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36 Years

1053, 1075 and 1145 March Road
CU Developments Inc.

Noise Control Feasibility Study

Engineering excellence. Planning precision. Inspired landscapes.

1053, 1075 and 1145 March Road
Noise Control Feasibility Study

Prepared for:

CU Developments Inc.

Prepared by:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario
K2M 1P6

Issued: July 23, 2018
Revised: May 13, 2019

Ref: R-2018-080
Novatech File No. 116132

NOVATECH
Engineers, Planners & Landscape Architects

May 13, 2019

Planning, Infrastructure, and Economic Development Department
City of Ottawa
110 Laurier Ave. West, 4th Floor
Ottawa, Ontario
K1P 1J1

Attention: **Stream Shen**

Reference: **1053, 1075 and 1145 March Road - CU Developments Inc.**
Noise Control Feasibility Study
Novatech File No.: 116132
City File No.: D02-02-18-0076 (Zoning)
City File No.: D02-16-18-0023 (Subdivision)

Novatech is pleased to submit the following revised Noise Control Feasibility Study on behalf of CU Developments Inc. in support of Draft Plan of Subdivision and Zoning By-law Amendment applications for 1053, 1075 and 1145 March Road in Kanata North.

CU Developments Inc. intends to develop a residential subdivision with a total of 825 units including 295 single detached dwellings, 314 townhouse dwellings, and 216 multi-unit residential dwellings. The subdivision is located in the northwest quadrant of the Kanata North Community Design Plan and incorporates a portion of the north tributary of Shirley's Brook, as well as a number of institutional blocks, a neighbourhood park, and a stormwater management pond. The subdivision will develop in multiple phases.

The attached Noise Control Feasibility Study will address the environmental impact of noise from traffic on outdoor amenity areas and the indoor environment, and assess the feasibility of mitigation measures to attenuate noise to acceptable levels.

Should you have any questions or comments, please do not hesitate to contact us.

Sincerely,

NOVATECH

Marc St. Pierre
Senior Project Manager

Copy: Annibale Ferro – Uniform Urban Developments
Jim Burghout – Claridge Homes

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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1.0 INTRODUCTION

Novatech has been retained by CU Developments Inc. to prepare a Noise Control Feasibility Study in support of a Draft Plan of Subdivision and Zoning By-Law Amendment (ZBLA) to allow for the development of lands known as 1053, 1075 and 1145 March Road in Kanata North (the "Subject Lands"). The Subject Lands are located in the northwest quadrant of the Kanata North Urban Expansion Area (KNUEA) which is subject to the Kanata North Community Design Plan (CDP), approved by Council on July 13, 2016.

The proposed development consists of 825 units including 295 single detached dwellings, 314 townhouse dwellings, and 216 multi-unit residential dwellings to be developed in multiple phases. This subdivision will be the first stage in building out the community envisioned in the Kanata North CDP. Refer to **Figure 1 – Concept Plan**.

This study will assess the environmental impact of noise from traffic on outdoor amenity areas and the indoor environment and review the feasibility of mitigation methods. Mitigation of in-door noise levels will not be discussed in this report since floor areas, window/door areas and building sections are not yet available. These components will be reviewed as part of a Noise Control Detailed Study at the detailed design phase.

1.1 Site Location and Context

The Subject Lands are owned by CU Developments Inc. and encompass approximately 48.05 hectares including several properties under the municipal addresses 1053, 1075 and 1145 March Road. The lands are legally described as Part of Lot 13 and 14, Concession 3, Township of March.

For the purposes of this report, March Road will be taken to be the north-south axis. The subject site is currently used for passive agricultural activities. The site has a moderate slope from the western boundary towards March Road. Refer to **Figure 2 – Site Location**.

MAXWELL ROAD

EXISTING TRIBUTARY 2

MARCH ROAD

Road Widening

Road Widening

INSTITUTIONAL
BLOCK 309

STREET 1

BLOCK 316

6.0m PATHWAY

EXISTING RESIDENTIAL 1035 MARCH RD

EXISTING RESIDENTIAL 1015 MARCH RD

MURPHY CRESCENT

EXISTING ST.ISIDORE ROMAN CATHOLIC PARISH

EXISTING CEMETERY

EXISTING ST.ISIDORE SCHOOL

INSTITUTIONAL

SWM BLOCK

OPEN SPACE

BLOCK 310

BLOCK 312

FUTURE CLARIDGE

BLOCK 311
RESIDENTIAL

BLOCK 307
RESIDENTIAL

FUTURE SCHOOL PROPERTY

RESIDENTIAL
BLOCK 281

STREET 12

EXISTING TRIBUTARY 2

BLOCK 305
RESIDENTIAL

STREET 10

STREET 1

C.E.P.E.O.
BLOCK 304
INSTITUTIONAL

EXISTING TRIBUTARY 3

STREET 12

STREET 3

STREET 3

STREET 7

STREET 11

6.0m PATHWAY

OPEN SPACE
BLOCK 286

STREET 2

STREET 2

STREET 4

STREET 6

STREET 7

STREET 8

STREET 9

STREET 10

STREET 9

MARCHBROOK CRES.

STREET 5

OPEN SPACE

OPEN SPACE

OPEN SPACE

7x7m SHELTER

PLAY GROUND

SPLASH PAD/ WADING POOL

BLOCK 294

STREET 7

STREET 9

MARCHBROOK CIRCLE

EXISTING TRIBUTARY 2

LEGEND

PROPOSED DEVELOPMENT

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
CU DEVELOPMENTS INC.
1053, 1075 and 1145 MARCH ROAD

CONCEPT PLAN

SCALE 1 : 4000 (0, 40, 80, 120, 160)

DATE MAY 2019

JOB 116132

FIGURE FIGURE 1

SHT11X17.DWG - 279mmX432mm

M:\2016\116132\CAD\Design\Figures\Noise\20190204\FIG 1 - CONCEPT.dwg, FIGURE 3 -CONCEPT, May 02, 2019 - 9:49am, szorgel

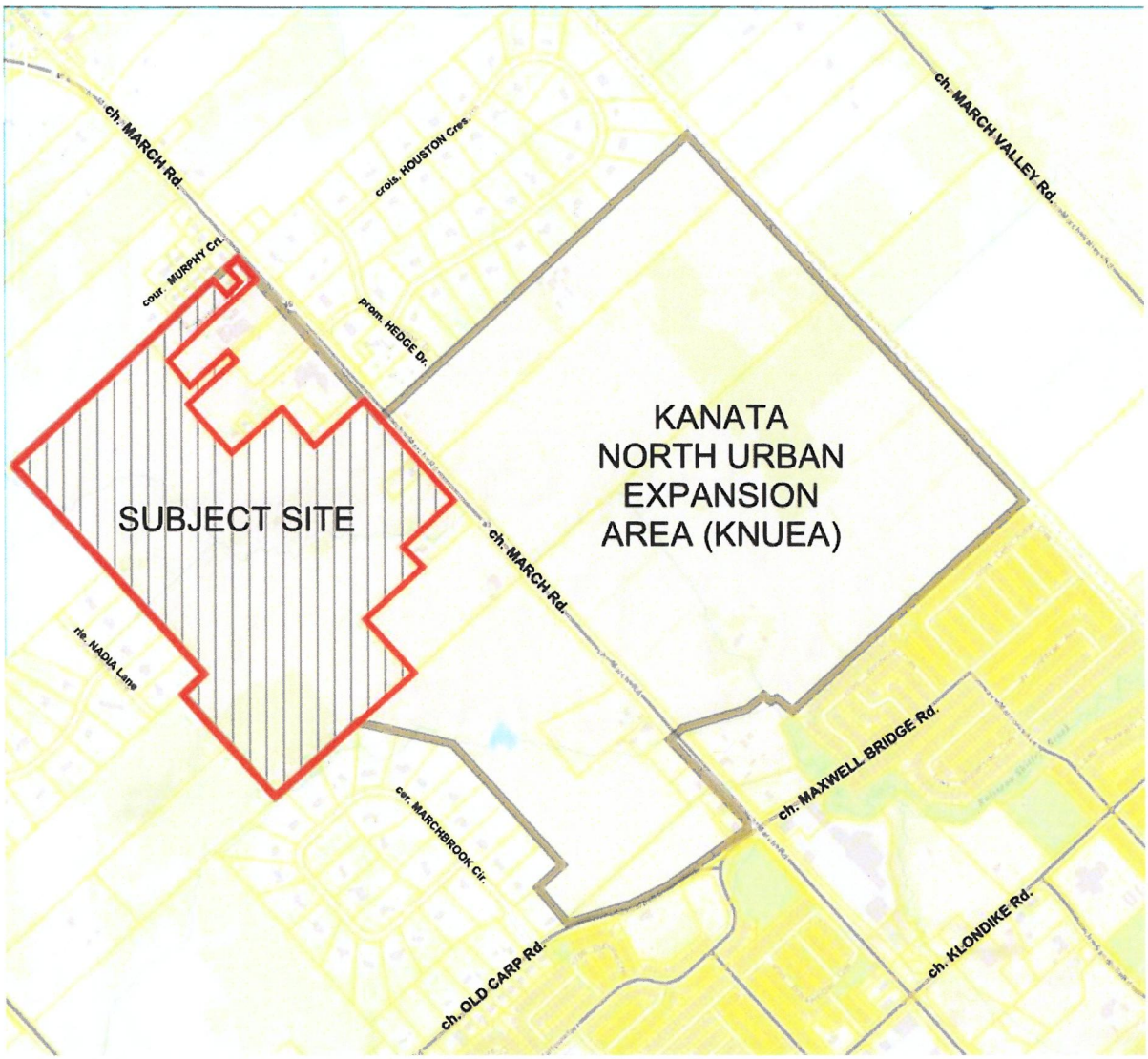


Figure 2: Site Location (Base Map Source: GeoOttawa)

The following describes the existing and planned land uses adjacent to the subject site:

North: Lands to the north are comprised of existing rural lands and several rural residential properties. These lands fall outside the existing urban boundary.

East: Lands east of the subject site contain a mixture of existing institutional lands (Saint Isidore Roman Catholic Parish and cemetery, and St. Isidore Catholic School), rural residential properties and rural lands. March Road forms the eastern boundary of the site. The rural lands to the east of March Road have been identified for residential development in the Kanata North Community Design Plan.

South: Lands to the south are comprised of existing rural lands and rural residential properties. The rural lands have been identified for residential development in the Kanata North Community Design Plan.

West: Lands to the west are comprised of existing rural lands and rural residential properties.

2.0 BACKGROUND AND REPORT ASSUMPTIONS AND LIMITATIONS

The City of Ottawa's Official Plan (OP) and Environmental Noise Control Guidelines (ENCG) stipulates that a noise study shall be prepared when a residential development is located in close proximity to surface transportation, stationary noise sources and aircraft noise sources. This report considers noise from traffic on urban collector Street 1, Street 4 and Street 10 and Street 12. All other sources of noise are located beyond the limits of consideration as outlined in Section 2.1 of the ENCG. Street 1, Street 4, Street 10 and Street 12 have been identified in the TMP as future collector roads as shown in the Preferred Land Use Plan (**Appendix C, Figure 23**). Preliminary cross sections were developed in the TMP for the internal collector roads (**Appendix C, Figure 29**).

Street 1, Street 4, Street 10 and Street 12 have an assumed classification of 2-Lane Urban Collector roadway (8,000 veh/day) with a posted speed of 40kph, as per the TMP (**Appendix C**).

Block 312 is the only proposed noise sensitive land use (residential) in close proximity to March Road as most of the properties are existing institutional or residential properties. Block 312 will be subject to a separate site plan or plan of subdivision application in the future and will require a noise feasibility study at that time. No other proposed residential lots or blocks are located within 150m of March Road (including Blocks 305 and 311) therefore, for the purposes of this report, March Road was not considered in the noise analysis for the remainder of the site.

All medium density Blocks (281, 305, 307 and 311) and future school Block 304 within CU developments will be subject to a separate site plan or plan of subdivision application in the future and will require a noise feasibility study at that time and are not included in this report.

The checklist of required information for a Noise Control Feasibility Study includes an evaluation of alternative site designs and recommendations for alternative site plan design. However, unlike other greenfield subdivisions where the street pattern is not yet established, the Kanata North Urban Expansion Area has a fixed Collector street pattern that does not permit significant modifications. The street pattern was deliberately designed through the Kanata North Community Design Plan process to provide the basis for the development of the lands. Significant analysis of design alternatives was undertaken during the Community Design Plan process.

Street oriented housing has been used as means of mitigating any road related noise impact on new residents in the community. As shown in the Preferred Land Use Plan (**Appendix C, Figure 23**), primarily non-residential land uses are recommended along either side of March Road to further buffer the residential development from road-related noise. The recommended land uses adjacent to March Road include community mixed use, service mixed use, neighbourhood mixed use, stormwater management ponds, a community park, a fire station and the park and ride.

The majority of single lots and townhouse blocks on this site have been oriented to provide significant shielding for Outdoor Living Areas (OLA's) from the collector roads within the site with only a limited number of side yards exposed to collector roads.

No rail or aircraft noise is considered to affect this site.

3.0 CITY OF OTTAWA NOISE CONTROL GUIDELINES

3.1 Sound Level Criteria

The City of Ottawa is concerned with noise from aircraft, roads, transitways, and railways, as expressed in Tables 2.2a: Sound Level Limit for Outdoor Living Areas – Road and Rail, Table 2.2b: Sound Level Limit for Indoor Living Areas Road and Rail, and Table 2.2c: Supplementary Sound Level Limits for Indoor Spaces – Road and Rail of the ENCG. The maximum suggested sound levels for outdoor and indoor living areas between 7am and 11pm are 55 dBA and 45 dBA, respectively. The maximum suggested sound level for indoor bedrooms is 40dBA between 11pm and 7am. For reference, Tables 2.2a, 2.2b and 2.2c of the ENCG are included in **Appendix A**.

Outdoor Living Area and Plane of Window receivers are defined as:

- **Outdoor Living Area (OLA):** The outdoor amenity area provided for quiet enjoyment of the outdoor environment during the daytime period (i.e., backyards, terraces and patios). OLA noise levels are considered 3.0m from the building façade, 1.5m above ground.

- **Plane of Window (POW):** The indoor living space where the sound levels will affect the living room area during daytime hours and bedrooms during nighttime hours. POW noise levels are considered inside the building, minimum 1.5m above ground for first storey and a minimum 4.5m for second storey windows.

3.2 Alternative Methods for Noise Attenuation

When OLA sound levels are predicted to be approximately equal to or less than 55 dBA, attenuation measures are not required. If the predicted noise levels are found to exceed 55 dBA, physical forms of mitigation are suggested and which may also include the provision of warning clauses to inform purchasers of the expected noise levels and specific mitigation measures.

These attenuation measures may include any or all of the following:

- Distance setback with soft ground;
- Insertion of noise insensitive land uses between the source and sensitive receptor;
- Orientation of building to provide sheltered zones;
- Construction of sound or acoustic barriers;
- Installation of air conditioning and ventilation; and
- Enhanced construction techniques and construction quality.

3.3 Noise Barrier

When the noise attenuation measures listed above do not reduce noise levels below 55 dBA in the Outdoor Living Area, control measures (barriers) are required to reduce the Leq below or as close to 55 dBA as technically, economically and administratively feasible.

The noise barriers are to be compliant with the City standard for noise barriers and have the following characteristics:

- Minimum height of 2.2m;
- Situated 0.30m inside the private property line;
- A surface mass density not less than 20kg/sq.m; and
- No holes or gaps.

3.4 Ventilation Requirements

A forced air heating system with provision for a central air conditioning system is required if the plane of window daytime noise levels are between 55 dBA and 65 dBA and/or the nighttime noise levels are between 50 dBA and 60 dBA.

The installation of a central air conditioning system is required when the daytime noise level exceeds 65 dBA and/or the nighttime noise level exceeds 60 dBA.

3.5 Building Component Assessment

When plane of window noise levels exceeds 65 dBA (daytime) or 60 dBA (nighttime) the exterior cladding system of the building envelope must be acoustically assessed to ensure indoor sound criteria are achieved. This includes analysis of the exterior wall, door, and/or glazing system specifications as appropriate.

The NRC research *Acoustic Insulation Factor: A Rating for the Insulation of Buildings against Noise* (June 1980, JD Quirt) is used to assess the building components and the required acoustic insulation factor (AIF). This method is recognized by the City of Ottawa.

The required AIF is based on the Outside L_{eq}, Indoor L_{eq} required, and the number of exterior façade components.

Minimum Required AIF = Outside L_{eq} – Indoor L_{eq} + 10 $\log_{10}$ (Number of Components) + 2dB

Where, N = Number of components (walls, windows and roof);

L = Sound Level expressed on a common decibel scale.

3.6 Warning Clauses

When predicted noise levels exceed the specified criteria, the City of Ottawa and the MECP recommend warning clauses be registered as a notice on title and incorporated into the lease/rental/sale agreements to warn potential purchaser/buyers/tenants of the possible elevated noise levels.

Warning clauses are extracted from Part 4, Appendix A the City of Ottawa ENCG and excerpts of have been provided in **Appendix A** of this report. As stated in the City of Ottawa ENCG, due to the variation of noise impact for any given site, it may be necessary to amend the example warning clauses to recognize the site conditions in each development.

It is recommended that the following noise clauses be registered on title and incorporated into the agreement of purchase and sale as noted in **Tables 3** and **4**:

Type 1

"Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and Ministry of the Environment, Conservation and Parks."

"To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area and indoor environment that is within provincial guidelines. Measures for sound attenuation include:

- An acoustic barrier"

"To ensure that provincial sound level limits are not exceeded it is important to maintain sound attenuation features."

"The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original."

Type 2

"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road/rail/Light Rail/transitway traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment, Conservation and Parks by up to 5 dBA."

"To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area and indoor environment that is within provincial guidelines. Measures for sound attenuation include:

- An acoustic barrier"

"To ensure that provincial sound level limits are not exceeded it is important to maintain sound attenuation features."

"The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original."

Type 3

"Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and Ministry of the Environment, Conservation and Parks."

"To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area and indoor environment that is within provincial guidelines. Measures for sound attenuation may include:

- Multi-pane glass
- Double brick veneer"

"To ensure that provincial sound level limits are not exceeded it is important to maintain sound attenuation features."

"This dwelling unit has also been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment"

Type 4

"Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and Ministry of the Environment, Conservation and Parks."

"To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area and indoor environment that is within provincial guidelines. Measures for sound attenuation may include:

- Multi-pane glass
- Double brick veneer
- High sound transmission class walls"

"To ensure that provincial sound level limits are not exceeded it is important to maintain sound attenuation features."

"This dwelling unit has also been supplied with a central air conditioning system and other measures which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment, Conservation and Parks."

Exact wording of the warning clauses will be adjusted based on the findings of the Detailed Noise Control Study. For units with multiple types of warning clauses, similar/identical wording can be combined as to not duplicate wording/information. Refer to drawing 116132-NC for details.

3.7 Summary of Noise Attenuation Requirements

Table 1 summarizes the required noise attenuation measures and warning clauses should sound criteria be exceeded. Excerpts from the MOE NPC-300 and the City of Ottawa ENCG documents are included in **Appendix A** for reference.

Table 1: Noise Attenuation Measure Requirements

Assessment Location	L_{eq} (dBA)	Outdoor Control Measures	Indoor Control Measures		Warning Clause
			Ventilation Requirements	Building Components	
Outdoor Living Area (OLA)	Less than 55	None required	N/A	N/A	None required
	Between 55 and 60	Control measures (barriers) may not be required but should be considered	N/A	N/A	Required if resultant L_{eq} exceeds 55 dBA Type 1* or Type 2**
	More than 60	Barriers required	N/A	N/A	Required if resultant L_{eq} exceeds 55 dBA Type 1* or Type 2*
Plane of Living Room Window (POW)	Less than 55	N/A	None Required	None Required	None Required
	Between 55 and 65	N/A	Forced air heating with provision for central air conditioning	None Required	Required Type 3
	More Than 65	N/A	Central Air Conditioning	Acoustical performance of the windows and walls should be specified	Required Type 4
Plane of Bedroom Window (POW)	Less than 50	N/A	None Required	None Required	None Required
	Between 50 and 60	N/A	Forced air heating with provision for central air conditioning	None Required	Required Type 3
	More than 60	N/A	Central Air Conditioning	Acoustical performance of the windows and walls should be specified	Required Type 4

*Type 1 warning clause refers to units requiring a noise barrier that mitigates noise below 55dBA.
**Type 2 warning clause refers to units requiring a noise barrier, but is technically or economically not feasible to reduce levels below 55dBA and a tolerance of up to 5dBA can be granted by the City.

4.0 PREDICTION AND MITIGATION OF NOISE LEVELS

4.1 Road Traffic

Table 2 outlines the traffic parameters used to predict the noise levels for the site.

Table 2: Traffic Parameters

Road	Implied Roadway Class	AADT	Traffic Split (%)		
			Day Night	Medium Trucks	Heavy Trucks
Street 1	2 Lane Urban Collector	8,000	92/8	7	5
Street 4	2 Lane Urban Collector	8,000	92/8	7	5
Street 10	2 Lane Urban Collector	8,000	92/8	7	5
Street 12	2 Lane Urban Collector	8,000	92/8	7	5

4.2 Noise Level Analysis

The noise levels for the site were analyzed using version 5.03 of the STAMSON computer noise modelling program. For the most part, due to the planned orientation of the outdoor living areas, noise levels will be below the new OLA guideline of 55 dBA. There are localized areas in which single homes and townhomes fronting local streets are exposed to the internal collector streets that require physical mitigation.

For OLAs exposed to internal collector streets it is proposed to install 2.2m noise walls along the side yards which will reduce the noise levels to below 55 dBA. **Table 3** shows predicted noise levels at various locations within the development.

For the purposes of this report, townhouse units within the development used as barriers in the noise calculations have an assumed height of 6.0m (typical 2-storey).

The Noise Control Plan (Drawing Number 116132-NC) in **Appendix D** shows the receiver locations, receiver elevations, and receiver distances to noise sources. The noise levels for all receiver locations generated from STAMSON are listed in **Tables 3** and **4** with detailed modeling results and figures in **Appendix B.**

Table 3: Predicted Noise Levels - OLA

Receiver	File	Calculated Noise Level, L_{eq} (dBa)		Mitigation Method
		Daytime Un-attenuated (OLA)	Daytime Attenuated (OLA)	
R1	r1bar22.te r1unmit.te	57.55	51.53	-2.2m Noise Wall -Warning Clauses as per Section 3.6 – Type 1
R2	r2bar22.te r2unmit.te	59.67	54.77	-2.2m Noise Wall -Warning Clauses as per Section 3.6 – Type 1
R3	r3unmit.te	52.74	-	N/A
R4	r4unmit.te	46.69	-	N/A
R5	r5unmit.te	52.26	-	N/A
R6	r6bar22.te r6unmit.te	56.20	52.45	-2.2m Noise Wall -Warning Clauses as per Section 3.6 – Type 1
R7	r7bar22.te r7unmit.te	59.36	54.03	-2.2m Noise Wall -Warning Clauses as per Section 3.6 – Type 1
R8	r8unmit.te	50.19	-	N/A
R9	r9unmit.te	51.31	-	N/A
R10	r10unmit.te	50.91	-	N/A
R11	r11unmit.te	50.55	-	N/A
R12	r12bar22.te r12unmit.te	57.63	52.53	-2.2m Noise Wall -Warning Clauses as per Section 3.6 – Type 1
R13	r13unmit.te	49.13	-	N/A
R14	r14bar22.te r14unmit.te	59.09	50.86	-2.2m Noise Wall -Warning Clauses as per Section 3.6 – Type 1
R15	r15bar22.te r15unmit.te	54.42	52.31	-2.2m Noise Wall (Primarily for R14)
R16	r16bar22.te r16unmit.te	51.62	50.76	-2.2m Noise Wall (Primarily for R14)
R17	r17unmit.te	47.01	-	N/A
R18	r18bar22.te r18unmit.te	59.61	54.31	-2.2m Noise Wall -Warning Clauses as per Section 3.6 – Type 1
R19	r19bar22.te r19unmit.te	52.95	51.36	-2.2m Noise Wall (Primarily for R18)
R20	R20bar22.te r20unmit.te	50.77	49.93	-2.2m Noise Wall (Primarily for R18)
R21	r21bar22.te r21unmit.te	60.09	52.29	-2.2m Noise Wall -Warning Clauses as per Section 3.6 – Type 1
R22	r22bar22.te r22unmit.te	53.23	51.56	-2.2m Noise Wall (Primarily for R21)
R23	r23bar22.te r23unmit.te	50.99	50.06	-2.2m Noise Wall (Primarily for R21)

*Noise Barrier refers to any combination of noise wall, berm and/or retaining wall

The maximum predicted un-attenuated outdoor amenity area noise level for the development is located within Block 283 and is 60.09 dBA. When attenuated, the maximum predicted outdoor amenity area noise level is reduced to 52.29 dBA. There are several areas where a 2.2m noise wall is required to mitigate noise levels below 55dBA. The majority of single lots and townhouse blocks on this site have been oriented to provide significant shielding for Outdoor Living Areas (OLA's) from the collector roads within the site with only a limited number of side yards exposed to collector roads. Some units (Lot 19) have been oriented to improve grading in the rear yards.

Table 4: Predicted Noise Levels - POW

Receiver	File	Calculated Noise Level, L_{eq} (dBa)		Mitigation Method
		Daytime Un-attenuated (POW)	Nighttime Un-attenuated (POW)	
R24	r24unmit.te	62.40	54.97	-Provide Forced Air Ventilation with Provision of Air Conditioning - Warning Clauses as per Section 3.6 – Type 3
R25	r25umit.te	63.99	56.63	-Provide Forced Air Ventilation with Provision of Air Conditioning - Warning Clauses as per Section 3.6 – Type 3

The maximum predicted daytime plane of window noise levels for the low-density development fronting one collector street is located within Lot 237 and is 62.40dBA and the nighttime level is 54.97dBa. The maximum predicted daytime plane of window noise level for the low-density development fronting two collector streets is located within Lot 1 and is 63.99dBA and the nighttime level is 56.53dBa.

Receiver 24 (Lot 237) represents the worst-case scenario (minimum offsets, no shielding) from a single collector street and receiver 25 (Lot 1) represents the worst-case scenario (minimum offsets, no shielding) from two collector streets. The mitigation methods for POW receivers with noise levels between 55-65 are the same, therefore, we can conclude any unit fronting a collector street will require indoor noise mitigation as stated in Table 4.

The units requiring mitigation measures are shown on Noise Control Plan (Drawing Number 116132-NC) in **Appendix D**.

5.0 CONCLUSIONS

This report confirms the predicted noise levels for the proposed residential development from Street 1, Street 4, Street 10 and Street 12 are in excess of the City of Ottawa and the Ministry of the Environment, Conservation and Parks guidelines as indicated in Table 3, 4 and 5. To mitigate the noise levels and inform potential buyers/tenants, the following noise attenuation measures are proposed:

Lots 1, 19, 80, 132, 275 and Blocks 276, 277, 278, 279, 283, 284:

- A noise wall with a total height of 2.2m is required along the adjacent collector road;
- Forced air ventilation and noise warning clauses type 1 and 3 are required.

Lots 2-18, 56-57, 61-79, 133-134, 169-189, 237 and Blocks 276, 279, 300, 303:

- Forced air ventilation and noise warning clauses type 3 are required.

The proposed attenuation measures are based on preliminary concept and grading plans. A Noise Control Detailed Study will be completed once the design details are finalized.

This report is respectfully submitted for City of Ottawa approval.

NOVATECH

Prepared by:

Trevor McKay, E.I.T.
Project Coordinator | Engineering

Reviewed by:

LICENSED PROFESSIONAL ENGINEER
S. A. N. ZORGEL
100191487
May 13, 2019
PROVINCE OF ONTARIO

Steve Zorgel, P.Eng.
Project Coordinator | Engineering

Appendix A
Excerpts from the Environmental Noise Control Guidelines and NPC-300

PLANNING AND GROWTH MANAGEMENT
URBANISME ET GESTION DE LA CROISSANCE

ENVIRONMENTAL NOISE CONTROL GUIDELINES: Introduction and Glossary

January 2016

Table 2.2a: Sound Level Limit for Outdoor Living Areas - Road and Rail
(from NPC-300, 2013 Table C-1)

Time Period	Required L_{eq} (16) (dBA)
16-hour, 07:00 – 23:00	55

Table 2.2b: Sound Level Limit for Indoor Living Areas Road and Rail
(from NPC-300, 2013 Table C-2)

Type of Space	Time Period	Required L_{eq} (dBA) Road	Rail
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	07:00 – 23:00	45	40
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	23:00 – 07:00	45	40
Sleeping quarters	07:00 – 23:00	45	40
	23:00 – 07:00	40	35

The Province also provides for supplementary indoor sound level limits for land uses not generally considered noise sensitive (see Table 2.2c below). These good practice design objectives should be addressed in any noise study prepared for the City. These supplementary sound level limits are based on the windows and doors to an indoor space being closed.

Table 2.2c: Supplementary Sound Level Limits for Indoor Spaces - Road and Rail (adapted from NPC-300 Table C-9)

Type of Space	Time Period	Required L_{eq} (dBA) Road	Rail
General offices, reception areas, retail stores, etc.	16 hours between 07:00 – 23:00	50	45
Theatres, places of worship, libraries, individual or semi- private offices, conference rooms, reading rooms, etc.	16 hours between 07:00 – 23:00	45	40
Sleeping quarters of hotels/motels	8 hours between 23:00 – 07:00	45	40
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	8 hours between 23:00 – 07:00	40	35

Appendix B: Table of Traffic and Road Parameters To Be Used For Sound Level Predictions

Table B1 Traffic And Road Parameters To Be Used For Sound Level Predictions

Row Width (m)	Implied Roadway Class	AADT Vehicles/Day	Posted Speed Km/Hr	Day/Night Split %	Medium Trucks %	Heavy Trucks % [1]
NA [2]	Freeway, Queensway, Highway	18,333 per lane	100	92/8	7	5
37.5-44.5	6-Lane Urban Arterial-Divided (6 UAD)	50,000	50-80	92/8	7	5
34-37.5	4-Lane Urban Arterial-Divided (4-UAD)	35,000	50-80	92/8	7	5
23-34	4-Lane Urban Arterial-Undivided (4-UAU)	30,000	50-80	92/8	7	5
23-34	4-Lane Major Collector (4-UMCU)	24,000	40-60	92/8	7	5
30-35.5	2-Lane Rural Arterial (2-RAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Urban Arterial (2-UAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Major Collector (2-UMCU)	12,000	40-60	92/8	7	5
30-35.5	2-Lane Outer Rural Arterial (near the extremities of the City) (2-RAU)	10,000	50-80	92/8	7	5
20-30	2-Lane Urban Collector (2-UCU)	8,000	40-50	92/8	7	5

[1] The MOE Vehicle Classification definitions should be used to estimate automobiles, medium trucks and heavy trucks.

[2] The number of lanes is determined by the future mature state of the roadway.

