are needed. The Collegiate School is responsible for all costs associated with the monitoring plan, development of mitigation measures, and the design and construction of mitigation measures requiring capital funding. Before commencing any monitoring plan, The Collegiate School must submit a scope of work for NYCDOT review and approval.

NOISE

Based on proportional modeling, the change in traffic volumes due to the proposed modifications would result in a maximum increase in noise levels of less than 2.2 dBA. A change of this magnitude would be barely perceptible and insignificant. However, the proposed school's rooftop playground and at-grade courtyard would have the potential to result in increased noise levels at adjacent buildings and would have the potential for changing the building attenuation requirements for Parcel K2 and K1. Consequently, the noise analysis presented examines the effects of noise from these sources and presents an analysis of the level of building attenuation necessary to ensure that interior noise levels satisfy applicable CEQR interior noise criteria.

ACOUSTICAL FUNDAMENTALS

Quantitative information on the effects of airborne noise on people is well documented. If sufficiently loud, noise may adversely affect people in several ways. For example, noise may interfere with human activities, such as sleep, speech communication, and tasks requiring concentration or coordination. It may also cause annoyance, hearing damage, and other physiological problems. Although it is possible to study these effects on people on an average or statistical basis, it must be remembered that all the stated effects of noise on people vary greatly with the individual. Several noise scales and rating methods are used to quantify the effects of noise on people. These scales and methods consider such factors as loudness, duration, time of occurrence, and changes in noise level with time.

"A"-Weighted Sound Level (dBA)

Noise is typically measured in units called decibels (dB), which are ten times the logarithm of the ratio of the sound pressure squared to a standard reference pressure squared. Because loudness is important in the assessment of the effects of noise on people, the dependence of loudness on frequency must be taken into account in the noise scale used in environmental assessments. Frequency is the rate at which sound pressures fluctuate in a cycle over a given quantity of time, and is measured in Hertz (Hz), where 1 Hz equals 1 cycle per second. Frequency defines sound in terms of pitch components. One of the simplified

scales that accounts for the dependence of perceived loudness on frequency is the use of a weighting network known as A-weighting in the measurement system, to simulate response of the human ear. For most noise assessments the A-weighted sound pressure level in units of dBA is used in view of its widespread recognition and its close correlation with perception. In this analysis, all measured noise levels are reported in dBA or A-weighted decibels. Common noise levels in dBA are shown in **Table 18**.

Ability to Perceive Changes in Noise Levels

The average ability of an individual to perceive changes in noise levels is well documented (see **Table 19**). Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners, whereas 10 dBA changes are normally perceived as doublings (or halvings) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

Table 18
Common Noise Levels

Sound Source	(dBA)
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Freight train at 30 meters	95
Train horn at 30 meters	90
Heavy truck at 15 meters	80–90
Busy city street, loud shout	80
Busy traffic intersection	70–80
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Light car traffic at 15 meters, city or commercial areas, or residential areas close to industry	50–60
Background noise in an office	50
Suburban areas with medium-density transportation	40–50
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0

Note: A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.
Sources: Cowan, James P. *Handbook of Environmental Acoustics,* Van Nostrand Reinhold, New York, 1994. Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

Table 19
Average Ability to Perceive Changes in Noise Levels

Change (dBA)	Human Perception of Sound
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A dramatic change
40	Difference between a faintly audible sound and a very loud sound

Source: Bolt Beranek and Newman, Inc., *Fundamentals and Abatement of Highway Traffic Noise*, Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.

Noise Descriptors Used In Impact Assessment

Because the sound pressure level unit of dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise over extended periods have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific time period as if it had been a steady, unchanging sound. For this condition, a descriptor called the "equivalent sound level,"

L_{eq}, can be computed. L_{eq} is the constant sound level that, in a given situation and time period (e.g., 1 hour, denoted by $L_{eq(1)}$, or 24 hours, denoted as $L_{eq(24)}$), conveys the same sound energy as the actual time-varying sound. Statistical sound level descriptors such as L_1, L_{10}, L_{50}, L_{90}, and L_x, are used to indicate noise levels that are exceeded 1, 10, 50, 90, and x percent of the time, respectively. Discrete event peak levels are given as L_1 levels.

For the purposes of this project, the maximum 1-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in the noise impact evaluation. $L_{eq(1)}$ is the noise descriptor recommended for use in the *City Environmental Quality Review (CEQR) Technical Manual* and is used to provide an indication of highest expected sound levels. The 1-hour L_{10} is the noise descriptor used in the *CEQR Technical Manual* noise exposure guidelines for City environmental impact review classification. Statistical noise levels (particularly L_{10} and L_{eq} levels) were used to characterize the relevant noise sources and their relative importance at each receptor location.

NOISE STANDARDS AND CRITERIA

New York CEQR Noise Standards

The *CEQR Technical Manual* contains guidelines for required attenuation values to achieve acceptable interior noise levels. These values are shown in **Table 20**. The *CEQR Technical Manual* criteria are based on maintaining an interior noise level for the worst-case hour $L_{10(1)}$ less than or equal to 45 dBA for classroom uses.

Table 20
Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Unacceptable				Clearly Unacceptable
Noise level with proposed project	$70<L_{10}\leq73$	$73<L_{10}\leq76$	$76<L_{10}\leq78$	$78<L_{10}\leq80$	$80<L_{10}$
Attenuation[A]	(I) 28 dB(A)	(II) 31 dB(A)	(III) 33 dB(A)	(IV) 35 dB(A)	$36 + (L_{10} - 80)^B$ dB(A)

Notes:
[A]The above composite window-wall attenuation values are for residential dwellings. Commercial office spaces and meeting rooms would be 5 dB(A) less in each category. All the above categories require a closed window situation and hence an alternate means of ventilation.
[B]Required attenuation values increase by 1 dB(A) increments for L_{10} values greater than 80 dBA.
Sources: New York City Department of Environmental Protection

In addition, the *CEQR Technical Manual* uses the following criteria to determine whether a proposed project would result in a significant adverse noise impact. The impact assessments compare the proposed project's Build condition $L_{eq(1)}$ noise levels to those calculated for the No Build condition, for receptors potentially affected by the project.

If the No Build levels are less than 60 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period, the threshold for a significant impact would be an increase of at least 5 dBA $L_{eq(1)}$. For the 5 dBA threshold to be valid, the resultant Build condition noise level would have to be equal to or less than 65 dBA. If the No Build noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the CEQR standards as being between 10 PM and 7 AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$. (If the No Build noise level is 61 dBA $L_{eq(1)}$, the maximum incremental increase would be 4 dBA, since an increase higher than this would result in a noise level higher than the 65 dBA $L_{eq(1)}$ threshold.)

NOISE PREDICTION METHODOLOGY

Noise from the School Playgrounds

The proposed project includes one elevated playground on the 9th floor roof of the north portion of the proposed K2 building, and one at-grade courtyard for use by the school's K-12 students. While use of the rooftop playground has not yet been programmed, for analysis purposes it was conservatively assumed

that it would have active (noisy) recreational activities with 60 students per hour based on discussions with representatives of The Collegiate School. Field observations at the existing school courtyard of The Collegiate School at 260 West 78th Street, yielded a maximum of less than 15 students per hour engaged in active noisy recreation. For analysis purposes it was conservatively assumed that it would have active (noisy) recreational activities with 20 students per hour.

The CadnaA model was used to determine sound effects of the proposed playground at nearby receptor locations. The CadnaA model is a computerized model developed by DataKustik for sound prediction and assessment. The model can be used for the analysis of a wide variety of sound sources, including stationary sources (e.g., construction equipment, industrial equipment, power generation equipment, etc.), transportation sources (e.g., roads, highways, railroad lines, busways, airports, etc.), and other specialized sources (e.g., sporting facilities, etc.) The model takes into account the sound power levels of the sound sources, attenuation with distance, ground contours, reflections from barriers and structures, attenuation due to shielding, etc. The CadnaA model has been used in several SCA projects with rooftop and adjacent playgrounds; predicted noise levels are proportional to the number of students. The CadnaA model is based on the acoustic propagation standards promulgated in International Standard ISO 9613-2. The CadnaA model is a state-of-the-art tool for acoustical analysis.

The analysis of the proposed playgrounds consisted of the following five step procedure:

- The project site geometry and surrounding building geometry were coded into the CadnaA model;
- Using the latest drawings of the proposed buildings on Parcels K1 and K2 and the location of the proposed playgrounds at the site, the building geometry in the CadnaA model was updated to reflect future conditions with the proposed modifications;
- An area source was created in the CadnaA model for each proposed playground. The acoustical parameters of the area sources were defined based on noise measurements that were performed at an existing rooftop playground at P.S./I.S. 210 in Manhattan, NY. The sound power level of the area source created in the CadnaA model was based on measured octave band noise levels (in dBA) from the comparable playground and the number of children assumed to be utilizing the corresponding proposed playground at any given time; and
- Using the area source to represent the proposed playgrounds, the CadnaA model was used to predict noise levels with the proposed modifications at nearby buildings.

FUTURE NOISE LEVELS

School Playground Noise

Using the methodology previously described, noise levels due to the noise generated by the at-grade courtyard and playground on the 9th floor roof were calculated at receptor locations adjacent to the project site (i.e., at nearby Riverside South and Riverside Center buildings, including the K1 parcel at all elevations) and at receptor locations on the proposed Collegiate School building.

