

APPENDIX AA



Noise Impact Evaluation

HUDSON HERITAGE
U.S. Route 9
Town of Poughkeepsie, Dutchess County, NY

January 8, 2016

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TABLE OF CONTENTS **PAGE NO.**

A. PROJECT DESCRIPTION AND LOCATION (FIGURE NO. 1)1
B. SCOPE OF STUDY1
C. CHARACTERISTICS OF ENVIRONMENTAL NOISE (TABLES NO. 1 AND 2).....2
D. EXISTING NOISE LEVELS (FIGURES NO. 1 AND TABLE NO. 3).....2
E. NOISE ANALYSIS METHODOLOGY AND DISCUSSION OF IMPACTS3
F. SUMMARY AND CONCLUSION5

APPENDICES

APPENDIX A FIGURES
APPENDIX B..... TABLES

A. PROJECT DESCRIPTION AND LOCATION (Figure No. 1)

The Hudson Heritage development is a proposed mixed use redevelopment planned on the former Hudson River Psychiatric Center property located on the east side of U.S. Route 9 in the Town of Poughkeepsie, New York. The site will be redeveloped to include approximately 750 residential dwelling units and up to 350,000 s.f. of commercial/retail space. The site will be provided access. The existing internal access roads will also be reconfigured to improve the geometry and to accommodate the development layout. The primary access will be to U.S. Route 9 via the two roadway connections which will be reconstructed to meet current standards. A secondary access connection via Paint Shop Road and West Cottage Road, which connects at NYS Route 9G at Cottage Road will also be utilized.

Under current conditions, the primary noise sources in the area are associated with the traffic along U.S. Route 9 and NYS Route 9G as well the noise generated by Metro North/Amtrak Rail Line and more remotely from the West Shore freight line. The location of the site is identified in Figure No. 1 which also indicates the receptor locations which were evaluated in this study.

B. SCOPE OF STUDY

This evaluation has been prepared to identify the existing noise levels in the area and project potential noise levels under the future conditions anticipated at the site.

Existing noise levels were measured to obtain the ambient (background) noise levels at several receptor locations on the site including receptors along U.S. Route 9 and NYS Route 9G. At the time of the noise measurements, simultaneous vehicle classification traffic counts were also conducted to allow the development of a relationship between the existing traffic volumes and the actual measured noise levels. The existing and future noise levels were then compared to the recommended noise level guidelines to determine whether there will be any significant impact on this residential site or other sensitive receptors in the area. Recommendations for improvements to mitigate any potential noise impacts were then made.

A description of noise receptors, noise guidelines, and the analysis methodology utilized in evaluating the noise levels is described in the following sections.

C. CHARACTERISTICS OF ENVIRONMENTAL NOISE (Tables No. 1 and 2)

A single value of broad band noise levels is established using a frequency weighting that simulates human perception and is used to characterize the noise environment and to assess any impact on noise sensitive areas. Governmental noise criteria generally specify noise level guidelines in the units of A-weighted noise or decibels (dBA). The A-weighted noise measurement has been found to correlate well with the response of the human ear which is relatively insensitive to low frequencies. Table No. 1 provides a summary of some typical A-weighted noise levels. Governmental Guidelines typically stipulate that noise impacts be evaluated in terms of noise levels designated L_{eq} and L_{10} . The L_{eq} (equivalent Sound Level) is an equivalent level “energy average” over a specified period of time. This measure is useful for characterizing environmental noise including highway noise since it specifically accounts for both the duration and magnitude of sound. Other descriptors include L_{max} and L_{90} . The L_{max} represents the maximum level observed for a specific time period of observation while the L_{90} represents the noise level which is exceeded 90% of the time.

Community noise guidelines are specified by several agencies including the Environmental Protection Agency (EPA), the Federal Highway Administration (FHWA), and the Department of Housing and Urban Development (HUD). These agencies have established certain criteria for acceptable noise levels for various land uses and development types. The FHWA guidelines, are summarized in Table No. 2, recommend an exterior noise level of 57 dBA expressed in terms of L_{eq} for activity Category A or activity Category B, the FHWA recommends an exterior noise level of 67 dBA and for Category C a level of 72 dBA.