Environmental Noise Guideline

Stationary and Transportation Sources – Approval and Planning

Publication NPC-300

Ontario

Table C-10
Supplementary Indoor Aircraft Noise Limits
(Applicable over 24-hour period)

Type of Space	Indoor NEF/NEP*
General offices, reception areas, retail stores, etc.	15
Individual or semi-private offices, conference rooms, etc.	10
Living/dining areas of residences, sleeping quarters of hotels/motels, theatres, libraries, schools, daycare centres, places of worship, etc.	5
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	0

* The indoor NEF/NEP values listed in Table C-10 are not obtained from NEF/NEP contour maps. The values are representative of the indoor sound levels and are used as assessment criteria for the evaluation of acoustical insulation requirements.

C7 Noise Control Measures

The following sections provide MOE guidance for appropriate noise control measures. These sections constitute requirements that are applied to MOE approvals for stationary sources. This information is also provided as guidance which land use planning authorities may consider adopting.

The definition in Part A describes the various types and application of noise control measures. All the noise control measures described in the definition are appropriate to address the impact of noise of transportation sources (road, rail and aircraft) on planned sensitive land uses. Only some of the noise control measures described in the definition are appropriate to address the noise impact of stationary sources on planned sensitive land uses.

C7.1 Road Noise Control Measures

C7.1.1 Outdoor Living Areas

If the 16-Hour Equivalent Sound Level, L_{eq} (16) in the OLA is greater than 55 dBA and less than or equal to 60 dBA, noise control measures may be applied to reduce the sound level to 55 dBA. If measures are not provided, prospective purchasers or tenants should be informed of potential noise problems by a warning clause Type A.

If the 16-Hour Equivalent Sound Level, L_{eq} (16) in the OLA is greater than 60 dBA, noise control measures should be implemented to reduce the level to 55 dBA. Only in cases where the required noise control measures are not feasible for technical, economic or administrative reasons would an excess above the limit (55 dBA) be acceptable with a warning clause Type B. In the above situations, any excess above the limit will not be acceptable if it exceeds 5 dBA.

C7.1.2 Plane of a Window – Ventilation Requirements

C7.1.2.1 Daytime Period, 07:00 – 23:00 Hours

Noise control measures may not be required if the L_{eq} (16) daytime sound level in the plane of a bedroom or living/dining room window is less than or equal to 55 dBA. If the sound level in the plane of a bedroom or living/dining room window is greater than 55 dBA and less than or equal to 65 dBA, the dwelling should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion. Warning clause Type C is also recommended.

If the daytime sound level in the plane of a bedroom or living/dining room window is greater than 65 dBA, installation of central air conditioning should be implemented with a warning clause Type D. In addition, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the sound level limits in Table C-2. The location and installation of the outdoor air conditioning device should comply with sound level limits of Publication NPC-216, Reference [32], and guidelines contained in Environmental Noise Guidelines for Installation of Residential Air Conditioning Devices, Reference [6], or should comply with other criteria specified by the municipality.

C7.1.2.2 Nighttime Period, 23:00 – 07:00 Hours

Noise control measures may not be required if the L_{eq} (8) nighttime sound level in the plane of a bedroom or living/dining room window is less than or equal to 50 dBA. If the sound level in the plane of a bedroom or living/dining room window is greater than 50 dBA and less than or equal to 60 dBA, the dwelling should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion. Warning clause Type C is also recommended.

If the nighttime sound level in the plane of a bedroom or living/dining room window is greater than 60 dBA, installation of central air conditioning should be implemented, with a warning clause Type D. In addition, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the sound level limits in Table C-2. The location and installation of the outdoor air conditioning device should comply with sound level limits of Publication NPC-216, Reference [32], and guidelines contained in Environmental Noise Guidelines for Installation of Residential Air Conditioning Devices, Reference [6], or should comply with other criteria specified by the municipality.

C7.1.3 Indoor Living Areas – Building Components

If the nighttime sound level outside the bedroom or living/dining room windows exceeds 60 dBA or the daytime sound level outside the bedroom or living/dining area windows exceeds 65 dBA, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the

sound level limits in Table C-2. The acoustical performance of the building components (windows, doors and walls) should be specified.

C7.2 Rail Noise Control Measures

C7.2.1 Outdoor Living Areas

Whistle noise is not included in the determination of the outdoor daytime sound level due to railway trains. All the provisions of Section C7.1.1 apply also to noise control requirements for rail noise.

C7.2.2 Plane of a Window – Ventilation Requirements

Whistle noise is not included in the determination of the sound level in the plane of a window. All the provisions of Section C7.1.2 apply also to noise control requirements for rail noise.

C7.2.3 Indoor Living Areas – Building Components

The sound level, L_{eq}, during the daytime (16-hour) and nighttime (8-hour) periods is determined using the prediction method STEAM, Reference [34], immediately outside the dwelling envelope. Whistle noise is included in the determination of the sound level.

If the nighttime sound level outside the bedroom or living/dining room windows exceeds 55 dBA or the daytime sound level outside the bedroom or living/dining area windows exceeds 60 dBA, building components including windows, walls and doors, where applicable, need to be designed so that the indoor sound levels comply with the sound level limits in Table C-2. The acoustical performance of the building components (windows, doors and walls) needs to be specified.

In addition, the exterior walls of the first row of dwellings next to railway tracks are to be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters when the rail traffic L_{eq} (24-hour), estimated at a location of a nighttime receptor, is greater than 60 dBA, and when the first row of dwellings is within 100 metres of the tracks.

C7.3 Combination of Road and Rail Noise

The noise impact in the OLA and in the plane of a window, and the requirements for outdoor measures, ventilation measures and warning clauses, should be determined by combining road and rail traffic sound levels.

The assessment of the indoor sound levels and the resultant requirement for the acoustical descriptors of the building components should be done separately for road

In Class 4 areas, where windows for noise sensitive spaces are assumed to be closed, the use of central air conditioning may be acceptable if it forms an essential part of the overall building designs.

C7.9 Verification of Noise Control Measures

It is recommended that the implementation of noise control measures be verified by qualified individuals with experience in environmental acoustics.

C8 Warning Clauses

The use of warning clauses or easements in respect of noise are recommended when circumstances warrant. Noise warning clauses may be used to warn of potential annoyance due to an existing source of noise and/or to warn of excesses above the sound level limits. Direction on the use of warning clauses should be included in agreements that are registered on title to the lands in question. The warning clauses would be included in agreements of Offers of Purchase and Sale, lease/rental agreements and condominium declarations. Alternatively, the use of easements in respect of noise may be appropriate in some circumstances. Additional guidance on the use of noise warning clauses is provided in Section C7.1.1, Section C7.1.2.1, Section C7.1.2.2, Section C7.3 and Section C7.4.

C8.1 Transportation Sources

The following warning clauses may be used individually or in combination:

TYPE A: (see Section C7.1.1)

> "Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air traffic) may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."

TYPE B: (see Section C7.1.1 and Section C7.4)

> "Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic (rail traffic) (air traffic) may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."

TYPE C: (see Section C7.1.2.1, Section C7.1.2.2 and Section C7.4)

> "This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of

central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

TYPE D: (see Section C7.1.2.1, Section C7.1.2.2 and Section C7.4)

"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

C8.2 Stationary Sources

It is not acceptable to use warning clauses in place of physical noise control measures to identify an excess over the MOE sound level limits. Warning clause (Type E) for stationary sources may identify a potential concern due to the proximity of the facility but it is not acceptable to justify exceeding the sound level limits.

TYPE E: (see Section C7.6)

"Purchasers/tenants are advised that due to the proximity of the adjacent industry (facility) (utility), noise from the industry (facility) (utility) may at times be audible."

C8.3 Class 4 Area Notification

TYPE F: (see Section B9.2 and Section C4.4.2)

"Purchasers/tenants are advised that sound levels due to the adjacent industry (facility) (utility) are required to comply with sound level limits that are protective of indoor areas and are based on the assumption that windows and exterior doors are closed. This dwelling unit has been supplied with a ventilation/air conditioning system which will allow windows and exterior doors to remain closed."

Appendix A: Warning Clauses

Under the Official Plan and this guideline warning clauses may be required to be incorporated into development through development agreements, registration on title and inclusion in Agreements of Purchase and Sale. This requirement may be included in any development, regardless of whether it is considered a noise sensitive land use.

A warning clause provides recognition for the City, Province landowner or tenants that noise may be a concern, that noise may be audible at times or even quite loud, and, depending on the type of development, provincial guidelines for noise may be exceeded. Warning clauses also recognize that environmental noise is a potential health hazard that does impact people and neighbourhoods. It is for this reason that, unless a non-noise sensitive land use is established, a warning clause should also include noise mitigation.

A warning clause is not considered a form of noise mitigation. It is not acceptable therefore to use warning clauses in place of physical noise control measures to identify an excess over the MOE or City noise limits. The reason for a warning clause on all development is twofold. Firstly, it is important to note that a land use that although the development may not be considered noise sensitive it may include employees or tenants that are personally sensitive to noise. A warning clause provides protection against complaints to the ministry of Environment should provincial guidelines be exceeded. Secondly, a warning clause on title could obviate the need for a new noise study in the future. In a redevelopment scenario the warning clause would provide recognition of the extent noise conditions.

Given the variation in potential intensity and impact of noise it will often be necessary to amend warning clauses to recognize the site specific conditions in each development. Final wording of any warning clause is to be approved by the City.

The following subsections provide example text to be adapted into warning clauses.

Surface Transportation Warning Clauses

Table A1 Surface Transportation Warning Clauses

Type	Example	Notes
Generic	*Purchasers/tenants are advised that sound levels due to increasing road/rail/Light Rail/transitway traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and the Ministry of the Environment.* *To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area that is within provincial guidelines. Measures for sound attenuation include:* • *A setback of buildings from the noise source and* • *An acoustic barrier.* *To ensure that provincial sound level limits are not exceeded it is important to maintain sound attenuation features.* *The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original.* *Additionally this development includes trees and shrubs to screen the source of noise from occupants.*	The generic warning clause outlines that MOE sound levels may be exceeded but the indoor environment and outdoor amenity areas are within guidelines. Mitigation measures are described including urban design features. Mention is also made of landscaping to screen the development visually from the source of noise.
Extensive mitigation of indoor and	*"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units,*	The warning clause makes reference to MOE sound levels

Table A1 Surface Transportation Warning Clauses

Type	Example	Notes
outdoor amenity area	*sound levels due to increasing road/rail/Light Rail/transitway traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.* *To help address the need for sound attenuation this development includes:* • *multi-pane glass;* • *double brick veneer;* • *an earth berm; and* • *an acoustic barrier.* *To ensure that provincial sound level limits are not exceeded it is important to maintain these sound attenuation features.* *The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original.* *This dwelling unit has also been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment.*	being exceeded from time to time and that there are sound attenuation features and landscaping within the development that should be maintained. An option for air conditioning is noted as well as landscaping to screen the source of noise.

Table A1 Surface Transportation Warning Clauses

Type	Example	Notes
	Additionally this development includes trees and shrubs to screen the source of noise from occupants.	
No outdoor amenity area	*Purchasers/tenants are advised that sound levels due to increasing road/rail/Light Rail/transitway traffic will interfere with outdoor activities as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.* *To help address the need for sound attenuation this development includes:* • *multi-pane glass;* • *double brick veneer;* • *high sound transmission class walls.* *To ensure that provincial sound level limits are not exceeded it is important to maintain these sound attenuation features.* *This dwelling unit has been supplied with a central air conditioning system and other measures which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment*	This warning clause notes that only an indoor environment is being provided for.

Stationary Source Warning Clauses

The Province notes that it is not acceptable to use warning clauses in place of physical noise control measures to identify an excess over the MOE sound level limits for stationary sources. The generic warning clause for stationary sources (called Type E in NPC-300) may identify a potential concern due to the proximity of the facility but it is not possible to justify exceeding the sound level limits.
The wording of the generic stationary noise warning clause may also be used as the basis for new development adjacent to areas licensed for mineral aggregate extraction.

Appendix B
STAMPSON Noise Modelling Results

- **Part 1 – Mitigated Results**
- **Part 2 – Unmitigated Results**
- **Part 3 – Stamson Modelling Angles**

Part 1 – Mitigated Results (Appendix B)

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:16:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: house (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: house (day/night)

Angle1 Angle2	:	-90.00 deg -32.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	21.90 / 21.90 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -32.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	4.80 / 4.80 m
Source elevation	:	90.10 m
Receiver elevation	:	90.32 m
Barrier elevation	:	90.50 m
Reference angle	:	0.00

Road data, segment # 2: open (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: open (day/night)
--------------------------------------
Angle1   Angle2           : -32.00 deg   47.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.90 / 21.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -32.00 deg   Angle2 : 47.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :   9.90 / 9.90   m
Source elevation          :  90.10 m
Receiver elevation        :  90.32 m
Barrier elevation         :  90.20 m
Reference angle           :   0.00


Road data, segment # 3: house (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: house (day/night)
---------------------------------------
Angle1   Angle2           :  47.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.90 / 21.90  m
Receiver height           :   1.50 / 4.50   m
```

```
Topography                  :      2       (Flat/gentle slope; with
barrier)
Barrier angle1              :  47.00 deg   Angle2 : 90.00 deg
Barrier height              :   6.00 m
Barrier receiver distance   :   4.20 / 4.20   m
Source elevation            :  90.10 m
Receiver elevation          :  90.32 m
Barrier elevation           :  90.31 m
Reference angle             :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.house	1.50	40.33	40.33
2.open	1.50	50.88	50.88
3.house	1.50	39.61	39.61
Total			51.53 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.house	1.50	37.15	37.15
2.open	1.50	49.98	49.98 *
3.house	1.50	36.81	36.81
Total			50.40 dBA

```
TOTAL Leq FROM ALL SOURCES (DAY): 51.53
                           (NIGHT): 50.40
```

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:15:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str1House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Str1House (day/night)

Angle1 Angle2 : -90.00 deg 13.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 47.70 / 47.70 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 13.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 13.50 / 13.50 m
Source elevation : 88.68 m
Receiver elevation : 89.27 m
Barrier elevation : 89.00 m
Reference angle : 0.00

Road data, segment # 2: Str1Open (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str1Open (day/night)
------------------------------------------
Angle1   Angle2           :  13.00 deg   50.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  47.70 / 47.70  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  13.00 deg   Angle2 : 50.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :   8.60 / 8.60   m
Source elevation          :  88.68 m
Receiver elevation        :  89.27 m
Barrier elevation         :  88.70 m
Reference angle           :   0.00


Road data, segment # 3: Str1House (day/night)
---------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str1House (day/night)
------------------------------------------
Angle1   Angle2           :  50.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  47.70 / 47.70  m
Receiver height           :   1.50 / 4.50   m
```

```
Topography                 :      2       (Flat/gentle slope; with
barrier)
Barrier angle1             :  50.00 deg   Angle2 : 90.00 deg
Barrier height             :   6.00 m
Barrier receiver distance  :  30.00 / 30.00  m
Source elevation           :  88.68 m
Receiver elevation         :  89.27 m
Barrier elevation          :  89.00 m
Reference angle            :   0.00


Road data, segment # 4: Str4House (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: Str4House (day/night)
-------------------------------------------
Angle1   Angle2            : -90.00 deg   -77.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      1       (Absorptive ground surface)
Receiver source distance   :  20.60 / 20.60  m
Receiver height            :   1.50 / 4.50   m
Topography                 :      2       (Flat/gentle slope; with
barrier)
Barrier angle1             : -90.00 deg   Angle2 : -77.00 deg
Barrier height             :   6.00 m
Barrier receiver distance  :   3.10 / 3.10   m
Source elevation           :  88.64 m
Receiver elevation         :  89.27 m
Barrier elevation          :  89.00 m
Reference angle            :   0.00


Road data, segment # 5: Str4Open (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
```

```
Road gradient         :     2 %
Road pavement         :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: Str4Open (day/night)
------------------------------------------
Angle1   Angle2           : -77.00 deg   43.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.60 / 20.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -77.00 deg   Angle2 : 43.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :   8.60 / 8.60   m
Source elevation          :  88.64 m
Receiver elevation        :  89.27 m
Barrier elevation         :  88.70 m
Reference angle           :   0.00


Road data, segment # 6: Str4House (day/night)
---------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: Str4House (day/night)
-------------------------------------------
Angle1   Angle2           :  43.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
```

```
Surface                    :      1        (Absorptive ground surface)
Receiver source distance   :  20.60 / 20.60  m
Receiver height            :   1.50 / 4.50   m
Topography                 :      2        (Flat/gentle slope; with
barrier)
Barrier angle1             :  43.00 deg   Angle2 : 90.00 deg
Barrier height             :   6.00 m
Barrier receiver distance  :   3.20 / 3.20   m
Source elevation           :  88.64 m
Receiver elevation         :  89.27 m
Barrier elevation          :  89.45 m
Reference angle            :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str1House	1.50	40.49	40.49
2.Str1Open	1.50	43.82	43.82
3.Str1House	1.50	38.14	38.14
4.Str4House	1.50	36.61	36.61
5.Str4Open	1.50	53.89	53.89
6.Str4House	1.50	39.46	39.46
Total			54.77 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.Str1House	1.50	37.59	37.59	
2.Str1Open	1.50	41.16	41.16	*
3.Str1House	1.50	32.98	32.98	
4.Str4House	1.50	33.70	33.70	
5.Str4Open	1.50	51.81	51.81	*
6.Str4House	1.50	36.42	36.42	
Total			52.53 dBA	

```
TOTAL Leq FROM ALL SOURCES (DAY): 54.77
                           (NIGHT): 52.53
```

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:05:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str12House (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: Str12House (day/night)

Angle1 Angle2	:	-90.00 deg -42.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	24.70 / 24.70 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -42.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	6.90 / 6.90 m
Source elevation	:	87.85 m
Receiver elevation	:	88.36 m
Barrier elevation	:	88.11 m
Reference angle	:	0.00

Road data, segment # 2: Str12Opem (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str12Opem (day/night)
--------------------------------------------
Angle1   Angle2           : -42.00 deg   18.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  24.70 / 24.70  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -42.00 deg   Angle2 : 18.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  13.60 / 13.60  m
Source elevation          :  87.85 m
Receiver elevation        :  88.36 m
Barrier elevation         :  87.95 m
Reference angle           :   0.00


Road data, segment # 3: Str12House (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str12House (day/night)
--------------------------------------------
Angle1   Angle2           :  18.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  24.70 / 24.70  m
Receiver height           :   1.50 / 4.50   m
```

```
Topography                 :      2       (Flat/gentle slope; with
barrier)
Barrier angle1             :  18.00 deg   Angle2 : 90.00 deg
Barrier height             :   6.00 m
Barrier receiver distance  :   5.30 / 5.30   m
Source elevation           :  87.85 m
Receiver elevation         :  88.36 m
Barrier elevation          :  88.42 m
Reference angle            :   0.00


Road data, segment # 4: Str10Open (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: Str10Open (day/night)
-----------------------------------------------
Angle1   Angle2            : -90.00 deg   -58.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      2       (Reflective ground surface)
Receiver source distance   :  39.50 / 39.50  m
Receiver height            :   1.50 / 4.50   m
Topography                 :      2       (Flat/gentle slope; with
barrier)
Barrier angle1             : -90.00 deg   Angle2 : -58.00 deg
Barrier height             :   2.20 m
Barrier receiver distance  :   7.60 / 7.60   m
Source elevation           :  87.99 m
Receiver elevation         :  88.36 m
Barrier elevation          :  87.95 m
Reference angle            :   0.00


Road data, segment # 5: Str10House (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
```

Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	8000
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	7.00
Heavy Truck % of Total Volume	5.00
Day (16 hrs) % of Total Volume	92.00

Data for Segment # 5: Str10House (day/night)

Angle1 Angle2	-58.00 deg	90.00 deg
Wood depth	0	(No woods.)
No of house rows	0 / 0	
Surface	2	(Reflective ground surface)
Receiver source distance	39.50 / 39.50	m
Receiver height	1.50 / 4.50	m
Topography	2	(Flat/gentle slope; with barrier)
Barrier angle1	-58.00 deg	Angle2 : 90.00 deg
Barrier height	6.00	m
Barrier receiver distance	3.00 / 3.00	m
Source elevation	87.99	m
Receiver elevation	88.36	m
Barrier elevation	88.42	m
Reference angle	0.00	

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str12House	1.50	40.30	40.30
2.Str12Opem	1.50	49.51	49.51
3.Str12House	1.50	40.52	40.52
4.Str10Open	1.50	47.10	47.10
5.Str10House	1.50	41.20	41.20
Total			52.45 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.Str12House	1.50	37.17	37.17	
2.Str12Opem	1.50	48.02	48.02	*
3.Str12House	1.50	37.53	37.53	
4.Str10Open	1.50	44.66	44.66	*
5.Str10House	1.50	38.70	38.70	
Total			50.45	dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.45
(NIGHT): 50.45

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:07:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str12House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: Str12House (day/night)

Angle1 Angle2	:	-90.00 deg -32.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	21.20 / 21.20 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -32.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	4.80 / 4.80 m
Source elevation	:	87.84 m
Receiver elevation	:	88.24 m
Barrier elevation	:	88.42 m
Reference angle	:	0.00

Road data, segment # 2: Str12Opem (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str12Opem (day/night)
--------------------------------------------
Angle1   Angle2           : -32.00 deg   63.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.20 / 21.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -32.00 deg   Angle2 : 63.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :   9.90 / 9.90   m
Source elevation          :  87.84 m
Receiver elevation        :  88.24 m
Barrier elevation         :  87.90 m
Reference angle           :   0.00


Road data, segment # 3: Str12House (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str12House (day/night)
--------------------------------------------
Angle1   Angle2           :  63.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.20 / 21.20  m
Receiver height           :   1.50 / 4.50   m
```

```
Topography                 :      2        (Flat/gentle slope; with
barrier)
Barrier angle1             :  63.00 deg   Angle2 : 90.00 deg
Barrier height             :   6.00 m
Barrier receiver distance  :   4.00 / 4.00   m
Source elevation           :  87.84 m
Receiver elevation         :  88.24 m
Barrier elevation          :  88.42 m
Reference angle            :   0.00


Road data, segment # 4: Str10House (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: Str10House (day/night)
---------------------------------------------
Angle1   Angle2            : -90.00 deg   58.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      2       (Reflective ground surface)
Receiver source distance   :  39.50 / 39.50  m
Receiver height            :   1.50 / 4.50   m
Topography                 :      2       (Flat/gentle slope; with
barrier)
Barrier angle1             : -90.00 deg   Angle2 : 58.00 deg
Barrier height             :   6.00 m
Barrier receiver distance  :   3.00 / 3.00   m
Source elevation           :  87.99 m
Receiver elevation         :  88.24 m
Barrier elevation          :  88.42 m
Reference angle            :   0.00
```

Road data, segment # 5: Str10Open (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 5: Str10Open (day/night)

Angle1 Angle2	:	58.00 deg	90.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0 / 0	
Surface	:	2	(Reflective ground surface)
Receiver source distance	:	39.50 / 39.50	m
Receiver height	:	1.50 / 4.50	m
Topography	:	2	(Flat/gentle slope; with barrier)
Barrier angle1	:	58.00 deg	Angle2 : 90.00 deg
Barrier height	:	2.20 m	
Barrier receiver distance	:	6.20 / 6.20	m
Source elevation	:	87.99 m	
Receiver elevation	:	88.24 m	
Barrier elevation	:	87.90 m	
Reference angle	:	0.00	

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str12House	1.50	40.43	40.43
2.Str12Opem	1.50	52.34	52.34
3.Str12House	1.50	38.28	38.28
4.Str10House	1.50	41.13	41.13
5.Str10Open	1.50	47.04	47.04
Total			54.03 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.Str12House	1.50	37.15	37.15	
2.Str12Opem	1.50	50.83	50.83	*
3.Str12House	1.50	35.13	35.13	
4.Str10House	1.50	38.32	38.32	
5.Str10Open	1.50	44.66	44.66	*
Total			52.19	dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 54.03
(NIGHT): 52.19

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:10:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r12bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str10House (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	2 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: Str10House (day/night)

Angle1 Angle2	:	-90.00 deg -32.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	21.90 / 21.90 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -32.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	4.80 / 4.80 m
Source elevation	:	91.84 m
Receiver elevation	:	92.48 m
Barrier elevation	:	92.66 m
Reference angle	:	0.00

Road data, segment # 2: Str10Opem (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	2 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str10Opem (day/night)
--------------------------------------------
Angle1   Angle2           : -32.00 deg   49.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.90 / 21.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -32.00 deg   Angle2 : 49.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :   9.90 / 9.90   m
Source elevation          :  91.84 m
Receiver elevation        :  92.48 m
Barrier elevation         :  91.91 m
Reference angle           :   0.00


Road data, segment # 3: Str10House (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str10House (day/night)
--------------------------------------------
Angle1   Angle2           :  49.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.90 / 21.90  m
Receiver height           :   1.50 / 4.50   m
```

```
Topography                  :      2        (Flat/gentle slope; with
barrier)
Barrier angle1              :  49.00 deg   Angle2 : 90.00 deg
Barrier height              :   6.00 m
Barrier receiver distance   :   3.90 / 3.90    m
Source elevation            :  91.84 m
Receiver elevation          :  92.48 m
Barrier elevation           :  92.00 m
Reference angle             :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str10House	1.50	40.21	40.21
2.Str10Opem	1.50	52.01	52.01
3.Str10House	1.50	39.87	39.87
Total			52.53 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.Str10House	1.50	36.94	36.94	
2.Str10Opem	1.50	50.07	50.07	*
3.Str10House	1.50	37.72	37.72	
Total			50.51 dBA	

```
TOTAL Leq FROM ALL SOURCES (DAY): 52.53
                           (NIGHT): 50.51
```

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:20:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r14bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	: 6477/563	veh/TimePeriod	*
Medium truck volume	: 515/45	veh/TimePeriod	*
Heavy truck volume	: 368/32	veh/TimePeriod	*
Posted speed limit	: 40 km/h		
Road gradient	: 0 %		
Road pavement	: 1 (Typical asphalt or concrete)		

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	: -90.00 deg	-32.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0 / 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 20.20 / 20.20	m
Receiver height	: 1.50 / 4.50	m
Topography	: 2	(Flat/gentle slope; with barrier)
Barrier angle1	: -90.00 deg	Angle2 : -32.00 deg
Barrier height	: 6.00 m	
Barrier receiver distance	: 4.80 / 4.80	m
Source elevation	: 89.86 m	
Receiver elevation	: 89.18 m	
Barrier elevation	: 90.44 m	
Reference angle	: 0.00	

Road data, segment # 2: Open (day/night)

Car traffic volume	: 6477/563	veh/TimePeriod	*
Medium truck volume	: 515/45	veh/TimePeriod	*
Heavy truck volume	: 368/32	veh/TimePeriod	*
Posted speed limit	: 40 km/h		
Road gradient	: 0 %		
Road pavement	: 1 (Typical asphalt or concrete)		

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -32.00 deg   85.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.20 / 20.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -32.00 deg   Angle2 : 85.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :   8.20 / 8.20   m
Source elevation          :  89.86 m
Receiver elevation        :  89.18 m
Barrier elevation         :  90.00 m
Reference angle           :   0.00


Road data, segment # 3: House (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: House (day/night)
---------------------------------------
Angle1   Angle2           :  85.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.20 / 20.20  m
Receiver height           :   1.50 / 4.50   m
```

Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 85.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 5.00 / 5.00 m
Source elevation : 89.86 m
Receiver elevation : 89.18 m
Barrier elevation : 89.35 m
Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	39.96	39.96
2.Open	1.50	50.39	50.39
3.House	1.50	34.15	34.15
Total			50.86 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	35.57	35.57
2.Open	1.50	51.64	51.64 *
3.House	1.50	29.93	29.93
Total			51.77 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.86
(NIGHT): 51.77

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:39:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r15bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -10.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	32.90 / 32.90 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -10.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	17.40 / 17.40 m
Source elevation	:	89.86 m
Receiver elevation	:	89.18 m
Barrier elevation	:	90.44 m
Reference angle	:	0.00

Road data, segment # 2: Bar22 (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Bar22 (day/night)
--------------------------------------
Angle1   Angle2           : -10.00 deg   25.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  32.90 / 32.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -10.00 deg   Angle2 : 25.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  20.90 / 20.90  m
Source elevation          :  89.86 m
Receiver elevation        :  89.18 m
Barrier elevation         :  90.00 m
Reference angle           :   0.00


Road data, segment # 3: Open (day/night)
---------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Open (day/night)
--------------------------------------
Angle1   Angle2           :  25.00 deg   73.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  32.90 / 32.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
```

Reference angle : 0.00

Road data, segment # 4: House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	8000
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	7.00
Heavy Truck % of Total Volume	5.00
Day (16 hrs) % of Total Volume	92.00

Data for Segment # 4: House (day/night)

Angle1 Angle2 : 73.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 32.90 / 32.90 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 73.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 17.40 / 17.40 m
Source elevation : 89.86 m
Receiver elevation : 89.18 m
Barrier elevation : 89.35 m
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	40.07	40.07
2.Bar22	1.50	43.49	43.49
3.Open	1.50	51.22	51.22
4.House	1.50	37.21	37.21
Total			52.31 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.House	1.50	35.01	35.01	
2.Bar22	1.50	43.83	43.83	*
3.Open	1.50	44.10	44.10	
4.House	1.50	32.42	32.42	
Total			47.39	dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.31
(NIGHT): 47.39

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:39:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r16bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -6.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	45.50 / 45.50 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -6.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	30.00 / 30.00 m
Source elevation	:	89.86 m
Receiver elevation	:	89.18 m
Barrier elevation	:	90.44 m
Reference angle	:	0.00

Road data, segment # 2: Bar22 (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Bar22 (day/night)
--------------------------------------
Angle1   Angle2           :  -6.00 deg   9.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  45.50 / 45.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  -6.00 deg   Angle2 : 9.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  33.50 / 33.50  m
Source elevation          :  89.86 m
Receiver elevation        :  89.18 m
Barrier elevation         :  90.00 m
Reference angle           :   0.00


Road data, segment # 3: Open (day/night)
---------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Open (day/night)
--------------------------------------
Angle1   Angle2           :   9.00 deg   62.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  45.50 / 45.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
```

Reference angle : 0.00

Road data, segment # 4: House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 4: House (day/night)

Angle1 Angle2 : 62.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 45.50 / 45.50 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 62.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 30.30 / 30.30 m
Source elevation : 89.86 m
Receiver elevation : 89.18 m
Barrier elevation : 89.35 m
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	39.18	39.18
2.Bar22	1.50	38.27	38.27
3.Open	1.50	49.93	49.93
4.House	1.50	37.57	37.57
Total			50.76 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	33.66	33.66
2.Bar22	1.50	33.48	33.48
3.Open	1.50	42.87	42.87
4.House	1.50	32.34	32.34
Total			44.09 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.76
(NIGHT): 44.09

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:21:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r18bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	50 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -43.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	19.90 / 19.90 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -43.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	3.20 / 3.20 m
Source elevation	:	89.46 m
Receiver elevation	:	89.32 m
Barrier elevation	:	89.44 m
Reference angle	:	0.00

Road data, segment # 2: Open (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	50 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -43.00 deg   88.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  19.90 / 19.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -43.00 deg   Angle2 : 88.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :   7.90 / 7.90   m
Source elevation          :  89.46 m
Receiver elevation        :  89.32 m
Barrier elevation         :  89.61 m
Reference angle           :   0.00


Road data, segment # 3: House (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: House (day/night)
---------------------------------------
Angle1   Angle2           :  88.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  19.90 / 19.90  m
Receiver height           :   1.50 / 4.50   m
```

Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 88.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 1.80 / 1.80 m
Source elevation : 89.46 m
Receiver elevation : 89.32 m
Barrier elevation : 90.31 m
Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	41.67	41.67
2.Open	1.50	54.04	54.04
3.House	1.50	31.27	31.27
Total			54.31 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	38.80	38.80
2.Open	1.50	53.98	53.98 *
3.House	1.50	26.86	26.86
Total			54.12 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.31
(NIGHT): 54.12

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:12:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r19bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -3.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	38.10 / 38.10 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -3.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	21.40 / 21.40 m
Source elevation	:	89.46 m
Receiver elevation	:	89.41 m
Barrier elevation	:	89.44 m
Reference angle	:	0.00

Road data, segment # 2: Bar22 (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Bar22 (day/night)
---------------------------------------
Angle1   Angle2           :  -3.00 deg   24.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  38.10 / 38.10  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  -3.00 deg   Angle2 : 24.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  26.10 / 26.10  m
Source elevation          :  89.46 m
Receiver elevation        :  89.41 m
Barrier elevation         :  89.61 m
Reference angle           :   0.00


Road data, segment # 3: Open (day/night)
---------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Open (day/night)
---------------------------------------
Angle1   Angle2           :  24.00 deg   70.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  38.10 / 38.10  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
```

Reference angle : 0.00

Road data, segment # 4: House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 4: House (day/night)

Angle1 Angle2 : 70.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 38.10 / 38.10 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 70.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 19.80 / 19.80 m
Source elevation : 89.46 m
Receiver elevation : 89.41 m
Barrier elevation : 90.31 m
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	41.06	41.06
2.Bar22	1.50	42.47	42.47
3.Open	1.50	50.10	50.10
4.House	1.50	36.13	36.13
Total			51.36 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.House	1.50	36.23	36.23	
2.Bar22	1.50	41.70	41.70	*
3.Open	1.50	43.03	43.03	
4.House	1.50	31.21	31.21	
Total			46.06	dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.36
(NIGHT): 46.06

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:14:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r20bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -5.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	50.20 / 50.20 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -5.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	33.50 / 33.50 m
Source elevation	:	89.46 m
Receiver elevation	:	89.47 m
Barrier elevation	:	89.44 m
Reference angle	:	0.00

Road data, segment # 2: Bar22 (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Bar22 (day/night)
--------------------------------------
Angle1   Angle2           :  -5.00 deg   10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.20 / 50.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  -5.00 deg   Angle2 : 10.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  38.20 / 38.20  m
Source elevation          :  89.46 m
Receiver elevation        :  89.47 m
Barrier elevation         :  89.61 m
Reference angle           :   0.00


Road data, segment # 3: Open (day/night)
---------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Open (day/night)
--------------------------------------
Angle1   Angle2           :  10.00 deg   58.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.20 / 50.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
```

Reference angle : 0.00

Road data, segment # 4: House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 4: House (day/night)

Angle1 Angle2 : 58.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 50.20 / 50.20 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 58.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 32.60 / 32.60 m
Source elevation : 89.46 m
Receiver elevation : 89.47 m
Barrier elevation : 90.31 m
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	40.03	40.03
2.Bar22	1.50	38.34	38.34
3.Open	1.50	48.87	48.87
4.House	1.50	36.45	36.45
Total			49.93 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	34.72	34.72
2.Bar22	1.50	32.97	32.97
3.Open	1.50	41.83	41.83
4.House	1.50	31.10	31.10
Total			43.32 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 49.93
(NIGHT): 43.32

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:22:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r21bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -87.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	18.60 / 18.60 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -87.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	3.00 / 3.00 m
Source elevation	:	89.46 m
Receiver elevation	:	89.17 m
Barrier elevation	:	90.44 m
Reference angle	:	0.00

Road data, segment # 2: Open (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -87.00 deg   43.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  18.60 / 18.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -87.00 deg   Angle2 : 43.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :   6.60 / 6.60   m
Source elevation          :  89.46 m
Receiver elevation        :  89.17 m
Barrier elevation         :  89.61 m
Reference angle           :   0.00


Road data, segment # 3: House (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: House (day/night)
---------------------------------------
Angle1   Angle2           :  43.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  18.60 / 18.60  m
Receiver height           :   1.50 / 4.50   m
```

```
Topography                 :      2       (Flat/gentle slope; with
barrier)
Barrier angle1             :  43.00 deg   Angle2 : 90.00 deg
Barrier height             :   6.00 m
Barrier receiver distance  :   3.20 / 3.20   m
Source elevation           :  89.46 m
Receiver elevation         :  89.17 m
Barrier elevation          :  89.35 m
Reference angle            :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	31.46	31.46
2.Open	1.50	51.97	51.97
3.House	1.50	40.19	40.19
Total			52.29 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	27.04	27.04
2.Open	1.50	52.64	52.64 *
3.House	1.50	37.15	37.15
Total			52.77 dBA

```
TOTAL Leq FROM ALL SOURCES (DAY): 52.29
                           (NIGHT): 52.77
```

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:15:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r22bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -70.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	36.80 / 36.80 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -70.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	21.30 / 21.30 m
Source elevation	:	89.46 m
Receiver elevation	:	88.87 m
Barrier elevation	:	90.44 m
Reference angle	:	0.00

Road data, segment # 2: Open (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -70.00 deg   -23.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  36.80 / 36.80  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Bar22 (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Bar22 (day/night)
---------------------------------------
Angle1   Angle2           : -23.00 deg   4.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  36.80 / 36.80  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -23.00 deg   Angle2 : 4.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  24.80 / 24.80  m
Source elevation          :  89.46 m
Receiver elevation        :  88.87 m
Barrier elevation         :  89.61 m
```

Reference angle : 0.00

Road data, segment # 4: House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 4: House (day/night)

Angle1 Angle2 : 4.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 36.80 / 36.80 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 4.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 21.40 / 21.40 m
Source elevation : 89.46 m
Receiver elevation : 88.87 m
Barrier elevation : 89.35 m
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	35.82	35.82
2.Open	1.50	50.47	50.47
3.Bar22	1.50	41.95	41.95
4.House	1.50	40.89	40.89
Total			51.56 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	30.65	30.65
2.Open	1.50	43.38	43.38
3.Bar22	1.50	37.46	37.46
4.House	1.50	35.89	35.89
Total			45.10 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.56
(NIGHT): 45.10

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:15:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r23bar22.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -60.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	48.90 / 48.90 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -60.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	33.10 / 33.10 m
Source elevation	:	89.46 m
Receiver elevation	:	88.87 m
Barrier elevation	:	90.44 m
Reference angle	:	0.00

Road data, segment # 2: Open (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -60.00 deg   -11.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.90 / 48.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Bar22 (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Bar22 (day/night)
---------------------------------------
Angle1   Angle2           : -11.00 deg   5.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.90 / 48.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -11.00 deg   Angle2 : 5.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  36.90 / 36.90  m
Source elevation          :  89.46 m
Receiver elevation        :  88.87 m
Barrier elevation         :  89.61 m
```

Reference angle : 0.00

Road data, segment # 4: House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	8000
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	7.00
Heavy Truck % of Total Volume	5.00
Day (16 hrs) % of Total Volume	92.00

Data for Segment # 4: House (day/night)

Angle1 Angle2 : 5.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 48.90 / 48.90 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 5.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 33.50 / 33.50 m
Source elevation : 89.46 m
Receiver elevation : 88.87 m
Barrier elevation : 89.35 m
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	35.89	35.89
2.Open	1.50	49.09	49.09
3.Bar22	1.50	38.22	38.22
4.House	1.50	39.87	39.87
Total			50.06 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	30.42	30.42
2.Open	1.50	42.05	42.05
3.Bar22	1.50	33.26	33.26
4.House	1.50	34.43	34.43
Total			43.43 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.06
(NIGHT): 43.43

Part 2 – Unmitigated Results (Appendix B)

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:16:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: house (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: house (day/night)

Angle1 Angle2	:	-90.00 deg -32.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	21.90 / 21.90 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -32.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	4.80 / 4.80 m
Source elevation	:	90.10 m
Receiver elevation	:	90.32 m
Barrier elevation	:	90.50 m
Reference angle	:	0.00

Road data, segment # 2: open (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: open (day/night)
--------------------------------------
Angle1   Angle2           : -32.00 deg   47.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.90 / 21.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: house (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: house (day/night)
---------------------------------------
Angle1   Angle2           :  47.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.90 / 21.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  47.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.20 / 4.20   m
Source elevation          :  90.10 m
Receiver elevation        :  90.32 m
Barrier elevation         :  90.31 m
```

Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.house	1.50	40.33	40.33
2.open	1.50	57.39	57.39
3.house	1.50	39.61	39.61
Total			57.55 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.house	1.50	37.15	37.15
2.open	1.50	49.98	49.98
3.house	1.50	36.81	36.81
Total			50.40 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.55
(NIGHT): 50.40

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:03:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str1House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: Str1House (day/night)

Angle1 Angle2	:	-90.00 deg 13.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	47.70 / 47.70 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : 13.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	13.50 / 13.50 m
Source elevation	:	88.68 m
Receiver elevation	:	89.27 m
Barrier elevation	:	89.00 m
Reference angle	:	0.00

Road data, segment # 2: Str1open (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str1open (day/night)
------------------------------------------
Angle1   Angle2           :  13.00 deg   50.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  47.70 / 47.70  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Str1House (day/night)
---------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str1House (day/night)
-------------------------------------------
Angle1   Angle2           :  50.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  47.70 / 47.70  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  50.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  30.00 / 30.00  m
Source elevation          :  88.68 m
Receiver elevation        :  89.27 m
Barrier elevation         :  89.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: Str4House (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: Str4House (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   -77.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.60 / 20.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -77.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   3.10 / 3.10   m
Source elevation          :  88.64 m
Receiver elevation        :  89.27 m
Barrier elevation         :  89.00 m
Reference angle           :   0.00


Road data, segment # 5: Str4Open (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
```

```
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: Str4Open (day/night)
------------------------------------------
Angle1   Angle2           : -77.00 deg   43.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.60 / 20.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 6: Str4House (day/night)
---------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: Str4House (day/night)
-------------------------------------------
Angle1   Angle2           :  43.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.60 / 20.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  43.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   3.20 / 3.20   m
Source elevation          :  88.64 m
Receiver elevation        :  89.27 m
Barrier elevation         :  89.45 m
Reference angle           :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str1House	1.50	40.49	40.49
2.Str1open	1.50	48.23	48.23
3.Str1House	1.50	38.14	38.14
4.Str4House	1.50	36.61	36.61
5.Str4Open	1.50	59.19	59.19
6.Str4House	1.50	39.46	39.46
Total			59.67 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str1House	1.50	37.59	37.59
2.Str1open	1.50	41.16	41.16
3.Str1House	1.50	32.98	32.98
4.Str4House	1.50	33.70	33.70
5.Str4Open	1.50	51.81	51.81
6.Str4House	1.50	36.42	36.42
Total			52.53 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.67
(NIGHT): 52.53

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:04:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str1House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Str1House (day/night)

Angle1 Angle2 : -90.00 deg 4.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 46.50 / 46.50 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 4.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 11.40 / 11.40 m
Source elevation : 88.68 m
Receiver elevation : 88.27 m
Barrier elevation : 88.20 m
Reference angle : 0.00

Road data, segment # 2: Str1Open (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str1Open (day/night)
------------------------------------------
Angle1   Angle2           :   4.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  46.50 / 46.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Str12House (day/night)
----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str12House (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   -71.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.90 / 120.90 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -71.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   3.70 / 3.70   m
Source elevation          :  86.86 m
Receiver elevation        :  88.27 m
Barrier elevation         :  88.20 m
Reference angle           :   0.00
```

```
Road data, segment # 4: Str12Open (day/night)
----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: Str12Open (day/night)
-------------------------------------------
Angle1   Angle2           : -71.00 deg   63.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.90 / 120.90 m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 5: Str12House (day/night)
----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: Str12House (day/night)
--------------------------------------------
Angle1   Angle2           :  63.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
```

```
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.90 / 120.90 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  63.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   2.00 / 2.00   m
Source elevation          :  86.86 m
Receiver elevation        :  88.27 m
Barrier elevation         :  88.45 m
Reference angle           :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str1House	1.50	40.15	40.15
2.Str1Open	1.50	51.05	51.05
3.Str12House	1.50	28.35	28.35
4.Str12Open	1.50	46.90	46.90
5.Str12House	1.50	28.09	28.09
Total			52.74 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str1House	1.50	37.57	37.57
2.Str1Open	1.50	44.07	44.07
3.Str12House	1.50	26.69	26.69
4.Str12Open	1.50	40.22	40.22
5.Str12House	1.50	26.37	26.37
Total			46.30 dBA

```
TOTAL Leq FROM ALL SOURCES (DAY): 52.74
                           (NIGHT): 46.30
```

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:17:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: house (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: house (day/night)

Angle1 Angle2	:	-90.00 deg -27.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	111.00 / 111.00 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -27.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	3.90 / 3.90 m
Source elevation	:	87.26 m
Receiver elevation	:	88.38 m
Barrier elevation	:	88.44 m
Reference angle	:	0.00

Road data, segment # 2: open (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: open (day/night)
--------------------------------------
Angle1   Angle2           : -27.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 111.00 / 111.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Result summary (day)
--------------------

                   !  source  !   Road   !  Total
                   !  height  !   Leq    !   Leq
                   !   (m)    !  (dBA)   !  (dBA)
-------------------+---------+---------+---------
 1.house           !     1.50 !    31.81 !    31.81
 2.open            !     1.50 !    46.55 !    46.55
-------------------+---------+---------+---------
                     Total                  46.69 dBA


Result summary (night)
----------------------

                   !  source  !   Road   !  Total
                   !  height  !   Leq    !   Leq
                   !   (m)    !  (dBA)   !  (dBA)
-------------------+---------+---------+---------
 1.house           !     1.50 !    30.73 !    30.73
 2.open            !     1.50 !    39.85 !    39.85
-------------------+---------+---------+---------
                     Total                  40.35 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 46.69
                           (NIGHT): 40.35
```

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:04:53
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str12Open (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Str12Open (day/night)

Angle1 Angle2 : -90.00 deg 12.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 46.80 / 46.80 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Str12House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Str12House (day/night)

Angle1 Angle2	:	12.00 deg 90.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	46.80 / 46.80 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	12.00 deg Angle2 : 90.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	29.40 / 29.40 m
Source elevation	:	87.61 m
Receiver elevation	:	87.54 m
Barrier elevation	:	87.96 m
Reference angle	:	0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str12Open	1.50	52.02	52.02
2.Str12House	1.50	39.60	39.60
Total			52.26 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str12Open	1.50	45.01	45.01
2.Str12House	1.50	34.34	34.34
Total			45.37 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.26
(NIGHT): 45.37

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:06:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str12House (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: Str12House (day/night)

Angle1 Angle2	:	-90.00 deg -42.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	24.70 / 24.70 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -42.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	6.90 / 6.90 m
Source elevation	:	87.85 m
Receiver elevation	:	88.36 m
Barrier elevation	:	88.11 m
Reference angle	:	0.00

Road data, segment # 2: Str12Opem (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str12Opem (day/night)
-------------------------------------------
Angle1   Angle2           : -42.00 deg   18.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  24.70 / 24.70  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Str12House (day/night)
----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str12House (day/night)
--------------------------------------------
Angle1   Angle2           :  18.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  24.70 / 24.70  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  18.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   5.30 / 5.30   m
Source elevation          :  87.85 m
Receiver elevation        :  88.36 m
Barrier elevation         :  88.42 m
```

```
Reference angle           :   0.00


Road data, segment # 4: Str10Open (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: Str10Open (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   -58.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  39.50 / 39.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 5: Str10House (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: Str10House (day/night)
-------------------------------------------
Angle1   Angle2           : -58.00 deg   90.00 deg
```

```
Wood depth                 :      0        (No woods.)
No of house rows           :      0 / 0
Surface                    :      2        (Reflective ground surface)
Receiver source distance   :  39.50 / 39.50  m
Receiver height            :   1.50 / 4.50   m
Topography                 :      2        (Flat/gentle slope; with
barrier)
Barrier angle1             : -58.00 deg   Angle2 : 90.00 deg
Barrier height             :   6.00 m
Barrier receiver distance  :   3.00 / 3.00   m
Source elevation           :  87.99 m
Receiver elevation         :  88.36 m
Barrier elevation          :  88.42 m
Reference angle            :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str12House	1.50	40.30	40.30
2.Str12Opem	1.50	55.39	55.39
3.Str12House	1.50	40.52	40.52
4.Str10Open	1.50	45.54	45.54
5.Str10House	1.50	41.20	41.20
Total			56.20 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str12House	1.50	37.17	37.17
2.Str12Opem	1.50	48.02	48.02
3.Str12House	1.50	37.53	37.53
4.Str10Open	1.50	38.80	38.80
5.Str10House	1.50	38.70	38.70
Total			49.51 dBA

```
TOTAL Leq FROM ALL SOURCES (DAY): 56.20
                           (NIGHT): 49.51
```

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:07:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str12House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: Str12House (day/night)

Angle1 Angle2	:	-90.00 deg -32.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	21.20 / 21.20 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -32.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	4.80 / 4.80 m
Source elevation	:	87.84 m
Receiver elevation	:	88.24 m
Barrier elevation	:	88.42 m
Reference angle	:	0.00

Road data, segment # 2: Str12Opem (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str12Opem (day/night)
-------------------------------------------
Angle1   Angle2           : -32.00 deg   63.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.20 / 21.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Str12House (day/night)
----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str12House (day/night)
--------------------------------------------
Angle1   Angle2           :  63.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.20 / 21.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  63.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  87.84 m
Receiver elevation        :  88.24 m
Barrier elevation         :  88.42 m
Reference angle           :   0.00
```

Road data, segment # 4: Str10House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	8000
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	7.00
Heavy Truck % of Total Volume	5.00
Day (16 hrs) % of Total Volume	92.00

Data for Segment # 4: Str10House (day/night)

Angle1 Angle2 : -90.00 deg 58.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 39.50 / 39.50 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 58.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 3.00 / 3.00 m
Source elevation : 87.99 m
Receiver elevation : 88.24 m
Barrier elevation : 88.42 m
Reference angle : 0.00

Road data, segment # 5: Str10Open (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	8000
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	7.00

```
    Heavy Truck  % of Total Volume      :   5.00
    Day (16 hrs) % of Total Volume      :  92.00

Data for Segment # 5: Str10Open (day/night)
-------------------------------------------
Angle1   Angle2           :  58.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  39.50 / 39.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Str12House       !     1.50 !    40.43 !    40.43
 2.Str12Opem        !     1.50 !    58.23 !    58.23
 3.Str12House       !     1.50 !    38.28 !    38.28
 4.Str10House       !     1.50 !    41.13 !    41.13
 5.Str10Open        !     1.50 !    52.25 !    52.25
--------------------+---------+---------+---------
                      Total                 59.36 dBA


Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Str12House       !     1.50 !    37.15 !    37.15
 2.Str12Opem        !     1.50 !    50.83 !    50.83
 3.Str12House       !     1.50 !    35.13 !    35.13
 4.Str10House       !     1.50 !    38.32 !    38.32
 5.Str10Open        !     1.50 !    44.66 !    44.66
--------------------+---------+---------+---------
                      Total                 52.19 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 59.36
                           (NIGHT): 52.19
```

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:08:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str12House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Str12House (day/night)

Angle1 Angle2 : -90.00 deg 19.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 47.20 / 47.20 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 19.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 13.00 / 13.00 m
Source elevation : 88.23 m
Receiver elevation : 88.72 m
Barrier elevation : 88.75 m
Reference angle : 0.00

Road data, segment # 2: Str12Open (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str12Open (day/night)
------------------------------------------
Angle1   Angle2           :  19.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  47.20 / 47.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Str12House       !     1.50 !    40.22 !    40.22
 2.Str12Open        !     1.50 !    49.73 !    49.73
--------------------+---------+---------+---------
                      Total                 50.19 dBA


Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Str12House       !     1.50 !    37.17 !    37.17
 2.Str12Open        !     1.50 !    42.79 !    42.79
--------------------+---------+---------+---------
                      Total                 43.84 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 50.19
                           (NIGHT): 43.84
```

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:08:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r9unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str10House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Str10House (day/night)

Angle1 Angle2 : -90.00 deg -51.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 45.50 / 45.50 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -51.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 27.50 / 27.50 m
Source elevation : 88.59 m
Receiver elevation : 88.87 m
Barrier elevation : 88.45 m
Reference angle : 0.00

Road data, segment # 2: Str10Opem (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str10Opem (day/night)
-------------------------------------------
Angle1   Angle2           : -51.00 deg   -28.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  45.50 / 45.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Str10House (day/night)
----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str10House (day/night)
--------------------------------------------
Angle1   Angle2           : -28.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  45.50 / 45.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -28.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :  88.59 m
Receiver elevation        :  88.87 m
Barrier elevation         :  88.96 m
Reference angle           :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str10House	1.50	41.83	41.83
2.Str10Opem	1.50	50.20	50.20
3.Str10House	1.50	41.86	41.86
Total			51.31 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str10House	1.50	35.94	35.94
2.Str10Opem	1.50	42.61	42.61
3.Str10House	1.50	38.90	38.90
Total			44.76 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.31
(NIGHT): 44.76

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:09:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r10unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str10House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	2 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: Str10House (day/night)

Angle1 Angle2	:	-90.00 deg 28.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	2 (Reflective ground surface)
Receiver source distance	:	45.50 / 45.50 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : 28.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	9.00 / 9.00 m
Source elevation	:	88.59 m
Receiver elevation	:	88.98 m
Barrier elevation	:	88.82 m
Reference angle	:	0.00

Road data, segment # 2: Str10Opem (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	2 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str10Opem (day/night)
-------------------------------------------
Angle1   Angle2           :  28.00 deg   48.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  45.50 / 45.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Str10House (day/night)
----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str10House (day/night)
--------------------------------------------
Angle1   Angle2           :  48.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  45.50 / 45.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  48.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  27.50 / 27.50  m
Source elevation          :  88.59 m
Receiver elevation        :  88.98 m
Barrier elevation         :  88.50 m
```

Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str10House	1.50	42.19	42.19
2.Str10Opem	1.50	49.59	49.59
3.Str10House	1.50	41.95	41.95
Total			50.91 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str10House	1.50	39.53	39.53
2.Str10Opem	1.50	42.00	42.00
3.Str10House	1.50	36.09	36.09
Total			44.61 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.91
(NIGHT): 44.61

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:09:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r11unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str10House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	2 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: Str10House (day/night)

Angle1 Angle2	:	-90.00 deg 28.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	2 (Reflective ground surface)
Receiver source distance	:	45.50 / 45.50 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : 28.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	9.00 / 9.00 m
Source elevation	:	92.27 m
Receiver elevation	:	92.20 m
Barrier elevation	:	92.50 m
Reference angle	:	0.00

Road data, segment # 2: Str10Opem (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	2 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str10Opem (day/night)
------------------------------------------
Angle1   Angle2           :  28.00 deg   47.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  45.50 / 45.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Str10House (day/night)
----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str10House (day/night)
--------------------------------------------
Angle1   Angle2           :  47.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  45.50 / 45.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  47.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  29.60 / 29.60  m
Source elevation          :  92.27 m
Receiver elevation        :  92.20 m
Barrier elevation         :  92.78 m
```

Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str10House	1.50	41.66	41.66
2.Str10Opem	1.50	49.37	49.37
3.Str10House	1.50	40.88	40.88
Total			50.55 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str10House	1.50	38.54	38.54
2.Str10Opem	1.50	41.78	41.78
3.Str10House	1.50	34.66	34.66
Total			44.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.55
(NIGHT): 44.00

STAMSON 5.0 SUMMARY REPORT Date: 05-02-2019 14:10:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r12unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Str10House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	2 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: Str10House (day/night)

Angle1 Angle2	:	-90.00 deg -32.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	21.90 / 21.90 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -32.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	4.80 / 4.80 m
Source elevation	:	91.84 m
Receiver elevation	:	92.48 m
Barrier elevation	:	92.66 m
Reference angle	:	0.00

Road data, segment # 2: Str10Opem (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	2 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Str10Opem (day/night)
-------------------------------------------
Angle1   Angle2           : -32.00 deg   49.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.90 / 21.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Str10House (day/night)
----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Str10House (day/night)
--------------------------------------------
Angle1   Angle2           :  49.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  21.90 / 21.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  49.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   3.90 / 3.90   m
Source elevation          :  91.84 m
Receiver elevation        :  92.48 m
Barrier elevation         :  92.00 m
```

Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str10House	1.50	40.21	40.21
2.Str10Opem	1.50	57.48	57.48
3.Str10House	1.50	39.87	39.87
Total			57.63 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Str10House	1.50	36.94	36.94
2.Str10Opem	1.50	50.07	50.07
3.Str10House	1.50	37.72	37.72
Total			50.51 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.63
(NIGHT): 50.51

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:20:24
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r13unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -69.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	2 (Reflective ground surface)
Receiver source distance	:	39.50 / 39.50 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -69.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	23.10 / 23.10 m
Source elevation	:	89.89 m
Receiver elevation	:	89.15 m
Barrier elevation	:	89.44 m
Reference angle	:	0.00

Road data, segment # 2: Open (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -69.00 deg   -58.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  39.50 / 39.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: House (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: House (day/night)
---------------------------------------
Angle1   Angle2           : -58.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  39.50 / 39.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -58.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   3.00 / 3.00   m
Source elevation          :  89.89 m
Receiver elevation        :  89.15 m
Barrier elevation         :  90.31 m
```

Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	40.90	40.90
2.Open	1.50	47.61	47.61
3.House	1.50	40.71	40.71
Total			49.13 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	34.83	34.83
2.Open	1.50	40.02	40.02
3.House	1.50	35.88	35.88
Total			42.29 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 49.13
(NIGHT): 42.29

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:20:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r14unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -32.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	20.20 / 20.20 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -32.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	4.80 / 4.80 m
Source elevation	:	89.86 m
Receiver elevation	:	89.18 m
Barrier elevation	:	90.44 m
Reference angle	:	0.00

Road data, segment # 2: Open (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -32.00 deg   85.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.20 / 20.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: House (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: House (day/night)
---------------------------------------
Angle1   Angle2           :  85.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.20 / 20.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  85.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          :  89.86 m
Receiver elevation        :  89.18 m
Barrier elevation         :  89.35 m
```

Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	39.96	39.96
2.Open	1.50	59.02	59.02
3.House	1.50	34.15	34.15
Total			59.09 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	35.57	35.57
2.Open	1.50	51.64	51.64
3.House	1.50	29.93	29.93
Total			51.77 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.09
(NIGHT): 51.77

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:39:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r15unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -10.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	32.90 / 32.90 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -10.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	17.40 / 17.40 m
Source elevation	:	89.86 m
Receiver elevation	:	89.18 m
Barrier elevation	:	90.44 m
Reference angle	:	0.00

Road data, segment # 2: Bar22 (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Bar22 (day/night)
---------------------------------------
Angle1   Angle2           : -10.00 deg   25.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  32.90 / 32.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Open (day/night)
---------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Open (day/night)
---------------------------------------
Angle1   Angle2           :  25.00 deg   73.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  32.90 / 32.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

Road data, segment # 4: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 4: House (day/night)

Angle1 Angle2	:	73.00 deg 90.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	32.90 / 32.90 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	73.00 deg Angle2 : 90.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	17.40 / 17.40 m
Source elevation	:	89.86 m
Receiver elevation	:	89.18 m
Barrier elevation	:	89.35 m
Reference angle	:	0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	40.07	40.07
2.Bar22	1.50	51.11	51.11
3.Open	1.50	51.22	51.22
4.House	1.50	37.21	37.21
Total			54.42 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	35.01	35.01
2.Bar22	1.50	43.83	43.83
3.Open	1.50	44.10	44.10
4.House	1.50	32.42	32.42
Total			47.39 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.42
(NIGHT): 47.39

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:40:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r16unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

```
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
```

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

Data for Segment # 1: House (day/night)

```
Angle1   Angle2           : -90.00 deg   -6.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  45.50 / 45.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -6.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  30.00 / 30.00  m
Source elevation          :  89.86 m
Receiver elevation        :  89.18 m
Barrier elevation         :  90.44 m
Reference angle           :   0.00
```

Road data, segment # 2: Bar22 (day/night)

```
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
```

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Bar22 (day/night)
--------------------------------------
Angle1   Angle2           :  -6.00 deg   9.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  45.50 / 45.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Open (day/night)
---------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Open (day/night)
--------------------------------------
Angle1   Angle2           :   9.00 deg   62.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  45.50 / 45.50  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

Road data, segment # 4: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 4: House (day/night)

Angle1 Angle2	:	62.00 deg	90.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0 / 0	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	45.50 / 45.50	m
Receiver height	:	1.50 / 4.50	m
Topography	:	2	(Flat/gentle slope; with barrier)
Barrier angle1	:	62.00 deg	Angle2 : 90.00 deg
Barrier height	:	6.00 m	
Barrier receiver distance	:	30.30 / 30.30	m
Source elevation	:	89.86 m	
Receiver elevation	:	89.18 m	
Barrier elevation	:	89.35 m	
Reference angle	:	0.00	

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	39.18	39.18
2.Bar22	1.50	45.15	45.15
3.Open	1.50	49.93	49.93
4.House	1.50	37.57	37.57
Total			51.62 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	33.66	33.66
2.Bar22	1.50	38.00	38.00
3.Open	1.50	42.87	42.87
4.House	1.50	32.34	32.34
Total			44.73 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.62
(NIGHT): 44.73

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:21:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r17unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -25.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	87.05 / 87.05 m
Receiver height	:	1.50 / 4.50 m
Topography	:	4 (Elevated; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -25.00 deg
Barrier height	:	6.00 m
Elevation	:	3.54 m
Barrier receiver distance	:	70.30 / 70.30 m
Source elevation	:	89.68 m
Receiver elevation	:	89.35 m
Barrier elevation	:	89.44 m
Reference angle	:	0.00

Road data, segment # 2: Open (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -25.00 deg   18.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  87.05 / 87.05  m
Receiver height           :   1.50 / 4.50   m
Topography                :      3       (Elevated; no barrier)
Elevation                 :   3.54 m
Reference angle           :   0.00


Road data, segment # 3: House (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: House (day/night)
---------------------------------------
Angle1   Angle2           :  18.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  87.05 / 87.05  m
Receiver height           :   1.50 / 4.50   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            :  18.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Elevation                 :   3.54 m
Barrier receiver distance :  69.20 / 69.20  m
Source elevation          :  89.68 m
Receiver elevation        :  89.35 m
```