At receptor locations adjacent to the project site, noise generated by playground activities at the at-grade courtyard and playground on the 9th floor roof would not be expected to change ambient noise levels appreciably. As part of the 1992 Riverside South approvals, adjacent residential buildings were required to have "exterior double-glazed windows and air conditioning such that window/wall noise attenuation would be at least 30 dBA." As part of the 2010 Riverside Center approvals, adjacent buildings were required to have a minimum of 31 dBA of building attenuation. With the proposed school's courtyard and rooftop playground, no additional building attenuation would be required at any adjacent building, including Parcel K1. (A wall varying in height from approximately 6 to 12 feet—which would function as a noise barrier—would be in place on the western boundary of the at-grade school courtyard. To be conservative, the CadnaA analysis assumed a 5 foot wall.) Therefore, there would be no significant adverse noise impact due to the proposed playground and courtyard (see Attachment B).

As shown in **Table 20**, the *CEQR Technical Manual* has set noise attenuation quantities for buildings, based on exterior $L_{10(1)}$ noise levels, and in order to maintain interior noise levels of 45 dBA $L_{10(1)}$ or lower for classroom uses. The results of the building attenuation analysis for the Collegiate School building on Parcel K2 are summarized in **Table 21**. The design of the proposed Collegiate School building on Parcel K2 will provide attenuation values as shown in Table 21.

Table 21
CEQR Attenuation Requirements

Proposed Building Façade Location	Governing Receptor	Floor Location	Maximum L_{10} (in dBA)[1]	CEQR Category	Attenuation Required (in dBA)
West Façade (facing courtyard)	V	1st Floor	80.8	Clearly Unacceptable	37
		2nd Floor	77.8	Marginally Unacceptable (III)	33
		3rd to 6th Floor	76.0	Marginally Unacceptable (II)	31
		7th and 8th Floor	72.7	Marginally Unacceptable (I)	30[2]
		Top Floor	74.3	Marginally Unacceptable (II)	31
South Façade	X	All Floors	72.9	Marginally Unacceptable (I)	28[2]
East Façade	AA	1st to 8th Floor	70.6	Marginally Unacceptable (I)	28[2]
		Top Floor	75.5	Marginally Unacceptable (II)	31
North Façade	BB	All Floors	70.7	Marginally Unacceptable (I)	28[2]

Notes:
(1) Based on the predicted Build L_{10} values.
(2) While the minimum attenuation required is 30 dBA as specified in the 1992 Riverside South FEIS, the (E) designation that would mandate the attenuation levels in this table (as discussed below) supersede the requirements of the 1992 FEIS.

Table 21 shows the minimum window/wall attenuation necessary to meet *CEQR Technical Manual* requirements for internal noise levels at required attenuation levels were determined. The required attenuation levels would be mandated by (E) designation on the project site specifying the appropriate amount of window/wall attenuation. The (E) designation would supersede the requirements of the 1992 FEIS.

There are four levels of required noise attenuation depending upon the ambient noise levels, 28 dBA, 31 dBA, 33 dBA, and 37 dBA.

For facades and floors requiring 37 dBA noise attenuation, the following (E) designation noise text would apply:

In order to ensure an acceptable interior noise environment, future community facility uses with outdoor play areas must provide a closed window condition with a minimum of 37 dB(A) window/wall attenuation for the following façades and floors in order to maintain an interior noise level of 45 dB(A).

Façade	Floor Location
Western Façade (facing courtyard)	1st Floor

For facades and floors requiring 33 dBA noise attenuation, the following (E) designation noise text would apply:

In order to ensure an acceptable interior noise environment, future community facility uses with outdoor play areas must provide a closed window condition with a minimum of 33 dB(A) window/wall attenuation for the following façades and floors in order to maintain an interior noise level of 45 dB(A).

Façade	Floor Location
Western Façade (facing courtyard)	2nd Floor

For facades and floors requiring 31 dBA noise attenuation, the following (E) designation noise text would apply:

In order to ensure an acceptable interior noise environment, future community facility uses with outdoor play areas must provide a closed window condition with a minimum of 31 dB(A) window/wall attenuation for the following façades and floors in order to maintain an interior noise level of 45 dB(A).

Façade	Floor Location
Western Façade (facing courtyard)	3rd to 6th floors; Top Floor
East Façade	Top Floor

For facades and floors requiring 28 dBA noise attenuation, the following (E) designation noise text would apply:

In order to ensure an acceptable interior noise environment, future community facility uses with outdoor play areas must provide a closed window condition with a minimum of 28 dB(A) window/wall attenuation for the following façades and floors in order to maintain an interior noise level of 45 dB(A).

Façade	Floor Location
Western Façade (facing courtyard)	7th and 8th Floors
South Façade	All Floors
East Façade	1st to 8th Floors
North Façade	All Floors

In order to maintain a closed window condition, an alternate means of ventilation that brings outside air into the building without degrading the acoustical performance of the building must also be provided. Alternate means of ventilation include, but are not limited to, central air conditioning. The specific attenuation requirements to be implemented for all facades are provided in the Collegiate School at Riverside South Technical Memorandum, Table 21 (CEQR No. 85-253M), March 2015.

With the (E) Designation specified on the above facades and floors and the modification of the Riverside South Restrictive Declaration to include a solid wall as shown on drawings ZSK-002 and ZSK-003 of at least 5 feet in height, the proposed action would not result in any significant adverse noise impacts, and no further analysis is warranted.

The attenuation of a composite structure is a function of the attenuation provided by each of its component parts and how much of the area is made up of each part. Normally, a building façade is comprised of the wall, glazing, and any vents or louvers for air conditioning units in various ratios of area. The proposed building will include acoustically-rated windows and an alternate means of ventilation. At these specific locations, the proposed building would need to be designed to provide a composite Outdoor-Indoor Transmission Class (OITC) rating greater than or equal to the attenuation requirements listed in **Table 21**. The OITC classification is defined by ASTM International (ASTM E1332-10a) and provides a single-number rating that is used for designing a building façade including walls, doors, glazing, and combinations thereof. The OITC rating is designed to evaluate building elements by their ability to reduce the overall loudness of ground and air transportation noise. The analysis included contributions from vehicular traffic noise and playground noise sources. By adhering to these design requirements, the proposed project will provide sufficient attenuation to achieve the CEQR interior noise level requirements.

Mechanical Systems

The building mechanical system (i.e., heating, ventilation, and air conditioning systems) would be designed to meet all applicable noise regulations (i.e., Subchapter 5, §24-227 of the New York City Noise Control Code and the New York City Department of Buildings Code) and to avoid producing levels that would result in any significant increase in ambient noise levels.

CONCLUSION

With the proposed minor project improvements to the two intersections outlined above, the proposed modifications to Parcel K2 would not result in any new significant adverse impacts not already identified in either the 1992 Riverside South FEIS or the 2010 Riverside Center FSEIS and subsequent technical memoranda.