D. EXISTING NOISE LEVELS (Figures No. 1 and Table No. 3)

Noise measurement surveys were conducted at several locations (receptors) on the site to provide a representative sampling of existing noise levels. The receptor locations were chosen to include representative areas of the site, and included areas to the north and south along the U.S. Route 9 and NYS Route 9G corridors.

Noise measurements were taken to identify ambient noise levels in the area. At those locations closer to U.S. Route 9, traffic volumes were also observed to determine the relationship between noise levels and existing traffic volumes. The noise measurements were collected by representatives of the Chazen Companies. The actual measurements and calibration procedures followed were completed in conformance with American National Standards Institute (ANSI) criteria.

The microphones used in the measurements were located, without obstruction from stationary objects at a height of five feet above a ground surface. Measurements taken included a L_{eq} level, and L_{90} and a L_{max} for each location. The measurements along U.S. Route 9 were collected on 5 and 15 minute intervals to coincide with the traffic monitoring data as present in the traffic study. The existing sound levels measurements were taken in September and October 2015. Table No. 3 summarizes the existing peak period noise levels measured at each receptor location. The existing measured noise levels represented in terms of L_{eq} (dBA) during the peak periods ranged from the mid 50's to high 60's.

The sound level measurements were taken at the various receptor locations in the area. The receptors evaluated are identified on Figure No. 1 and described below:

- R1 - Church on Hudson View Drive approaching the site.
- R2 - Quiet Cove Park on Clear Water Drive just west of Route 9.
- R3 - Residence on Riverview Circle just west of Route 9.
- R4 - Residence on Big Meadow Lane just east of Route 9.
- R5 - Windsor Court just north of project site.
- R6 - Route 9 just east of Marist College

Copies of the measurement particulars including detailed descriptions of the receptors are contained in Appendix B.

E. NOISE ANALYSIS METHODOLOGY AND DISCUSSION OF IMPACTS

Existing and future levels were then modeled for the above receptor locations. In order to evaluate the potential noise impacts, two criteria are generally utilized:

- 1) Will the predicted noise levels exceed the recommended guidelines for a particular area?
- 2) Will there be a significant increase above the existing levels (i.e., 3dBA or greater)?

As indicated previously, community noise guidelines are published by several Federal Agencies including the Environmental Protection Agency (EPA), the Federal Highway Administration (FHWA) and the Department of Housing and Urban Development (HUD). These guidelines establish recommended design noise levels for specific land

uses. With respect to roadway and traffic noise, FHWA has established certain guidelines for various land use categories.

The FHWA recommends a L_{eq} design level of 72 dBA for commercial areas, 67 dBA for residential areas; and 57 dBA for other more noise sensitive areas. Table No 2 summarizes the design level/land use relationships for various land use categories. Additional discussion of how the existing and future noise levels compare to the various noise guidelines is presented in the next section.

As can be seen from measurements summarized in Table 3, the receptors located along the U.S. Route 9 corridor are influenced most by the traffic levels while receptors 1 and 5 are more heavily influenced by local neighborhood noise levels.

Table No. 4 summarizes the relationship between noise increases and significance of impacts. It is important to note that in order to produce a 3-dBA increase in the sound pressure level, which represents a 3-dBA increase in the sound pressure level, which represents a perceptible change relative to human response, a doubling of the noise source (i.e., a doubling of the traffic volume) must occur. Furthermore, with regard to sound propagation in the air, as distance doubles from the sound source, the amplitude drops by half. This is a drop of approximately 6 dBA for a point source. For a line source such as mobile sources, reductions of 3 dBA for doubling distances are encountered under typical field conditions. For example, if a highway has an hourly volume of 2000 vehicles and a L_{eq} of 62 dBA and the volume increases to 4000 vehicles with similar speeds and vehicle mix, the L_{eq} would increase to 65 dBA.