Barrier elevation : 90.31 m
Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	38.18	38.18
2.Open	1.50	45.81	45.81
3.House	1.50	37.45	37.45
Total			47.01 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	32.44	32.44
2.Open	1.50	38.91	38.91
3.House	1.50	31.63	31.63
Total			40.41 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 47.01
(NIGHT): 40.41

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:21:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r18unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -43.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	19.90 / 19.90 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -43.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	3.20 / 3.20 m
Source elevation	:	89.46 m
Receiver elevation	:	89.32 m
Barrier elevation	:	89.44 m
Reference angle	:	0.00

Road data, segment # 2: Open (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -43.00 deg   88.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  19.90 / 19.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: House (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: House (day/night)
---------------------------------------
Angle1   Angle2           :  88.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  19.90 / 19.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  88.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   1.80 / 1.80   m
Source elevation          :  89.46 m
Receiver elevation        :  89.32 m
Barrier elevation         :  90.31 m
```

Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	39.88	39.88
2.Open	1.50	59.56	59.56
3.House	1.50	29.48	29.48
Total			59.61 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	37.01	37.01
2.Open	1.50	52.18	52.18
3.House	1.50	25.06	25.06
Total			52.32 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.61
(NIGHT): 52.32

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:13:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r19unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -3.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	38.10 / 38.10 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -3.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	21.40 / 21.40 m
Source elevation	:	89.46 m
Receiver elevation	:	89.41 m
Barrier elevation	:	89.44 m
Reference angle	:	0.00

Road data, segment # 2: Bar22 (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Bar22 (day/night)
---------------------------------------
Angle1   Angle2           :  -3.00 deg   24.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  38.10 / 38.10  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Open (day/night)
---------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Open (day/night)
---------------------------------------
Angle1   Angle2           :  24.00 deg   70.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  38.10 / 38.10  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

Road data, segment # 4: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 4: House (day/night)

Angle1 Angle2	:	70.00 deg	90.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0 / 0	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	38.10 / 38.10	m
Receiver height	:	1.50 / 4.50	m
Topography	:	2	(Flat/gentle slope; with barrier)
Barrier angle1	:	70.00 deg	Angle2 : 90.00 deg
Barrier height	:	6.00 m	
Barrier receiver distance	:	19.80 / 19.80	m
Source elevation	:	89.46 m	
Receiver elevation	:	89.41 m	
Barrier elevation	:	90.31 m	
Reference angle	:	0.00	

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	41.06	41.06
2.Bar22	1.50	48.92	48.92
3.Open	1.50	50.10	50.10
4.House	1.50	36.13	36.13
Total			52.95 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	36.23	36.23
2.Bar22	1.50	41.70	41.70
3.Open	1.50	43.03	43.03
4.House	1.50	31.21	31.21
Total			46.06 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.95
(NIGHT): 46.06

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:14:48
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r20unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -5.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	50.20 / 50.20 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -5.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	33.50 / 33.50 m
Source elevation	:	89.46 m
Receiver elevation	:	89.47 m
Barrier elevation	:	89.44 m
Reference angle	:	0.00

Road data, segment # 2: Bar22 (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Bar22 (day/night)
---------------------------------------
Angle1   Angle2           :  -5.00 deg   10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.20 / 50.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Open (day/night)
---------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Open (day/night)
---------------------------------------
Angle1   Angle2           :  10.00 deg   58.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.20 / 50.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 4: House (day/night)
---------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
```

```
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: House (day/night)
---------------------------------------
Angle1   Angle2           :  58.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.20 / 50.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  58.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  32.60 / 32.60  m
Source elevation          :  89.46 m
Receiver elevation        :  89.47 m
Barrier elevation         :  90.31 m
Reference angle           :   0.00


Result summary (day)
--------------------

                   !  source  !   Road   !  Total
                   !  height  !   Leq    !   Leq
                   !    (m)   !  (dBA)   !  (dBA)
-------------------+---------+---------+---------
 1.House           !     1.50 !    40.03 !    40.03
 2.Bar22           !     1.50 !    44.44 !    44.44
 3.Open            !     1.50 !    48.87 !    48.87
 4.House           !     1.50 !    36.45 !    36.45
-------------------+---------+---------+---------
                     Total                  50.77 dBA
```

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	34.72	34.72
2.Bar22	1.50	37.32	37.32
3.Open	1.50	41.83	41.83
4.House	1.50	31.10	31.10
Total			43.96 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.77
(NIGHT): 43.96

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:22:11
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r21unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -87.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	18.60 / 18.60 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -87.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	3.00 / 3.00 m
Source elevation	:	89.46 m
Receiver elevation	:	89.17 m
Barrier elevation	:	90.44 m
Reference angle	:	0.00