Attachment A

AREA MAP

LEGEND

- PROJECT AREA
- DEVELOPMENT SITE
- 600-FOOT RADIUS
- 10 NUMBER OF FLOORS

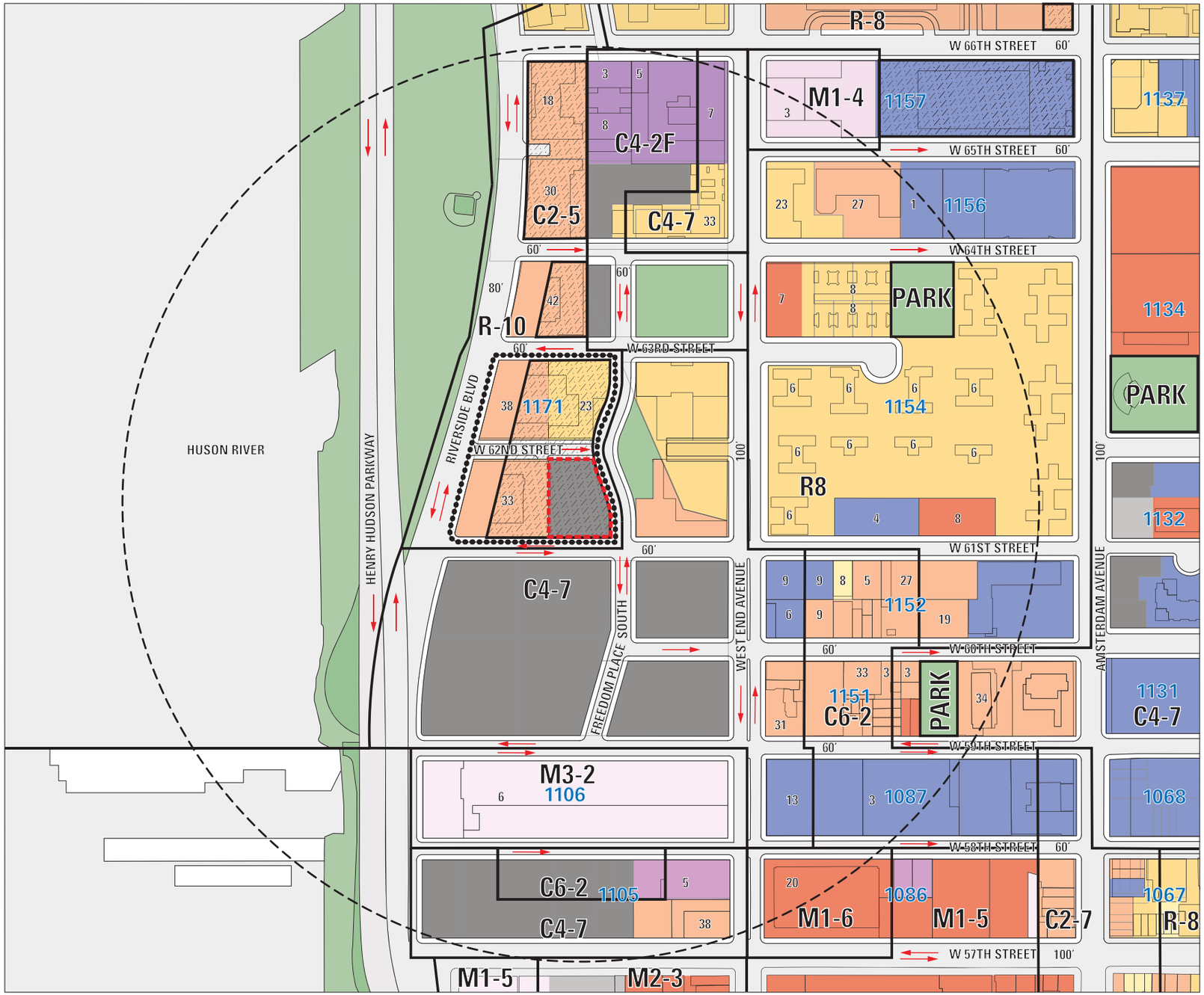
ZONING

- ZONING DISTRICT
- C1-1
- C1-2
- C1-3
- C1-4
- C1-5
- C2-1
- C2-2
- C2-3
- C2-4
- C2-5

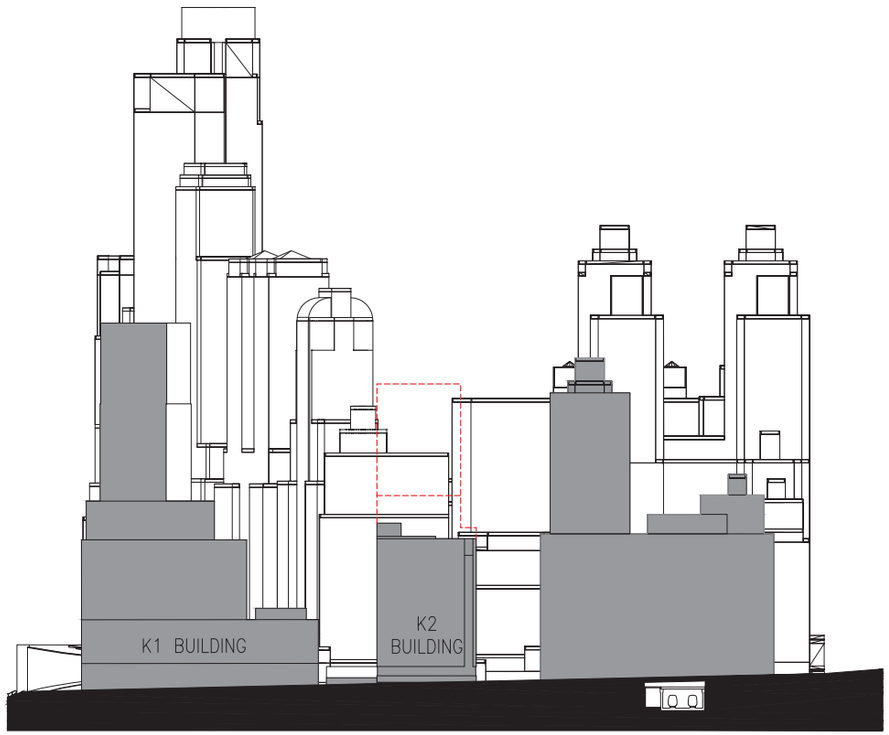
LAND USE

- 1-2 FAMILY RESIDENTIAL
- MULIFAMILY WALKUP
- MULIFAMILY ELEVATOR
- MIXED COMMERCIAL/RESIDENTIAL
- COMMERCIAL & OFFICE
- INDUSTRIAL & MFG
- TRANSPORTATION & UTILITY
- PUBLIC FACILITIES & INSTITUTIONS
- OPEN SPACE
- PARKING
- VACANT/NO DATA

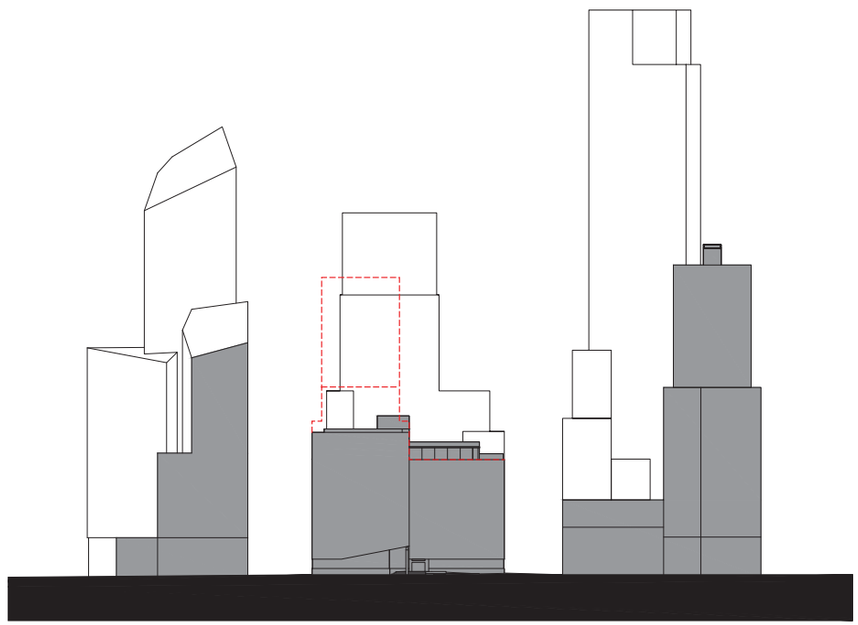
0 25 50 100 150 200 250 FEET



GLUCK+



02 WEST 61ST STREET ELEVATION (SOUTH FACING)
1/64" = 1'-0"



01 FREEDOM PLACE STREET ELEVATION (EAST FACING)
1/64" = 1'-0"

NOTE:
----- CURRENTLY APPROVED K2 BUILDING ENVELOPE
ELEVATIONS ARE FOR ILLUSTRATIVE PURPOSES ONLY

Riverside South

City of New York

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SEAL

ISSUE / REVISIONS

REV #	DATE	NOTES

PROJECT LOCATION
401 West 61st Street
New York, NY 10069

Manhattan
Block 1171
Lot 151

ZONING LOT J/K

DRAWING SET
STREET ELEVATIONS

DRAWING TITLE
1105
PROJECT NO.
04.04.2014
DATE
AS SHOWN
SCALE

ZSK-001

ZONING CALCULATIONS

GENERAL LARGE SCALE DEVELOPMENT	
Community Board	#7, Manhattan
Zoning Map	8c
Zoning District	R10, C2-5
Block	1171
Lot	145, 148, 150, 151
Parcel	J/K

ZR Section		Item	K2 (LOT 151)	J/K Total	Notes:
	1.	**LOT AREA**	152,705	**152,704**	a
32-00	2.	**USE REGULATIONS**			
	3A.	Uses Permitted	UG 1-4		b
	3B.	Uses Proposed	UG 3 - school		
35-31	4.	**MAX FLOOR AREA PROPOSED**			
33-123	4B.	Max Zoning Floor Area Provided for J/K		**1,358,280**	c
		J1 Floor Area		**462,512**	
		J2 Floor Area		**244,313**	
		K1 Floor Area		**527,176**	
		Balance remaining for K2		**124,279**	
		K2 Proposed		**124,000**	
		Remaining Balance		**279**	

Complies

15.	**BICYCLE PARKING**			
	Required	1240000 SF /10,000 SF = 13 spaces		e
	Proposed		13 spaces	

Complies

Street Tree Planting				
Required		Length	Number of Trees	k
	Freedom Place South	216.18	9	
	W 61st Street	168	7	
	Total		16	
Proposed				
	Total provided on-site		4	
	Total provided off-site		12	

Complies

Envelope Controls	**Midrise Base Zone**	**Transition Base Zone**	
	Proposed Max Height*	Envelope Offset	Proposed Max Height*
Streetwall B (W 61st Street)	EL 184.07'	10.00'	EL 220.07'
Streetwall B (Freedom Place South)	EL 184.07'	16.00'	EL 220.07'
Streetwall C (Freedom Place/W 62nd St)	EL 144.07'	NA	NA

* All elevations are measured above the borough of Manhattan Datum (2.75' above the USC&GS datum at Sandy Hook, New Jersey). See Z-28A for location and shape of zones.

Notes:

a. Per ULURP Z-8R1.
b. Use group 1-2 (residential); 3-4 (community facility); 5-12 (retail)
c. Figures provided reflect as-built and proposed conditions and overall floor area permitted on lot J/K as set forth on ULURP Sheet Z-8R1.
e. Permitted values per ULURP Z-8R1, Z-26A, Z-27A and Z-28A.
k. In accordance with applicability requirements of underlying district regulations, one street tree, pre-existing or newly planted, shall be provided for every 25 feet of street frontage of the zoning lot. Twelve of sixteen required street trees to be provided off-site due to infrastructure and feasibility issues. Off-site trees to be provided pursuant to Zoning Resolution, Building Code and Parks Department regulations.