An analysis of future noise level conditions for the various receptor locations assumed that the increase in traffic under future conditions would increase noise levels. The increases were predicted utilizing the FHWA Traffic Noise Model (TNM 1.0) which specifically accounts for vehicle mix, vehicle speeds and other related variables.

As can be seen from a review of the tables, the increases in noise levels at the receptors as a result of the project traffic are expected to be minimal with projected increases of 2 dBA or less. The following recommendations should be implemented as part of the development.

- a) The construction equipment used on-site will have to be inspected periodically to ensure that properly functioning muffler systems are used on all equipment. While on the site, all equipment should not idle unnecessarily.
- b) Normal building construction techniques should provide adequate attenuation to provide acceptable interior noise levels. However, extra attention should be given to

the windows being installed on the west side of the buildings to insure that the best interior noise levels will be provided.

F. SUMMARY AND CONCLUSION

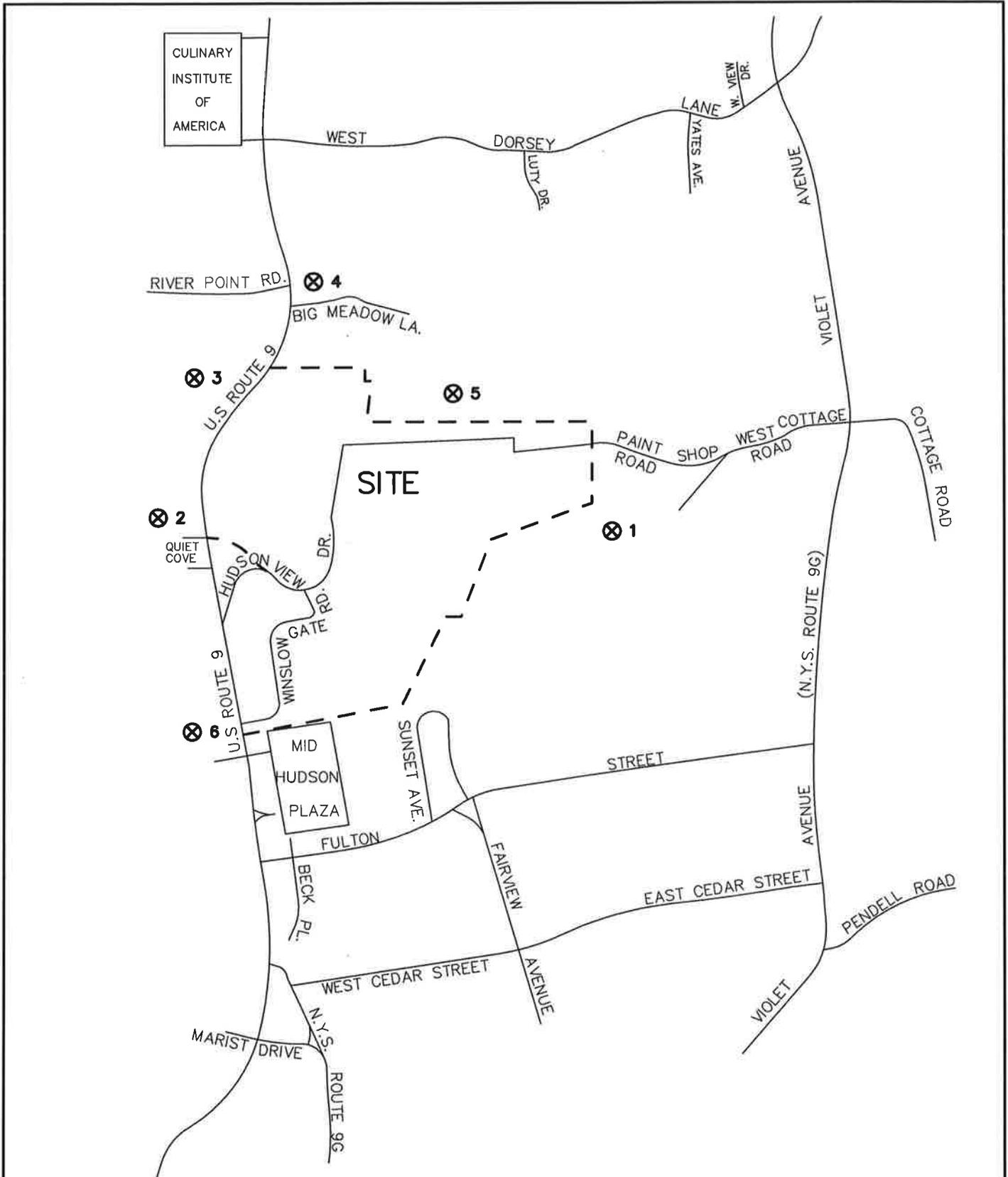
Based on the results of the field measurements and projections of the future noise levels The proposed development will not result in a significant increase in noise levels over those that are currently being experienced in the area and with the mitigation measures identified above, the future noise levels will be acceptable for the area.