Road data, segment # 2: Open (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -87.00 deg   43.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  18.60 / 18.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: House (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: House (day/night)
---------------------------------------
Angle1   Angle2           :  43.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  18.60 / 18.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  43.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   3.20 / 3.20   m
Source elevation          :  89.46 m
Receiver elevation        :  89.17 m
Barrier elevation         :  89.35 m
```

Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	31.46	31.46
2.Open	1.50	60.04	60.04
3.House	1.50	40.19	40.19
Total			60.09 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	27.04	27.04
2.Open	1.50	52.64	52.64
3.House	1.50	37.15	37.15
Total			52.77 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.09
(NIGHT): 52.77

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:15:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r22unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2	:	-90.00 deg -70.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	36.80 / 36.80 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -70.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	21.30 / 21.30 m
Source elevation	:	89.46 m
Receiver elevation	:	88.87 m
Barrier elevation	:	90.44 m
Reference angle	:	0.00

Road data, segment # 2: Open (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -70.00 deg   -23.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  36.80 / 36.80  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Bar22 (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Bar22 (day/night)
---------------------------------------
Angle1   Angle2           : -23.00 deg   4.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  36.80 / 36.80  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

Road data, segment # 4: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 4: House (day/night)

Angle1 Angle2	:	4.00 deg 90.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	36.80 / 36.80 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	4.00 deg Angle2 : 90.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	21.40 / 21.40 m
Source elevation	:	89.46 m
Receiver elevation	:	88.87 m
Barrier elevation	:	89.35 m
Reference angle	:	0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	35.82	35.82
2.Open	1.50	50.47	50.47
3.Bar22	1.50	49.18	49.18
4.House	1.50	40.89	40.89
Total			53.23 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	30.65	30.65
2.Open	1.50	43.38	43.38
3.Bar22	1.50	41.95	41.95
4.House	1.50	35.89	35.89
Total			46.28 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 53.23
(NIGHT): 46.28

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 14:16:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r23unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: House (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: House (day/night)

Angle1 Angle2 : -90.00 deg -60.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 48.90 / 48.90 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -60.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 33.10 / 33.10 m
Source elevation : 89.46 m
Receiver elevation : 88.87 m
Barrier elevation : 90.44 m
Reference angle : 0.00

Road data, segment # 2: Open (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Open (day/night)
--------------------------------------
Angle1   Angle2           : -60.00 deg   -11.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.90 / 48.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: Bar22 (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Bar22 (day/night)
--------------------------------------
Angle1   Angle2           : -11.00 deg   5.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.90 / 48.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

Road data, segment # 4: House (day/night)

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 4: House (day/night)

Angle1 Angle2	:	5.00 deg	90.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0 / 0	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	48.90 / 48.90	m
Receiver height	:	1.50 / 4.50	m
Topography	:	2	(Flat/gentle slope; with barrier)
Barrier angle1	:	5.00 deg	Angle2 : 90.00 deg
Barrier height	:	6.00 m	
Barrier receiver distance	:	33.50 / 33.50	m
Source elevation	:	89.46 m	
Receiver elevation	:	88.87 m	
Barrier elevation	:	89.35 m	
Reference angle	:	0.00	

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	35.89	35.89
2.Open	1.50	49.09	49.09
3.Bar22	1.50	44.91	44.91
4.House	1.50	39.87	39.87
Total			50.99 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.House	1.50	30.42	30.42
2.Open	1.50	42.05	42.05
3.Bar22	1.50	37.78	37.78
4.House	1.50	34.43	34.43
Total			44.13 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.99
(NIGHT): 44.13

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:29:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r24unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Street 1 (day/night)

Car traffic volume	:	6477/563 veh/TimePeriod	*
Medium truck volume	:	515/45 veh/TimePeriod	*
Heavy truck volume	:	368/32 veh/TimePeriod	*
Posted speed limit	:	40 km/h	
Road gradient	:	2 %	
Road pavement	:	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: Street 1 (day/night)

Angle1 Angle2	:	-90.00 deg	90.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0 / 0	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	15.20 / 15.20	m
Receiver height	:	1.50 / 4.50	m
Topography	:	1	(Flat/gentle slope; no barrier)
Reference angle	:	0.00	

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Street 1	1.50	62.40	62.40
Total			62.40 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Street 1	1.50	54.97	54.97
Total			54.97 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.40
(NIGHT): 54.97

STAMSON 5.0 SUMMARY REPORT Date: 04-02-2019 13:32:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r25unmit.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Street 12 (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Street 12 (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 17.60 / 17.60 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Street 10 (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Street 10 (day/night)

Angle1 Angle2	:	-90.00 deg	90.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0 / 0	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	19.60 / 19.60	m
Receiver height	:	1.50 / 4.50	m
Topography	:	1	(Flat/gentle slope; no barrier)
Reference angle	:	0.00	

Result summary (day)

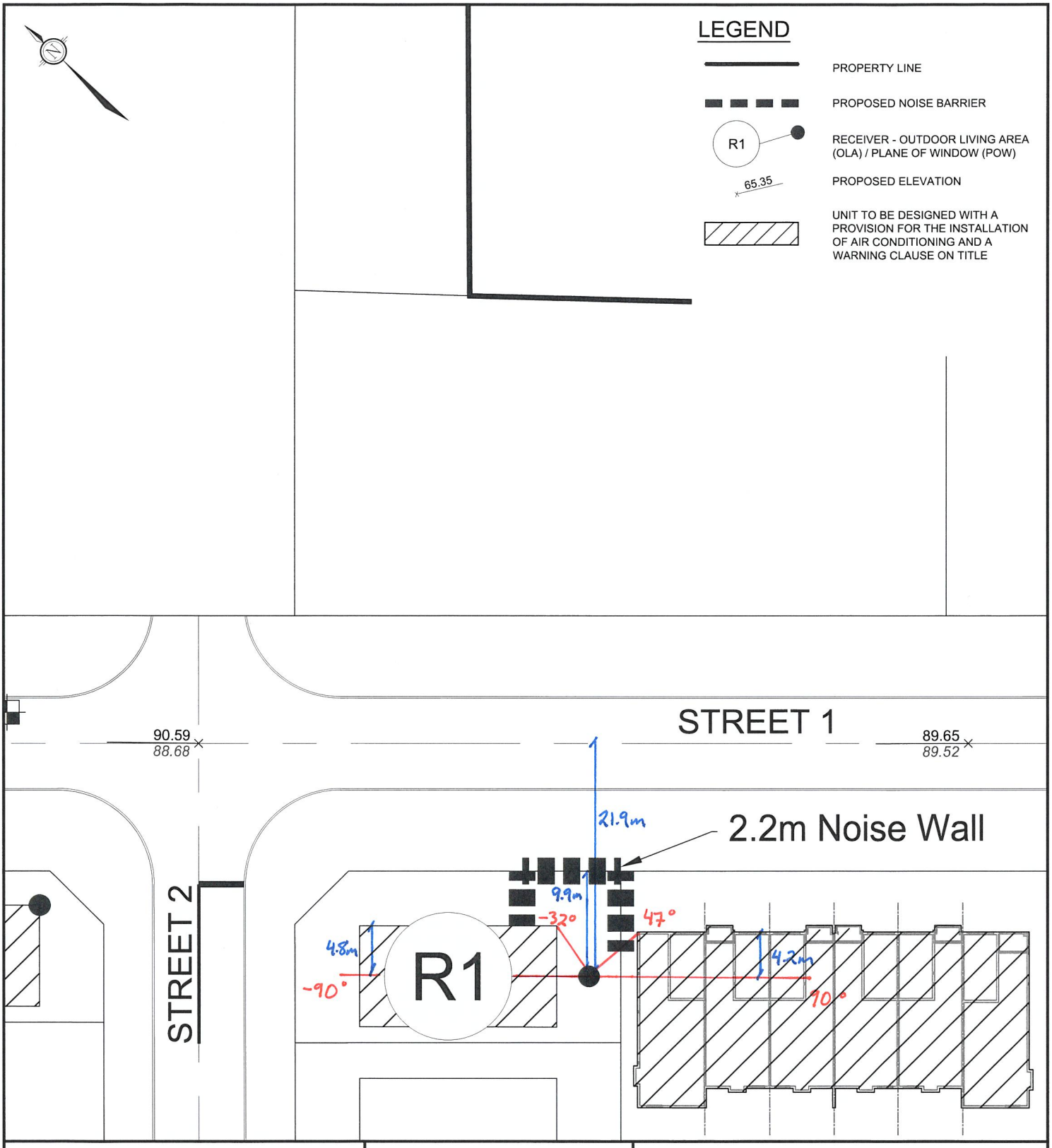
	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Street 12	1.50	61.35	61.35
2.Street 10	1.50	60.57	60.57
Total			63.99 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Street 12	1.50	53.97	53.97
2.Street 10	1.50	53.24	53.24
Total			56.63 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.99
(NIGHT): 56.63

Part 3 – Stamson Modelling Angles (Appendix B)



NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CU DEVELOPMENTS INC. (KNUEA)

RECEIVER ANGLES, R1

SCALE 1 : 500 (0, 5, 10, 15, 20)

DATE FEB 2019 | JOB 116132 | FIGURE R1

SHT8X11.DWG - 216mmx279mm

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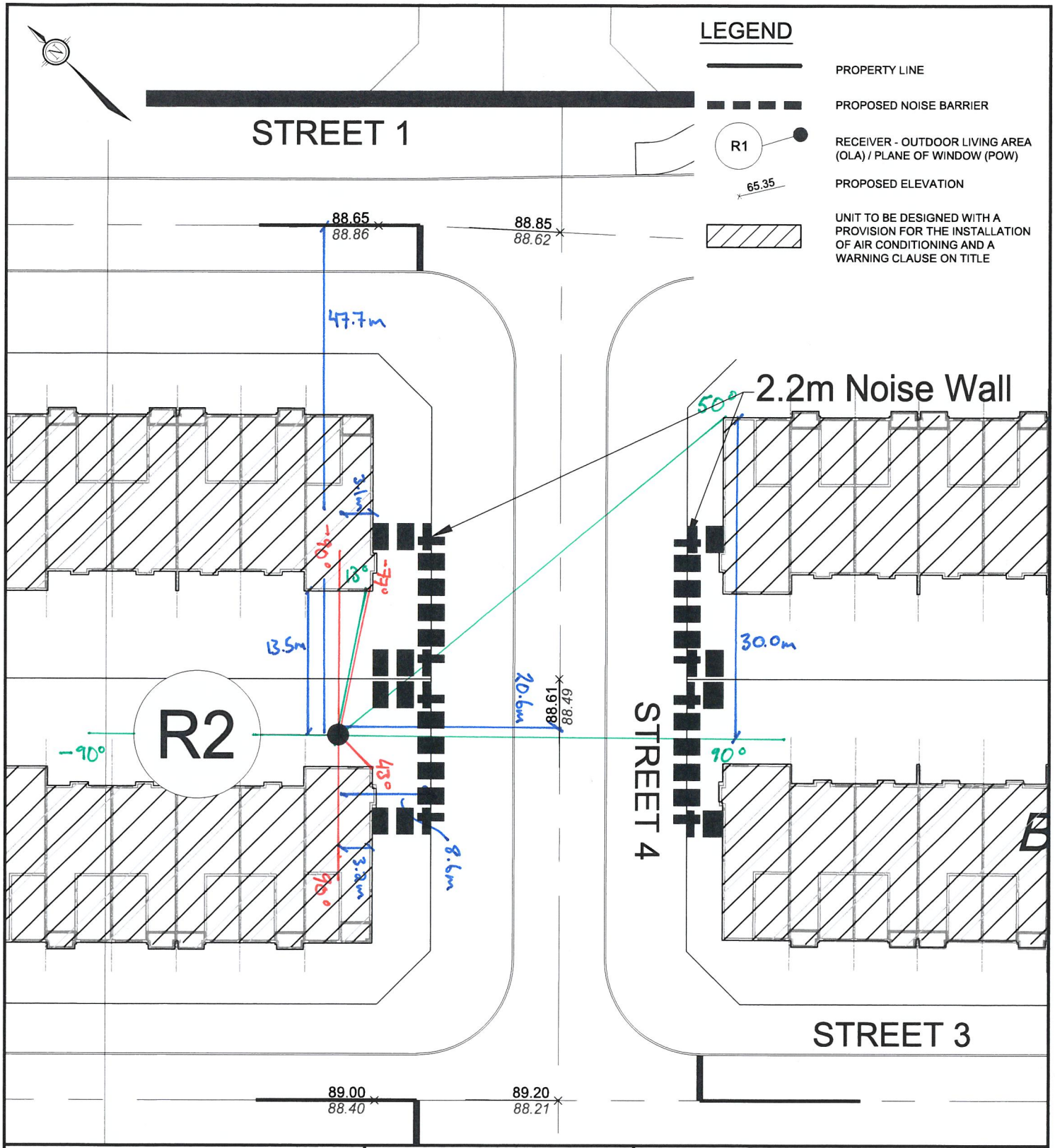

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- Street 4 Angles
- Street 1 Angles

CU DEVELOPMENTS INC. (KNUEA)

RECEIVER ANGLES, R2

SCALE 1 : 500 (0 5 10 15 20)

DATE	JOB	FIGURE
FEB 2019	116132	R2

M:\2016\116132\CAD\Design\Figures\Noise\20190204116132-NoiseAngles.dwg, R2, Feb 05, 2019 - 3:10pm, szorgel