NOTE:

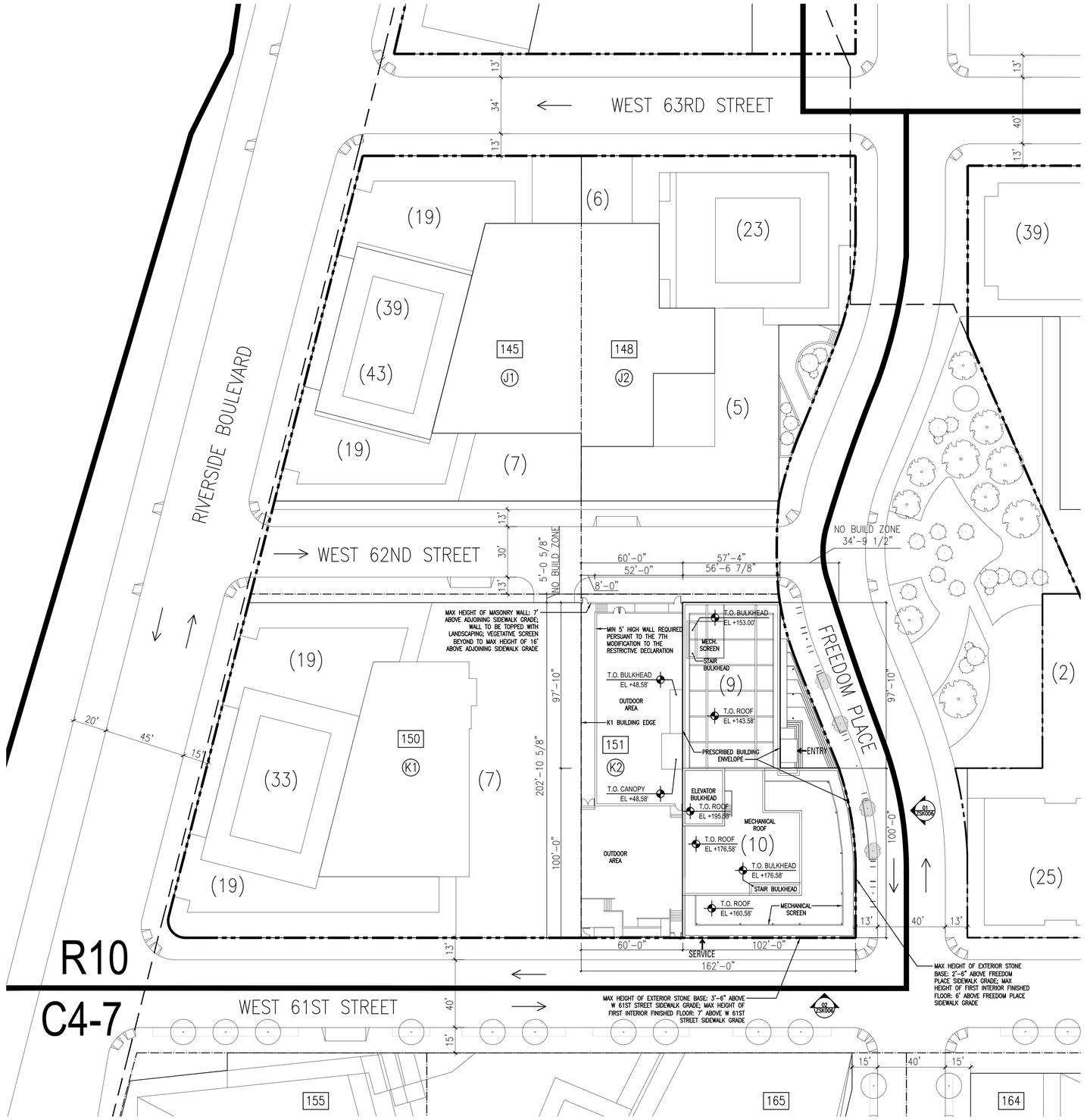
ELEMENTS WITHIN PRESCRIBED BUILDING ENVELOPE ARE FOR ILLUSTRATIVE PURPOSES ONLY.

ELEMENTS WITHIN NO BUILD ZONE ARE FOR ILLUSTRATIVE PURPOSES ONLY AND MAY INCLUDE: STREET FURNISHINGS SUCH AS BENCHES; MARQUEES; DOOR SWINGS; CANOPIES; EAVES, GUTTERS OR DOWNSPOUTS; FENCES; FLAGPOLES; STEPS, AND RAMPS FOR PEOPLE WITH DISABILITIES; TERRACES OR PORCHES, OPEN; WALLS, NOT EXCEEDING EIGHT FEET IN HEIGHT AND NOT ROOFED OR PART OF A BUILDING.

WITHIN OPEN AREAS WE MAY ADDITIONALLY INCLUDE OTHER OBSTRUCTIONS ALLOWED WITHIN 24–33(b), THE REGULATIONS FOR PERMITTED OBSTRUCTIONS FOR YARDS OF THE UNDERLYING ZONING DISTRICT (R–10).

LEGEND

- ZONING DISTRICT BOUNDARY
- RIVERSIDE SOUTH PROJECT AREA
- TAX LOT LINE
- ZONING LOT LINE
- PRESCRIBED BUILDING ENVELOPE
- R10 — ZONING DISTRICT
- (7) — NUMBER OF STORIES
- TRAFFIC DIRECTION
- (J2) — RIVERSIDE SOUTH PARCEL NUMBER
- 145 — LOT NUMBER
- EXISTING TREES
- PROPOSED TREES
- FUTURE TREES