HUDSON HERITAGE DEVELOPMENT

APPENDIX A

FIGURES



⊗ # NOISE RECEPTOR

NOTE: LINE DIAGRAM NOT TO SCALE



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HUDSON HERITAGE
 POUGHKEEPSIE, NY

NOISE RECEPTOR LOCATION MAP



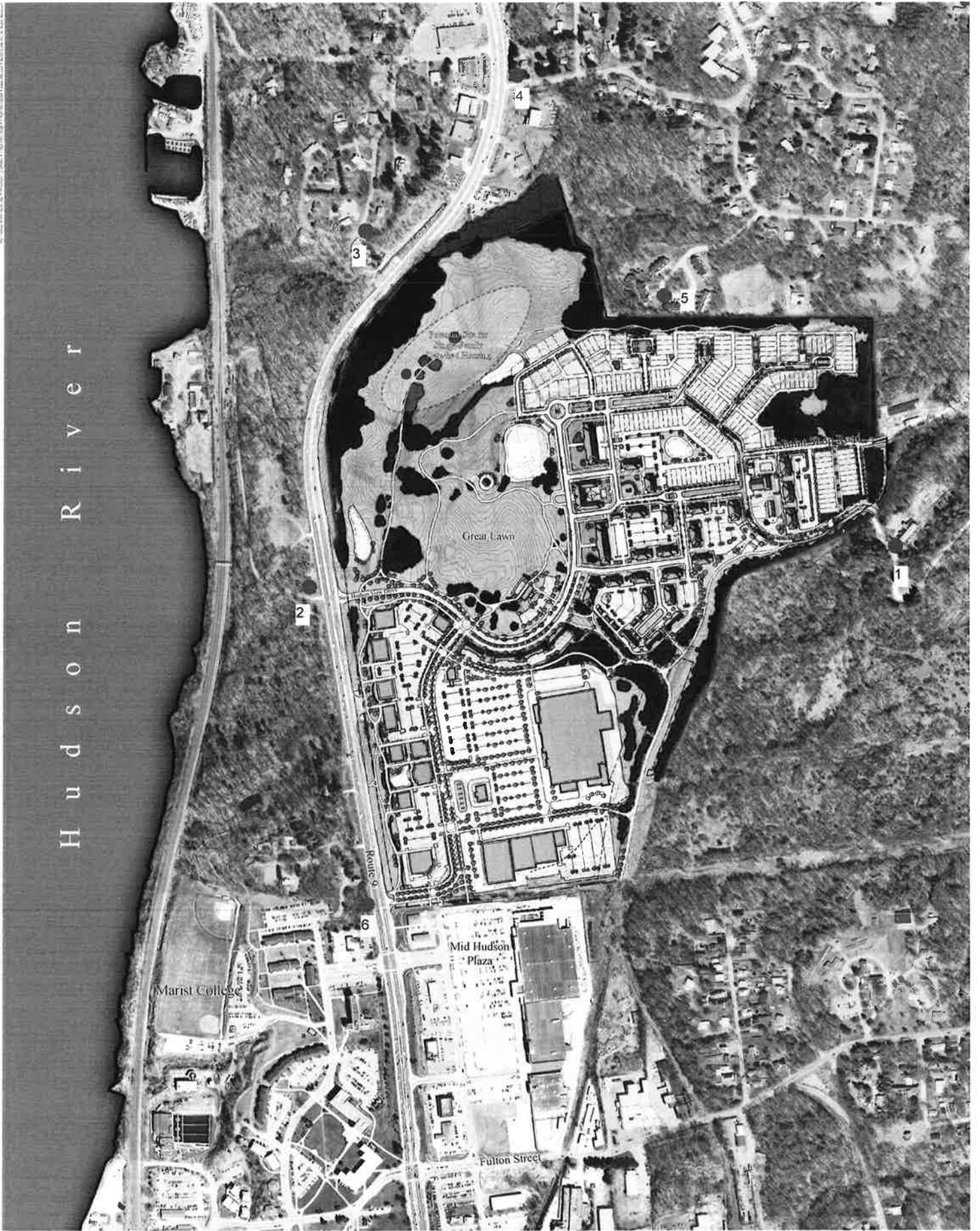
JOB NUMBER: DATE:

13002323A OCT. 2015

FIGURE NUMBER:

1A

Hudson River



CONCEPT PLAN - SCALE 1"=150'

HUDSON HERITAGE

Town of Poughkeepsie, New York

April 22, 2013 • Phase Number 01 • 14010103



EFG/DRA Heritage, LLC.





HUDSON HERITAGE DEVELOPMENT

APPENDIX B

TABLES

TABLE NO. 1

RANGE OF TYPICAL ENVIRONMENTAL A-WEIGHTED NOISE LEVELS

<u>SITUATION</u>	<u>NOISE LEVEL (dBA) (1,2)</u>
Discotheque/Rock Band at 5m	110
Jet Flyover at 1000 ft.	105
Gas Lawn Mower at 3 ft.	98
Inside Subway Train	95
Shouting at 3 ft.	78
Gas Lawn Mower at 100 ft.	70
Normal Speech at 3 ft.	65
Quiet Urban Day Time	50
Library	35
Optimum Sleeping Level	35 or Less
Threshold of Hearing	5

Sources:

- 1) "The Audible Landscape: Manual for Highway Noise and Land Use" Table A-16, Page 91, USDOT, 1974.
- 2) Transportation Planning Handbook, Institute of Transportation Engineers, Figure 8-2, 2nd Edition, 1999.

TABLE NO. 2

FHWA DESIGN LEVELS

Activity Category	Design Noise Level (dBA)		Description of Activity Category (2)
	L_{eq}	L_{10}	
A	57 (EXTERIOR)	60 (EXTERIOR)	Tracts where serenity and quiet are especially important.
B	67 (EXTERIOR)	70 (EXTERIOR)	Residences, motels, schools, churches, hospital, etc.
C	72 (EXTERIOR)	75 (EXTERIOR)	Developed lands other than those above.
E	52 (INTERIOR)	55 (INTERIOR)	Building interiors.

(1) - Source: Federal Highway Administration, "Procedures for the Abatement of Highway Traffic Noise and Construction Noise", Federal Register 41 (80), Washington, D.C.

(2) - Either L_{eq} or L_{10} can be used - not both - and an hourly measure applies. The land-use descriptions are further qualified in the reference, and a category D is also reserved for undeveloped land. The interior noise levels may be established by subtracting from outdoor levels the attenuation expected of the particular wall and window constructions involved.