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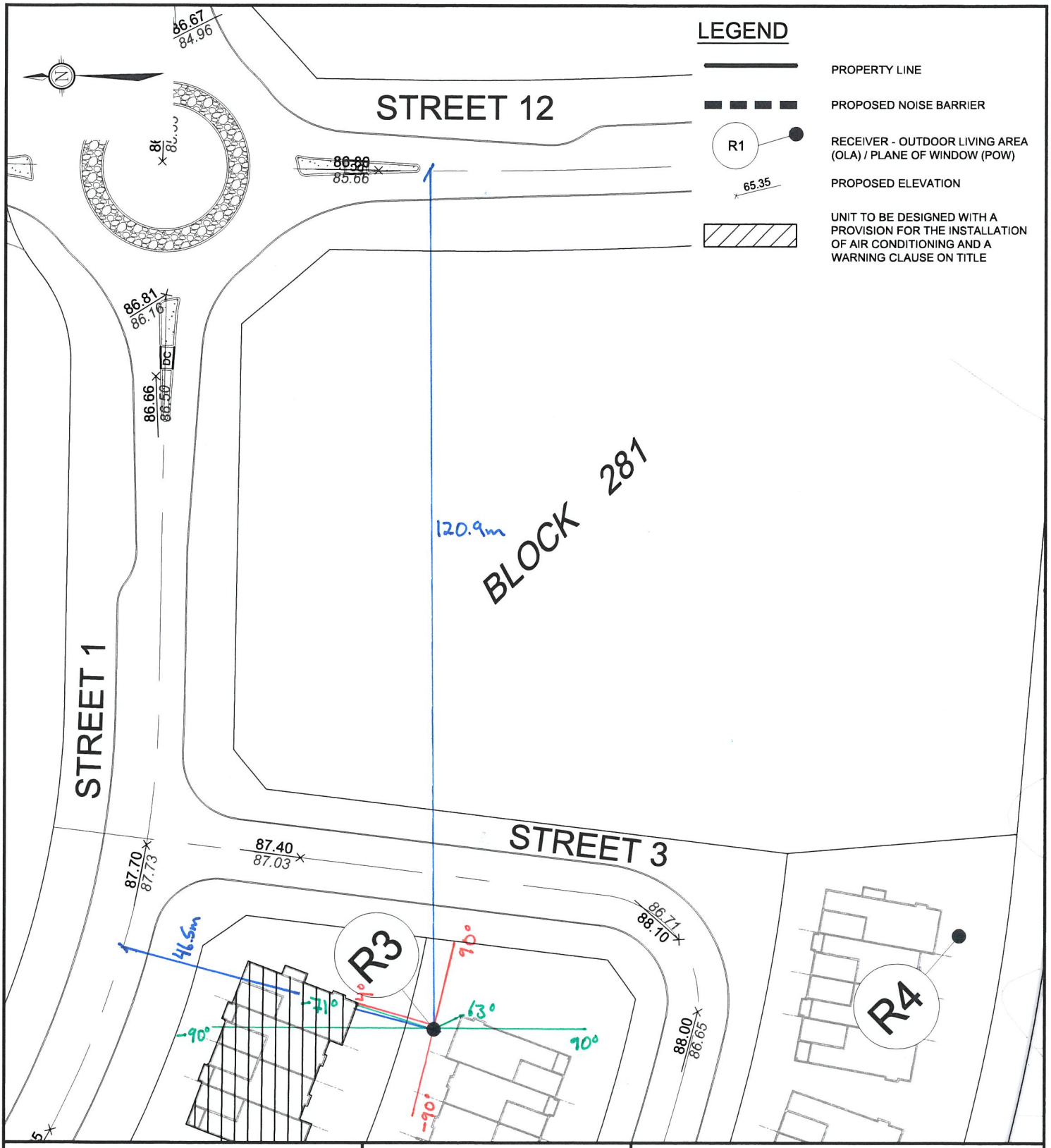

- Street 1 Angles
- Street 12 Angles

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

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Website www.novatech-eng.com

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RECEIVER ANGLES, R3

SCALE 1 : 750 (0, 6, 12, 18, 24, 30)

DATE	JOB	FIGURE
FEB 2019	116132	R3

SHT8X11.DWG - 216mmx279mm

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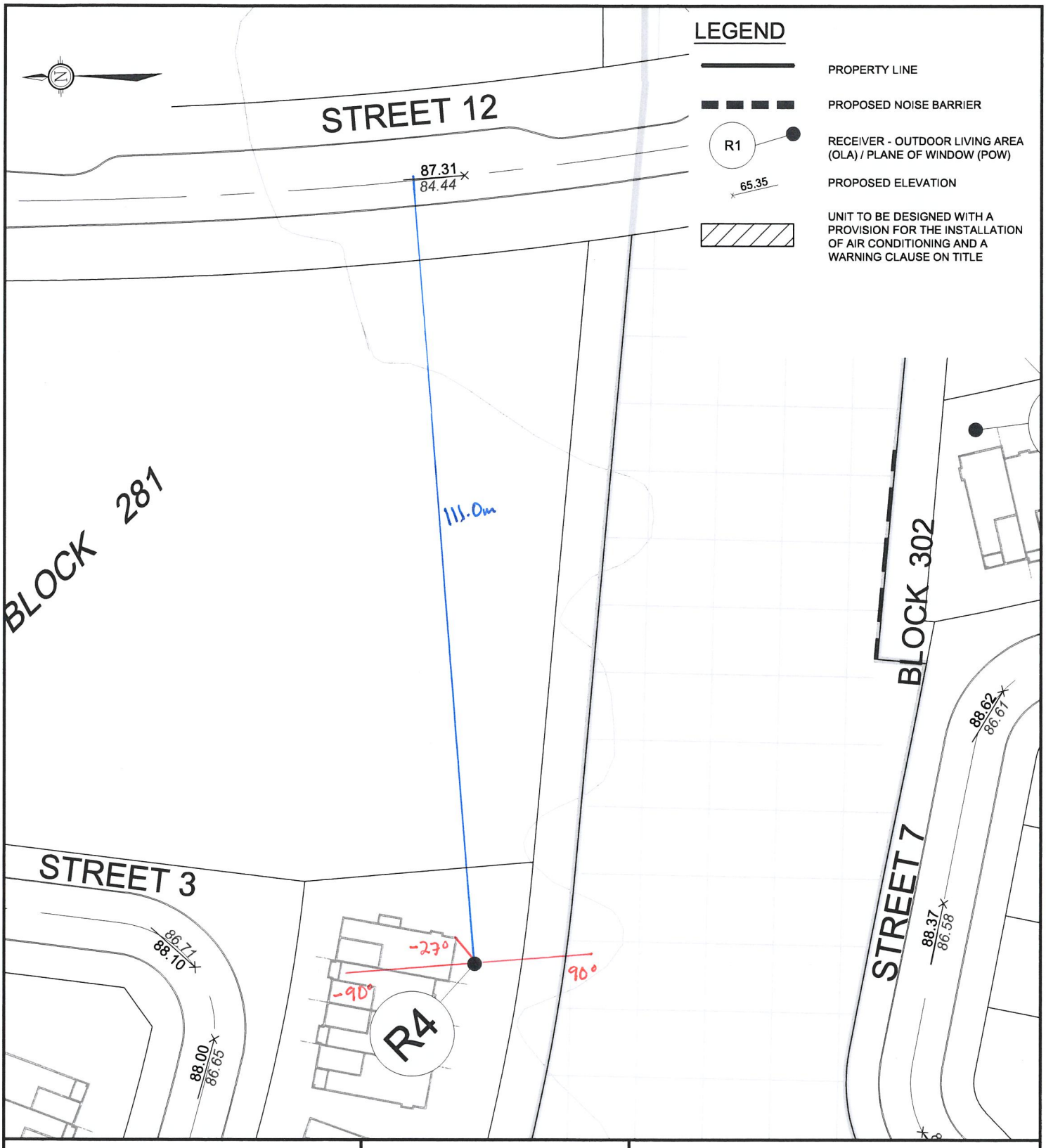

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
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RECEIVER ANGLES, R4

SCALE 1 : 750 (0, 6, 12, 18, 24, 30)

DATE FEB 2019 | JOB 116132 | FIGURE R4

SHT8X11.DWG - 216mmx279mm

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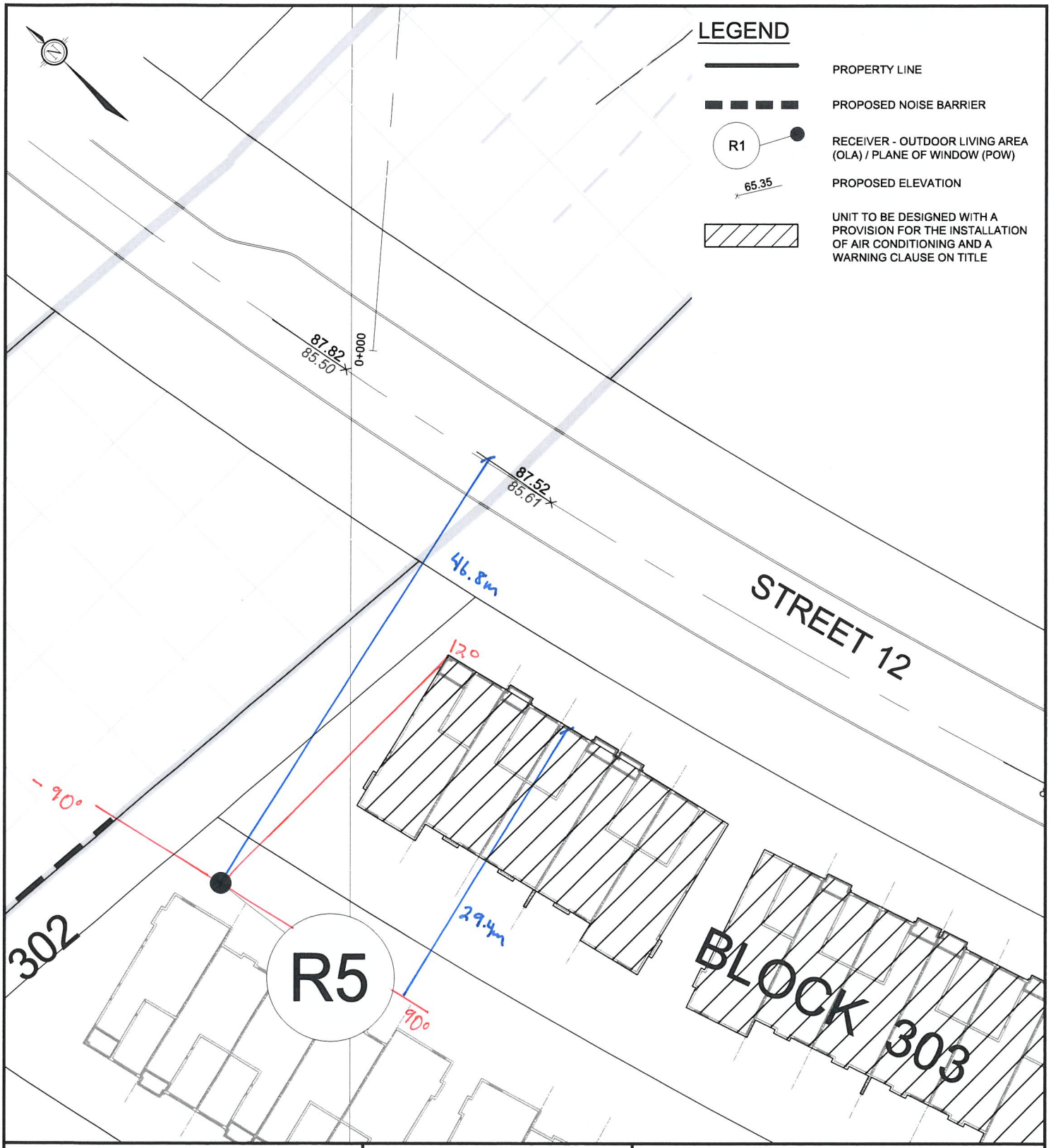

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CU DEVELOPMENTS INC.
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RECEIVER ANGLES, R5

SCALE 1 : 500 (0 5 10 15 20)

DATE	JOB	FIGURE
FEB 2019	116132	R5

SHT8X11.DWG - 216mmx279mm

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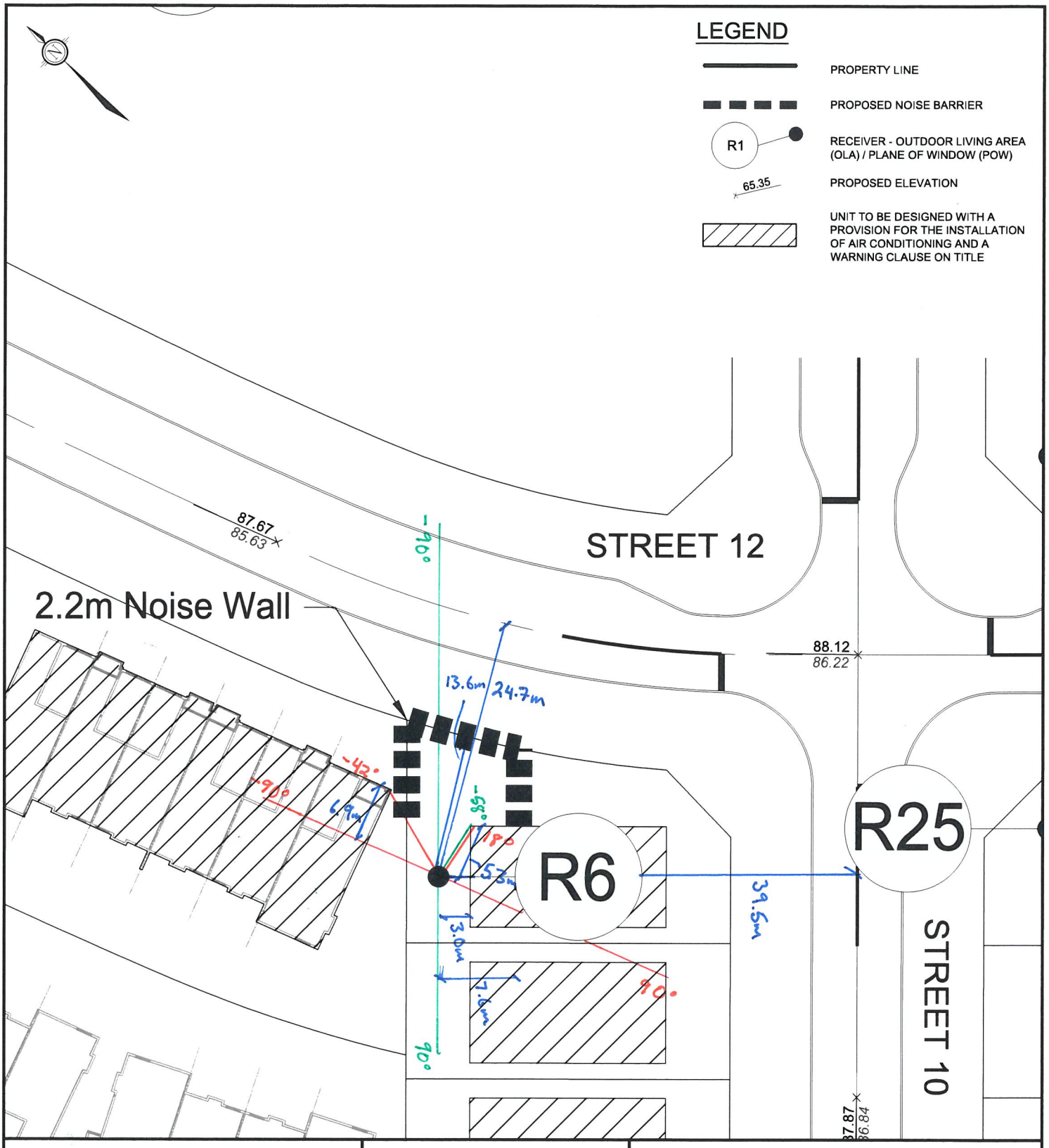

- Street 12 Angles
- Street 10 Angles

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

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RECEIVER ANGLES, R6

SCALE 1 : 500 (0 5 10 15 20)

DATE FEB 2019 | JOB 116132 | FIGURE R6

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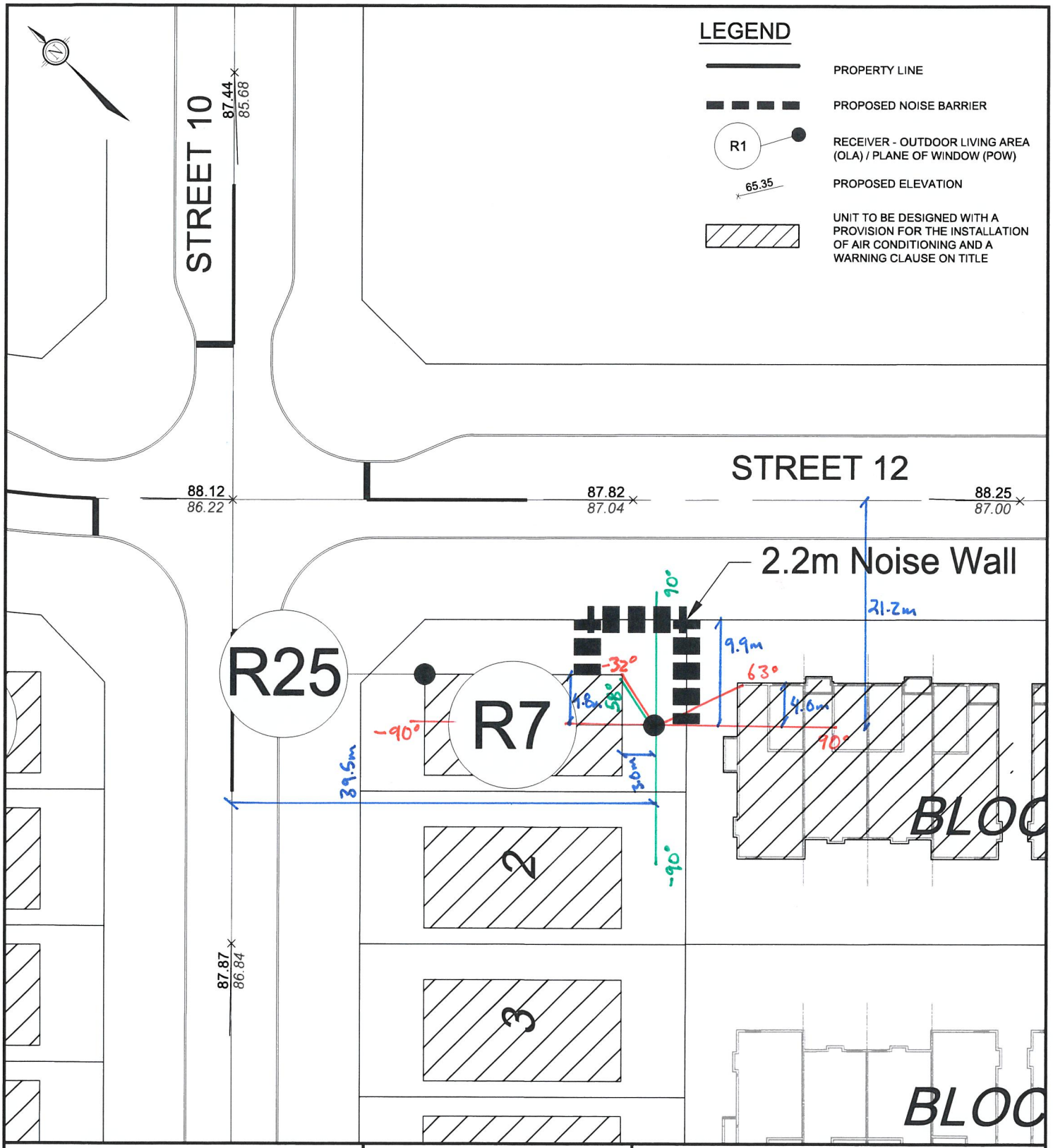

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
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- Street 10 Angles
- Street 12 Angles

CU DEVELOPMENTS INC. (KNUEA)

RECEIVER ANGLES, R7

SCALE 1 : 500 (0 5 10 15 20)

DATE	JOB	FIGURE
FEB 2019	116132	R7

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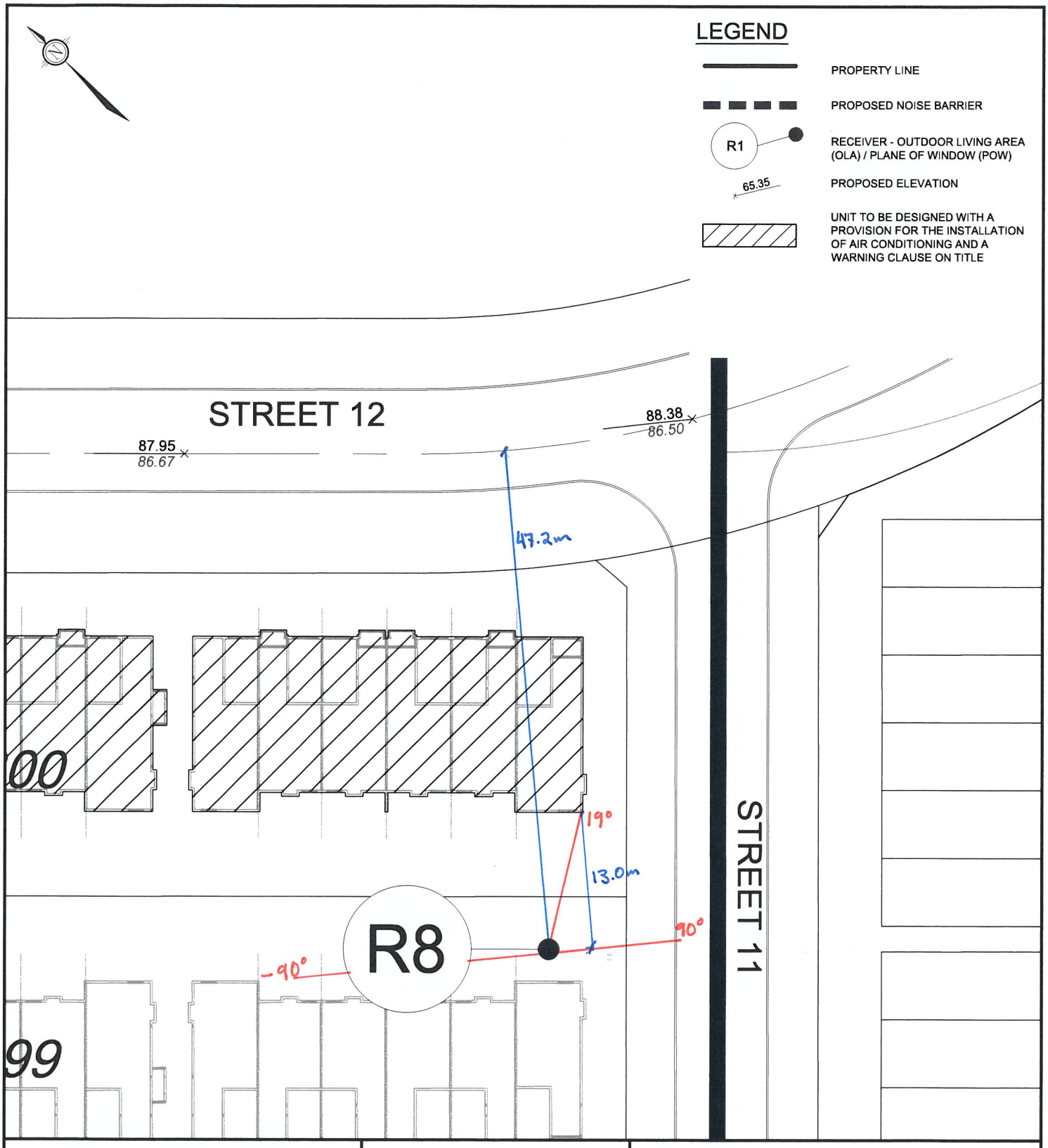

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
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CU DEVELOPMENTS INC. (KNUEA)

RECEIVER ANGLES, R8

SCALE 1 : 500 (0, 5, 10, 15, 20)

DATE	JOB	FIGURE
FEB 2019	116132	R8

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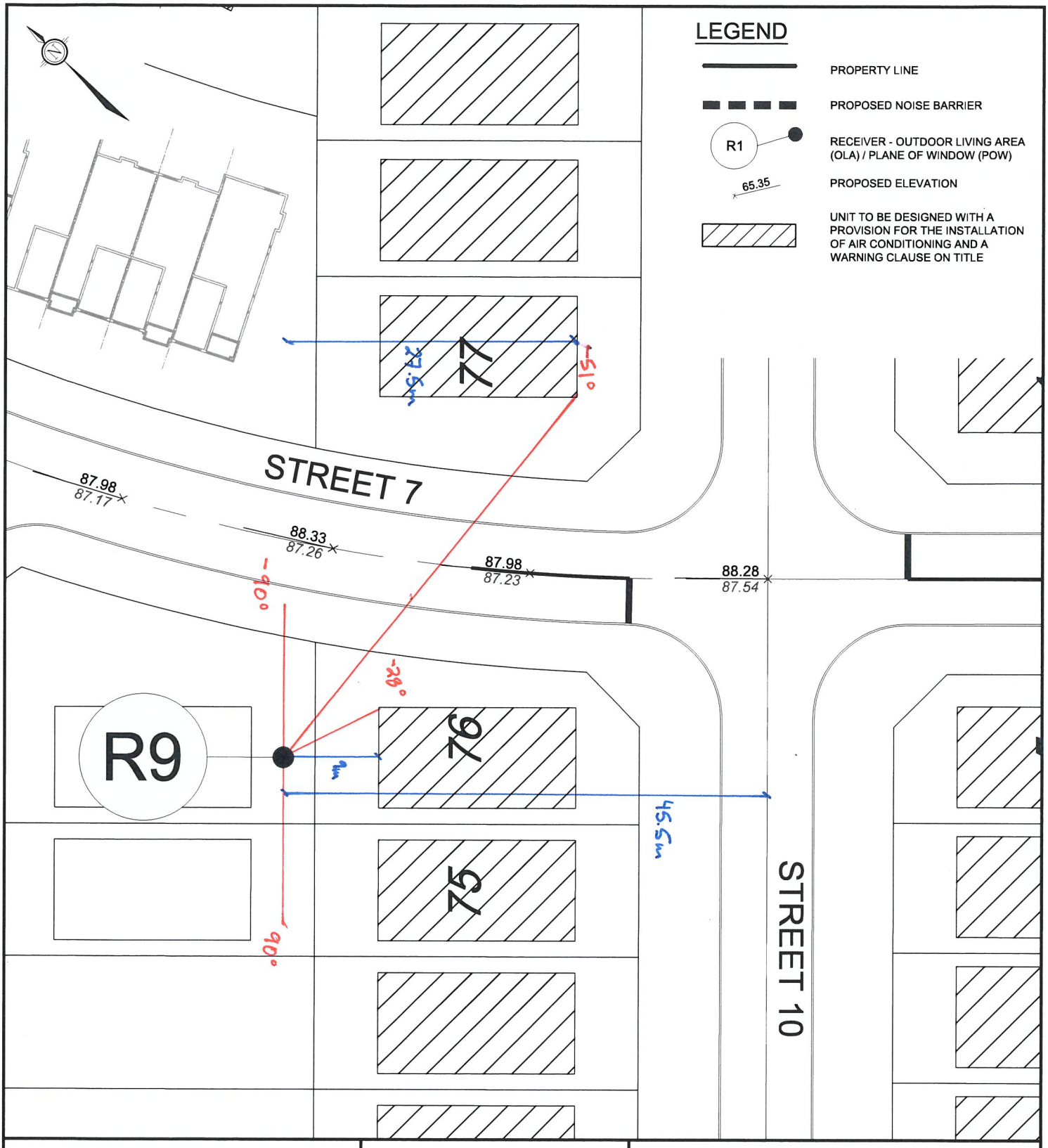

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
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CU DEVELOPMENTS INC. (KNUEA)

RECEIVER ANGLES, R9

SCALE 1 : 500 (0 5 10 15 20)

DATE FEB 2019 | JOB 116132 | FIGURE R9

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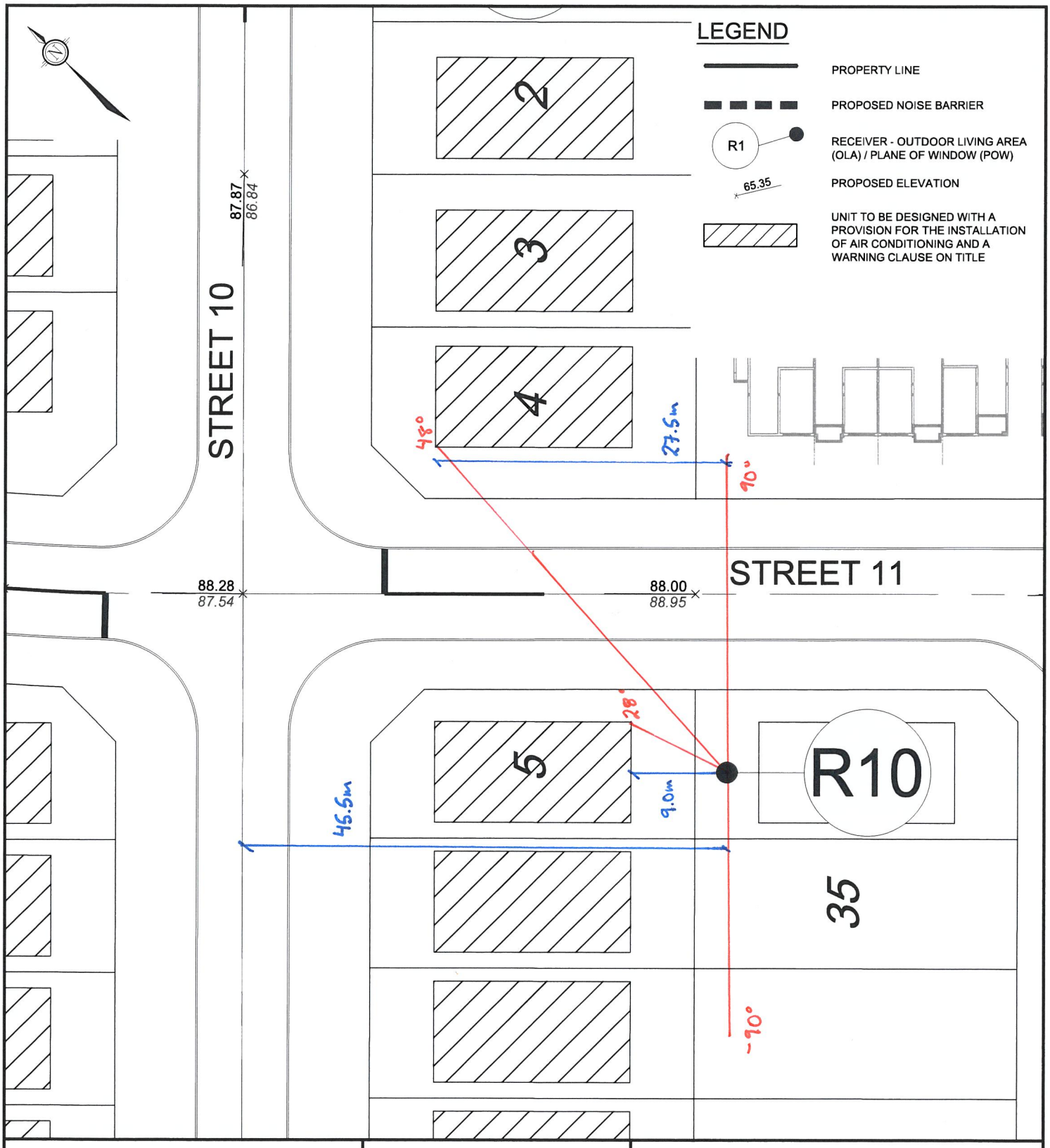

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
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RECEIVER ANGLES, R10

SCALE 1 : 500 (0 5 10 15 20)

DATE	JOB	FIGURE
FEB 2019	116132	R10

SHT8X11.DWG - 216mmx279mm

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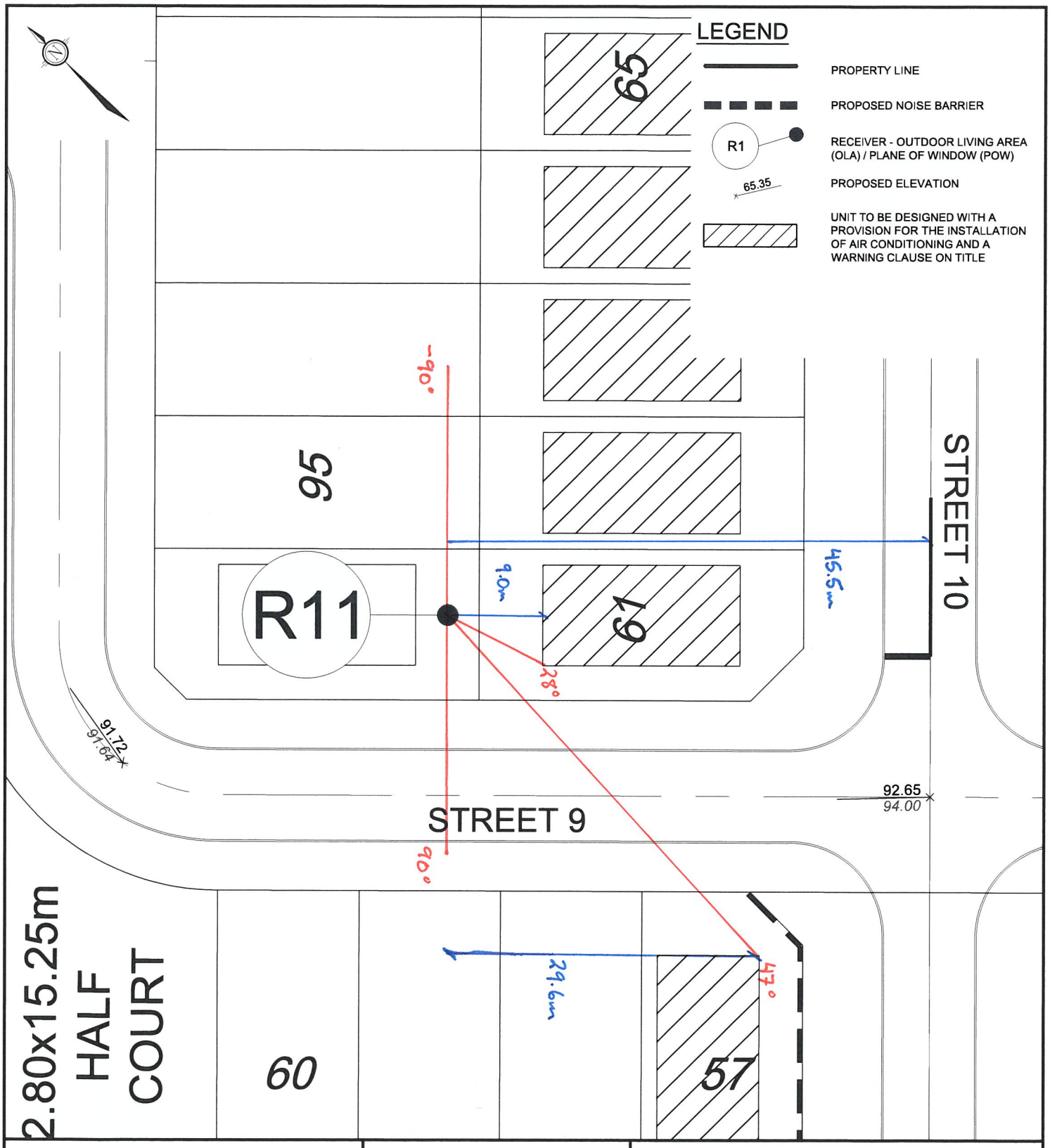

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Ottawa, Ontario, Canada K2M 1P6

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CU DEVELOPMENTS INC. (KNUEA)

RECEIVER ANGLES, R11

SCALE 1 : 500 (0 5 10 15 20)

DATE FEB 2019 | JOB 116132 | FIGURE R11

SHT8X11.DWG - 216mmx279mm

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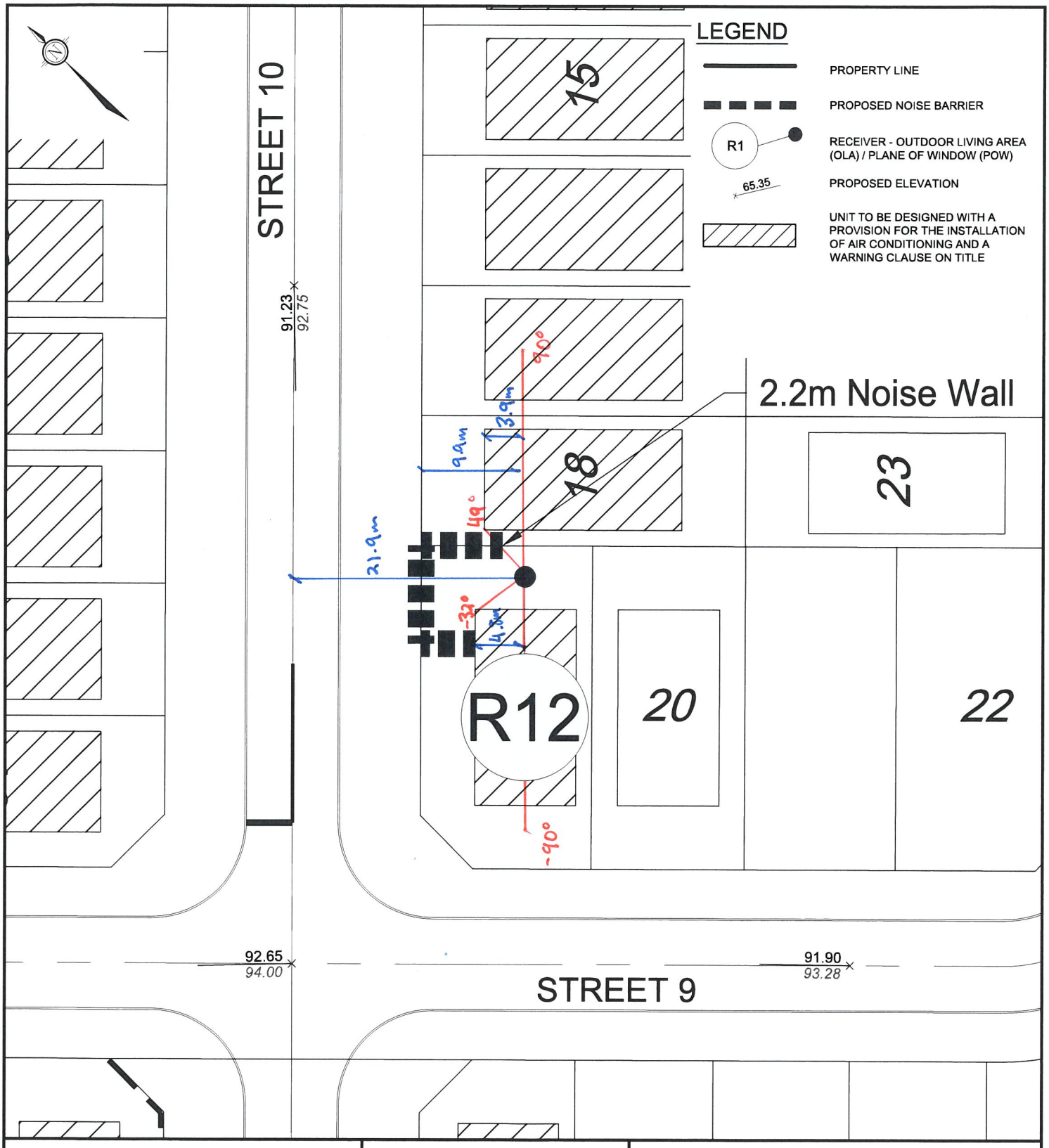

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Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
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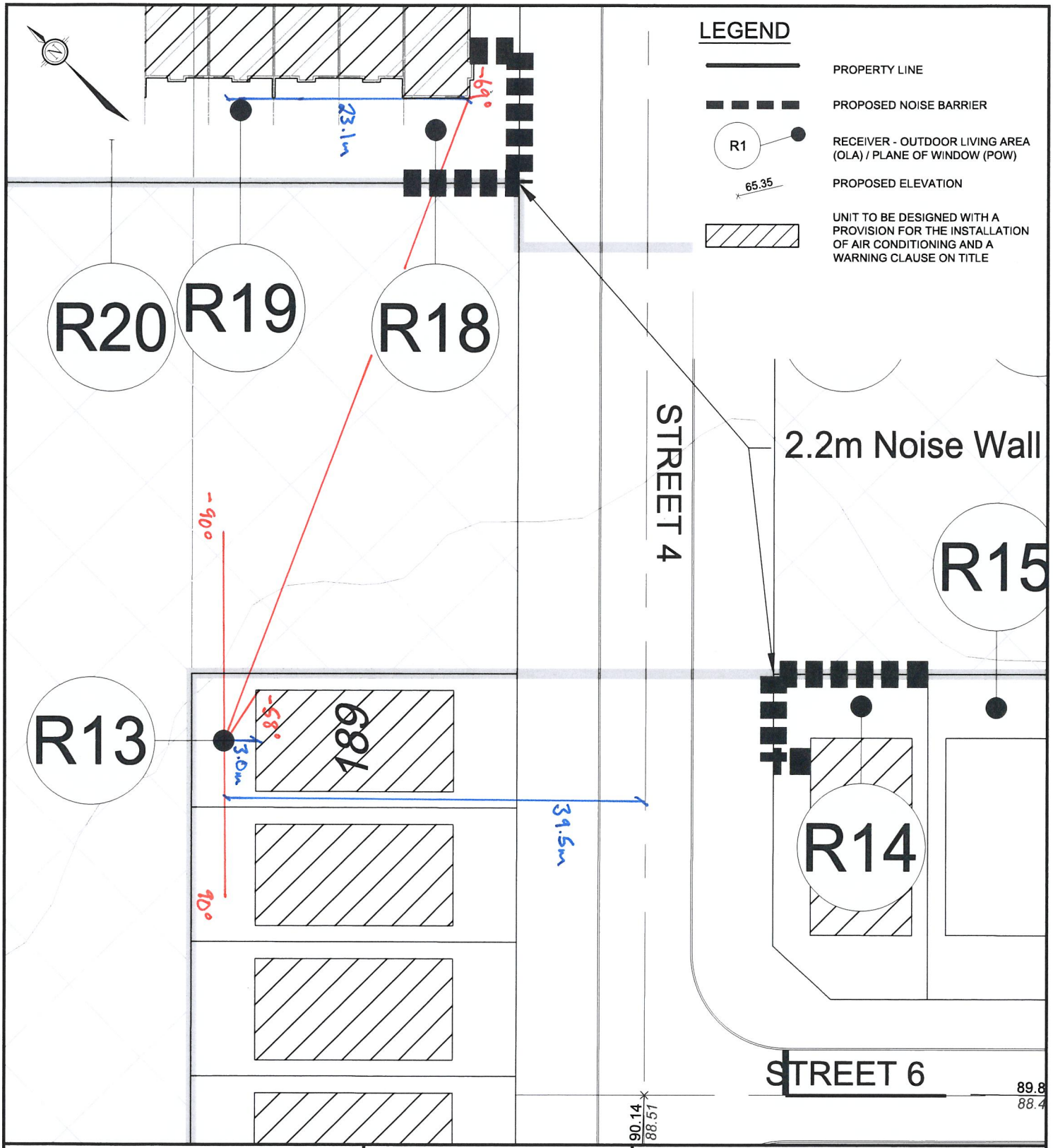
CU DEVELOPMENTS INC. (KNUEA)

RECEIVER ANGLES, R12

SCALE 1 : 500 (0 5 10 15 20)

DATE	JOB	FIGURE
FEB 2019	116132	R12

SHT8X11.DWG - 216mmx279mm



NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

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RECEIVER ANGLES, R13

SCALE 1 : 500 (0 5 10 15 20)

DATE FEB 2019 | JOB 116132 | FIGURE R13

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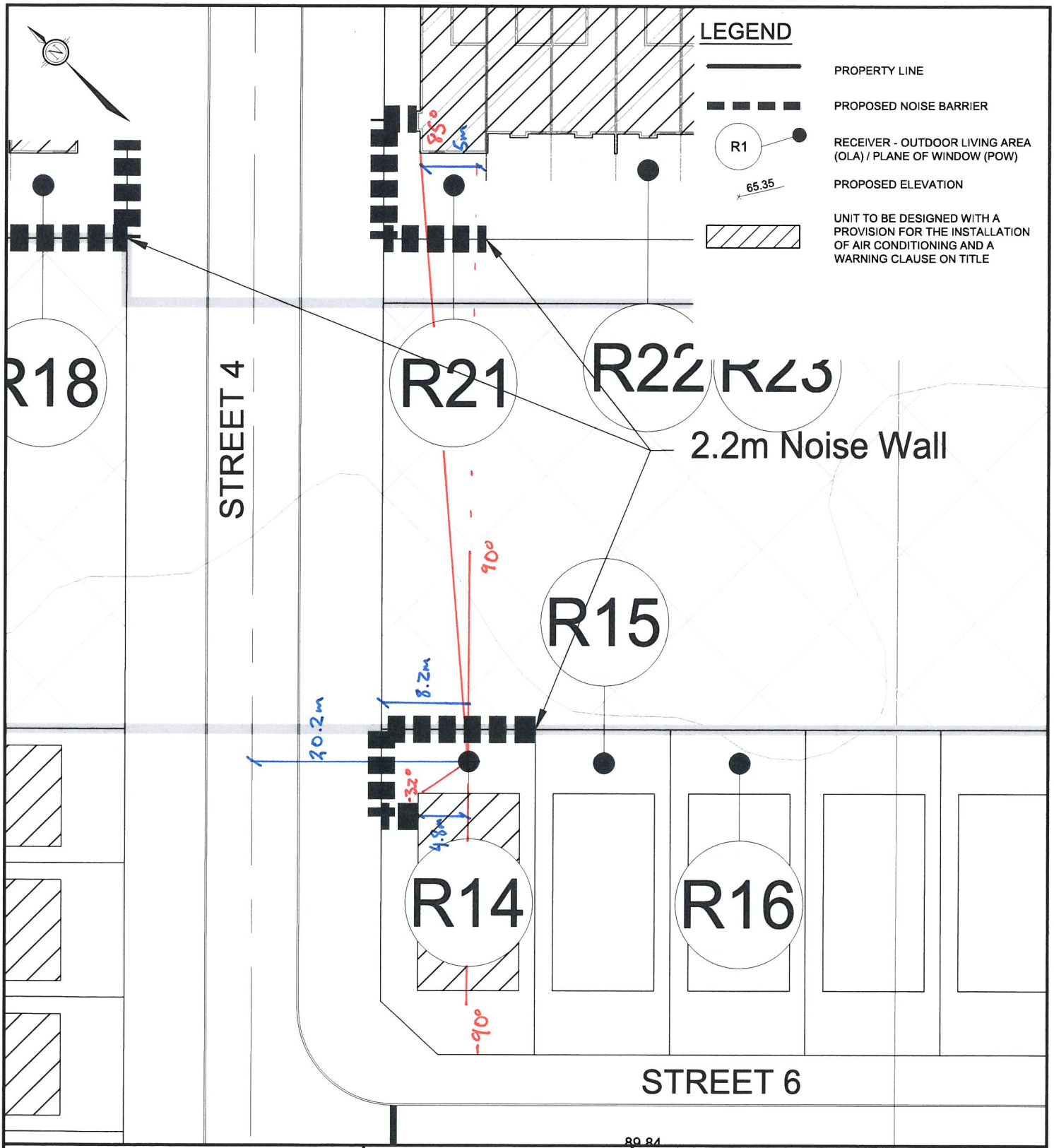

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

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CU DEVELOPMENTS INC.
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RECEIVER ANGLES, R14

SCALE 1 : 500 (0 5 10 15 20)

DATE	JOB	FIGURE
FEB 2019	116132	R14

SHT8X11.DWG - 216mmx279mm

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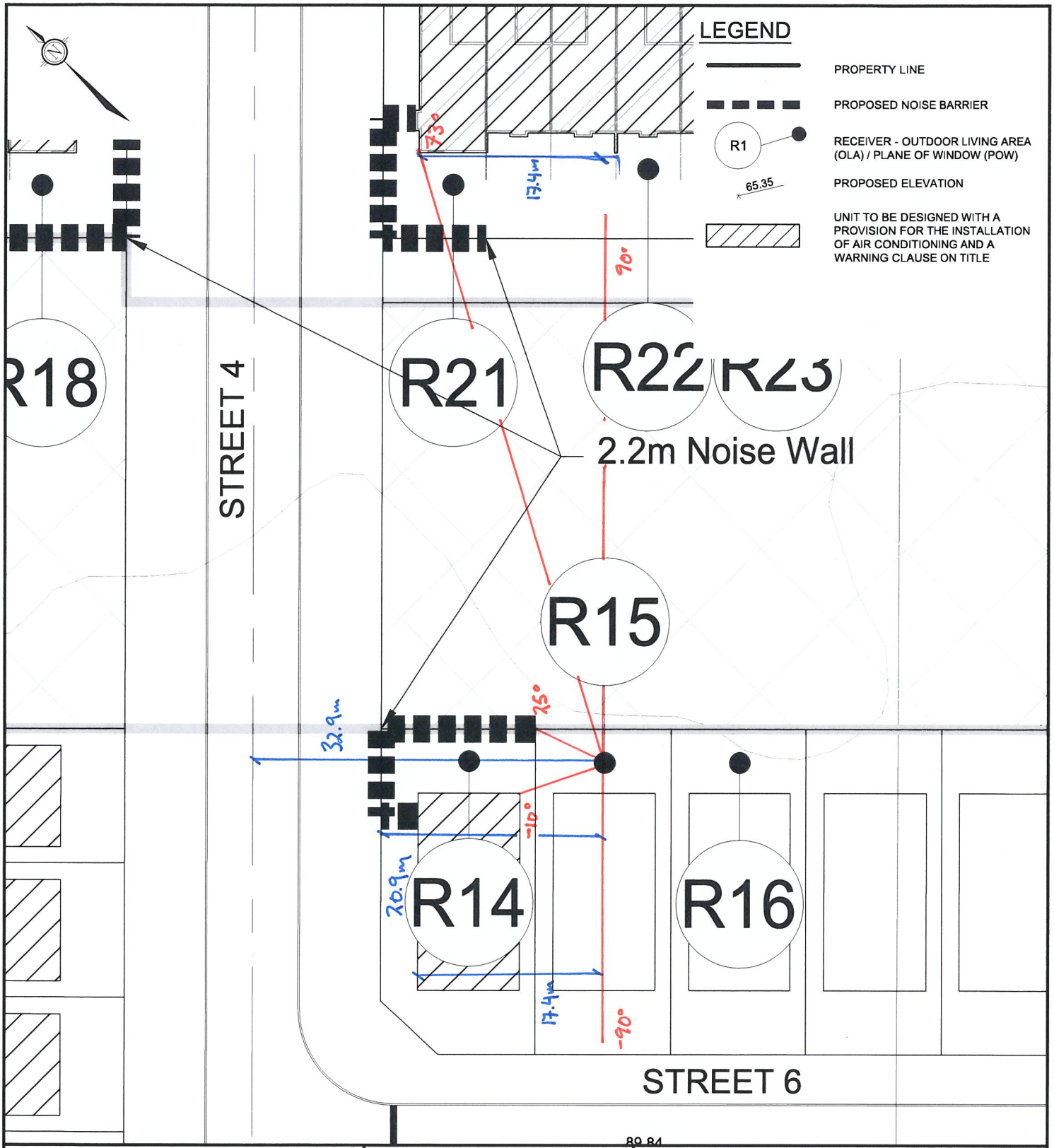

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
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RECEIVER ANGLES, R15

SCALE 1 : 500 (0 5 10 15 20)

DATE FEB 2019 | JOB 116132 | FIGURE R15

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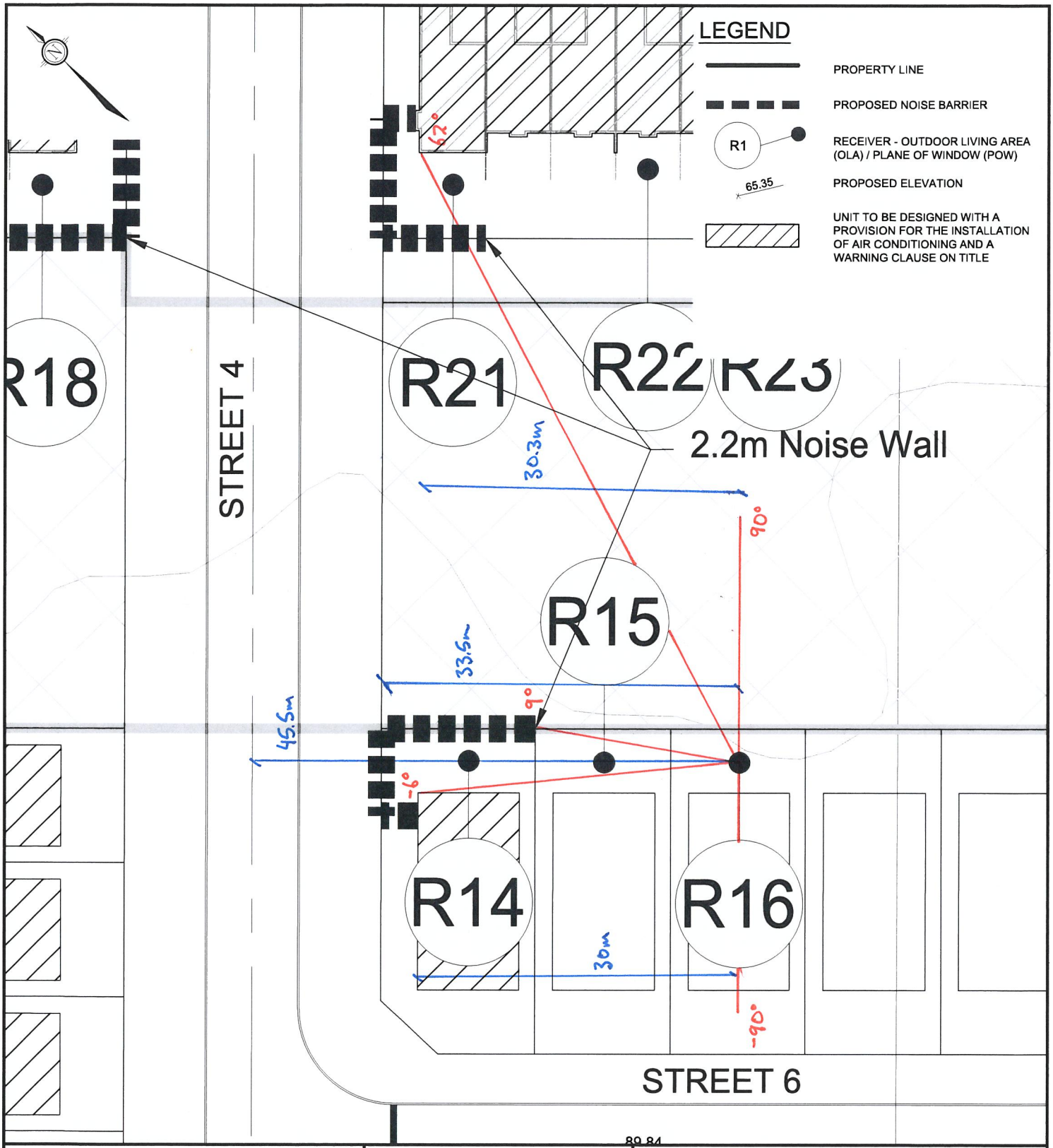
SHT8X11.DWG - 216mmx279mm



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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
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Facsimile (613) 254-5867
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CU DEVELOPMENTS INC.
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RECEIVER ANGLES, R16

SCALE 1 : 500 (0 5 10 15 20)

DATE	JOB	FIGURE
FEB 2019	116132	R16

SHT8X11.DWG - 216mmx279mm

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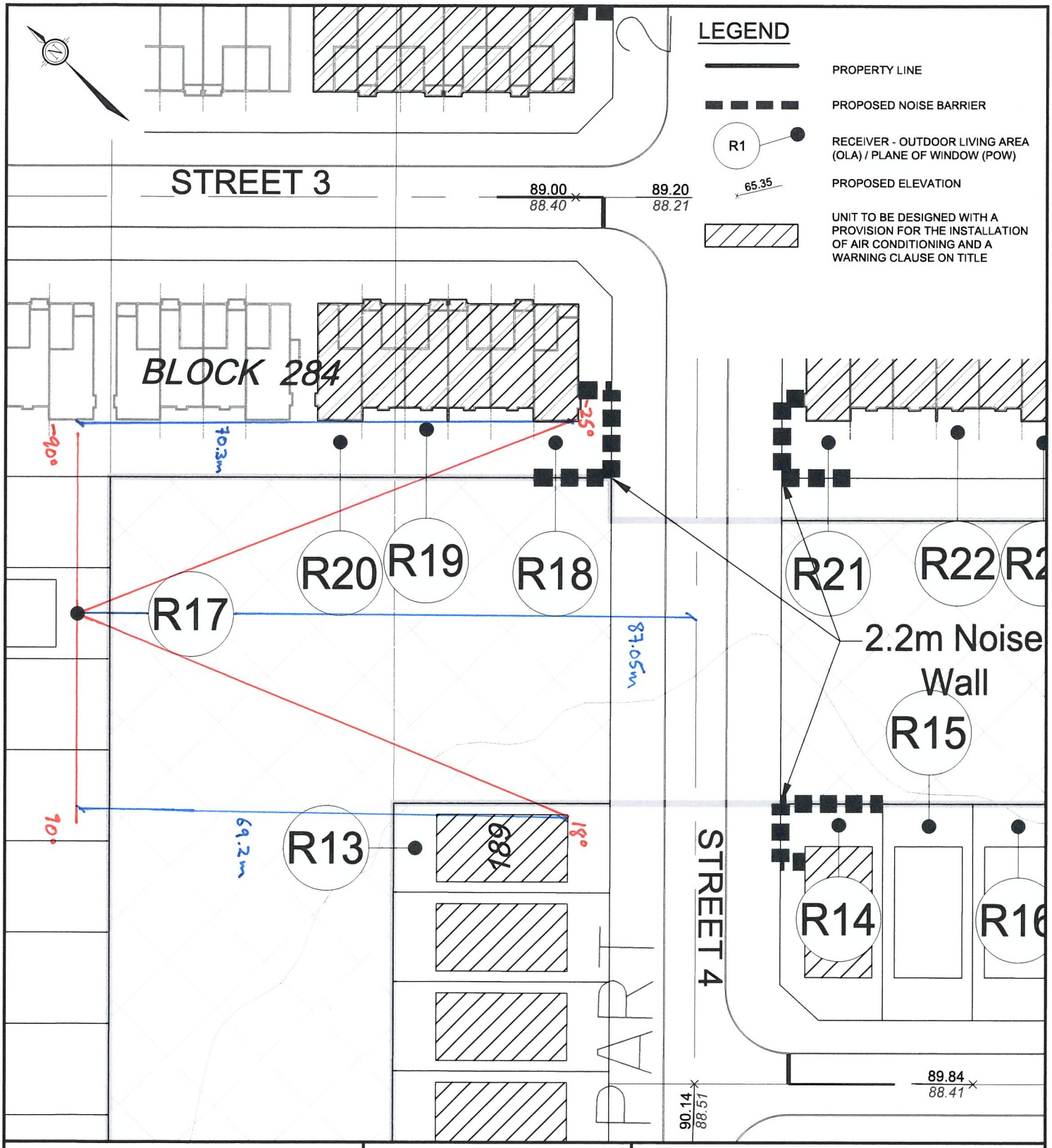

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

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CU DEVELOPMENTS INC.
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RECEIVER ANGLES, R17

SCALE 1 : 750 (0, 6, 12, 18, 24, 30)

DATE FEB 2019 | JOB 116132 | FIGURE R17

SHT8X11.DWG - 216mmx279mm

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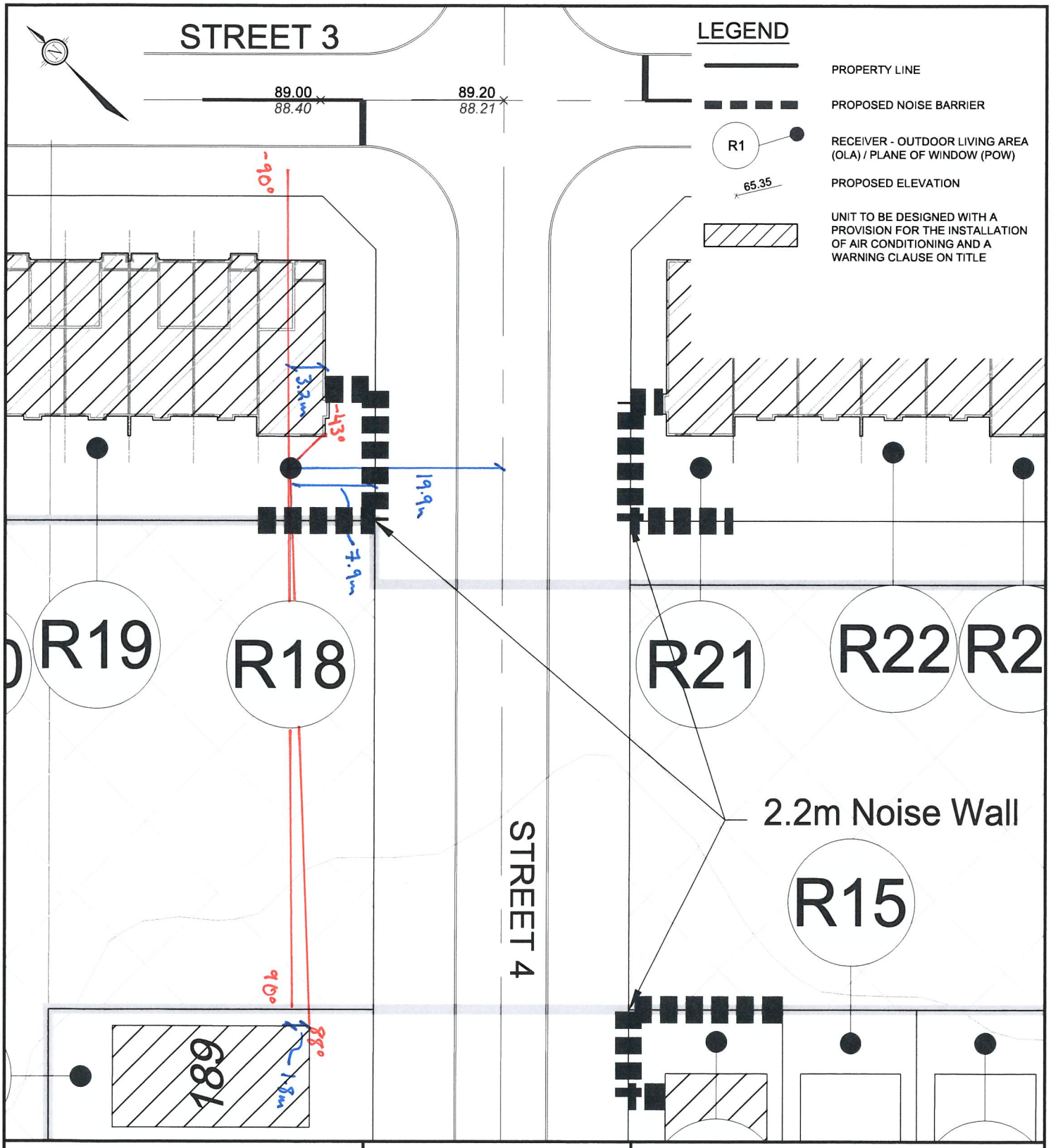

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

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CU DEVELOPMENTS INC.
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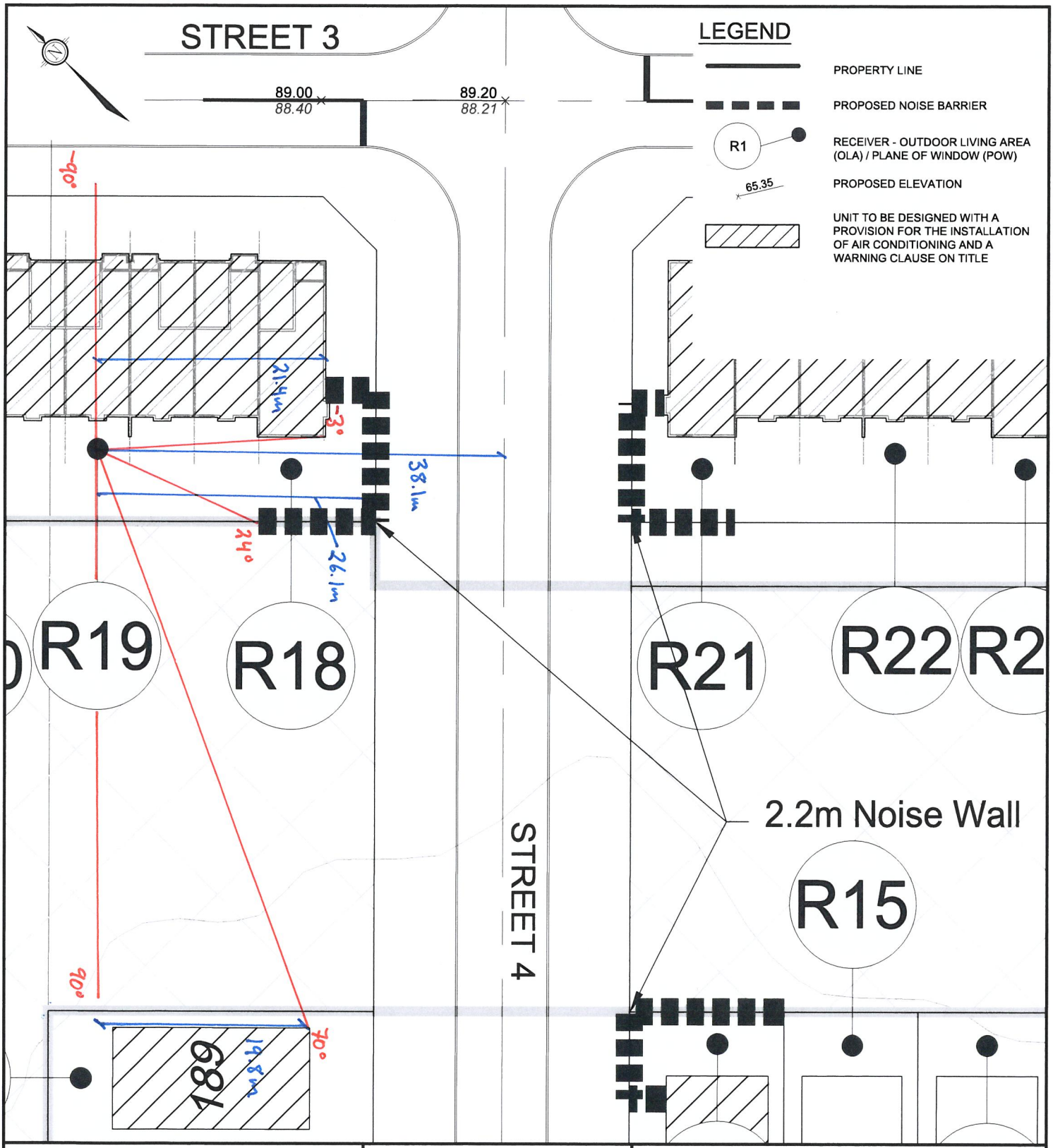
RECEIVER ANGLES, R18

SCALE 1 : 500 (0 5 10 15 20)

DATE	JOB	FIGURE
FEB 2019	116132	R18

SHT8X11.DWG - 216mmx279mm

M:\2016\116132\CAD\Design\Figures\Noise\20190204116132-NoiseAngles.dwg, R18, Feb 05, 2019 - 3:10pm, szorgel



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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
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CU DEVELOPMENTS INC.
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RECEIVER ANGLES, R19

SCALE 1 : 500 (0 5 10 15 20)

DATE	JOB	FIGURE
FEB 2019	116132	R19

SHT8X11.DWG - 216mmx279mm

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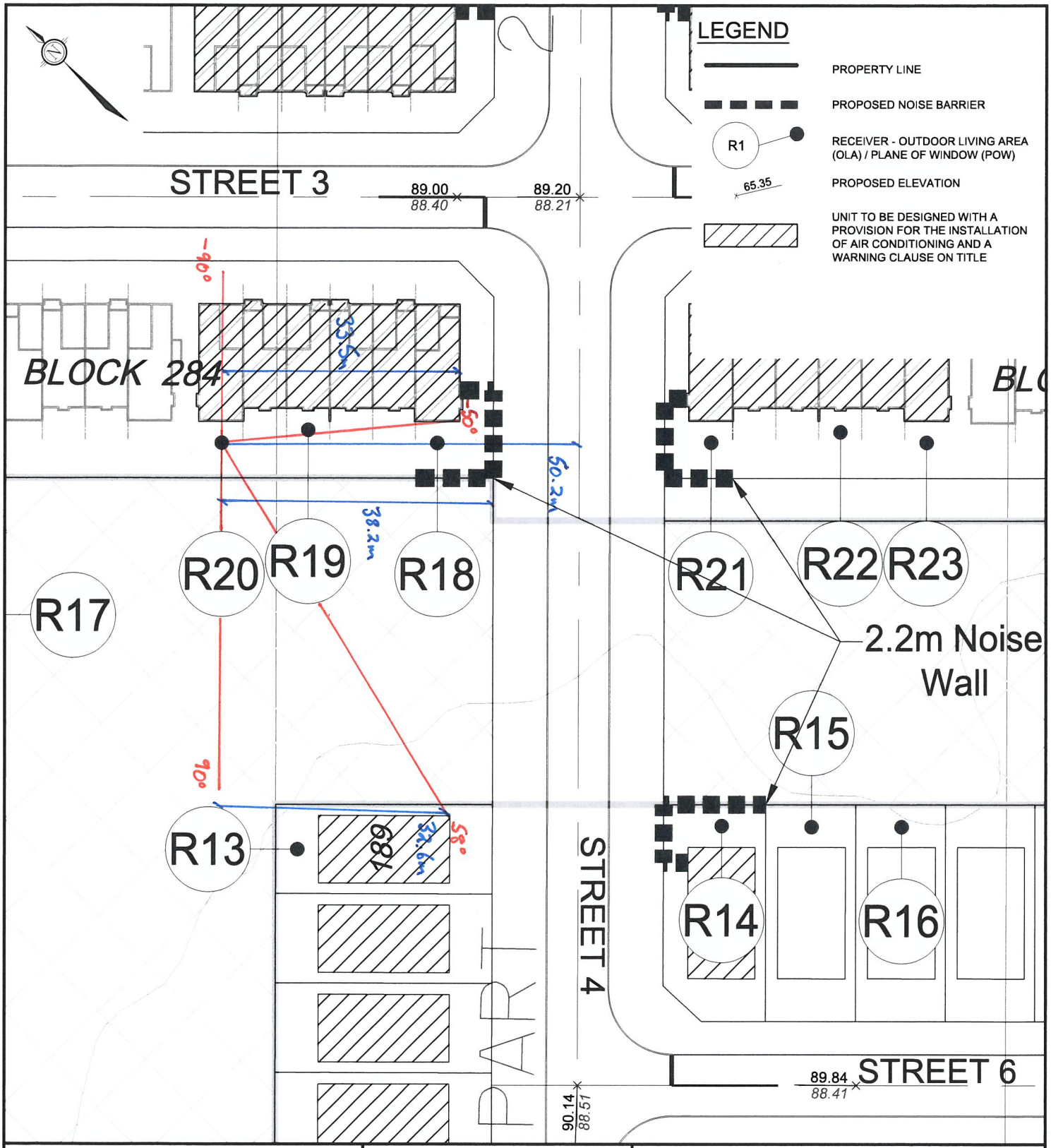

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
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CU DEVELOPMENTS INC. (KNUEA)

RECEIVER ANGLES, R20

SCALE 1 : 750 (0, 6, 12, 18, 24, 30)

DATE	JOB	FIGURE
FEB 2019	116132	R20

SHT8X11.DWG - 216mmx279mm

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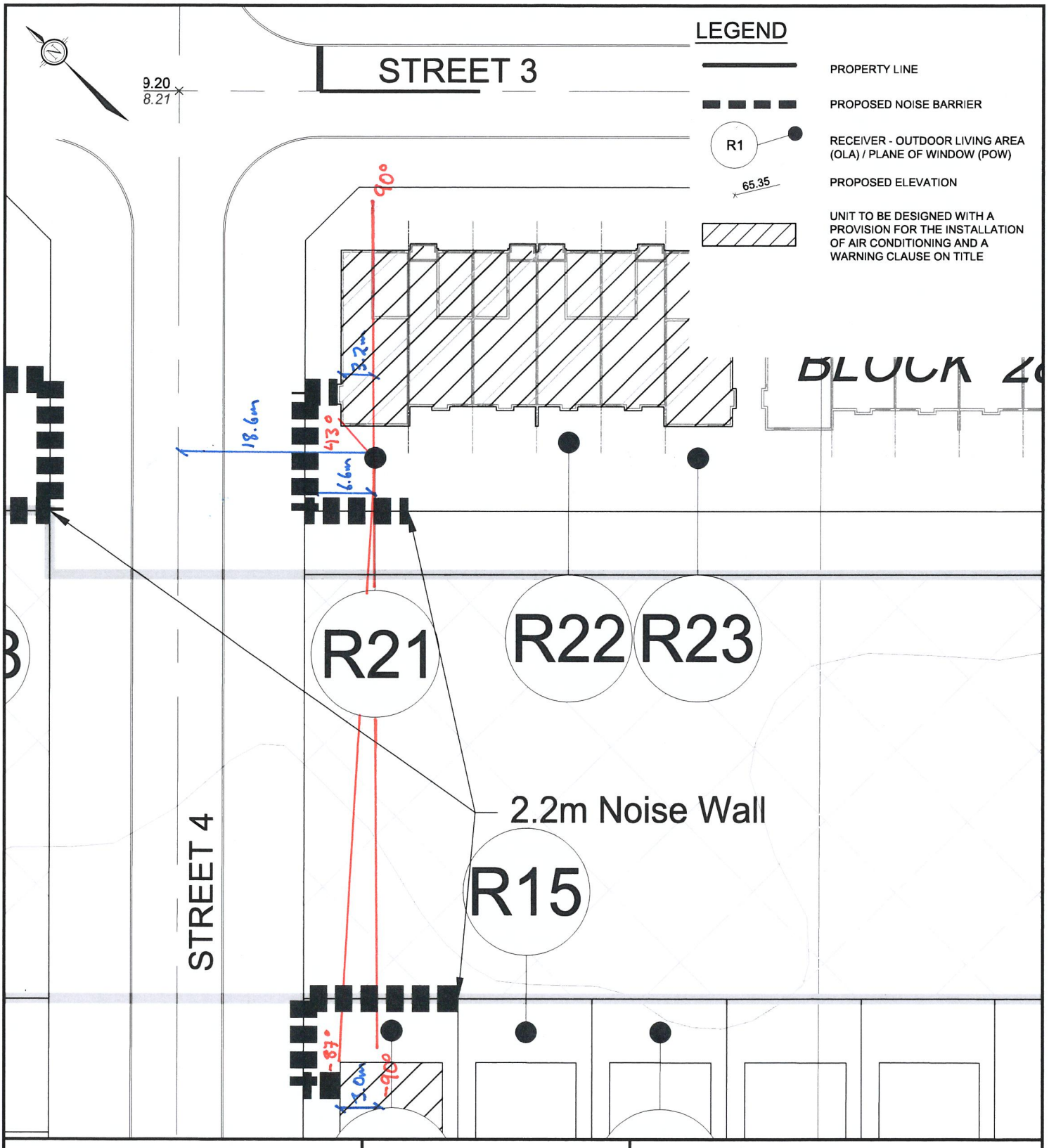

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
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CU DEVELOPMENTS INC. (KNUEA)

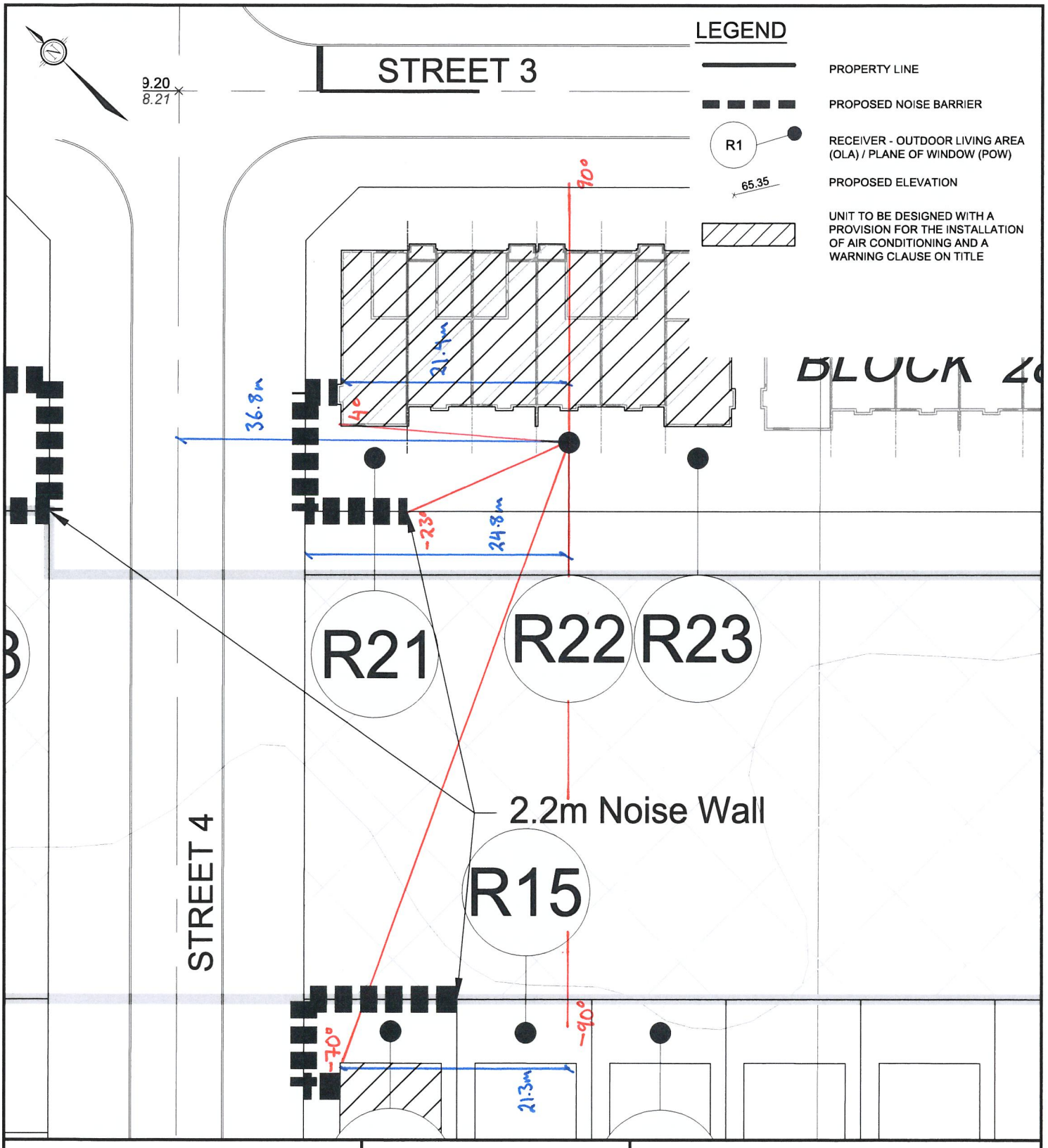
RECEIVER ANGLES, R21

SCALE 1 : 500 (0 5 10 15 20)

DATE FEB 2019 | JOB 116132 | FIGURE R21

M:\2016\116132\CAD\Design\Figures\Noise\20190204\116132-NoiseAngles.dwg, R21, Feb 05, 2019 - 3:10pm, szorgel

SHT8X11.DWG - 216mmx279mm



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Engineers, Planners & Landscape Architects
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CU DEVELOPMENTS INC.
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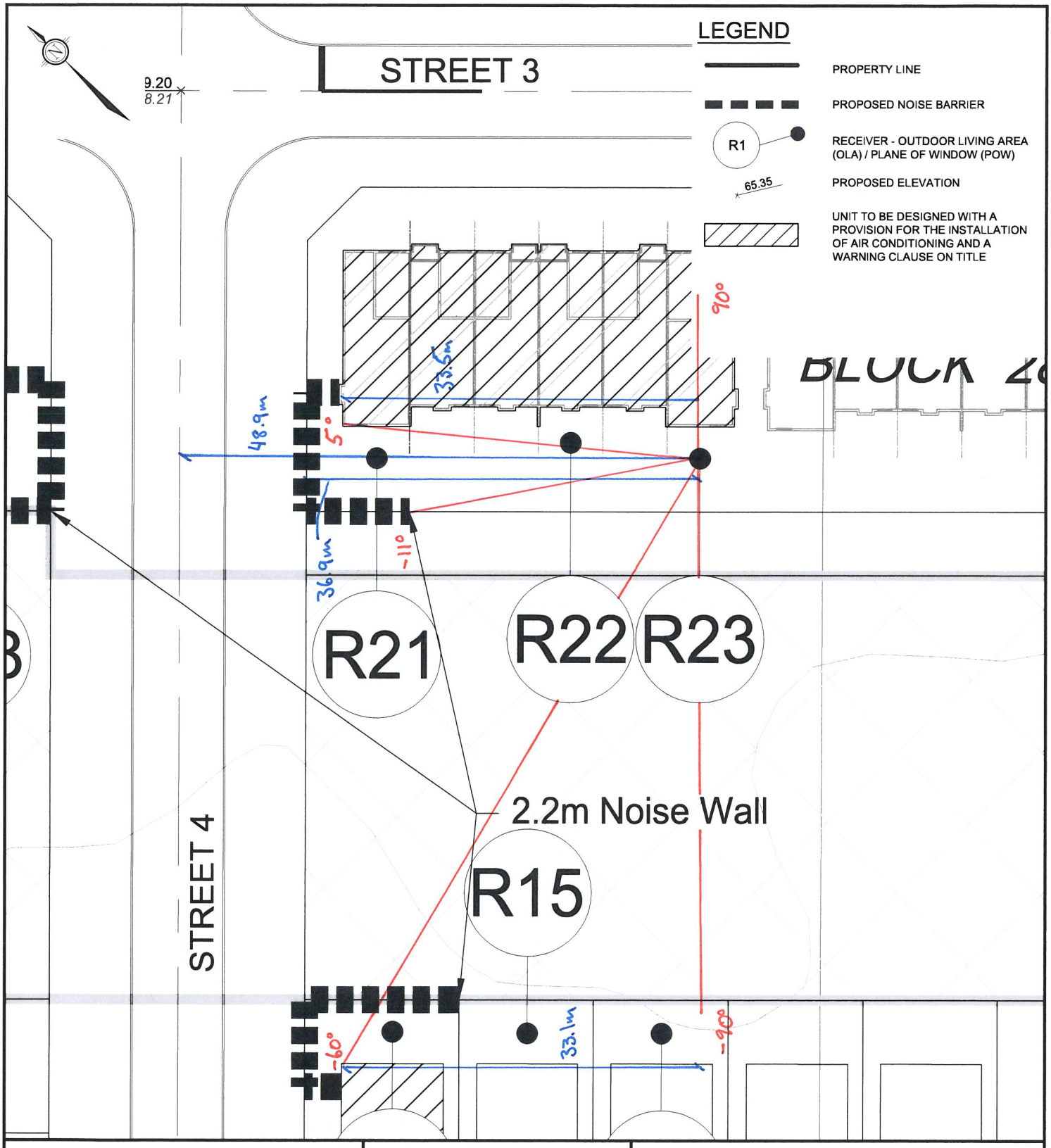
RECEIVER ANGLES, R22

SCALE 1 : 500 (0 5 10 15 20)

DATE	JOB	FIGURE
FEB 2019	116132	R22

SHT8X11.DWG - 216mmx279mm

M:\2016\116132\CAD\Design\Figures\Noise\20190204\116132-NoiseAngles.dwg, R22, Feb 05, 2019 - 3:10pm, szorgel



NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CU DEVELOPMENTS INC. (KNUEA)

RECEIVER ANGLES, R23