01 SITE PLAN
1/32" = 1'-0"

Riverside South

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PROJECT LOCATION

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New York, NY 10069

Manhattan
Block 1171
Lot 151

ZONING LOT J/K

DRAWING SET

ZONING COMPLIANCE CALCULATIONS + SITE PLAN

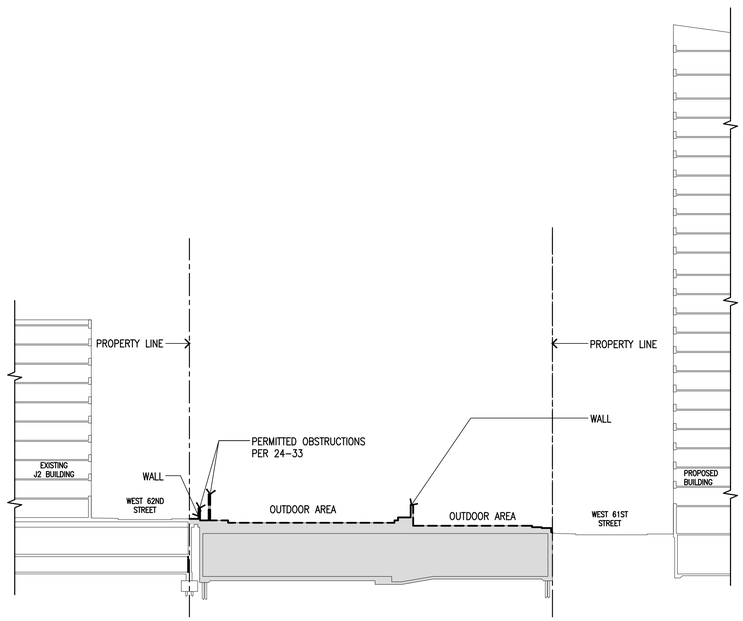
DRAWING TITLE

1105
PROJECT NO.

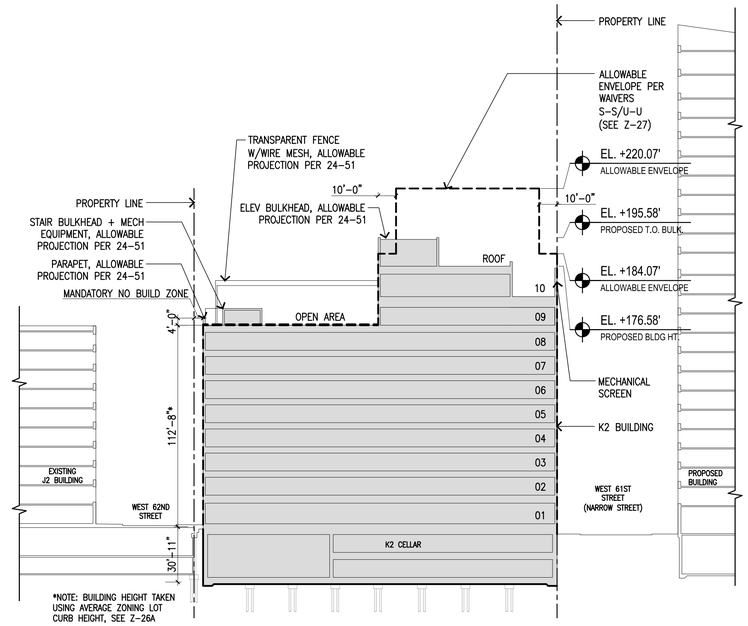
03.09.2015
DATE

AS SHOWN
SCALE

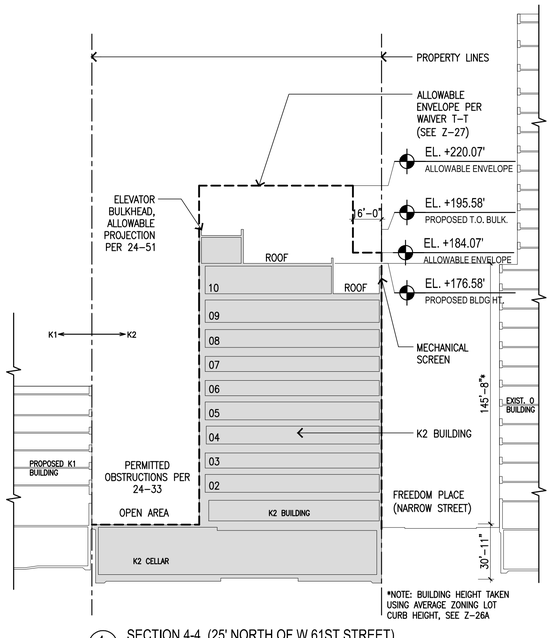
ZSK-002



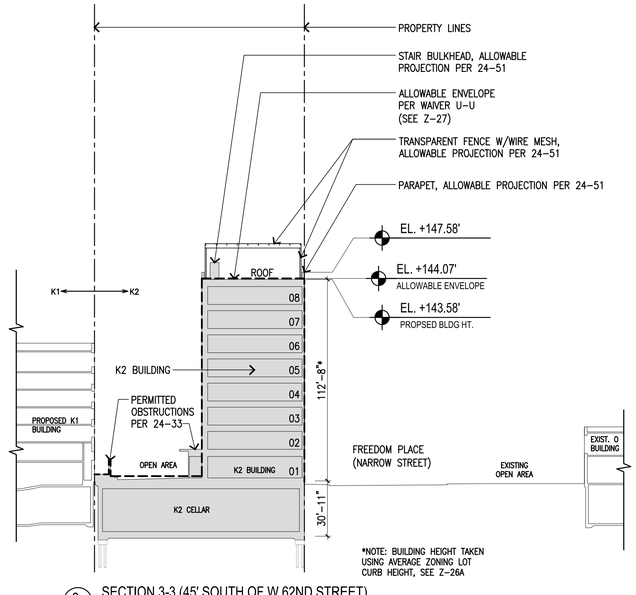
2 SECTION 2-2 (135' WEST OF FREEDOM PLACE SOUTH)
1" = 40'-0" PER ULURP SHEET Z-27



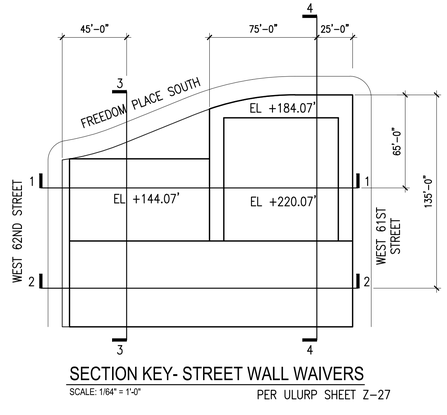
1 SECTION 1-1 (65' WEST OF FREEDOM PLACE SOUTH)
1" = 40'-0" PER ULURP SHEET Z-27



4 SECTION 4-4 (25' NORTH OF W 61ST STREET)
1" = 40'-0" PER ULURP SHEET Z-27



3 SECTION 3-3 (45' SOUTH OF W 62ND STREET)
1" = 40'-0" PER ULURP SHEET Z-27



SECTION KEY- STREET WALL WAIVERS
SCALE: 1/64" = 1'-0" PER ULURP SHEET Z-27

NOTE:

COMPLIANCE SECTIONS REPRESENT AN ILLUSTRATIVE BUILDING WITHIN THE ALLOWABLE ENVELOPE PER SECTION WAIVERS ON Z-27A; PERMITTED OBSTRUCTIONS IN YARDS AND ON ROOF ARE FOR ILLUSTRATIVE PURPOSES ONLY AND WILL CONFORM TO REGULATIONS STIPULATED ON ZSK-002.

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PROJECT LOCATION

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New York, NY 10069

Manhattan
Block 1171
Lot 151

ZONING LOT J/K

DRAWING SET

ZONING COMPLIANCE SECTIONS

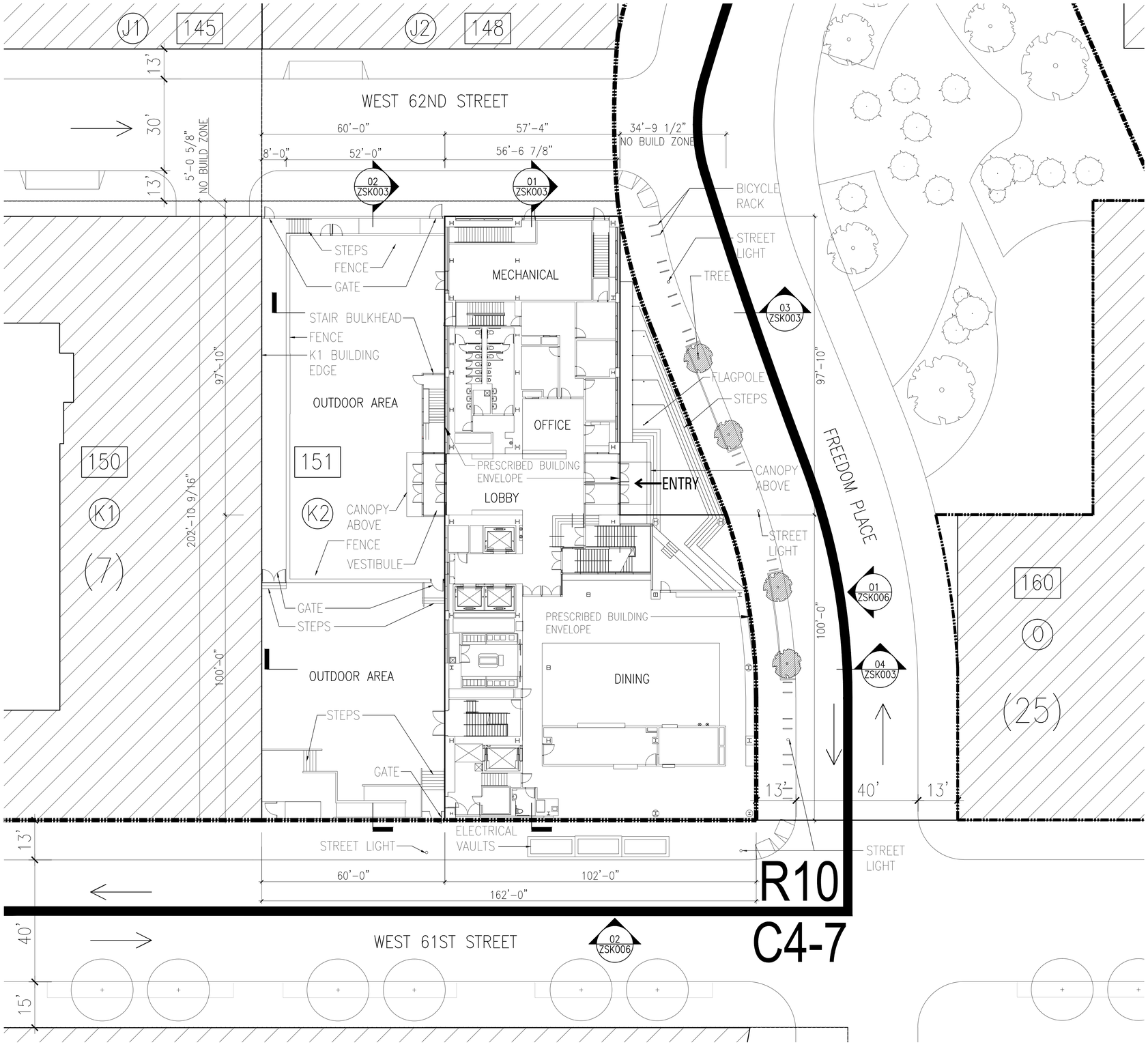
DRAWING TITLE

1105
PROJECT NO.

03.09.2015
DATE

AS SHOWN
SCALE

ZSK-003



LEGEND

- ZONING DISTRICT BOUNDARY
- RIVERSIDE SOUTH PROJECT AREA
- TAX LOT LINE
- ZONING LOT LINE
- PRESCRIBED BUILDING ENVELOPE
- R10 — ZONING DISTRICT
- (7) — NUMBER OF STORIES
- TRAFFIC DIRECTION
- J2 — RIVERSIDE SOUTH PARCEL NUMBER
- 145 — LOT NUMBER
- EXISTING TREES
- PROPOSED TREES
- FUTURE TREES

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02 FIRST FLOOR PLAN
1/16" = 1'-0"

NOTE:

FIRST FLOOR PLAN FOR ILLUSTRATIVE PURPOSES ONLY.