Table No. 3

Summary of Existing and Future Noise Levels										
Receptor Location/Description	Time Period	2015 Existing		2035 No Build		2035 Build		Δ No Build to Build		
		Leq (dB)	L10 (dB)	Leq (dB)	L10 (dB)	Leq (dB)	L10 (dB)	Leq (dB)	L10 (dB)	
R1 - Church on Hudson View Drive approaching the site	Morning Peak (7-9 AM)	43.9	44.0	44.3	44.5	46.2	46.5	1.9	2.0	
	Mid-Day (11AM-1PM)	40.3	42.5	40.7	43.0	40.9	43.3	0.2	0.3	
	Afternoon Peak (4:30-5:30PM)	42.4	45.0	42.8	45.5	45.0	48.0	2.2	2.5	
	Weekday Evening (7-10PM)	44.5	45.5	44.9	46.0	45.1	46.1	0.1	0.1	
	Weekend Mid-Day (11AM-1:30PM)	47.7	50.0	48.2	50.6	48.3	50.7	0.1	0.1	
R2 - Quiet Cove Park on Clear Water Drive just west of Route 9	Morning Peak (7-9 AM)	74.5	78.0	75.0	78.5	75.4	78.9	0.4	0.4	
	Mid-Day (11AM-1PM)	71.6	75.0	72.3	75.9	72.5	76.0	0.2	0.1	
	Afternoon Peak (4:30-5:30PM)	71.7	75.0	72.4	75.6	72.8	76.1	0.4	0.5	
	Weekday Evening (7-10PM)	69.8	74.0	70.5	74.9	70.7	75.0	0.2	0.1	
	Weekend Mid-Day (11AM-1:30PM)	73.6	77.5	74.3	78.4	74.5	78.5	0.2	0.1	
R3 - Residence on Riverview Circle just west of Route 9	Morning Peak (7-9 AM)	59.7	61.5	60.1	62.0	60.5	62.3	0.4	0.3	
	Mid-Day (11AM-1PM)	57.8	60.5	58.4	61.2	60.5	61.3	2.1	0.1	
	Afternoon Peak (4:30-5:30PM)	59.3	61.5	59.9	62.2	60.3	62.3	0.4	0.1	
	Weekday Evening (7-10PM)	57.6	60.5	58.2	61.2	58.3	61.3	0.1	0.1	
	Weekend Mid-Day (11AM-1:30PM)	59.5	62.0	60.1	62.7	60.2	62.8	0.1	0.1	
R4 - Residence on Big Meadow Lane just east of Route 9	Morning Peak (7-9 AM)	75.6	79.0	76.4	79.9	76.5	80.0	0.2	0.1	
	Mid-Day (11AM-1PM)	73.4	76.5	74.1	77.4	74.3	77.5	0.2	0.1	
	Afternoon Peak (4:30-5:30PM)	76.9	78.0	77.7	78.9	77.9	79.0	0.2	0.1	
	Weekday Evening (7-10PM)	72.2	75.5	72.9	76.4	73.1	76.5	0.2	0.1	
	Weekend Mid-Day (11AM-1:30PM)	74	77.0	74.7	77.9	74.9	78.0	0.2	0.1	
R5 - Windsor Court just north of project site	Morning Peak (7-9 AM)	44.5	46.0	44.9	46.6	46.8	48.7	1.9	2.1	
	Mid-Day (11AM-1PM)	53.4	55.5	53.9	56.2	54.3	56.4	0.4	0.2	
	Afternoon Peak (4:30-5:30PM)	46.7	49.0	47.2	49.6	48.5	51.1	1.3	1.5	
	Weekday Evening (7-10PM)	44.5	46.5	44.9	47.1	45.1	47.1	0.1	0.0	
	Weekend Mid-Day (11AM-1:30PM)	49.1	50.5	49.6	51.1	49.7	51.2	0.1	0.1	
R6 - Route 9 just east of Marist College	Morning Peak (7-9 AM)	71.6	75.0	72.3	75.9	72.7	76.1	0.4	0.2	
	Mid-Day (11AM-1PM)	69.9	73.5	70.6	74.4	71.8	75.5	1.2	1.1	
	Afternoon Peak (4:30-5:30PM)	71.9	74.5	72.6	75.4	73.9	76.5	1.3	1.1	
	Weekday Evening (7-10PM)	67.1	71.5	67.8	72.4	68.5	73.4	0.7	1.0	
	Weekend Mid-Day (11AM-1:30PM)	70.7	74.5	71.4	75.4	72.6	76.5	1.2	1.1	

Notes:

1) Existing sound levels collected by Chazen Engineering with locations and conditions as described on attached sheets.

