

**Tuesday January 22, 2019**  
**Medway Planning and Economic Development Board**  
**155 Village Street**  
**Medway, MA 02053**

<b>Members</b>	<b>Andy Rodenhiser</b>	<b>Bob Tucker</b>	<b>Tom Gay</b>	<b>Matt Hayes</b>	<b>Rich Di Iulio</b>
<b>Attendance</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

**The meeting is being broadcast and recorded by Medway Cable Access.**

**ALSO PRESENT:**

Susy Affleck-Childs, Planning and Economic Development Coordinator  
Planning Consultant Gino Carlucci, PGC Associates  
Amy Sutherland, Recording Secretary

Vice Chairman Tucker opened the meeting at 7:00 pm

There were no Citizen Comments.

**ANR Plan for 14-16 R Franklin Street:**

The Board is in receipt of the following: **(See Attached)**

- ANR application with attachments received 1-14-19.
- Revised ANR Plan dated 1-17-19.
- PGC Associates review letter dated 1-17-19.

The ANR plan was submitted for endorsement by applicant Marguerite Mele by attorney Stephen Kenney. The plan was prepared by Colonial Engineering. The plan shows the elimination of the lot line between two existing lots to create a single lot of 46,103 square feet. The combined lot has frontage of 89.32' for which a variance has been granted by the Zoning Board of Appeals. Consultant Carlucci noted some minor deficiencies which were addressed in a revised plan which was dated January 17, 2019.

**On a motion made by Matt Hayes and seconded by Tom Gay, the Board voted unanimously to endorse the revised ANR Plan dated 1-17-19 for 14-16 R Franklin Street.**

The plan will be signed at the conclusion of the meeting.

**ANR Plan for 180 Village Street John & Kathryn Regan:**

The Board is in receipt of the following: **(See Attached)**

- ANR application with attachments received 1-14-19
- Revised ANR Plan dated 1-17-19.
- PGC Associates review letter dated 1-17-19.

The applicant is represented by Attorney Stephen Kenney. The ANR plan was submitted by applicant John and Kathy Regan. The plan was prepared by Colonial Engineering, Inc, and is dated November 21, 2018. The plan proposes to divide the lot into two lots. Lot #1 will have 22,503 square feet of area and includes the existing two-family home. A variance has been granted by the Zoning Board of Appeals from the 30,000 square foot minimum for a two family. Lot #2 will have 17,759 square feet of area. A variance has been granted from the 22,500 square foot minimum. Both lots have adequate frontage. Consultant Carlucci noted that there were minor technical deficiencies which have been addressed in the revised plan dated January 17, 2019.

**On a motion made by Matt Hayes and seconded by Tom Gay, the Board voted unanimously to endorse the revised ANR Plan dated 1-17-19 for 180 Village Street.**

### **MINUTES:**

#### **January 8, 2019:**

**On a motion made by Rich Di Iulio and seconded by Matt Hayes, the Board voted unanimously to accept the minutes from the January 8, 2019 PEDB meeting.**

### **Committee Reports:**

Consultant Carlucci is working on creating the “Certificate for Zoning Compliance” paperwork. It will be presented to the Board at the next meeting.

### **Salmon Senior Living – Tree Preservation Plan:**

Salmon Senior Living has a prepared draft agreement for the Tree Preservation Plan. The Town is in receipt of the check for \$165,000. The agreement details are being finalized

## **2 MARC ROAD – ADULT RECREATIONAL MARIJUANA SPECIAL PERMIT – Public Hearing Continuation**

The Board is in receipt of the following documents: **(See Attached)**.

- Public hearing continuation notice dated 1-9-19.
- Email dated 1-10-2019 from resident Heidi Sia, 18 Main Street
- Email dated 1-16-19 from noise consultant Ron Dempsey.
- Updated draft decision dated January 18, 2019.
- Odor report provided to the Millis Planning Board for a marijuana cultivation facility 1073 Main Street in Millis.
- Email dated 1-22-19 from John Lally.
- Email dated 1-22-19 from Leigh Knowlton.
- Email dated 1-22-19 #2 from John Lally.

The Chairman opened the continued public hearing for 2 Marc Road for the Adult Recreational Marijuana Special Permit. The applicant Ellen Rosenfeld and engineer Dan Merrikin were present.

The Chairman indicated that there was new information submitted today from the abutters. This information was forwarded to the consultants for review.

Mr. Merrikin informed the Board that they are waiting for the preliminary design of the second floor of the facility at 2 Marc Road. The new design will address the chiller noise. It was further explained that the applicant will be exploring many options to address the concerns of the abutters. This will probably take six months.

All were in agreement that whatever mitigation is proposed for options, this will be reviewed by the Consultants. The Chairman explained that the Consultants will work collaboratively to resolve the concerns. It is the expectation that there will be a design by April 2019.

**Resident, John Lally, 35 Coffee Street:**

Mr. Lally explained that he supplied to the Board a letter explaining the new nuisance. It is located on the private way near the end of Marc Road. This noise is intermittent. He explained that there is also noise around the Milara building to the front door.

**Resident, Mr. Knowlton, 14 Green Valley Rd:**

Mr. Knowlton provided an email dated January 22, 2019. Mr. Knowlton provided a response to the “NCE Findings” document. It was also explained that there were a collection of tables and figures regarding the noise at the CommCan facility.

The Chairman thanked both abutters for their recent emails which will be provided to the Consultants.

Susy Affleck-Childs clarified that the odor mitigation plan she referenced at the last meeting was for a marijuana facility in the Town of Charlton and not Grafton as she had indicated.

The Board and applicant reviewed the draft decision dated January 18, 2019.

The following recommendations were made to the decision:

- Page 4 – There will be more names added to testimony.
- Page 4 – Add a number 3 summarizing the Acentech Report.
- Page 7 – The applicant wants to eliminate “monitoring” from the sentence, but the Board would like to include language within the conditions about monitoring.
- Page 8 – Under #6 the applicant proposes to include language about the existing bylaw.
- Page 8 – The emails and testimony from abutters could be added to this section since it is a proposed use will not be detrimental to the public good.
- Page 9: There was chart included to show the mitigation options for the chiller. The Building Inspector could require the applicant to provide further mitigation to demonstrate satisfactory regarding noise complaints. There was discussion about including a timeline component.
- Page 10 – In the Chart #2 should read any new – or altered external ...Also include the words mechanical equipment.
- Page 10 – In the Chart #4 there is language about an annual report. It was suggested to have a report for two years from start up date. It should be done at the same time each year. This would be post occupancy permit.
- Page 10 – Abutter Knowlton asked how to measure this at different speeds. The noise speed is different at various times through the year.

- Page 11- Include language about defining odor. Take out the reference to VOC's. The applicant is fine with the language in C. #1.
- Page 12 – Under Section f. Hours of Operation – The applicant responded that the growing takes place 24/7. The employees are present from 7:30 a.m. – 5:00 p.m. but the plants are watered everyday including weekends.

The next step in the process will be to take all the recommendations regarding the draft decision and incorporate those into a revised decision. The draft decision will be reviewed at the next meeting.

**On a motion made by Bob Tucker and seconded by Rich Di Iulio, the Board voted unanimously to continue the hearing for 2 Marc Road to January 29, 2019 at 7:15 pm.**

### **TOWN LINE ESTATES SUBDIVISION – Plan Endorsement**

The Board is in receipt of the following: **(See Attached)**

- Plan of Land for Town Line Estates, Definitive Subdivision Plan revised date December 4, 2018 by L.A.L Engineering Group and Continental Land Survey (for Land Court)
- Town Line Estate Permanent Private Way Definitive Subdivision Plan, revised June 8, 2018.
- Covenant and Private Roadway Agreement.

The Board was informed that they need to sign the one sheet plan for Land Court which is the official legal document to divide the land as this is “Registered” property. The Board also needs to sign the 10-sheet definitive subdivision plan which will be used for the Board’s purposes to monitor the construction of the infrastructure. The Town Clerk has provided the Certificate of No Appeal and there is verification that property taxes have been paid. The applicant paid \$5,000 of the \$7,900 invoice for construction services. The remainder of the balance will be paid prior to the pre-construction meeting.

**On a motion made by Matt Hayes and seconded by Bob Tucker, the Board voted unanimously to sign the plans and covenant as presented.**

### **EXELON BOND:**

Member Gay recused himself from the discussion on Exelon.

The Board is in receipt of the following: **(See Attached)**

- Updated bond estimate from BETA Group 12-14-18.
- Draft revised performance security agreement to reflect the full amount of the bond (\$363,691.25).
- Insurance Rider – Surety Group for the full amount.

**On a motion made by Bob Tucker and seconded by Rich Di Iulio, the Board voted unanimously to approve the Exelon Bond in the amount of \$363,691.25.**

Susy Affleck-Childs will make sure that the dollar amounts on both documents match. The Board signed the performance security agreement.



Member Gay returned to the table at 8:41 pm.

**CORRESPONDENCE:**

- The Town is in receipt of a letter dated January 18, 2019 from County of Norfolk Registry of Deeds. The Community Preservation Act surcharges for property conveyances within the Town of Medway during 2018 was \$47,000.00.

**CONSTRUCTION REPORTS:**

The Board is in receipt of the following documents: **(See Attached)**

- January 4, 2019 Exelon Construction Report.

**FUTURE MEETING:**

- Special Meeting: Tuesday, January 29, 2019. Susy Affleck-Childs noted that the site plan for the Medway DPS building is being revised and will not be ready for review at this meeting. However, the Board will work on the special permit decision for CommCan at 2 Marc Road.

**ADJOURN:**

**On a motion made by Rich Di Iulio and seconded by Matt Hayes, the Board voted unanimously to adjourn the meeting.**


The meeting was adjourned at 8:55 pm.

Prepared by,



Amy Sutherland  
Recording Secretary

Reviewed and edited by,



Susan E. Affleck-Childs  
Planning and Economic Development Coordinator



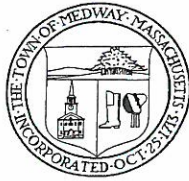
**January 22, 2019**

**Medway Planning & Economic Development Board  
Meeting**

**ANR Plan for 14-16R Franklin Street –  
Marguerite Mele**

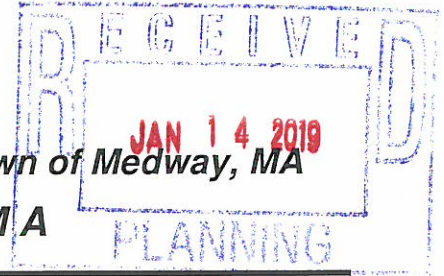
- ANR application with attachments received 1-14-19
- ANR plan dated 1-14-19 by Colonial Engineering, Inc.
- PGC Associates review letter dated 1-17-19

The applicant is represented by attorney Stephen Kenney. Gino Carlucci's review letter has been provided to Mr. Kenney and Colonial Engineering. It noted some very minor deficiencies. A revised plan is expected for you to review at the 1-22 meeting.