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Lot 151

ZONING LOT J/K

DRAWING SET

FIRST FLOOR PLAN

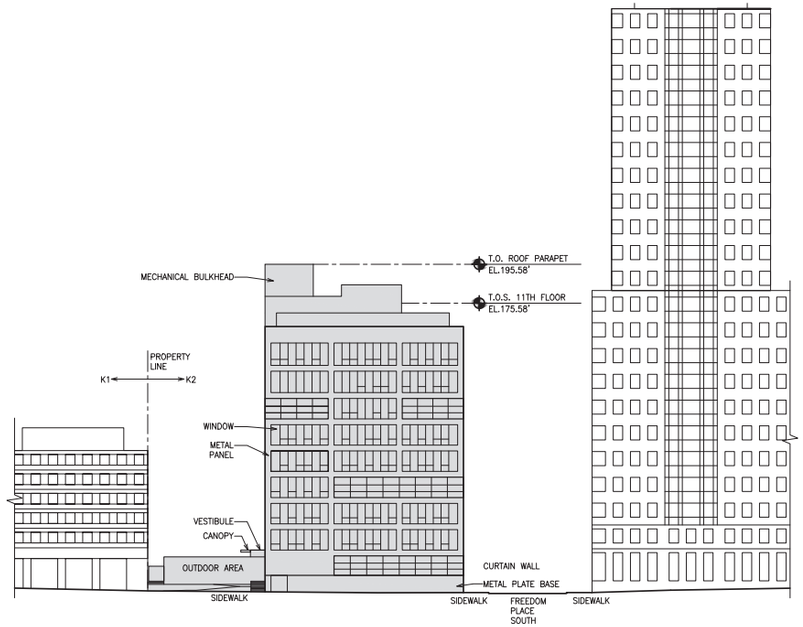
DRAWING TITLE

1105
PROJECT NO.

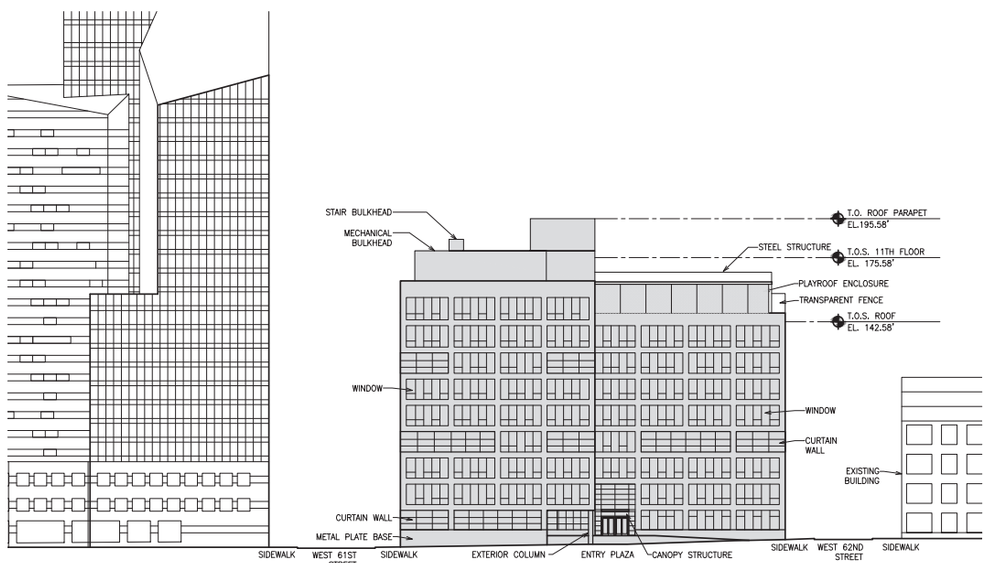
03.09.2015
DATE

AS SHOWN
SCALE

ZSK-004



02 SOUTH ELEVATION (WEST 61ST STREET)
1/32" = 1'-0"



01 EAST ELEVATION (FREEDOM PLACE SOUTH)
1/32" = 1'-0"

NOTE:

BUILDING ELEVATIONS ARE FOR ILLUSTRATIVE PURPOSES ONLY.

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Lot 151

ULURP ATTACHMENT

DRAWING SET

BUILDING ELEVATIONS

DRAWING TITLE

1105
PROJECT NO.

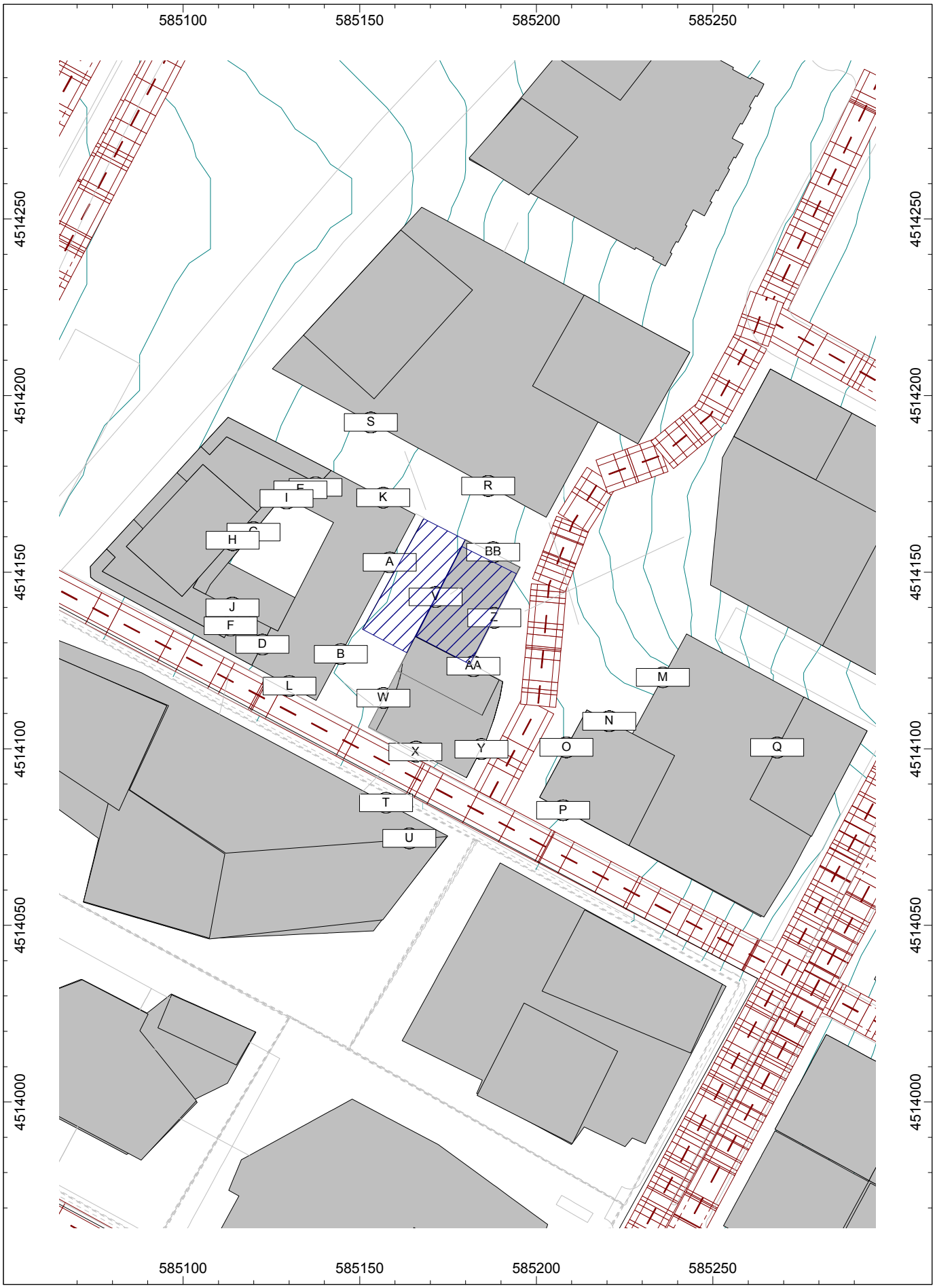
04.04.2014
DATE

AS SHOWN
SCALE

ZSK-005


KPF

Attachment B


585100
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4514150
4514100
4514050
4514000
S
R
K
I
H
A
BB
J
F
D
B
AA
L
W
M
N
O
Q
X
Y
T
U
P
Z