Receptor Location #1 Description

Receptor Location #1 is located at the church on Hudson View Drive. The meter was setup at the gated fence which leads into Hudson Heritage property. The meter was pointed northwest towards the Hudson Heritage Property. For the most part the site is very isolated and quiet with a significant amount of tree cover around the meter location. Some background noises that were observed during the testing include far away traffic and train noise, distant construction, and for one test-the church bells. There was an ongoing water fountain nearby the meter but the noise didn't seem loud enough to have a big effect on the readings. One test was done with wind gusts up to 18mph but the tree cover likely helped block and reduce this wind.

Testing Weather

Weekday Morning Peak (7-9AM)

10/19/2015- Start time: 7:35 AM, Winds: Calm, 22 degrees Fahrenheit

Weekday Mid-Day (11AM-1PM)

10/19/2015- Start time: 11:46 AM, Winds: Calm, 41 degrees Fahrenheit

Afternoon Peak (4:30-5:30 PM)

10/19/2015-Start Time: 4:30 PM, Winds: 10mph, 51 degrees Fahrenheit

Weekday evening (7-10PM)

10/27/2015-Start Time: 8:25 PM, Winds: Calm, 43 degrees Fahrenheit

Weekend Mid-Day (11-1:30PM)

10/17/2015- Start Time 11:00 AM, Winds: 11 mph, 49 degrees Fahrenheit

Receptor Location #2 Description

Receptor location #2 is located just north of the entrance of Quiet Cove Park on the west side of Route 9. The test was taken approximately 20 feet off of Route 9 with the meter pointed east towards the Hudson Heritage property. Being right off of Route 9, there was not a lot of tree cover and barriers to break wind or other noise. The main source of background noise was traffic on Route 9. An occasional train horn in the distance was noted, but the highest sound levels most likely came from large trucks passing by the meter on Route 9.

Testing Weather

Weekday Morning Peak (7-9AM)

10/20/2015- Start time: 7:35 AM, Winds: 2 mph, 44 degrees Fahrenheit

Weekday Mid-Day (11AM-1PM)

10/19/2015- Start time: 11:45 AM, Winds: 6 mph, 58 degrees Fahrenheit

Afternoon Peak (4:30-5:30 PM)

10/21/2015-Start Time: 4:30 PM, Winds: 7mph, 73 degrees Fahrenheit

Weekday evening (7-10PM)

10/19/2015-Start Time: 8:30 PM, Winds: 6 mph, 46 degrees Fahrenheit

Weekend Mid-Day (11-1:30PM)

10/31/2015- Start Time 11:06 AM, Winds: 2 mph, 47 degrees Fahrenheit

Receptor Location #3 Description

Receptor location #3 is located in a small residential neighborhood west of Route 9. The neighborhood was quiet and not frequented by pedestrian or vehicular traffic for the most part. The meter was set up on the eastern right of way of Riverview Circle. The meter was then set up and pointed southeast towards the Hudson Heritage property. The meter was positioned to point over a fence that separated Route 9 from the neighborhood. The main source of noise was traffic on Route 9 as well as train horns in east of the receptor location. One test was performed and had to be called off due to a rain event. The test was redone the following day.

Testing Weather

Weekday Morning Peak (7-9AM)

10/21/2015- Start time: 7:38 AM, Winds: Calm, 50 degrees Fahrenheit

Weekday Mid-Day (11AM-1PM)

11/04/2015- Start time: 11:39 AM, Winds: 4 mph, 65 degrees Fahrenheit

Afternoon Peak (4:30-5:30 PM)

11/02/2015-Start Time: 4:30 PM, Winds: 1mph, 60 degrees Fahrenheit

Weekday evening (7-10PM)

10/20/2015-Start Time: 7:21 PM, Winds: 8 mph, 63 degrees Fahrenheit

Weekend Mid-Day (11-1:30PM)

10/31/2015- Start Time 12:14 PM, Winds: 3 mph, 48 degrees Fahrenheit

Receptor Location #4 Description

Receptor location #4 is located at the entrance to Big Meadow Lane on the east side of Route 9 in the town of Hyde Park. The meter was set up right off the north side of Big Meadow Lane in the right of way. The meter was pointed south towards the Hudson Heritage property. The main source of noise came from passing traffic on Route 9 as well as people pulling on and off of Big Meadow Lane including large garbage trucks at times. A stop sign was adjacent to the meter and cars often stopped in close proximity to the meter before merging onto Route 9. There were times where loud music was resonating from the stopped cars and could have been picked up by the meter.