**Planning & Economic Development Board - Town of Medway, MA**

**LAND SUBDIVISION – FORM A**



***Application for Endorsement of Plan  
Believed Not to Require Subdivision Approval (ANR)***

**INSTRUCTIONS TO APPLICANT/OWNER**

This Application is made pursuant to the Medway *Subdivision Rules and Regulations*.  
Please complete this entire Application.

Submit two (2) signed originals of this ANR Application, two copies of the ANR Plan, an electronic version (PDF) of the ANR plan, two Project Explanations, and the appropriate ANR application/filing fee checks to the Medway Planning and Economic Development office, 155 Village ST, Medway, MA 02053.

The Applicant certifies that the information included in this Application is a true, complete and accurate representation of the facts regarding the property under consideration.

In submitting this application, the Applicant and Property Owner authorize the Planning & Economic Development Board and its agents to access the site during the plan review process.

The Town's Planning Consultant will review the Application, Project Explanation and ANR plan and provide a recommendation to the Planning & Economic Development Board.

A copy of that letter will be provided to you. Revisions to the plan may be needed.

**You or your duly authorized agent is expected to attend the Board meeting when the ANR Plan will be considered to answer any questions and/or submit such additional information as the Board may request.**

Your absence may result in a delay in the Board's review and decision.

January 10, 2019

**TO:** The Planning & Economic Development Board of the Town of Medway, MA

The undersigned, wishing to record the accompanying plan of property in the Town of Medway and believing that the plan does not constitute a subdivision within the meaning of the Subdivision Control Law, herewith submits this Application and ANR Plan to the Medway Planning and Economic Development Board and requests its determination and endorsement that the Board's approval under the Subdivision Control Law is not required.

**PROPERTY INFORMATION**

ANR Location Address(es): 14-16R Franklin Street, Medway, MA

The land shown on the plan is shown on Medway Assessor's Map # 57 Parcel(s) # 78 & 79

Total Acreage of Land to be Divided: 46,103 S.F.

Subdivision Name (if applicable): Type text here

Medway Zoning District Classification: AR II

Frontage Requirement: 150' Area Requirement: 22,500 S.F.



Is the road on which this property has its frontage a designated **Medway Scenic Road**? No

The owner's title to the land that is the subject matter of this application is derived under deed from: Robert Daum, Etal to Anthony F .Mele and Marguerite K. Mele dated March 18, 1982 and recorded in Norfolk County Registry of Deeds, Book 5984 Page 529 or Land Court Certificate of Title Number \_\_\_\_\_, Land Court Case Number \_\_\_\_\_, registered in the Norfolk County Land Registry District Volume \_\_\_\_\_, Page \_\_\_\_\_.

### **ANR PLAN INFORMATION**

Plan Title: Plan of Land in Medway, MA

Prepared by: Colonial Engineering, Inc.

P.E. or P.L.S registration #: 30466 Plan Date: April 9, 2018 *JAN 14, 2019*

### **APPLICANT INFORMATION**

Applicant's Name: Marguerite Mele

Address: 203 Main Street  
Medway, MA 02053

Telephone: 508-533-2163 Email: \_\_\_\_\_

### **PROPERTY OWNER INFORMATION**

*(If different than the applicant or if the plan shows a land swap between two adjacent properties)*

Property Owner's Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Email: \_\_\_\_\_

### **ENGINEER or SURVEYOR INFORMATION**

Name: Colonial Eningeering, Inc.

Address: 11 Awl Street  
Medway, MA 02053

Telephone: 508-533-1644 Email: \_\_\_\_\_

### **ATTORNEY INFORMATION**

Name: Stephen J. Kenney, Kenney & Kenney

Address: 181 Village Street  
Medway, MA 02053

Telephone: 508-533-6711 Email: sjk@kenney-law.com

## OFFICIAL REPRESENTATIVE INFORMATION

Name: Stephen J. Kenney, Kenney & Kenney  
Address: 181 Village Street  
Medway, MA 02053  
Telephone: 508-533-6711 Email: sjk@kenney-law.com

## PROJECT EXPLANATION

Provide a cover letter with a detailed explanation of how you propose to divide the land, what land transaction will occur, and what land reconfiguration will result from the endorsement and recording of this ANR Plan.

## APPROVAL NOT REQUIRED JUSTIFICATION

The Applicant believes that the Board's approval under the Subdivision Control Law is not required for the following reasons: *(Check all that apply.)*

- ☒ 1. The accompanying plan does not show a division of land.
- ☐ 2. Every lot shown on the plan has frontage as required by the Medway Zoning Bylaw. The frontage required by the Zoning Bylaw is located on Franklin Street by virtue of Variance (name of way(s), which is:
- ☒ a. A public way. Date of street acceptance: \_\_\_\_\_
- ☐ b. A way certified by the Town Clerk as being maintained and used as a public way. *(Attach Town Clerk's certification)*
- ☐ c. A way shown on a definitive subdivision plan entitled \_\_\_\_\_  
\_\_\_\_\_ that was previously endorsed by the Planning and Economic Development Board on \_\_\_\_\_ and recorded at the Norfolk County Registry of Deeds on \_\_\_\_\_  
Provide detailed recording information: \_\_\_\_\_
- ☐ d. A private way in existence on the ground before 1952 when the Subdivision Control Law was adopted in the Town of Medway, which has, in the opinion of the Planning & Economic Development Board, adequate width, suitable grades, and adequate construction to provide vehicular access to the lot(s) for their intended purpose of \_\_\_\_\_ and to permit the installation of municipal services to serve the lot(s) and any buildings thereon.
- ☒ 3. The division of land shown on the accompanying plan is not a "subdivision" for the following reasons: two parcels being combined to one parcel  
\_\_\_\_\_  
\_\_\_\_\_



## SIGNATURES

The undersigned, being the Applicant as defined under Chapter 41, Section 81P for endorsement of an Approval Not Required Plan, herewith submits this application and Approval Not Required Plan to the Medway Planning and Economic Development Board for review and endorsement.

I hereby certify, under the pains and penalties of perjury, that the information contained in this application is a true, complete and accurate representation of the facts regarding the property under consideration.

(If applicable, I hereby authorize Stephen J. Kenney to serve as my Agent/Official Representative to represent my interests before the Medway Planning & Economic Development Board with respect to this Approval Not Required Application.)

In submitting this application, I authorize the Board, its consultants and agents, and Town staff to access the site during the plan review process.

[Signature]  
Signature of Property Owner

1/14/19  
Date

[Signature]  
Signature of Applicant (if other than Property Owner)

          
Date

[Signature]  
Signature of Agent/Official Representative

1-14-19  
Date

### ANR PLAN FILING FEE

\$250 plus \$100 per lot or parcel for a plan involving three (3) or more lots/parcels, not to exceed a maximum of \$750.

Please prepare two checks: one for \$100 and one for the balance.  
Each check should be made payable to: Town of Medway

Fee approved 11-2-06

### APPLICATION CHECKLIST – All items must be submitted

- ✓          2 signed original ANR applications (FORM A)
- ✓          2 full size prints of ANR plan
- ✓          Electronic version of ANR plan – A flash drive may be provided or a PDF of the plan may be emailed to: [planningboard@townofmedway.org](mailto:planningboard@townofmedway.org).
- ✓          2 copies of the Project Explanation
- ✓          Application/Filing Fee (2 checks) – Check with PEDB office for amounts.

\*\*\*\*\*

ANR Application/Filing Fee Paid:

Amount: 150- Check # 259367

Amount: 100- Check # 259368

## PROJECT EXPLANATION

The ANR Plan being presented is combining two lots, shown as Assessors Map 57, Lots 78 and 79. The applicant, Marguerite Mele, obtained a variance on June 20, 2018, for frontage allowing a lot with 89.31 feet of frontage where 250 feet is required. Subject lot has more than adequate are and uplands for the zoning district in which it lays. A requirement of the Zoning Board of Appeals Decision was to submit to the Planning and Economic Development for ANR approval and endorsement. A copy of the ZBA Decision is attached hereto and incorporated herein by reference.

Respectfully submitted Marguerite Mele  
By her attorney:

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Stephen J. Kenney  
Kenney & Kenney  
181 Village Street  
Medway, MA 02053  
508-533-6711 (Phone)  
508-533-6904 (Fax)  
[sjk@kenney-law.com](mailto:sjk@kenney-law.com)  
BBO #: 549507





Town of Medway  
**ZONING BOARD OF APPEALS**  
155 Village Street, Medway, MA 02053

Eric Arbeene, Chair  
Brian White, Vice Chair  
Carol Gould, Clerk  
Bridgette Kelly, Member  
Rori Stumpf, Member  
Christina Oster, Assoc. Memb

**DECISION  
VARIANCE  
14 & 16R FRANKLIN STREET**

**Date Application Filed:** May 14, 2018

**Applicant(s):** Marguerite Mele ("the Applicant")  
203 Main Street,  
Medway, MA 02053

**Location of Property:** The Property is located at 14 and 16R Franklin Street (Assessor  
Parcel IDs: 57-078 and 57-079).

**Approval Requested:** Variance from Section 6.1 Table 2 of the Zoning Bylaw to Bylaw  
to allow for a lot with 89.31 feet of frontage where 150 feet is  
required.