Receptor	Floor	Playground Noise Levels (L_{eq})	Traffic Noise Levels (L_{eq})	Total Noise Levels (L_{eq})	Total Noise Levels (L_{10})	Building Attenuation Required (dBA)
A	1	69.1	66.5	71.0	73.8	
A	2	68.0	66.5	70.3	73.1	
A	3	66.9	66.5	69.7	72.5	
A	4	66.1	66.5	69.3	72.1	
A	5	65.4	66.5	69.0	71.8	
B	1	66.5	66.5	69.5	72.3	
B	2	66.3	66.5	69.4	72.2	
B	3	65.7	66.5	69.1	71.9	
B	4	65.3	66.5	69.0	71.8	
B	5	65.0	66.5	68.8	71.6	
C	8	58.2	66.5	67.1	69.9	
C	9	59.4	66.5	67.3	70.1	
C	10	60.5	66.5	67.5	70.3	
C	11	61.7	66.5	67.7	70.5	
C	12	62.8	66.5	68.0	70.8	
C	13	63.0	66.5	68.1	70.9	
C	14	63.3	66.5	68.2	71.0	
C	15	63.3	66.5	68.2	71.0	
D	8	58.0	66.5	67.1	69.9	
D	9	59.6	66.5	67.3	70.1	
D	10	60.1	66.5	67.4	70.2	
D	11	61.2	66.5	67.6	70.4	
D	12	62.2	66.5	67.9	70.7	
D	13	62.1	66.5	67.8	70.6	
D	14	64.6	66.5	68.7	71.5	
D	15	64.7	66.5	68.7	71.5	
E	16	62.7	66.5	68.0	70.8	
E	17	62.7	66.5	68.0	70.8	
E	18	62.7	66.5	68.0	70.8	
E	19	62.6	66.5	68.0	70.8	
F	16	60.9	66.5	67.6	70.4	
F	17	63.4	66.5	68.2	71.0	
F	18	63.4	66.5	68.2	71.0	
F	19	63.3	66.5	68.2	71.0	
G	1	42.0	66.5	66.5	69.3	
G	2	42.6	66.5	66.5	69.3	
G	3	44.2	66.5	66.5	69.3	
G	4	47.1	66.5	66.5	69.3	
G	5	52.8	66.5	66.7	69.5	
G	6	55.5	66.5	66.8	69.6	
G	7	57.1	66.5	67.0	69.8	
G	8	57.8	66.5	67.0	69.8	
G	9	58.0	66.5	67.1	69.9	
G	10	59.0	66.5	67.2	70.0	
G	11	60.5	66.5	67.5	70.3	
G	12	60.9	66.5	67.6	70.4	
G	13	61.2	66.5	67.6	70.4	
G	14	62.4	66.5	67.9	70.7	
G	15	62.4	66.5	67.9	70.7	
H	16	62.1	66.5	67.8	70.6	
H	17	61.9	66.5	67.8	70.6	
H	18	61.9	66.5	67.8	70.6	
H	19	62.1	66.5	67.8	70.6	
H	20	61.9	66.5	67.8	70.6	
H	21	62.0	66.5	67.8	70.6	
H	22	62.1	66.5	67.8	70.6	
H	23	62.0	66.5	67.8	70.6	
H	24	61.9	66.5	67.8	70.6	
H	25	61.7	66.5	67.7	70.5	
H	26	61.6	66.5	67.7	70.5	
H	27	61.4	66.5	67.7	70.5	
H	28	61.3	66.5	67.6	70.4	
H	29	61.0	66.5	67.6	70.4	
H	30	60.8	66.5	67.5	70.3	

H	31	60.6	66.5	67.5	70.3	
H	32	60.4	66.5	67.5	70.3	
H	33	60.2	66.5	67.4	70.2	
H	34	60.1	66.5	67.4	70.2	
I	1	41.3	66.5	66.5	69.3	
I	2	41.8	66.5	66.5	69.3	
I	3	42.9	66.5	66.5	69.3	
I	4	45.7	66.5	66.5	69.3	
I	5	50.0	66.5	66.6	69.4	
I	6	53.7	66.5	66.7	69.5	
I	7	55.4	66.5	66.8	69.6	
I	8	56.3	66.5	66.9	69.7	
I	9	57.8	66.5	67.0	69.8	
I	10	59.4	66.5	67.3	70.1	
I	11	59.9	66.5	67.4	70.2	
I	12	60.2	66.5	67.4	70.2	
I	13	60.7	66.5	67.5	70.3	
I	14	61.8	66.5	67.8	70.6	
I	15	61.8	66.5	67.8	70.6	
I	16	61.9	66.5	67.8	70.6	
I	17	62.0	66.5	67.8	70.6	
I	18	61.9	66.5	67.8	70.6	
I	19	61.9	66.5	67.8	70.6	
J	2	45.8	66.5	66.5	69.3	
J	3	49.5	66.5	66.6	69.4	
J	4	51.0	66.5	66.6	69.4	
J	5	53.4	66.5	66.7	69.5	
J	6	56.2	66.5	66.9	69.7	
J	7	57.2	66.5	67.0	69.8	
J	8	58.1	66.5	67.1	69.9	
J	9	59.6	66.5	67.3	70.1	
J	10	60.8	66.5	67.5	70.3	
J	11	61.8	66.5	67.8	70.6	
J	12	62.2	66.5	67.9	70.7	
J	13	62.2	66.5	67.9	70.7	
J	14	63.7	66.5	68.3	71.1	
J	15	63.7	66.5	68.3	71.1	
J	16	63.3	66.5	68.2	71.0	
J	17	63.9	66.5	68.4	71.2	
J	18	63.9	66.5	68.4	71.2	
J	19	63.8	66.5	68.4	71.2	
K	1	55.2	66.5	66.8	69.6	
K	2	57.7	66.5	67.0	69.8	
K	3	57.9	66.5	67.1	69.9	
K	4	57.9	66.5	67.1	69.9	
K	5	57.9	66.5	67.1	69.9	
K	6	57.9	66.5	67.1	69.9	
K	7	58.2	66.5	67.1	69.9	
L	1	49.1	66.5	66.6	69.4	
L	2	49.7	66.5	66.6	69.4	
L	3	51.0	66.5	66.6	69.4	
L	4	52.0	66.5	66.7	69.5	
L	5	51.3	66.5	66.6	69.4	
L	6	51.9	66.5	66.6	69.4	
L	7	53.8	66.5	66.7	69.5	
M	1	49.0	66.5	66.6	69.4	
M	2	49.9	66.5	66.6	69.4	
M	3	50.3	66.5	66.6	69.4	
N	1	48.5	66.5	66.6	69.4	
N	2	50.3	66.5	66.6	69.4	
N	3	50.1	66.5	66.6	69.4	
N	4	52.0	66.5	66.7	69.5	
N	5	53.0	66.5	66.7	69.5	
N	6	54.2	66.5	66.7	69.5	
N	7	55.4	66.5	66.8	69.6	
N	8	56.5	66.5	66.9	69.7	
N	9	58.9	66.5	67.2	70.0	
N	10	60.2	66.5	67.4	70.2	

N	11	61.5	66.5	67.7	70.5	
N	12	61.7	66.5	67.7	70.5	
N	13	61.8	66.5	67.8	70.6	
N	14	61.7	66.5	67.7	70.5	
N	15	61.7	66.5	67.7	70.5	
N	16	61.6	66.5	67.7	70.5	
N	17	61.5	66.5	67.7	70.5	
N	18	61.4	66.5	67.7	70.5	
N	19	61.0	66.5	67.6	70.4	
N	20	61.0	66.5	67.6	70.4	
N	21	60.7	66.5	67.5	70.3	
N	22	60.5	66.5	67.5	70.3	
N	23	60.3	66.5	67.4	70.2	
N	24	60.1	66.5	67.4	70.2	
N	25	59.7	66.5	67.3	70.1	
O	1	48.7	66.5	66.6	69.4	
O	2	50.4	66.5	66.6	69.4	
O	3	51.1	66.5	66.6	69.4	
O	4	52.0	66.5	66.7	69.5	
O	5	52.9	66.5	66.7	69.5	
O	6	54.4	66.5	66.8	69.6	
O	7	56.1	66.5	66.9	69.7	
O	8	57.5	66.5	67.0	69.8	
O	9	60.0	66.5	67.4	70.2	
O	10	61.1	66.5	67.6	70.4	
O	11	63.2	66.5	68.2	71.0	
O	12	64.3	66.5	68.5	71.3	
O	13	65.6	66.5	69.1	71.9	
O	14	66.1	66.5	69.3	72.1	
O	15	66.0	66.5	69.3	72.1	
O	16	65.9	66.5	69.2	72.0	
O	17	65.8	66.5	69.2	72.0	
O	18	65.6	66.5	69.1	71.9	
O	19	65.4	66.5	69.0	71.8	
O	20	65.1	66.5	68.9	71.7	
O	21	64.7	66.5	68.7	71.5	
O	22	64.5	66.5	68.6	71.4	
O	23	64.2	66.5	68.5	71.3	
O	24	64.0	66.5	68.4	71.2	
O	25	63.7	66.5	68.3	71.1	
P	1	42.4	66.5	66.5	69.3	
P	2	42.8	66.5	66.5	69.3	
P	3	43.2	66.5	66.5	69.3	
P	4	43.7	66.5	66.5	69.3	
P	5	44.2	66.5	66.5	69.3	
P	6	44.8	66.5	66.5	69.3	
P	7	45.6	66.5	66.5	69.3	
P	8	47.3	66.5	66.6	69.4	
P	9	49.1	66.5	66.6	69.4	
P	10	50.6	66.5	66.6	69.4	
P	11	54.8	66.5	66.8	69.6	
P	12	57.5	66.5	67.0	69.8	
P	13	59.9	66.5	67.4	70.2	
P	14	60.2	66.5	67.4	70.2	
P	15	60.2	66.5	67.4	70.2	
P	16	60.1	66.5	67.4	70.2	
P	17	60.0	66.5	67.4	70.2	
P	18	59.7	66.5	67.3	70.1	
P	19	59.4	66.5	67.3	70.1	
P	20	59.2	66.5	67.2	70.0	
P	21	59.0	66.5	67.2	70.0	
P	22	58.8	66.5	67.2	70.0	
P	23	58.5	66.5	67.1	69.9	
P	24	58.2	66.5	67.1	69.9	
P	25	58.0	66.5	67.1	69.9	
Q	4	52.8	66.5	66.7	69.5	
Q	5	53.9	66.5	66.7	69.5	
Q	6	55.1	66.5	66.8	69.6	