Testing Weather

Weekday Morning Peak (7-9AM)

10/27/2015- Start time: 7:26 AM, Winds: 1mph, 31 degrees Fahrenheit

Weekday Mid-Day (11AM-1PM)

11/02/2015- Start time: 11:42 AM, Winds: Calm, 60 degrees Fahrenheit

Afternoon Peak (4:30-5:30 PM)

11/03/2015-Start Time: 4:30 PM, Winds: 1mph, 69 degrees Fahrenheit

Weekday evening (7-10PM)

10/20/2015-Start Time: 8:30 PM, Winds: 6 mph, 59 degrees Fahrenheit

Weekend Mid-Day (11-1:30PM)

11/07/2015- Start Time 11:08 AM, Winds: 5 mph, 57 degrees Fahrenheit

Receptor Location #5 Description

Receptor location #5 is located in the Windsor Court residential neighborhood just north of the Hudson Heritage property. The meter was pointed south/ southwest towards the Hudson Heritage property. The meter was purposely set up in a location between houses to avoid missing any noise coming from the site. The dead end road did not receive much pedestrian or vehicular traffic throughout the testing period. The main source of noise in the neighborhood was an occasional car passing by the meter or people opening and closing car doors. Train horns could be heard from the location but were very distant.

Testing Weather

Weekday Morning Peak (7-9AM)

11/03/2015- Start time: 7:49 AM, Winds: Calm, 41 degrees Fahrenheit

Weekday Mid-Day (11AM-1PM)

10/30/2015- Start time: 11:35 AM, Winds: 15mph, 56 degrees Fahrenheit

Afternoon Peak (4:30-5:30 PM)

11/05/2015-Start Time: 4:30 PM, Winds: 7mph, 65 degrees Fahrenheit

Weekday evening (7-10PM)

10/27/2015-Start Time: 7:10 PM, Winds: Calm, 46 degrees Fahrenheit

Weekend Mid-Day (11-1:30PM)

11/07/2015- Start Time 12:15 PM, Winds: 5 mph, 57 degrees Fahrenheit

Receptor Location #6 Description

Receptor location #6 is located in the right of way of the east side of Route 9, just north of Marist College and across from Winslow Gate Rd. The meter was set up approximately 10 feet off of the curb of Route 9. The meter was pointed northeast towards the Hudson Heritage property. The main source of noise was traffic on Route 9 including large trucks and loud mufflers passing by the meter. On one occasion there was a car horn sounded in close distance to the meter. An occasional train horn could be heard in the distance.

Testing Weather

Weekday Morning Peak (7-9AM)

11/04/2015- Start time: 7:40 AM, Winds: Calm, 43 degrees Fahrenheit

Weekday Mid-Day (11AM-1PM)

11/03/2015- Start time: 11:39 AM, Winds: 7mph, 65 degrees Fahrenheit

Afternoon Peak (4:30-5:30 PM)

11/04/2015-Start Time: 4:31 PM, Winds: 6mph, 65 degrees Fahrenheit

Weekday evening (7-10PM)

10/19/2015-Start Time: 7:15 PM, Winds: 5 mph, 45degrees Fahrenheit

Weekend Mid-Day (11-1:30PM)

10/17/2015- Start Time 12:19 PM, Winds: 12 mph, 51 degrees Fahrenheit

TABLE NO. 4

HUMAN REACTION TO INCREASES IN SOUND PRESSURE LEVEL

<u>INCREASE IN SOUND PRESSURE (Db)</u>	<u>HUMAN REACTION</u>
UNDER 5	UNNOTICED TO TOLERABLE
5 - 10	INTRUSIVE
10 - 15	VERY NOTICEABLE
15-20	OBJECTIONABLE
OVER 20	VERY OBJECTIONABLE TO INTOLERABLE