**Members Participating:** Eric Arbeene (Chair), Brian White (Vice Chair), Carol Gould, Rori  
Stumpf, and Christina Oster

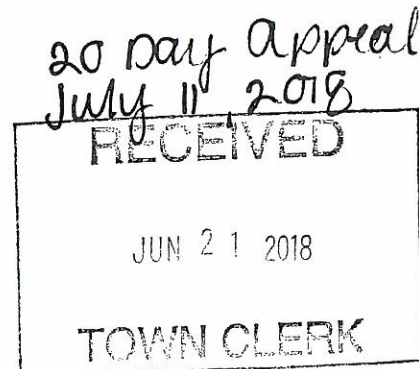
**Members Voting:** Eric Arbeene (Chair), Brian White (Vice Chair), Carol Gould, Rori  
Stumpf, and Christina Oster

**Hearing Opened:** June 20, 2018

**Hearing Closed:** June 20, 2018

**Date of Decision:** June 20, 2018

**Decision:** Granted





## **I. PROCEDURAL HISTORY**

1. On May 14, 2018, the Applicant's Representative filed an applicant for a variance from Section 6.1 Table 2 of the Zoning Bylaw to Bylaw to allow for a lot with 89.31 feet of frontage where 150 feet is required. The applicant proposed to merge two existing lots, 57-078 and 57-079, which had 44.66 feet of frontage and 44.65 feet of frontage, respectively, to have the 89.31 feet of total frontage.
2. Notice of the public hearing was published in the Milford Daily News on June 6, 2018 and June 13, 2018, and notice sent by mail to all interested parties and posted in Town Hall as required by G.L. c. 40A §11.
3. The public hearing was opened on June 20, 2018. The Board closed the public hearing the same evening.
4. The Property is located in the Agricultural Residential II District. The front setback requirement is 35 feet and the side and rear setback requirements are 15 feet. The minimum lot area requirement is 22,500 s.f. and the minimum frontage requirement is 150 feet.
5. The Applicant was represented by Stephen Kenney of Kenney & Kenney, 181 Village Street, Medway, MA 02053.
6. The Board notified Town departments, boards and committees of this application. The Board received comments from Conservation Agent Bridget Graziano.
7. All documents and exhibits received during the public hearing are contained in the Zoning Board of Appeal's files and listed in Section V. of this Decision.

## **II. TESTIMONY**

At the June 20, 2018 meeting, the hearing was opened by the Board. The Applicant's representative, Stephen Kenney, was present. Mr. Kenney provided an overview of the request. The applicant had originally been granted two frontage variances for 14 and 16R Franklin Street ("the parcels") in 1992, but the applicant had never pulled permits or constructed any buildings and the variance lapsed. In 2013, the applicant returned to the Board for a similar variance request, but the request was denied. The applicant was now requesting a lesser variance, where the applicant had proposed to merge the two previous parcels into one larger parcel which would still have less than the required frontage, but would not require as significant a variance.

The shape of the parcels are narrow at their frontages and widens with obscure angles towards their rears. The parcels have more than 50% uplands and meets the lots shape factor. The

merged and separately. The new merged parcel will be significantly larger than other parcels in the zoning district. The new merged parcel shall meet all other dimensional requirements. Where the parcels are lacking in frontage, the applicant has provided sufficient reasons that construction of a single family on a parcel of more than adequate area would not nullify or derogate from the intent of the Zoning Bylaw.

The Applicant's representative has provided documentation in the Variance application form submitted with this application, and as explained during the hearing, to meet all of the required Variance Criteria.

#### IV. CONDITIONS OF APPROVAL

Based upon the findings of the Board and testimony and information received into the record during the public hearing process, the Board **GRANTS** the Applicant, Marguerite Mele, a **VARIANCE** from Section 6.1 Table 2 of the Zoning Bylaw to Bylaw to allow for a lot with 89.31 feet of frontage where 150 feet is required, subject to the Plan of Land for Map 57 Lot 079 and Map 57 Lot 078, also known as 14 and 16R Franklin Street, in Medway, MA, dated April 9, 2018, prepared by Colonial Engineering Inc. of 11 Awl Street, Medway, MA which joins the two parcels into one larger parcel, is submitted to the Planning and Economic Development Board for ANR approval and endorsement and then recorded with the Registry of Deeds.

1. This variance is subject to all subsequent conditions that may be imposed by other Town departments, boards, agencies, or commissions. Any changes to the variance that may be required by the decisions of other Town boards, agencies or commissions shall be submitted to the Board for review as a new request.

Any work or use that deviates from this Decision shall be a violation of the *Medway Zoning Bylaw*.

2. Upon receipt of a written request by the applicant filed at least 30 days prior to the date of expiration, the Board may grant an extension for good cause. The request shall state the reasons for the extension and also the length of time requested. If no request for extension is filed and approved, the variance shall lapse one year from the date of Decision, unless action is taken, or as may be otherwise specified herein, and may be reestablished only after a new filing, hearing, and decision.

#### V. INDEX OF DOCUMENTS

A. The application included the following plans and information that were provided to the Board at the time the application was filed:

1. Variance Decision for 14 and 16R Franklin Street dated May 6, 1992

2. Variance Decision for 14 and 16R Franklin Street dated November 20, 2013
3. Plan of Land of Lot 1, 2, and 3 on Franklin Street, in Medway, MA, dated 9/28/90 and revised 5/1/91 and 5/6/92, prepared by DeSimone Survey Service, Inc. of 89 Main Street, Medway, MA
4. Plan of Land for Map 57 Lot 079 and Map 57 Lot 078, also known as 14 and 16R Franklin Street, in Medway, MA, dated April 9, 2018, prepared by Colonial Engineering Inc. of 11 Awl Street, Medway, MA

**B.** During the course of the review, the following materials were submitted to the Board by Town Departments/Boards:

1. Comments: Bridget Graziano, May 31, 2018



## VI. VOTE OF THE BOARD

By a vote of 5 to 0, on a motion made by Brian White and seconded by Rori Stumpf, the Zoning Board of Appeals hereby **GRANTS** the Applicant, Marguerite Mele, a **VARIANCE** from Section 6.1 Table 2 of the Zoning Bylaw to Bylaw to allow for a lot with 89.31 feet of frontage where 150 feet is required, subject to the Plan of Land for Map 57 Lot 079 and Map 57 Lot 078, also known as 14 and 16R Franklin Street, in Medway, MA, dated April 9, 2018, prepared by Colonial Engineering Inc. of 11 Awl Street, Medway, MA which joins the two parcels into one larger parcel, is submitted to the Planning and Economic Development Board for ANR approval and endorsement and then recorded with the Registry of Deeds.

Member:	Vote:	Signature:
Eric Arbeene	<u>YES</u>	_____
Brian White	<u>YES</u>	_____
Carol Gould	<u>YES</u>	_____
Rori Stumpf	<u>YES</u>	_____
Christina Oster	<u>YES</u>	_____

The Board and the Applicant have complied with all statutory requirements for the issuance of this Variance on the terms hereinafter set forth. A copy of this Decision will be filed with the Medway Town Clerk and mailed to the Applicant, and notice will be mailed to all parties in interest as provided in G.L. c. 40A §15.

Any person aggrieved by the decision of the Board may appeal to the appropriate court pursuant to Massachusetts General Laws, Chapter 40A, §17, and shall be filed within twenty days (20) after the filing of this notice in the Office of the Medway Town Clerk.

In accordance with MGL c. 40A, Section 11, no variance or special permit shall take effect until a copy of the Decision is recorded in the Norfolk County Registry of Deeds, and indexed in the grantor index under the name of the owner of record or is recorded and noted on the owner's certificate of title, bearing the certification of the Town Clerk that twenty days have elapsed after the Decision has been filed in the Office of the Town Clerk and no appeal has been filed within said twenty day period or that any duly filed appeal has been dismissed or denied. The fee for recording or registering shall be paid by the Applicant. A copy of the recorded Decision certified by the Registry, and notification by the Applicant of the recording, shall be furnished to the Board.



## MEDWAY TOWN CLERK

155 VILLAGE STREET  
MEDWAY, MASSACHUSETTS 02053  
(508) 533-3204 • FAX: (508) 533-3287  
mwhite@townofmedway.org

**MARYJANE WHITE, CMMC**

*CERTIFIED MASSACHUSETTS MUNICIPAL CLERK*

*JUSTICE OF THE PEACE*

*NOTARY PUBLIC*

### **CERTIFICATE**

*I, TOWN CLERK OF THE TOWN OF MEDWAY, HEREBY CERTIFY THAT NOTICE OF THE VARIANCE DECISION OF THE MEDWAY ZONING BOARD HAS BEEN*

*RECEIVED IN THE MATTER OF:*

*MARGUERITE K MELE*

*14 FRANKLIN ST*

*MEDWAY, MA. 02053*

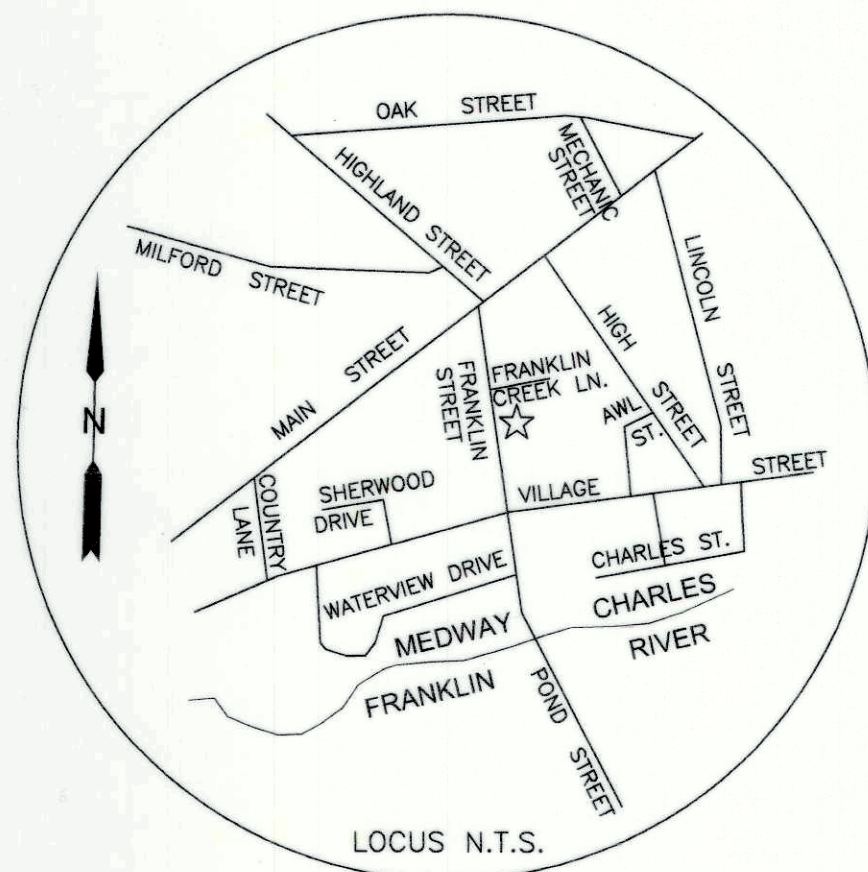
*FILED IN THE TOWN CLERK'S OFFICE ON JUNE 21, 2018*

*AND NO APPEAL WAS RECEIVED DURING THE NEXT TWENTY DAYS AFTER SUCH RECEIPT AND RECORDING OF SAID DECISION.*

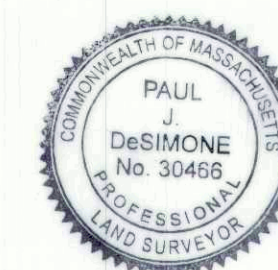
*DATED AT MEDWAY, MA.....JULY 16, 2018*

*A TRUE COPY  
ATTEST.....*





ZONE ARII  
 AREA 22,500 S.F.  
 FRONTAGE 150'  
 SETBACK 35'  
 SIDEYARD 15'  
 REARYARD 15'  
 LOT COVERAGE  
 STRUCTURE 30%  
 IMPERVIOUS 40%



I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

*Paul J. DeSimone*  
 DATE: 1/14/19

APPROVAL UNDER SUBDIVISION CONTROL  
 LAW NOT REQUIRED.  
 DATE APPROVED: \_\_\_\_\_

TOWN OF MEDWAY PLANNING BOARD

PLANNING BOARD ENDORSEMENT DOES NOT CONSTITUTE A DETERMINATION OF COMPLIANCE WITH MEDWAY ZONING BY-LAWS.