Q	7	55.9	66.5	66.9	69.7	
Q	8	56.4	66.5	66.9	69.7	
Q	9	57.1	66.5	67.0	69.8	
Q	10	57.5	66.5	67.0	69.8	
Q	11	57.7	66.5	67.0	69.8	
Q	12	57.7	66.5	67.0	69.8	
Q	13	57.7	66.5	67.0	69.8	
Q	14	57.7	66.5	67.0	69.8	
Q	15	57.7	66.5	67.0	69.8	
Q	16	57.6	66.5	67.0	69.8	
Q	17	57.6	66.5	67.0	69.8	
Q	18	57.4	66.5	67.0	69.8	
Q	19	57.4	66.5	67.0	69.8	
Q	20	57.4	66.5	67.0	69.8	
R	1	64.2	66.5	68.5	71.3	
R	2	64.7	66.5	68.7	71.5	
R	3	64.7	66.5	68.7	71.5	
R	4	64.5	66.5	68.6	71.4	
R	5	64.2	66.5	68.5	71.3	
R	6	63.9	66.5	68.4	71.2	
R	7	63.6	66.5	68.3	71.1	
R	8	63.4	66.5	68.2	71.0	
R	9	63.4	66.5	68.2	71.0	
R	10	63.8	66.5	68.4	71.2	
R	11	65.6	66.5	69.1	71.9	
R	12	67.1	66.5	69.8	72.6	
R	13	67.0	66.5	69.8	72.6	
R	14	66.8	66.5	69.7	72.5	
R	15	66.5	66.5	69.5	72.3	
R	16	66.2	66.5	69.4	72.2	
R	17	65.8	66.5	69.2	72.0	
S	1	52.6	66.5	66.7	69.5	
S	2	54.6	66.5	66.8	69.6	
S	3	55.3	66.5	66.8	69.6	
S	4	55.7	66.5	66.8	69.6	
S	5	55.7	66.5	66.8	69.6	
S	6	56.5	66.5	66.9	69.7	
S	7	57.4	66.5	67.0	69.8	
S	8	57.7	66.5	67.0	69.8	
S	9	58.2	66.5	67.1	69.9	
S	10	59.2	66.5	67.2	70.0	
S	11	60.6	66.5	67.5	70.3	
S	12	61.5	66.5	67.7	70.5	
S	13	61.7	66.5	67.7	70.5	
S	14	61.7	66.5	67.7	70.5	
S	15	61.6	66.5	67.7	70.5	
S	16	61.5	66.5	67.7	70.5	
S	17	61.5	66.5	67.7	70.5	
T	1	48.2	66.5	66.6	69.4	
T	2	50.1	66.5	66.6	69.4	
T	3	52.6	66.5	66.7	69.5	
U	4	52.8	66.5	66.7	69.5	
U	5	54.6	66.5	66.8	69.6	
U	6	53.9	66.5	66.7	69.5	
U	7	55.4	66.5	66.8	69.6	
U	8	57.1	66.5	67.0	69.8	
U	9	58.4	66.5	67.1	69.9	
U	10	58.5	66.5	67.1	69.9	
U	11	60.4	66.5	67.5	70.3	
U	12	61.7	66.5	67.7	70.5	
V	1	77.7	66.5	78.0	80.8	37
V	2	74.3	66.5	75.0	77.8	33
V	3	72.1	66.5	73.2	76.0	31
V	4	70.4	66.5	71.9	74.7	31
V	5	69.1	66.5	71.0	73.8	31
V	6	68.0	66.5	70.3	73.1	31
V	7	67.3	66.5	69.9	72.7	28
V	8	67.1	66.5	69.8	72.6	28

V	9	69.9	66.5	71.5	74.3	31
W	1	63.3	66.5	68.2	71.0	28
W	2	65.9	66.5	69.2	72.0	28
W	3	65.8	66.5	69.2	72.0	28
W	4	65.4	66.5	69.0	71.8	28
W	5	65.1	66.5	68.9	71.7	28
W	6	64.8	66.5	68.7	71.5	28
W	7	64.6	66.5	68.7	71.5	28
W	8	64.6	66.5	68.7	71.5	28
W	9	65.0	66.5	68.8	71.6	28
W	10	67.8	66.5	70.2	73.0	31
X	1	50.1	66.5	66.6	69.4	0
X	2	51.0	66.5	66.6	69.4	0
X	3	52.0	66.5	66.7	69.5	0
X	4	53.0	66.5	66.7	69.5	0
X	5	54.3	66.5	66.8	69.6	0
X	6	55.5	66.5	66.8	69.6	0
X	7	56.8	66.5	66.9	69.7	0
X	8	58.6	66.5	67.2	70.0	0
X	9	61.3	66.5	67.6	70.4	28
X	10	67.6	66.5	70.1	72.9	28
Y	1	50.6	66.5	66.6	69.4	0
Y	2	51.6	66.5	66.6	69.4	0
Y	3	52.8	66.5	66.7	69.5	0
Y	4	54.0	66.5	66.7	69.5	0
Y	5	55.3	66.5	66.8	69.6	0
Y	6	56.8	66.5	66.9	69.7	0
Y	7	58.3	66.5	67.1	69.9	0
Y	8	59.9	66.5	67.4	70.2	28
Y	9	62.0	66.5	67.8	70.6	28
Y	10	68.2	66.5	70.4	73.2	31
Z	1	51.0	66.5	66.6	69.4	0
Z	2	52.1	66.5	66.7	69.5	0
Z	3	53.1	66.5	66.7	69.5	0
Z	4	53.9	66.5	66.7	69.5	0
Z	5	55.3	66.5	66.8	69.6	0
Z	6	56.8	66.5	66.9	69.7	0
Z	7	58.7	66.5	67.2	70.0	0
Z	8	61.9	66.5	67.8	70.6	28
Z	9	71.1	66.5	72.4	75.2	31
AA	1	50.0	66.5	66.6	69.4	0
AA	2	50.8	66.5	66.6	69.4	0
AA	3	51.9	66.5	66.6	69.4	0
AA	4	52.8	66.5	66.7	69.5	0
AA	5	53.9	66.5	66.7	69.5	0
AA	6	55.8	66.5	66.9	69.7	0
AA	7	57.7	66.5	67.0	69.8	0
AA	8	61.8	66.5	67.8	70.6	28
AA	9	71.5	66.5	72.7	75.5	31
BB	1	57.2	66.5	67.0	69.8	0
BB	2	59.2	66.5	67.2	70.0	28
BB	3	59.1	66.5	67.2	70.0	28
BB	4	59.0	66.5	67.2	70.0	28
BB	5	58.9	66.5	67.2	70.0	0
BB	6	58.9	66.5	67.2	70.0	0
BB	7	59.0	66.5	67.2	70.0	28
BB	8	59.3	66.5	67.3	70.1	28
BB	9	60.0	66.5	67.4	70.2	28
BB	10	60.9	66.5	67.6	70.4	28
BB	11	62.4	66.5	67.9	70.7	28

Attachment C

Table 1
Collegiate School Tech Memo
Proposed Signal Timing Modifications - West End Avenue and West 66th Street

Peak Hour	Signal Timing/Phasing			
Weekday Midday	Phase	Green	Amber	Red
	EB/WB	31	3	2
	NB	7	3	2
	NB/SB	28	3	2
	NB/SB Ped Clearance	9	0	0
	Cycle Length = 90 Seconds			
Weekday PM	Phase	Green	Amber	Red
	EB/WB	31	3	2
	NB	7	3	2
	NB/SB	31	3	2
	NB/SB Ped Clearance	6	0	0
	Cycle Length = 90 Seconds			

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; Ped = Pedestrian

Table 2
Collegiate School Tech Memo
Level of Service Analysis - West End Avenue and West 66th Street

	No Build				Build				Mitigation			
Approach	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
Weekday Midday												
Eastbound	LR	0.50	28.4	C	LR	0.51	28.8	C	LR	0.51	28.8	C
Westbound	L	0.48	27.7	C	L	0.54	29.6	C	L	0.54	29.6	C
	LT	0.66	31.8	C	LT	0.68	32.9	C	LT	0.68	32.9	C
	R	0.31	23.7	C	R	0.31	23.7	C	R	0.31	23.7	C
Northbound	L	0.27	19.0	B	L	0.29	19.7	B	L	0.27	19.4	B
	T	0.23	15.9	B	T	0.25	16.2	B	T	0.25	16.2	B
Southbound	T	0.53	19.8	B	T	0.56	20.3	C	T	0.80	36.0	D
	R	0.14	15.5	B	R	0.14	15.5	B	R	0.22	24.7	C
	Intersection		22.8	C	Intersection		23.4	C	Intersection		29.6	C
Weekday PM												
Eastbound	LR	0.27	22.6	C	LR	0.27	22.6	C	LR	0.27	22.6	C
Westbound	L	0.49	28.1	C	L	0.57	29.6	C	L	0.54	29.6	C
	LT	0.74	35.9	D	LT	0.78	38.4	D	LT	0.78	38.4	D
	R	0.54	29.4	C	R	0.54	29.4	C	R	0.54	29.4	C
Northbound	L	0.38	18.3	B	L	0.41	19.9	B	L	0.33	20.6	C
	T	0.29	11.8	B	T	0.31	11.9	B	T	0.31	11.9	B
Southbound	T	0.64	19.9	B	T	0.67	20.6	C	T	0.93	43.8	D
	R	0.11	13.4	B	R	0.11	13.4	B	R	0.15	21.4	C
	Intersection		21.5	C	Intersection		22.3	C	Intersection		31.1	C