SCALE 1 : 500 (0 5 10 15 20)

DATE FEB 2019 | JOB 116132 | FIGURE R23

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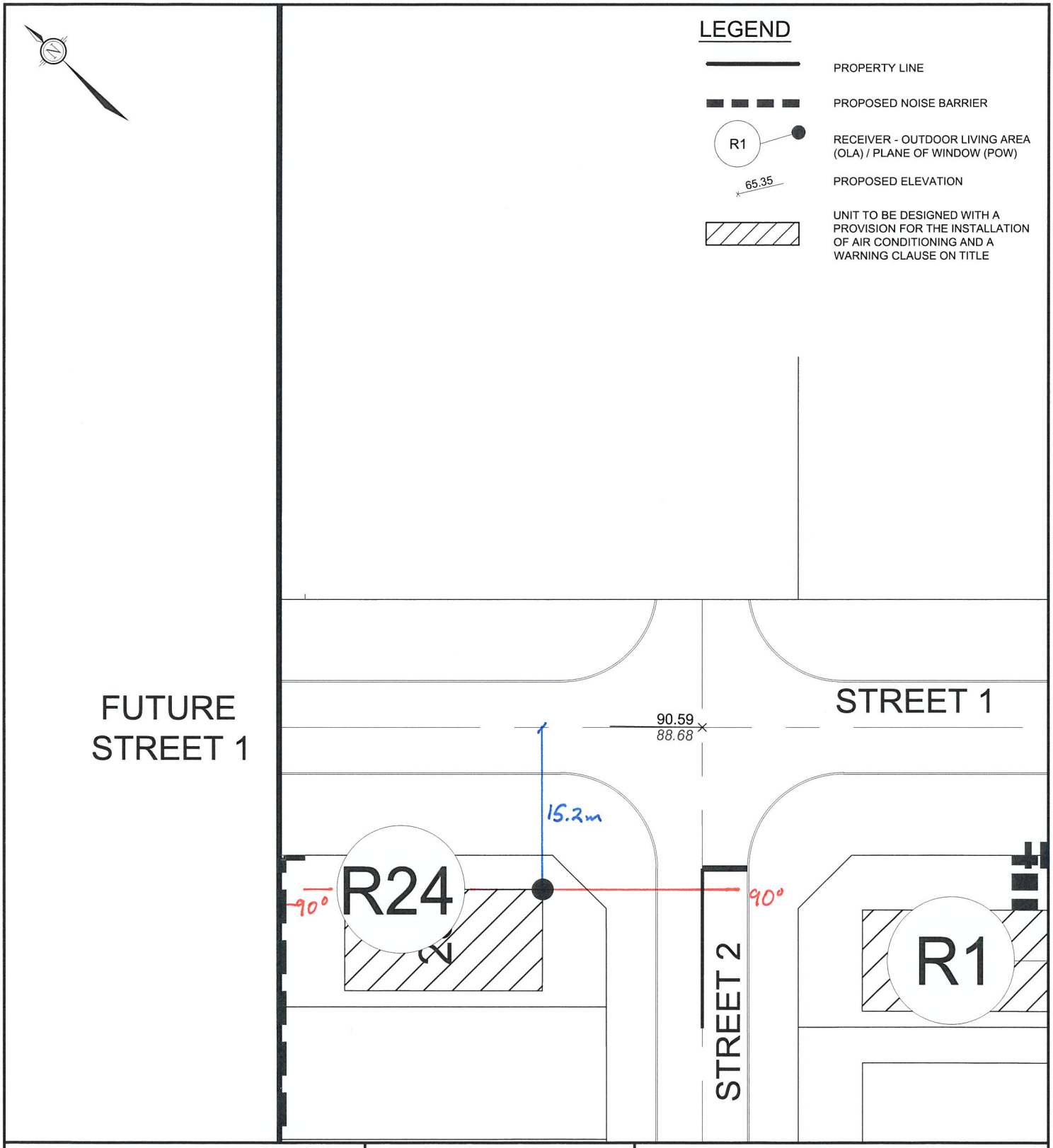

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Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CU DEVELOPMENTS INC. (KNUEA)

RECEIVER ANGLES, R24

SCALE 1 : 500 (0, 5, 10, 15, 20)

DATE	JOB	FIGURE
FEB 2019	116132	R24

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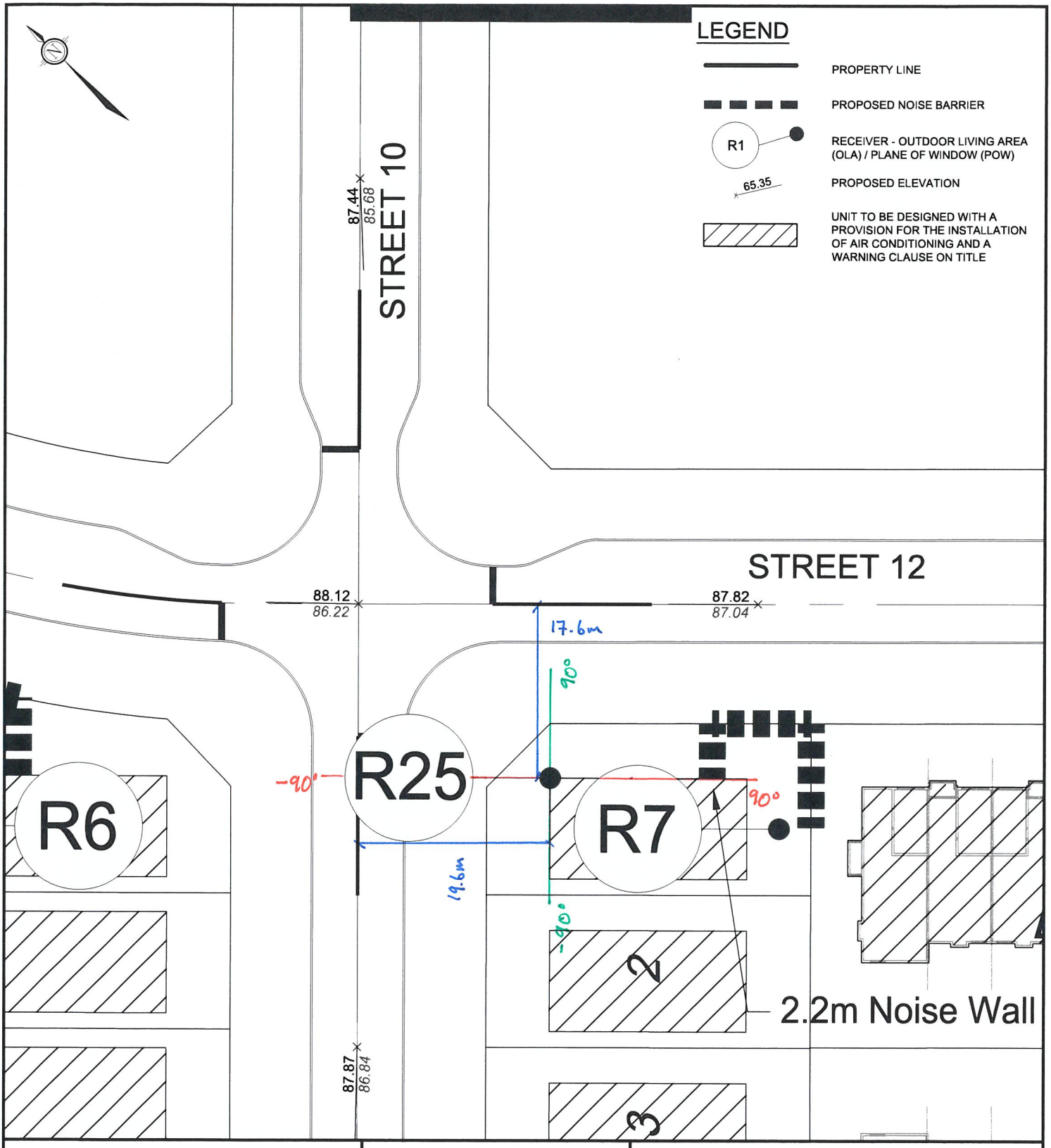
SHT8X11.DWG - 216mmx279mm



NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CU DEVELOPMENTS INC.
(KNUEA)

RECEIVER ANGLES, R25

SCALE 1 : 500 (0 5 10 15 20)

DATE	JOB	FIGURE
FEB 2019	116132	R25

M:\2016\116132\CAD\Design\Figures\Noise\20190204\116132-NoiseAngles.dwg, R25, Feb 05, 2019 - 3:10pm, szorgel

SHT8X11.DWG - 216mmx279mm

Appendix C

Kanata North Community Design Plan - Transportation Master Plan (TMP) – Report No. R-2015-161, dated June 28, 2016, Excerpts.

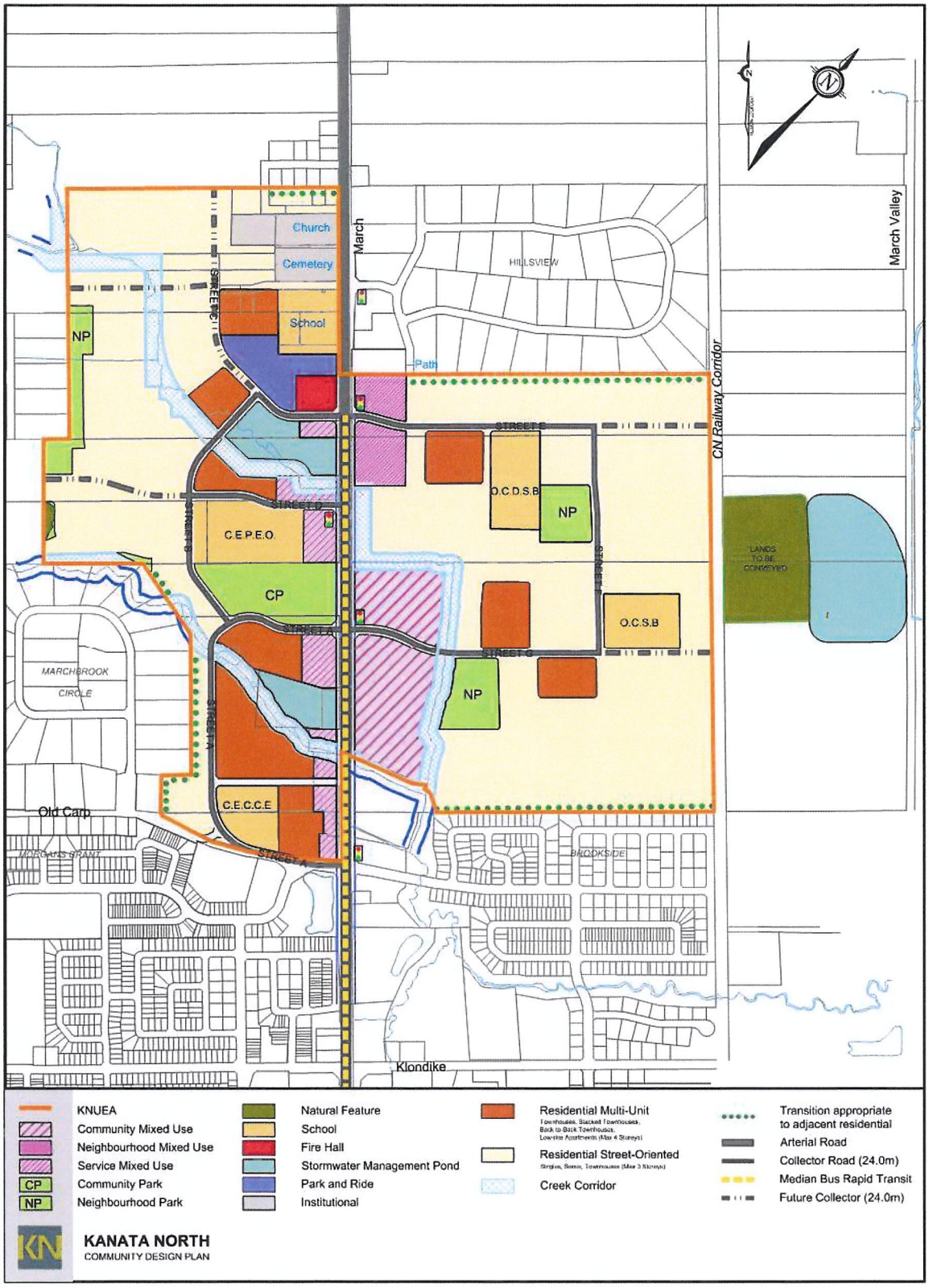


Figure 23 – Preferred Land Use Plan

9.0 RECOMMENDED PLAN

9.1 Plan of Roads

The Kanata North community will be well served by the adjacent arterial and collector road network, including March Road, Old Carp Road, Second Line Road and Terry Fox Drive. A network of seven collector roads is recommended to safely and adequately distribute traffic throughout the new community. Possible future road connections to the north, east and west allow for future connectivity.

The Preferred Land Use Plan includes four full movement signalized intersections and a right-in right-out intersection. Two right-in right-out driveways are assumed for the commercial uses along the east side of March Road. A full movement intersection on Old Carp Road is also included. These road connections will provide direct access to the new community.

9.1.1 Intersection Spacing

A detailed review of the proposed intersection spacing is provided in the November 25th, 2015 technical memorandum included in **Appendix D**. The memo also includes a review of the existing traffic signal spacing along March Road between Maxwell Bridge Road/Halton Terrace and Herzberg Road. The findings are summarized as follows:

- Transportation Association of Canada (TAC) Geometric Design Guidelines identify minimum spacing requirements along arterial roads. Table 2.3.1.1 of the TAC guidelines suggests a desirable spacing of 835m for signalized intersections with 100 second cycle lengths and a posted speed of 60km/hr to maintain traffic progression through successive intersections. It is noted that the benefits of signal progression are reduced for intersection spacings greater than 800m.

- The current traffic signal spacing along March Road does not meet TAC standards for traffic progression through successive intersections.

- Section 2.3.1.7 of the TAC guidelines indicates that in areas of intense development a typical minimum intersection spacing along arterial roadways is 200m. This 200m spacing allows for minimum lengths of back-to-back storage for left turning vehicles at adjacent intersections.

- The proposed intersection spacing along March Road through the KNUEA exceeds the minimum spacing of 200m, with the exception of the Midblock Collector (Street 'D') intersection which is approximately 190m south of the North Collector (Streets 'C' and 'E') intersection. Since this intersection is a tee intersection with a northbound, southbound and eastbound approach, a southbound left turn lane is not required. As such, the minimum intersection spacing can be less than 200m subject to projected queue lengths.

- The intersection capacity analysis shows that projected queue lengths are not anticipated to impact adjacent intersections.

9.1.2 Complete Streets

The City's 2013 Transportation Master Plan update includes policies and actions for providing safe and efficient roads by designing and building complete streets. Complete streets design elements have been considered for all roadways in the KNUEA.

Cross sections have been developed for March Road as well as the collector and local roadways within the KNUEA. The cross sections incorporate the following complete street principles.

- Pedestrians
  - Buffer between sidewalk and vehicular traffic on collector roadways and March Road
  - Sidewalks on both sides of collector roadways and March Road
- Cyclists
  - Multi-use pathway on one side of collector roadways
  - Raised cycle tracks on March Road
- Transit Users
  - Accessible transit stops
  - Transit shelters on inbound direction (towards downtown) of collector roadways
  - Future median BRT on March Road
- All Road Users
  - Street lighting on all roadways
  - Landscaping in boulevards and medians on all roadways

In addition to the above complete streets elements, a design speed of 40 kph is recommended for collector and local roads in the KNUEA. A lower design speed will help improve the viability of active transportation, especially for vulnerable road users and on local roads without sidewalks. A variety of physical measures could be considered at the Plan of Subdivision stage to ensure compliance with the desired design speed, including:

- Road narrowing at collector/local intersections,
- Midblock narrowing and signage at multi-use pathway crossings,
- Raised crosswalks on local streets (non-transit routes),
- Street trees, and
- On-street parking.

The recommended local, collector and future March Road cross sections are described in more detail in the following sections.

9.1.3 March Road Cross Section

March Road will be widened in two phases to accommodate the increase in vehicular traffic and extend the future Kanata North Transitway. A 44.5m right-of-way width is recommended along the March Road corridor between the current urban area boundary and the northern limit of the KNUEA. This right-of-way width will provide for the interim four lane widening of March Road and the ultimate widening to accommodate extension of the median BRT system.

The City of Ottawa's 2013 TMP identifies the median BRT system along March Road between Corkstown Road and Solandt Road in its 2031 Affordable Rapid Transit and Transit Priority Network. The 2013 TMP also identifies the future need to extend the median BRT system to Maxwell Bridge Road/Halton Terrace post 2031, with a conceptual future transit corridor extending

further north towards Dunrobin Road. The Kanata North CDP TMP satisfies the requirements of the Municipal Class EA process for the portion of the conceptual future transit corridor, as shown in the City's 2013 TMP, that extends between Maxwell Bridge Road/Halton Terrace and the North Collector (Streets 'C' and 'E'). Additional studies will need to be completed to fulfill the Municipal Class EA requirements for any further extension of the median BRT north of the March Road/North Collector intersection.

A median BRT station(s) will be identified along the corridor within the KNUEA, as development occurs and detailed BRT plans are developed. The identification of station location(s) will need to take into consideration the location of the most northerly planned station along the corridor (March/Klondike, as per the approved Kanata North Transitway EA) and the planned park and ride at March Road/North Collector (Streets 'C' and 'E', as per the Kanata North CDP process).

Subject to City and Development Charges funding, March Road will be widened to a four lane divided urban cross section. It is recommended that the City examine and implement interim transit priority measures as required through the study area as part of the initial widening from two to four lanes in preparation for the next City of Ottawa TMP update. Transit priority measures typically include dedicated bus lanes, transit signal priority treatments, and bus queue jumps.