NOTE: SUBJECT PROPERTY IS NOT CLASSIFIED AS CHAPTER 61A OR 61B.

NOTE: SEE DECISION FROM Z.B.A. DATED JUNE 20, 2018 FOR FRONTAGE.

PLAN OF LAND  
 IN

**MEDWAY, MA.**

SCALE: 1"=20' JAN 14, 2019

OWNER: Marguerite Mele  
 203 Main Street  
 Medway, Ma. 02053

COLONIAL ENGINEERING INC.  
 11 AWL STREET MEDWAY, MA.  
 508-533-1644



N/F STEPHEN & CYNTHIA JAQUITH  
 4 FRANKLIN CREEK LANE MEDWAY, MA. 02053  
 MAP 57 LOT 82

N/F KNOX ROGERS &  
 ALLISON DELUCIA  
 4 STAGECOACH WAY  
 MEDWAY, MA. 02053  
 MAP 57 LOT 67

N/F DEMETRIOS & MELISSA GIALLOUSIS  
 5 STAGECOACH WAY MEDWAY, MA. 02053  
 MAP 57 LOT 68

N/F PAUL J. SANTOSUSSO  
 2 FRANKLIN CREEK LANE MEDWAY, MA. 02053  
 MAP 57 LOT 81

N/F BETH & JOSEPH TUNNEY  
 16 FRANKLIN STREET MEDWAY, MA. 02053  
 MAP 57 LOT 80

N/F JOSEPH & MICHELLE MELE  
 12 FRANKLIN STREET MEDSWAY, MA. 02053  
 MAP 57 LOT 77

LOTS 1 & 2  
 46,103 S.F.  
 100% UPLANDS  
 18.94 L.S.F.

**FRANKLIN STREET**  
 (PUBLIC VARIABLE WIDTH)

N/F NATALIA CHEB  
 11 FRANKLIN STREET MEDWAY, MA. 02053  
 MAP 57 LOT 125



---

**PGC ASSOCIATES, LLC.**

1 Toni Lane  
Franklin, MA 02038-2648  
508.533.8106  
gino@pgcassociates.com

---

**MEMO TO:** Medway Planning and Economic Development Board

**FROM:** Gino D. Carlucci, Jr.

**DATE:** January 17, 2019

**RE:** 14-16R Franklin St. ANR

---

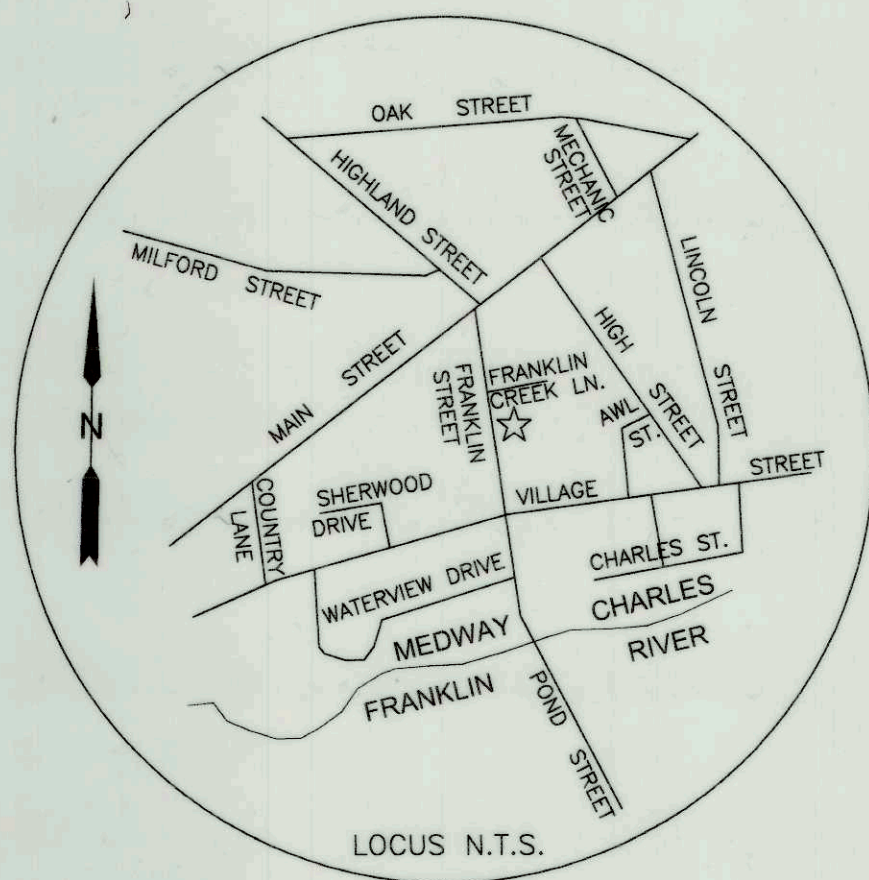
I have reviewed the ANR plan submitted for endorsement by Marguerite Mele. The plan was prepared by Colonial Engineering, Inc. of Medway, and is dated January 14, 2019. The plan proposes to eliminate the lot line between 2 existing lots to create a single lot of 46,103 square feet. The combined lot has frontage of 89.32, for which a variance has been granted by the ZBA.

I have comments as follows:

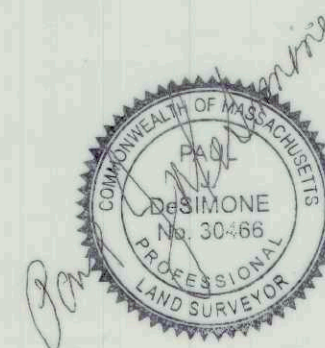
1. The plan meets the substantive and technical requirements for ANR endorsement.
2. Section 3.2.7 requires that Scenic roads be indicated. Franklin Street is a Scenic Road.

I recommend that the technical deficiency be corrected and that the plan be endorsed by the Board.





ZONE ARII  
 AREA 22,500 S.F.  
 FRONTAGE 150'  
 SETBACK 35'  
 SIDEYARD 15'  
 REARYARD 15'  
 LOT COVERAGE  
 STRUCTURE 30%  
 IMPERVIOUS 40%



I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

DATE: 8/17/19

APPROVAL UNDER SUBDIVISION CONTROL  
 LAW NOT REQUIRED.  
 DATE APPROVED: \_\_\_\_\_

TOWN OF MEDWAY PLANNING BOARD

PLANNING BOARD ENDORSEMENT DOES NOT CONSTITUTE A DETERMINATION OF COMPLIANCE WITH MEDWAY ZONING BY-LAWS.

NOTE: SUBJECT PROPERTY IS NOT CLASSIFIED AS CHAPTER 61A OR 61B.

NOTE: SEE DECISION FROM Z.B.A. DATED JUNE 20, 2018 FOR FRONTAGE.

PLAN OF LAND  
 IN

**MEDWAY, MA.**

SCALE: 1"=20' JAN 14, 2019  
 REVISED JANUARY 17, 2019

OWNER: Marguerite Mele  
 203 Main Street  
 Medway, Ma. 02053

COLONIAL ENGINEERING INC.  
 11 AWL STREET MEDWAY, MA.  
 508-533-1644



N/F STEPHEN & CYNTHIA JAQUITH  
 4 FRANKLIN CREEK LANE MEDWAY, MA. 02053  
 MAP 57 LOT 82

N/F KNOX ROGERS &  
 ALLISON DELUCIA  
 4 STAGECOACH WAY  
 MEDWAY, MA. 02053  
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N/F DEMETRIOS & MELISSA GIALLOUSIS  
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 16 FRANKLIN STREET MEDWAY, MA. 02053  
 MAP 57 LOT 80

N/F JOSEPH & MICHELLE MELE  
 12 FRANKLIN STREET MEDWAY, MA. 02053  
 MAP 57 LOT 77

LOTS 1 & 2  
 46,103 S.F.  
 100% UPLANDS  
 18.94 L.S.F.

**FRANKLIN STREET**  
 (PUBLIC - SCENIC VARIABLE WIDTH)

N/F NATALIA CHEB  
 11 FRANKLIN STREET MEDWAY, MA. 02053  
 MAP 57 LOT 125





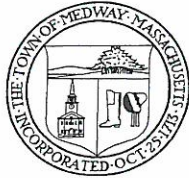
**January 22, 2019**

**Medway Planning & Economic Development Board  
Meeting**

**ANR Plan for 180 Village Street**  
**John & Kathryn Regan**

- ANR application with attachments received 1-14-19
- ANR plan dated 11-21-2018 by Colonial Engineering, Inc.
- PGC Associates review letter dated 1-17-19

The applicant is represented by attorney Stephen Kenney. Gino Carlucci's review letter has been provided to Mr. Kenney and Colonial Engineering. It noted some very minor deficiencies. A revised plan is expected for your review at the 1-22 meeting.



**Planning & Economic Development Board - Town of Medway, MA**

**LAND SUBDIVISION – FORM A**



***Application for Endorsement of Plan  
Believed Not to Require Subdivision Approval (ANR)***

**INSTRUCTIONS TO APPLICANT/OWNER**

This Application is made pursuant to the Medway Subdivision Rules and Regulations.  
Please complete this entire Application.

Submit two (2) signed originals of this ANR Application, two copies of the ANR Plan, an electronic version (PDF) of the ANR plan, two Project Explanations, and the appropriate ANR application/filing fee checks to the Medway Planning and Economic Development office, 155 Village ST, Medway, MA 02053.

The Applicant certifies that the information included in this Application is a true, complete and accurate representation of the facts regarding the property under consideration.

In submitting this application, the Applicant and Property Owner authorize the Planning & Economic Development Board and its agents to access the site during the plan review process.

The Town's Planning Consultant will review the Application, Project Explanation and ANR plan and provide a recommendation to the Planning & Economic Development Board.

A copy of that letter will be provided to you. Revisions to the plan may be needed.

**You or your duly authorized agent is expected to attend the Board meeting  
when the ANR Plan will be considered to answer any questions and/or submit such  
additional information as the Board may request.**

Your absence may result in a delay in the Board's review and decision.

January 10, 20<sup>19</sup>

**TO:** The Planning & Economic Development Board of the Town of Medway, MA

The undersigned, wishing to record the accompanying plan of property in the Town of Medway and believing that the plan does not constitute a subdivision within the meaning of the Subdivision Control Law, herewith submits this Application and ANR Plan to the Medway Planning and Economic Development Board and requests its determination and endorsement that the Board's approval under the Subdivision Control Law is not required.

**PROPERTY INFORMATION**

ANR Location Address(es): 180 Village Street, Medway, MA

The land shown on the plan is shown on Medway Assessor's Map # 60 Parcel(s) # 178

Total Acreage of Land to be Divided: ~~40,626~~ S.F. 40,262 S.F.

Subdivision Name (if applicable):

Medway Zoning District Classification: VR

Frontage Requirement: 150' Area Requirement: 22,500 S.F.



Is the road on which this property has its frontage a designated **Medway Scenic Road**? No

The owner's title to the land that is the subject matter of this application is derived under deed from: Nancy Maria Stevens and Virginia Ann Glennon to John J. Regan and Kathryn Regan dated February 13, 2003 and recorded in Norfolk County Registry of Deeds, Book 18327 Page 159 or Land Court Certificate of Title Number \_\_\_\_\_, Land Court Case Number \_\_\_\_\_, registered in the Norfolk County Land Registry District Volume \_\_\_\_\_, Page \_\_\_\_\_.

### **ANR PLAN INFORMATION**

Plan Title: Plan of Land in Medway, MA

Prepared by: Colonial Engineering, Inc.

P.E. or P.L.S registration #: 30466 Plan Date: November 21, 2018

### **APPLICANT INFORMATION**

Applicant's Name: John J. Regan and Kathryn Regan

Address: 180 Village Street, Medway, MA  
Medway, MA 02053

Telephone: 508-269-8793 Email: \_\_\_\_\_

### **PROPERTY OWNER INFORMATION**

*(If different than the applicant or if the plan shows a land swap between two adjacent properties)*

Property Owner's Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: \_\_\_\_\_ Email: \_\_\_\_\_

### **ENGINEER or SURVEYOR INFORMATION**

Name: Colonial Engineering, Inc.

Address: 11 Awl Street  
Medway, MA 02053

Telephone: 508-533-1644 Email: \_\_\_\_\_

### **ATTORNEY INFORMATION**

Name: Stephen J. Kenney, Kenney & Kenney

Address: 181 Village Street  
Medway, MA 02053

Telephone: 508-533-6711 Email: sjk@kenney-law.com

## OFFICIAL REPRESENTATIVE INFORMATION

Name: Stephen J. Kenney, Kenney & Kenney  
Address: 181 Village Street  
Medway, MA 02053  
Telephone: 508-533-6711 Email: sjk@kenney-law.com

## PROJECT EXPLANATION

Provide a cover letter with a detailed explanation of how you propose to divide the land, what land transaction will occur, and what land reconfiguration will result from the endorsement and recording of this ANR Plan.

## APPROVAL NOT REQUIRED JUSTIFICATION

The Applicant believes that the Board's approval under the Subdivision Control Law is not required for the following reasons: *(Check all that apply.)*

- ☐ 1. The accompanying plan does not show a division of land.
- ☒ 2. Every lot shown on the plan has frontage as required by the Medway Zoning Bylaw. The frontage required by the Zoning Bylaw is located on Village Street and Holliston Street by virtue of Variace grant *(name of way(s), which is:*
- ☒ a. A public way. Date of street acceptance: \_\_\_\_\_
- ☐ b. A way certified by the Town Clerk as being maintained and used as a public way. *(Attach Town Clerk's certification)*
- ☐ c. A way shown on a definitive subdivision plan entitled \_\_\_\_\_  
that was previously endorsed by the Planning and Economic Development Board on \_\_\_\_\_ and recorded at the Norfolk County Registry of Deeds on \_\_\_\_\_  
Provide detailed recording information: \_\_\_\_\_
- ☐ d. A private way in existence on the ground before 1952 when the Subdivision Control Law was adopted in the Town of Medway, which has, in the opinion of the Planning & Economic Development Board, adequate width, suitable grades, and adequate construction to provide vehicular access to the lot(s) for their intended purpose of \_\_\_\_\_ and to permit the installation of municipal services to serve the lot(s) and any buildings thereon.
- ☒ 3. The division of land shown on the accompanying plan is not a "subdivision" for the following reasons: each lots has frontage on a public way and by virtue of Varinace  
granted by ZBA dated February 2, 2018



## SIGNATURES

The undersigned, being the Applicant as defined under Chapter 41, Section 81P for endorsement of an Approval Not Required Plan, herewith submits this application and Approval Not Required Plan to the Medway Planning and Economic Development Board for review and endorsement.

I hereby certify, under the pains and penalties of perjury, that the information contained in this application is a true, complete and accurate representation of the facts regarding the property under consideration.

(If applicable, I hereby authorize Stephen J. Kenney to serve as my Agent/Official Representative to represent my interests before the Medway Planning & Economic Development Board with respect to this Approval Not Required Application.)

In submitting this application, I authorize the Board, its consultants and agents, and Town staff to access the site during the plan review process.

John J. Regan  
Signature of Property Owner

1-14-19  
Date

[Signature]  
Signature of Applicant (if other than Property Owner)

                      
Date

[Signature]  
Signature of Agent/Official Representative

1-14-19  
Date

### ANR PLAN FILING FEE

\$250 plus \$100 per lot or parcel for a plan involving three (3) or more lots/parcels, not to exceed a maximum of \$750.

Please prepare two checks: one for \$100 and one for the balance.  
Each check should be made payable to: Town of Medway

Fee approved 11-2-06

### APPLICATION CHECKLIST – All items must be submitted

- \_\_\_\_\_ 2 signed original ANR applications (FORM A)
- \_\_\_\_\_ 2 full size prints of ANR plan
- \_\_\_\_\_ Electronic version of ANR plan – A flash drive may be provided or a PDF of the plan may be emailed to: [planningboard@townofmedway.org](mailto:planningboard@townofmedway.org).
- \_\_\_\_\_ 2 copies of the Project Explanation
- \_\_\_\_\_ Application/Filing Fee (2 checks) – Check with PEDB office for amounts.

\*\*\*\*\*

ANR Application/Filing Fee Paid:

Amount: \$100 Check # 259370  
Amount: \$150 Check # 259369

### PROJECT EXPLANATION

The applicant is seeking to divide the property located at 180 Village Street, Medway, MA, into two lots as John J. Kenney grant of Variance by the Medway Zoning Board of Appeals on February 7, 2018, allowing for two area variances. Each of the lots would have adequate frontage on Village Street and Holliston Street respectively, and with the grant of variances by the ZBA adequate frontage pursuant to the grant.

Respectfully submitted  
John J. Regan and Kathryn Regan  
By their attorney:

---

Stephen J. Kenney  
Kenney & Kenney  
181 Village Street  
Medway, MA 02053  
508-533-6711 (Phone)  
508-533-6904 (Fax)  
[sjk@kenney-law.com](mailto:sjk@kenney-law.com)  
BBO#: 549507



CERTIFY

*William P. O'Donnell*  
WILLIAM P. O'DONNELL, REGISTER



Town of Medway

## ZONING BOARD OF APPEALS

155 Village Street, Medway, MA 02053

Eric Arbeene, Chair  
Brian White, Vice Chair  
Carol Gould, Clerk  
Bridgette Kelly, Member  
Rori Stumpf, Member

### DECISION VARIANCES 180 VILLAGE STREET



*20 Day Appeal  
March 13, 2018*

**Date Application Filed:** December 14, 2017

**Applicant(s):** John & Kathryn Regan ("the Applicants")  
180 Village Street  
Medway, MA 02053

**Location of Property:** The Project is located on a parcel of land in Medway located at 180 Village Street (Assessor Parcel ID: 60-178).

**Approval Requested:** Variances from Section 6.1 Table 2: Dimensional and Density Regulations of the Medway Zoning Bylaw to split one lot into two lots. Lot 1 would be 22,503 sq. ft. for an existing multifamily dwelling, requiring a variance from the required 30,000 sq. ft. Lot 2 would be 17,759 sq. ft., requiring a variance from the required 22,500 sq. ft. for a single family lot. The applicant also requests variances for the existing structures on Lot 2, which would not be within the required setbacks.

**Members Participating:** Eric Arbeene (Chair), Brian White (Vice Chair), Carol Gould, Bridgette Kelly, and Rori Stumpf

**Members Voting:** Eric Arbeene (Chair), Brian White (Vice Chair), Carol Gould, Bridgette Kelly, and Rori Stumpf

**Hearing Opened:** February 7, 2018

**Hearing Closed:** February 7, 2018

**Date of Decision:** February 7, 2018

**Decision:** Granted

MARGINAL REFERENCE

BOOK 18327 PAGE 159

## **I. PROCEDURAL HISTORY**

1. On December 14, 2017, the Applicant's Representative filed a Variance application, pursuant to G.L. c. 40A, as amended, and the Medway Zoning Bylaw, in order to split one lot into two lots. Lot 1 would be 22,503 sq. ft. for an existing multifamily dwelling, requiring a variance from the required 30,000 sq. ft. Lot 2 would be 17,759 sq. ft., requiring a variance from the required 22,500 sq. ft. for a single family lot. The applicant also requests variances for the existing structures on Lot 2, which would not be within the required setbacks.
2. Notice of the public hearing was published in the Milford Daily News on January 17, 2018 and January 24, 2018, and notice sent by mail to all interested parties, and posted in Town Hall as required by G.L. c. 40A §11.
3. The public hearing was opened on February 7, 2018. The Board closed the public hearing the same evening.
4. The Property is located in the Village Residential (VR) District. The front setback requirement is 20 feet and the side and rear setback requirements are 10 feet. The minimum lot area requirement for a single family home is 22,500 s.f. The minimum lot area for a two-family home is 30,000 s.f. The existing home is a multi-family building and is pre-existing nonconforming.
5. The Applicants were represented by Attorney Steve Kenney, of Kenney & Kenney, 181 Village Street, Medway, MA 02053.
6. The Board notified Town departments, boards and committees of this application. The Board received comments from Fire Chief Jeff Lynch.
7. All documents and exhibits received during the public hearing are contained in the Zoning Board of Appeal's files and listed in Section V. of this Decision.