Figure 24 shows the proposed interim cross section for March Road following the widening from two to four lanes. As shown, March Road will not be centred within the right-of-way under the interim condition. This will reduce the construction throwaway cost when the City widens March Road to extend the Kanata North Transitway. When the City of Ottawa extends the median BRT system further north through the KNUEA, the interim cross-section can be widened to the west to form the ultimate median BRT cross-section as shown in **Figure 25**.

The proposed cross sections are consistent with the recommendations of the 1994 March Road Reconstruction ESR and are addressed by the Kanata North Transitway EPR.

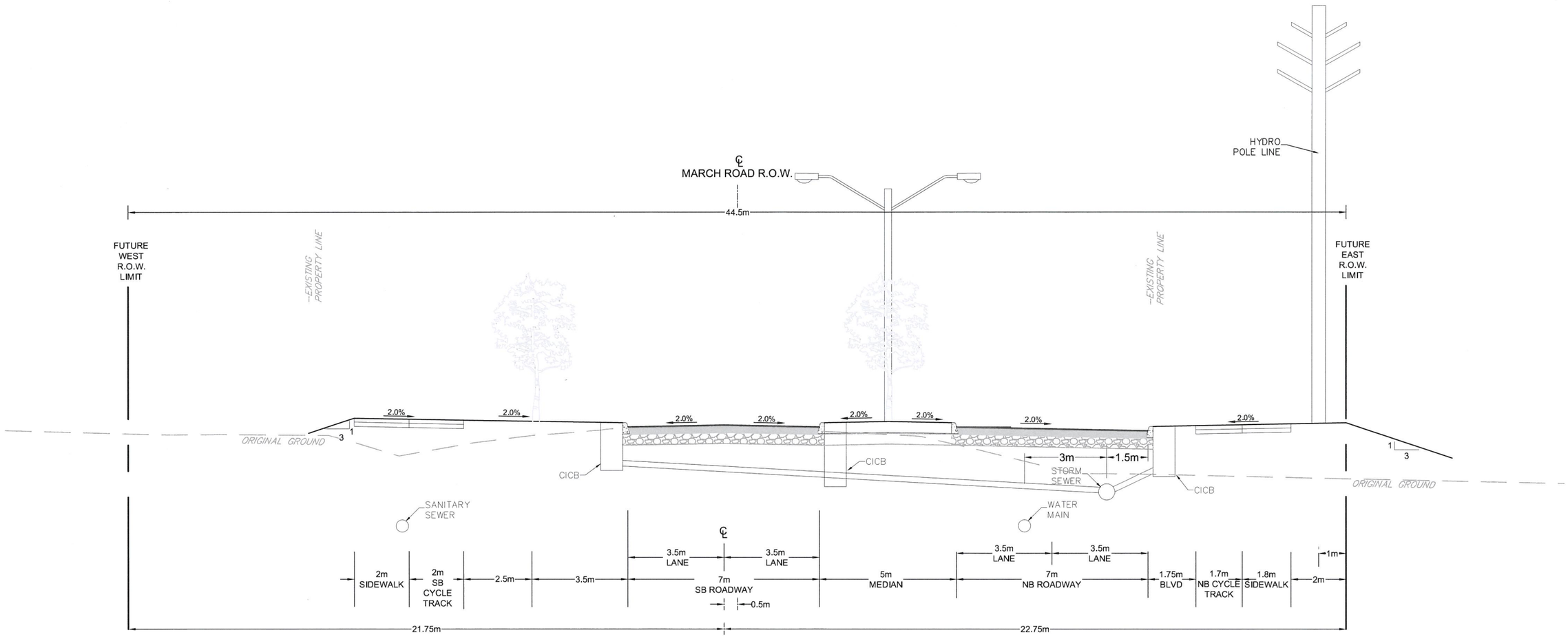
The interim and ultimate cross sections have geometric features (such as landscaping in the medians and narrow lane widths) that reflect a design speed of 60 kilometres per hour.

9.1.4 Collector Road Cross Section

Detailed discussions were held with the TAC to produce three collector roadway cross sections. The right-of-way to be protected along all collector roadways within the KNUEA will be 24m. Future collectors, identified with a dashed line on the Preferred Land Use Plan will be provided with a 24m right-of-way but will be built as local roads in the short term.

All collector roadways, excluding the Midblock Collector (Street 'D'), will have a 7m road platform with a 2.5m parking lane, a multi-use pathway on one side and a sidewalk on the other, as shown in **Figure 26**. Bus shelters will be located on the multi-use pathway side of these roadways, where the multi-use pathway will veer around the bus shelter, as shown in **Figure 27**.

The North-South Collector roadway (Street 'B' and the majority of Street 'A'), between the northern collector (Street 'C') and March Road, on the west side of the KNUEA will have a cross section as depicted in **Figure 28**. Bus shelters will be located on the sidewalk side of this roadway, where the sidewalk will veer in front of the bus shelter, as shown in **Figure 29**.



KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 24

MARCH ROAD - INTERIM
CROSS SECTION

DATE
JUN 2016

JOB
112117

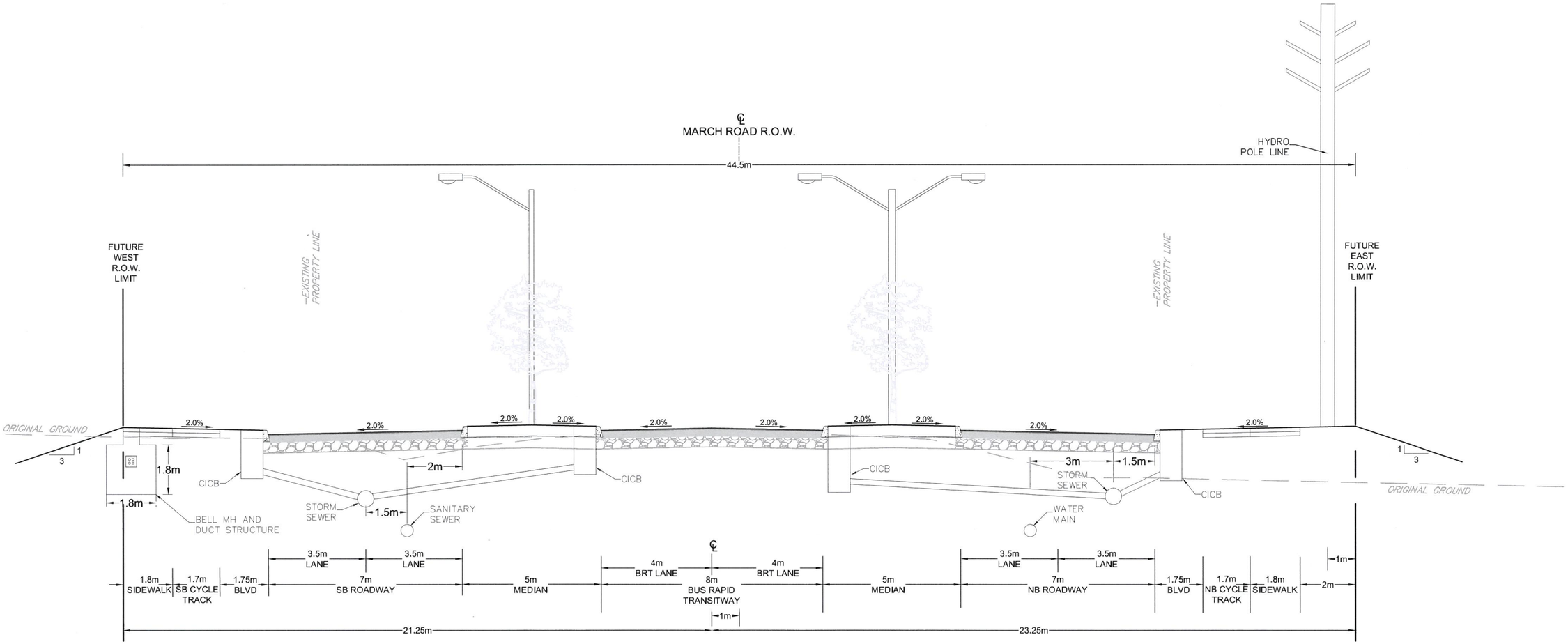
SCALE
1:150

0 1m 2m 4m

NOVATECH
Engineers, Planners & Landscape Architects

SHT11x17.DWG - 279mmx432mm

M:\2012\112117\CAD\Design\Figures\Traffic\TMP\FINAL\112117 - March sections - 20160212.dwg, INTERIM (TMP), Apr 05, 2016 - 9:09am, tbrooks



KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 25

MARCH ROAD - ULTIMATE CROSS SECTION

DATE JUN 2016

JOB 112117

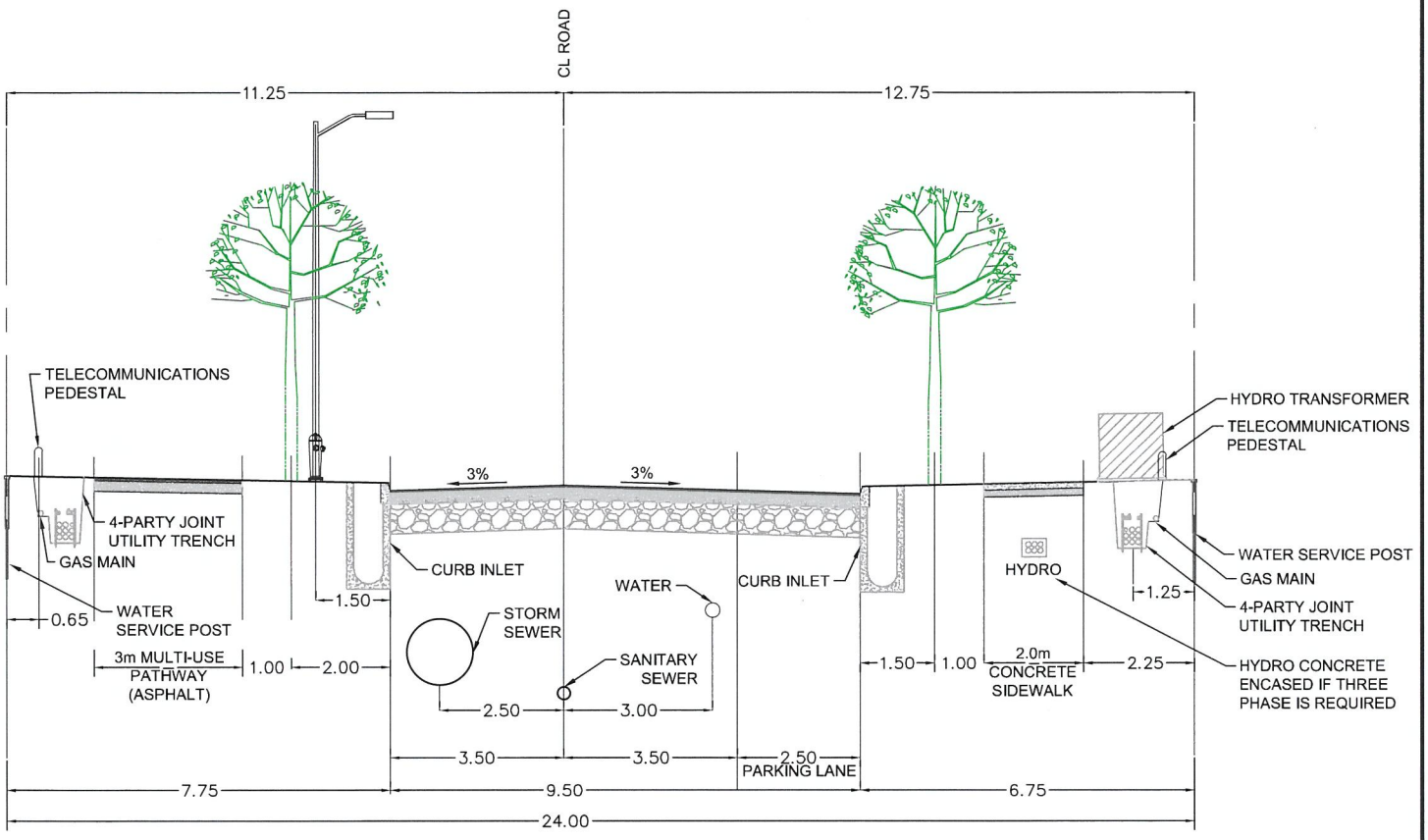
SCALE 1:150

0 1m 2m 4m

NOVATECH
Engineers, Planners & Landscape Architects

M:\2012\112117\CAD\Design\Figures\Traffic\TMP\FINAL\112117 - March sections - 20160212.dwg, ULTIMATE (TMP), Apr 05, 2016 - 9:09am, tbrooks

SHT11x17.DWG - 279mmx432mm



KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 26
COLLECTOR ROAD -
TYPICAL CROSS SECTION 1

DATE
JUN 2016

JOB
112117

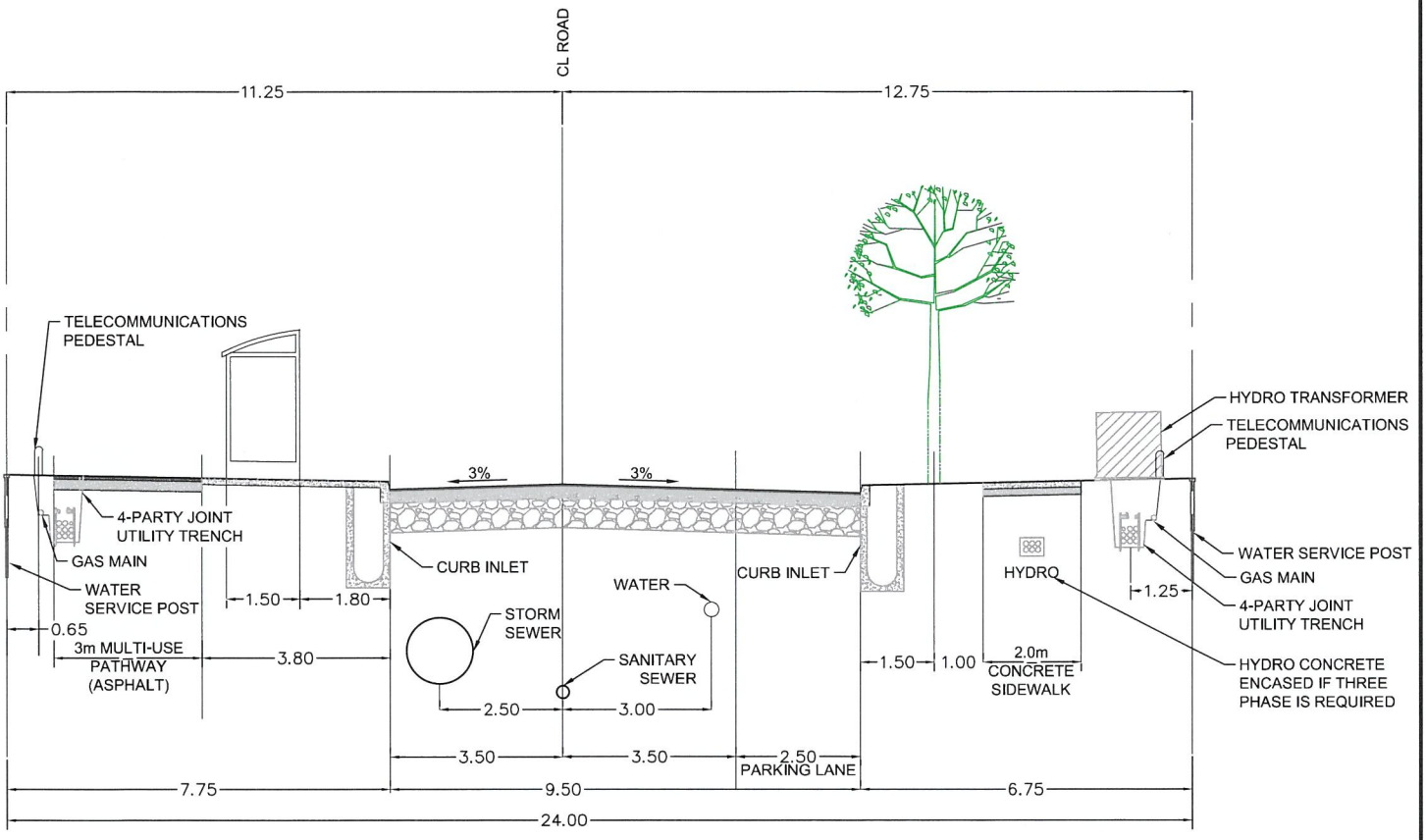
SCALE
1:150

0 1m 2m 4m

NOVATECH
Engineers, Planners & Landscape Architects

M:\2012\112117\CAD\Design\Figures\Traffic\TMP\FINAL\112117 - FIG-24mROW-MUP (1-150).dwg, TYPICAL 1 (TMP), Mar 28, 2016 - 1:29pm, tbrooks

SHT8x11.DWG - 216mmx279mm



NOTES:

AT THE TIME OF PLAN OF SUBDIVISION OR SITE PLAN CONTROL WHEN BUS STOPS ARE IDENTIFIED, AT THESE LOCATIONS ON THE SIDEWALK SIDE OF THE STREET, THE SIDEWALK SHOULD BE RELOCATED TO BE ADJACENT TO THE CURB AND A BUS PAD (1.55m IN WIDTH), IF DETERMINED TO BE IMPLEMENTED, SHALL BE TO THE REAR OF THE SIDEWALK.

KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 27
COLLECTOR ROAD -
TYPICAL CROSS SECTION 1
(WITH BUS STOP)

DATE
JUN 2016

JOB
112117

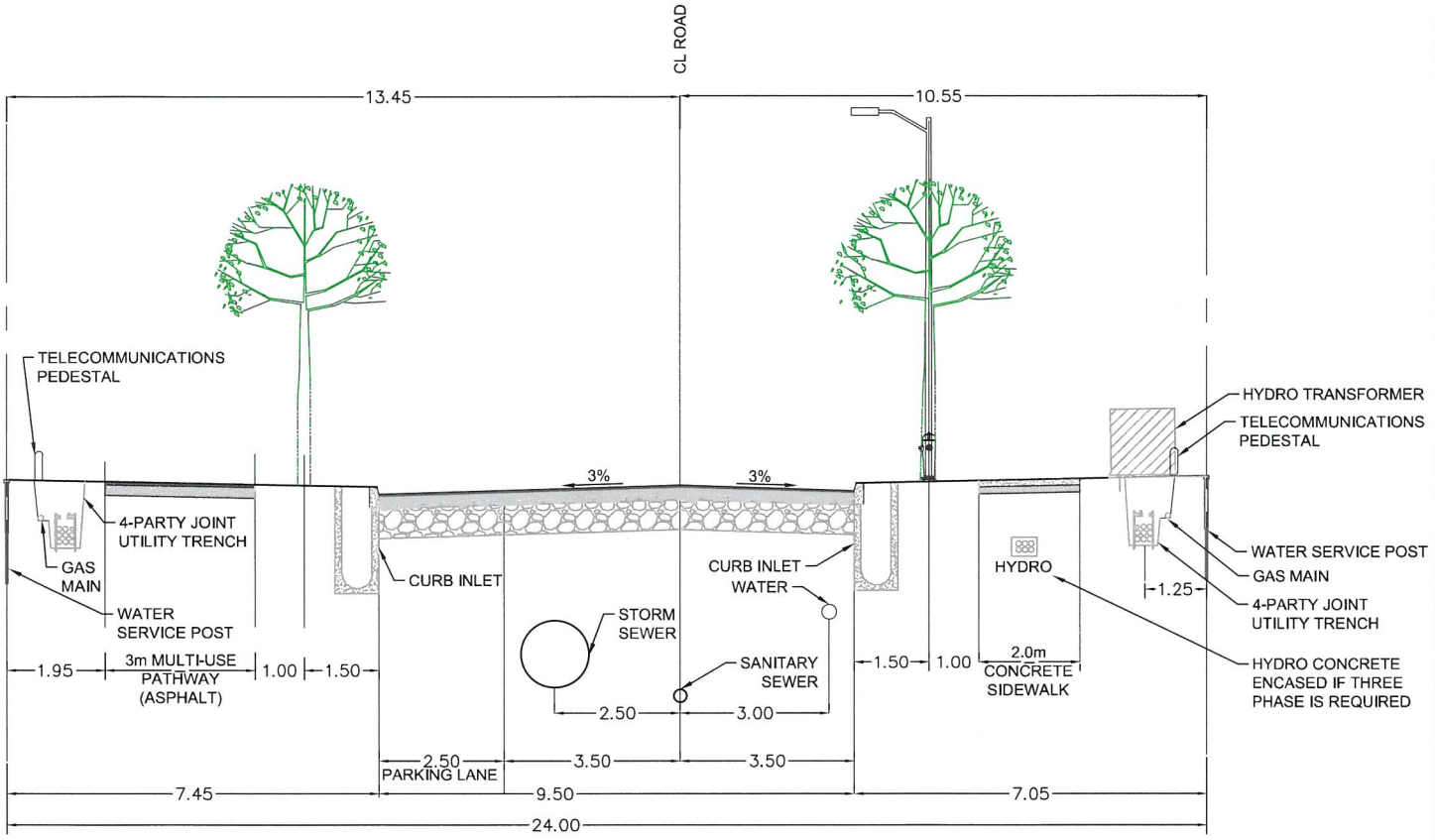
SCALE
1:150

0 1m 2m 4m

NOVATECH
Engineers, Planners & Landscape Architects

M:\2012\112117\CAD\Design\Figures\Traffic\TMP\FINAL\112117 - FIG-24mROW-MUP (1-150).dwg, TYPICAL 1 BUS (TMP), Mar 28, 2016 - 1:29pm, tbrooks

SHT8x11.DWG - 216mmx279mm



KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 28
COLLECTOR ROAD -
TYPICAL CROSS SECTION 2

DATE
JUN 2016

JOB
112117

SCALE
1:150

0 1m 2m 4m

NOVATECH
Engineers, Planners & Landscape Architects

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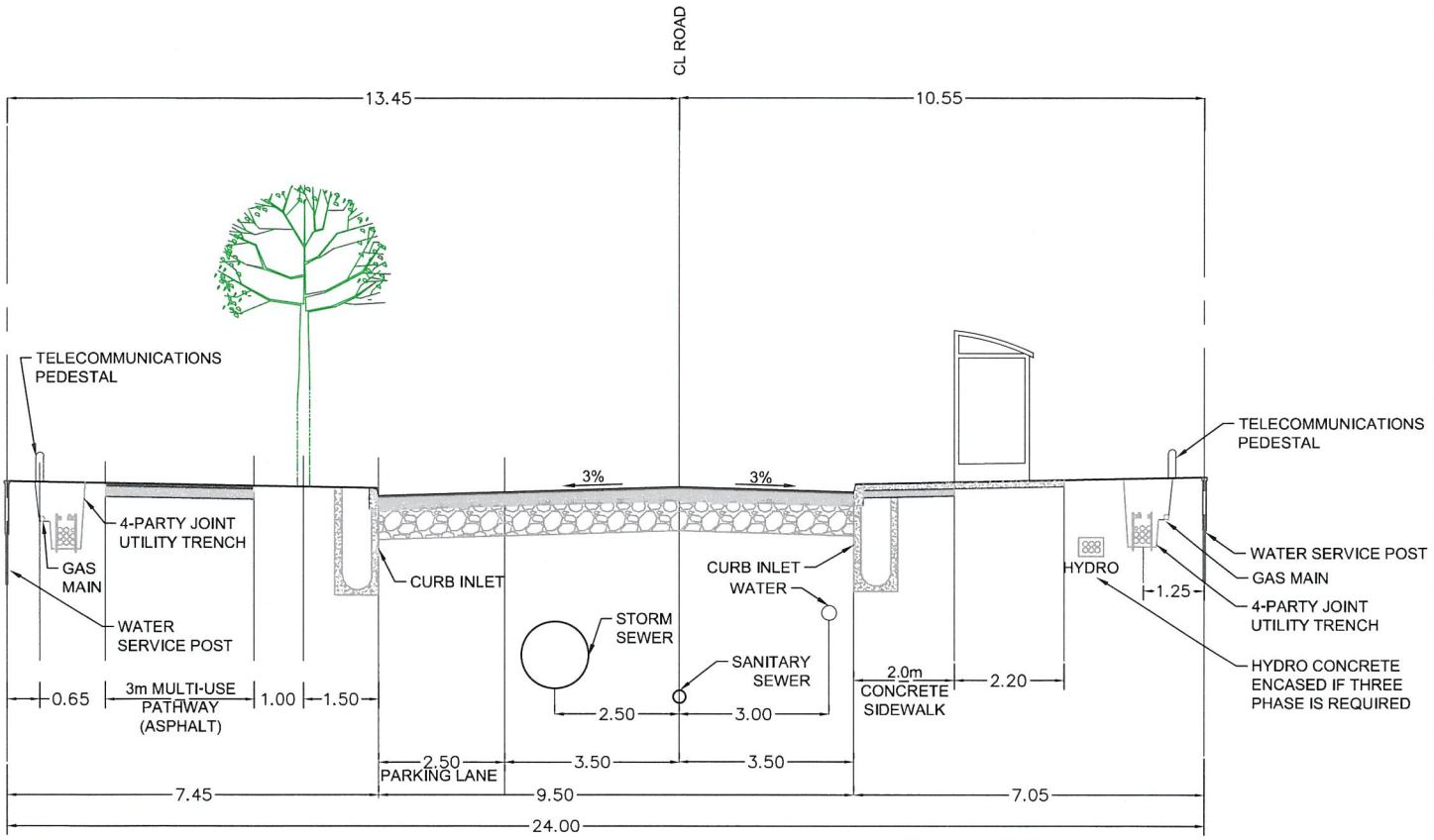
SHT8x11.DWG - 216mmx279mm



NOTES:

AT THE TIME OF PLAN OF SUBDIVISION OR SITE PLAN CONTROL WHEN BUS STOPS ARE IDENTIFIED, AT THESE LOCATIONS ON THE MULTI-USE PATHWAY SIDE OF THE STREET, BUS PLATFORMS (1.80m IN WIDTH) WILL BE PLANNED/IMPLEMENTED ADJACENT TO THE CURB.

KANATA NORTH
COMMUNITY DESIGN PLAN

DATE
JUN 2016

JOB
112117

SCALE
1:150

0 1m 2m 4m

FIGURE NO. 29
COLLECTOR ROAD -
TYPICAL CROSS SECTION 2
(WITH BUS STOP)

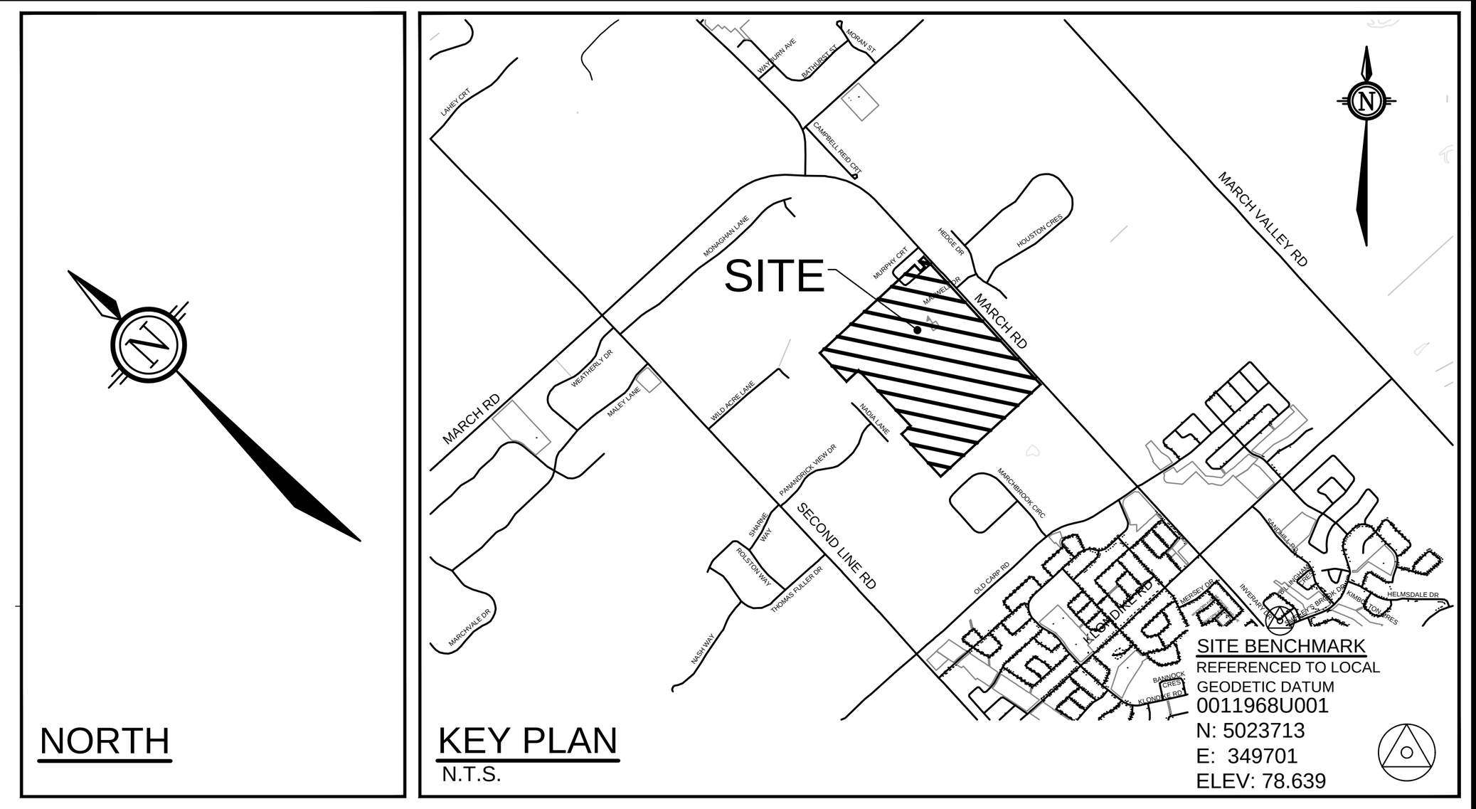
NOVATECH
Engineers, Planners & Landscape Architects

M:\2012\112117\CAD\Design\Figures\Traffic\TMP\FINAL\112117 - FIG-24mROW-MUP (1-150).dwg, TYPICAL 2 BUS (TMP), Mar 28, 2016 - 1:29pm, tbrooks

SHT8x11.DWG - 216mmx279mm

Appendix D

Noise Control Plan, 116132-NC



LEGEND

- PROPERTY LINE
- PROPOSED NOISE BARRIER
- R1 — RECEIVER - OUTDOOR LIVING AREA (OLA) / PLANE OF WINDOW (POW)
- 65.35 — PROPOSED ELEVATION
- UNIT TO BE DESIGNED WITH A PROVISION FOR THE INSTALLATION OF AIR CONDITIONING AND A WARNING CLAUSE ON TITLE

NOTES:

1. NOISE CONTROL PLAN TO BE READ IN CONJUNCTION WITH NOISE IMPACT FEASIBILITY REPORT (R-2018-080) PREPARED BY NOVATECH. REFER TO REPORT FOR THE TYPICAL WARNING CLAUSES TO BE REGISTERED ON TITLE AND PROPOSED NOISE MITIGATION MEASURES.
2. ROADWAY CLASSIFICATION AS PER CITY OF OTTAWA OFFICIAL PLAN, SCHEDULE F, CENTRAL AREA/INNER CITY NETWORK.
3. REFER TO GRADING PLANS (116132-GR1 to 116132-GR4) FOR ALL DETAILED GRADING INFORMATION.
4. NOISE BARRIER REFERS TO ANY COMBINATION OF NOISE WALL, BERM AND/OR RETAINING WALL.

RECEIVER DATA TABLE

RECEIVER INFORMATION					DISTANCES TO NOISE SOURCE (m)	
RECEIVER	HEIGHT (m)	RECEIVER GROUND ELEVATION (m)	ROAD ELEVATION STREET 1 (m)	ROAD ELEVATION STREET 4 (m)	STREET 1 (CENTERLINE)	STREET 4 (CENTERLINE)
R1	1.5	90.32	90.10	-	21.9	-
R2		89.27	88.68	88.64	47.7	20.6
RECEIVER	HEIGHT (m)	RECEIVER GROUND ELEVATION (m)	ROAD ELEVATION STREET 1 (m)	ROAD ELEVATION STREET 12 (m)	STREET 1 (CENTERLINE)	STREET 12 (CENTERLINE)
R3	1.5	88.27	88.68	86.86	46.5	120.9
R4		88.38	-	87.26	-	111.0
RECEIVER	HEIGHT (m)	RECEIVER GROUND ELEVATION (m)	ROAD ELEVATION STREET 10 (m)	ROAD ELEVATION STREET 12 (m)	STREET 10 (CENTERLINE)	STREET 12 (CENTERLINE)
R5	1.5	87.54	-	87.61	-	46.8
R6		88.36	87.99	87.85	39.5	24.7
R7		88.24	87.99	87.84	39.5	21.2
R8		88.72	-	88.23	-	47.2
R9		88.87	88.59	-	45.5	-
R10		88.98	88.59	-	45.5	-
R11		92.20	92.27	-	45.5	-
R12		92.48	91.84	-	21.9	-
RECEIVER	HEIGHT (m)	RECEIVER GROUND ELEVATION (m)	ROAD ELEVATION STREET 4 (m)		STREET 4 (CENTERLINE)	
R13	1.5	89.15	89.89		39.5	
R14		89.18	89.86		20.2	
R15		89.18	89.86		32.9	
R16		89.18	89.86		45.5	
R17		89.35	89.68		87.05	
R18		89.32	89.46		19.9	
R19		89.41	89.46		38.1	
R20		89.47	89.46		50.2	
R21		89.17	89.46		18.6	
R22		88.87	89.46		36.8	
R23		88.87	89.46		48.9	

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
2.	REVISED AS PER CITY OF OTTAWA COMMENTS	MAY 13/19	MSP
1.	ISSUED FOR DRAFT PLAN OF SUBDIVISION APPLICATION	JULY 23/18	MSP

SCALE 1:1500

1:1500 — 0 15 45 60

DESIGN	SAZ
CHECKED	DDB
DRAWN	TJM
CHECKED	DDB
APPROVED	MSP

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
S.A.N. ZORGEL
100191487
May 13, 2019
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
CU DEVELOPMENTS INC.
1053, 1075 AND 1145 MARCH ROAD

DRAWING NAME
NOISE CONTROL PLAN

PROJECT No. 116132
REV: REV # 2
DRAWING No. 116132-NC

D07-16-18-0023

#17801