## **II. TESTIMONY**

At the February 7, 2018 meeting, the hearing was opened by the Board. The Applicant's Representative provided an overview of the requested variances. He explained that the lot area was 40,662 s.f. and that the Applicant was requesting a total of five variances. However, three of the five variance requests are incidental to the request to "split" the lot into two lots, as some of the structures were pre-existing nonconforming and do not meet the required setbacks. Lot 1 would be 22,503 square feet, necessitating a variance from the required minimum 30,000 square feet lot size for a multi-family dwelling and Lot 2 would be 17,759 square feet, necessitating a variance from the required minimum 22,500 square feet lot size for a single family lot. If the Board granted the requests, the garage and barn on Lot 2 would most likely be moved or razed at the time that the lot was sold and a new home was built, however, the owners did not want to tear down the existing structures until such time that the lot was sold.



The Applicant's Representative continued to explain that there was a taking of land by Norfolk County on the property as Village Street and Holliston Street layouts were changed in 1936. The lot is a corner lot and had substantially more land taken than the surrounding properties. In addition, the lot is much larger than the surrounding properties, many of which pre-date zoning. The shape of the lot is triangular and has more than adequate frontage. "Splitting" of the lot would not create a lot that is uncharacteristic of the Zoning District.

The plan for the taking can be found in pl. 42 bk. 120 of 1936, plan showing the Relocation and Widening of Holliston Street.

The Applicants' intent would be to sell Lot 2 in order to provide for their retirement.

No member of the public spoke in favor or opposition of the requests.

### **III. FINDINGS**

In making its findings and reaching the decision described herein, the Board is guided by G.L. c. 40A, as amended, and by the Medway Zoning Bylaw. The Board also considered evidence and testimony presented at the public hearing and comments submitted by residents placed in the public record during the course of the hearings.

#### **A. Variance Criteria**

1. *Circumstances relating to the shape, topography, or soil conditions of the subject property, which do not generally affect other land in the zoning district.*
2. *Substantial hardship caused by the circumstances from Criteria A.1 when the Zoning Bylaw is literally enforced.*
3. *Why/how the grant of relief would not nullify or derogate from the intent of the Zoning Bylaw.*
  - a. The lot is of sufficient size, in comparison to other lots within the Village Residential Zoning District, that it would not be detrimental to be "split" into two lots, in accordance with the plans provided and attached hereto.
  - b. The existing structures on the lot do not meet the setback requirements for the Village Residential District, however, granting of the requested relief for setbacks in splitting the lot into two lots would not be detrimental as they are pre-existing nonconforming and no "new" nonconformities would be made.
  - c. The overall shape of the existing lot has been changed by the County's taking from January 1936.

The Applicant's representative has provided documentation in the Variance application form submitted with this application, and as explained during the hearing, to satisfy the requested Variances.

#### IV. CONDITIONS OF APPROVAL

Based upon the findings of the Board and testimony and information received into the record during the public hearing process, the Board **GRANTS** the Applicant(s), John & Kathryn Regan, **VARIANCES** from Section 6.1 of the Zoning Bylaw in order to split the property at 180 Village Street into two lots. Lot 1 will be 22,503 square feet, with a variance from the required 30,000 square feet for a multi-family dwelling and Lot 2 will be 17,759 square feet, with a variance from the required 22,500 square feet for a single family lot. In addition, the Board grants the variances for the side setback of the existing garage from 10 feet to 5.8 feet, the front setback for the existing garage from 20 feet to 0 feet, and a variance for the existing ramp from 10 feet to 0 feet.

1. These Variances are subject to all subsequent conditions that may be imposed by other Town departments, boards, agencies, or commissions. Any changes to the Variances that may be required by the decisions of other Town boards, agencies or commissions shall be submitted to the Board for review as a new request.

Any work or use that deviates from this Decision shall be a violation of the *Medway Zoning Bylaw*.

2. Upon receipt of a written request by the applicant filed at least thirty (30) days prior to the date of expiration, the Board may grant an extension for good cause. The request shall state the reasons for the extension and also the length of time requested. If no request for extension is filed and approved, the Variances shall lapse one year from the date of Decision, unless action is taken, or as may be otherwise specified herein, and may be reestablished only after a new filing, hearing, and decision.

#### V. INDEX OF DOCUMENTS

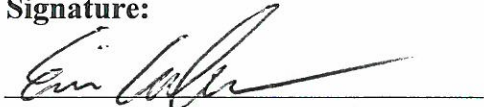



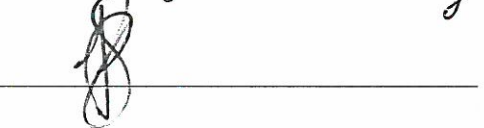
A. The Variance application included the following plans and information that were provided to the Board:

1. General Application Form
2. Variance Application Form
3. 180 Main Street Plan of Land with existing and proposed conditions, prepared by Colonial Engineering Inc. of 11 Awl Street, Medway, MA, dated October 18, 2017
4. Plan showing the Relocation and Widening of Holliston Street, Medway, MA, pl.42 bk.120



## VI. VOTE OF THE BOARD

By a vote of 5 to 0, on a motion made by Eric Arbeene and seconded by Rori Stumpf, the Zoning Board of Appeals hereby **GRANTS** the Applicant(s), John & Kathryn Regan, **VARIANCES** from Section 6.1 of the Zoning Bylaw in order to split the property of 180 Village Street into two lots. Lot 1 will be 22,503 square feet, a variance from the required 30,000 square feet for a multi-family dwelling and Lot 2 will be 17,759 square feet, a variance from the required 22,500 square feet for a single family lot. In addition, the Board grants the variances for the side setback of the existing garage from 10 feet to 5.8 feet, the front setback for the existing garage from 20 feet to 0 feet, and a variance for the existing ramp from 10 feet to 0 feet.

Member:	Vote:	Signature:
Eric Arbeene	YES	
Brian White	YES	
Carol Gould	YES	
Bridgette Kelly	YES	
Rori Stumpf	YES	

The Board and the Applicant have complied with all statutory requirements for the issuance of this Decision on the terms hereinafter set forth. A copy of this Decision will be filed with the Medway Town Clerk and mailed to the Applicant, and notice will be mailed to all parties in interest as provided in G.L. c. 40A §15.

Any person aggrieved by the decision of the Board may appeal to the appropriate court pursuant to Massachusetts General Laws, Chapter 40A, §17, and shall be filed within twenty days (20) after the filing of this notice in the Office of the Medway Town Clerk.

In accordance with MGL c. 40A, Section 11, no variance or special permit shall take effect until a copy of the Decision is recorded in the Norfolk County Registry of Deeds is recorded in the Norfolk County Registry of Deeds, and indexed in the grantor index under the name of the owner of record or is recorded and noted on the owner's certificate of title, bearing the certification of the Town Clerk that twenty days have elapsed after the Decision has been filed in the Office of the Town Clerk and no appeal has been filed within said twenty day period or that any duly filed appeal has been dismissed or denied. The fee for recording or registering shall be paid by the Applicant. A copy of the recorded Decision certified by the Registry, and notification by the Applicant of the recording, shall be furnished to the Board.

Vote of the Board  
180 Village Street



## MEDWAY TOWN CLERK

155 VILLAGE STREET  
MEDWAY, MASSACHUSETTS 02053  
(508) 533-3204 • Fax: (508) 533-3287  
mwhite@townofmedway.org

**MARYJANE WHITE, CMMC**

CERTIFIED MASSACHUSETTS MUNICIPAL CLERK

JUSTICE OF THE PEACE

NOTARY PUBLIC

### CERTIFICATE

I, TOWN CLERK OF THE TOWN OF MEDWAY, HEREBY CERTIFY THAT NOTICE OF THE VARIANCE DECISION OF THE MEDWAY ZONING BOARD HAS BEEN

RECEIVED IN THE MATTER OF:

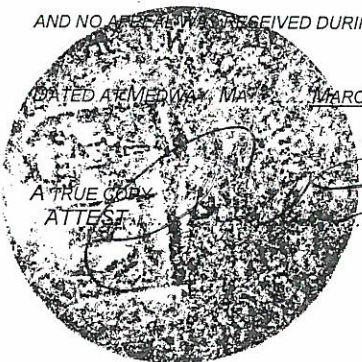
JOHN AND KATHRYN REGAN  
180 VILLAGE ST  
MEDWAY MA

FILED IN THE TOWN CLERK'S OFFICE ON FEB. 21, 2018

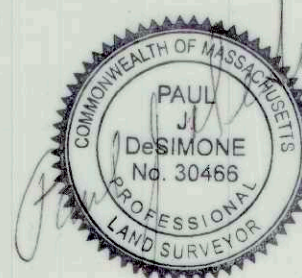
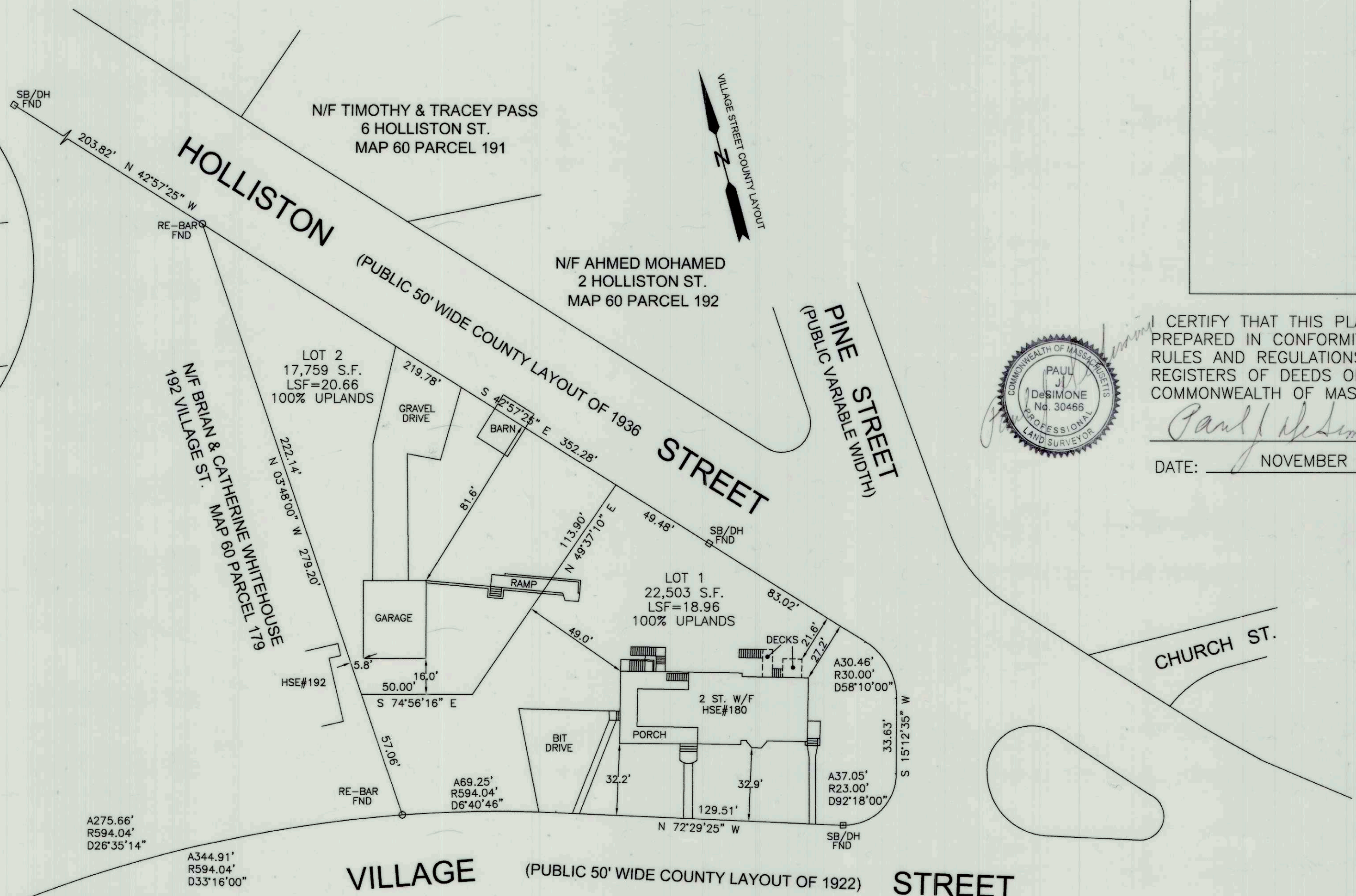
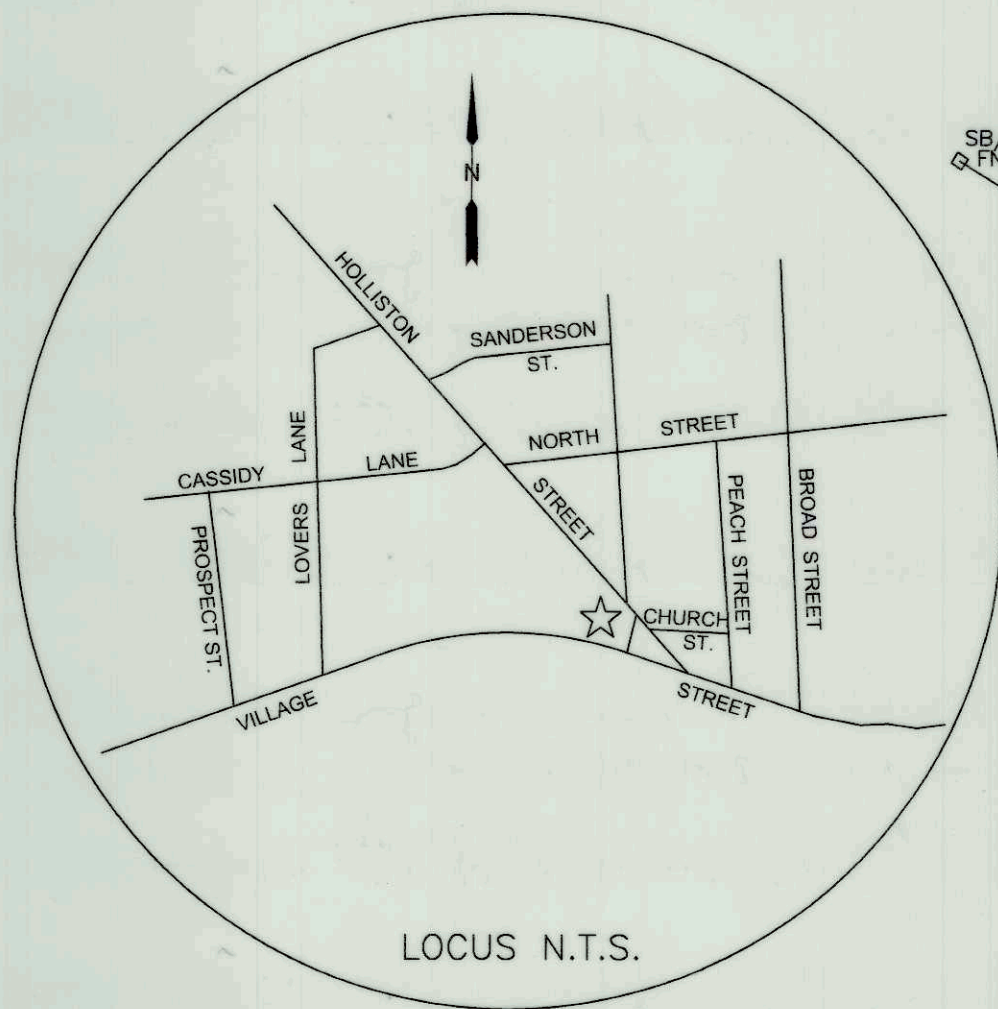
AND NO APPEAL WAS RECEIVED DURING THE NEXT TWENTY DAYS AFTER SUCH RECEIPT AND RECORDING OF SAID DECISION.

DATED AT MEDWAY, MASS. MARCH 28, 2018

A TRUE COPY  
ATTEST







I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

*Paul J. DeSimone*

DATE: NOVEMBER 21, 2018

MAP 60 PARCEL 178  
PLAN OF LAND  
IN

MEDWAY, MA.

SCALE: 1"=40' NOV. 21, 2018

OWNER: LIVING ESTATE OF  
John & Kathryn Regan  
180 Village Street  
Medway, Ma, 02053

COLONIAL ENGINEERING INC.  
11 AWL STREET MEDWAY, MA.  
508-533-1644



ZONE VR (AUOD)  
22,500 S.F. AREA  
150' FRONTAGE  
20' SETBACK  
10' SIDEYARD  
10' REARYARD  
30% BUILDING LOT COVERAGE  
40% IMPERVIOUS LOT COVERAGE  
NOT WITHIN WATER PROTECTION DISTRICT  
NOT WITHIN THE FLOOD PLAIN

LOT 1 EXISTING COVERAGE  
11.68% BUILDING LOT COVERAGE  
20.63% IMPERVIOUS LOT COVERAGE

LOT 2 EXISTING COVERAGE  
6.92% BUILDING LOT COVERAGE  
8.24% IMPERVIOUS LOT COVERAGE

APPROVAL UNDER SUBDIVISION CONTROL  
LAW IS NOT REQUIRED.  
DATE ENDORSED: \_\_\_\_\_

TOWN OF MEDWAY PLANNING BOARD

"PLANNING BOARD ENDORSEMENT DOES NOT CONSTITUTE A DETERMINATION OF COMPLIANCE WITH THE MEDWAY ZONING BY-LAWS."

NOTE: PROPERTY SHOWN ON THIS PLAN IS NOT CLASSIFIED AS CHAPTER 61A OR 61B.

NOTE: SEE DECISION FROM Z.B.A. DATED FEBRUARY 7, 2018 FOR AREA AND SETBACKS.



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**PGC ASSOCIATES, LLC.**

1 Toni Lane  
Franklin, MA 02038-2648  
508.533.8106  
gino@pgcassociates.com

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**MEMO TO:** Medway Planning and Economic Development Board

**FROM:** Gino D. Carlucci, Jr.

**DATE:** January 17, 2019

**RE:** 180 Village St. ANR

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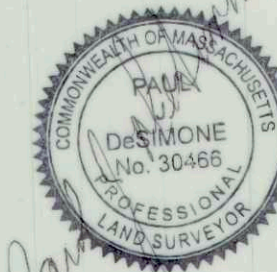
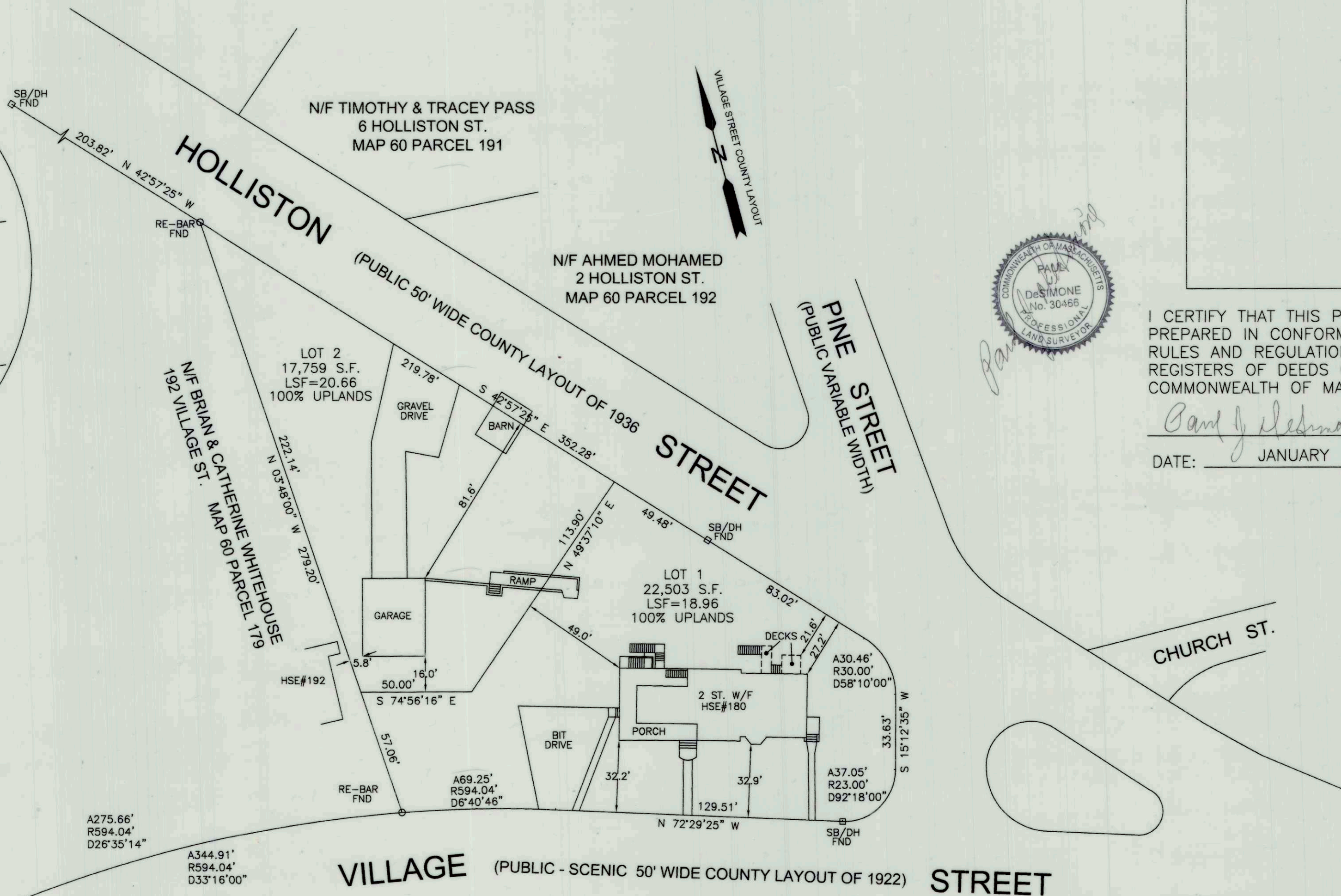
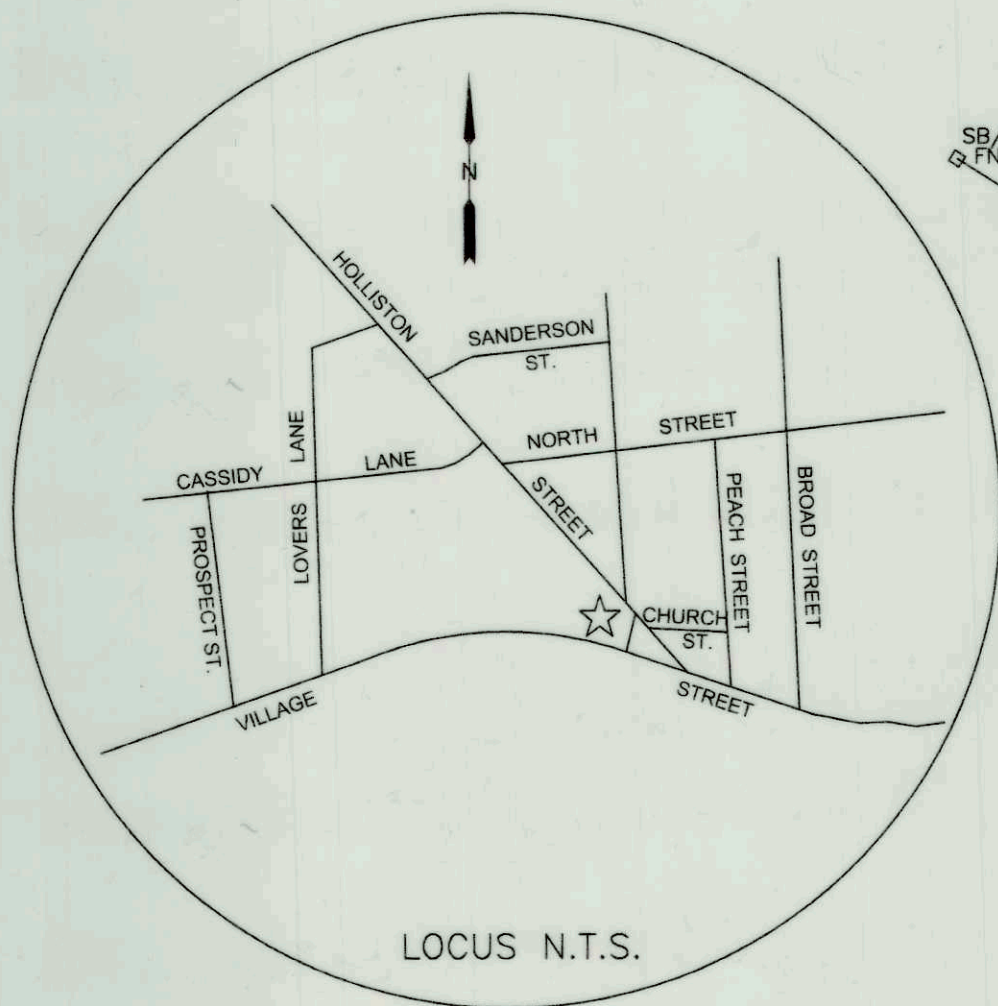
I have reviewed the ANR plan submitted for endorsement by John and Kathy Regan. The plan was prepared by Colonial Engineering, Inc. of Medway, and is dated November 21, 2018. The plan proposes to divide the lot into 2 lots. Lot 1 will have 22,503 square feet and it includes the existing 2-family home. A variance has been granted from the 30,000 square foot minimum for a 2-family. Lot 2 will have 17,759 square feet. A variance has been granted from the 22,500 square foot minimum. Both lots have adequate frontage in compliance with the Zoning Bylaw.

I have comments as follows:

1. The plan meets the substantive and technical requirements for ANR endorsement.
2. Section 3.2.7 requires that Scenic roads be indicated. Village Street is a Scenic Road.
3. I recommend that, in the future, the surveyor use a different line style for features other than lot lines as it took a while to recognize the lot lines by the distance and bearings labels.

I recommend that the technical deficiency be corrected and that the plan be endorsed by the Board.





I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

*Paul Desimone*  
DATE: JANUARY 17, 2019

277.27'  
N 74°14'35" E  
SB/DH  
FND

ZONE VR (AUOD)  
22,500 S.F. AREA  
150' FRONTAGE  
20' SETBACK  
10' SIDEYARD  
10' REARYARD  
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APPROVAL UNDER SUBDIVISION CONTROL  
LAW IS NOT REQUIRED.  
DATE ENDORSED: \_\_\_\_\_

TOWN OF MEDWAY PLANNING BOARD

"PLANNING BOARD ENDORSEMENT DOES NOT CONSTITUTE A DETERMINATION OF COMPLIANCE WITH THE MEDWAY ZONING BY-LAWS."

NOTE: PROPERTY SHOWN ON THIS PLAN IS NOT CLASSIFIED AS CHAPTER 61A OR 61B.

NOTE: SEE DECISION FROM Z.B.A. DATED FEBRUARY 7, 2018 FOR AREA AND SETBACKS.

MAP 60 PARCEL 178  
PLAN OF LAND  
IN  
MEDWAY, MA.

SCALE: 1"=40' NOV. 21, 2018  
REVISED: JANUARY 17, 2019

OWNER: LIVING ESTATE OF  
John & Kathryn Regan  
180 Village Street  
Medway, Ma, 02053

COLONIAL ENGINEERING INC.  
11 AWL STREET MEDWAY, MA.  
508-533-1644







**January 22, 2019**

**Medway Planning & Economic Development Board  
Meeting**

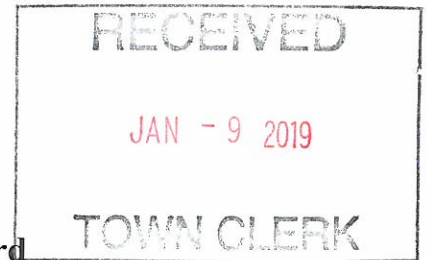
**2 Marc Road Adult Recreational  
Marijuana Special Permit – Public  
Hearing Continuation**

- Public Hearing Continuation Notice dated 1-9-2019
- Email dated 1-10-2019 from resident Heidi Sia, 18 Main Street
- Email dated 1-16-19 from noise consultant Ron Dempsey with a conversion of noise standards in the Zoning Bylaw to the equivalent modern standards.
- UPDATED draft decision dated January 18, 2019
- Odor report provided to the Millis Planning Board for a marijuana cultivation facility 1073 Main Street in Millis





**TOWN OF MEDWAY**  
**Planning & Economic Development Board**  
155 Village Street  
Medway, Massachusetts 02053



*Andy Rodenhiser, Chairman*  
*Robert K. Tucker, Vice-Chairman*  
*Thomas A. Gay, Clerk*  
*Matthew Hayes, P.E.*  
*Richard Di Iulio*

**MEMORANDUM**

January 9, 2019

TO: Maryjane White, Town Clerk  
Town of Medway Departments, Boards and Committees

FROM: Susy Affleck-Childs, Planning & Economic Development Coordinator

RE: **Public Hearing Continuation: 2 Marc Road – Adult Recreational Marijuana Special Permit**  
**CONTINUATION DATE: Tuesday, January 22, 2019 at 7:15 p.m.**  
**LOCATION: Medway Town Hall – Sanford Hall, 155 Village Street**

At its meeting on January 8, 2019, the Planning and Economic Development Board voted to continue the public hearing on the application of Ellen Realty Trust of Millis, MA for a special permit to operate an adult recreational marijuana cultivation and processing facility at 2 Marc Road to Tuesday, January 22, 2019 at 7:15 p.m. in Sanford Hall at Medway Town Hall, 155 Village Street.

The applicant proposes to use the existing two story, 60,000 sq. ft. industrial building at 2 Marc Road (Parcel 33-001) located on the north side of Marc Road in the East Industrial zoning district. The 6.93 acre property is owned by Ellen Realty Trust of Millis, MA. NOTE - A medical marijuana special permit, site plan, and groundwater protection special permit were previously approved for this property on June 28, 2016. The proposed use pertains to the cultivation, manufacturing, processing, and packaging of marijuana for adult recreational use and the delivery of such products off-site to retail marijuana establishments in other communities. A recreational marijuana retail facility is not proposed at this location.

The application and associated documents are on file with the Medway Town Clerk and at the office of the Planning and Economic Development Board at Medway Town Hall, 155 Village Street and may be reviewed during regular business hours. The materials are also posted at the Planning and Economic Development Board's web page at: <https://www.townofmedway.org/planning-economic-development-board/pages/current-development-applications>

**If Town staff, boards and committees have not yet reviewed this proposal and wish to provide comments, please do so by January 16th so that I can share them with the Board and the applicant and enter them into the public record during the hearing. The Board will begin its deliberations and review a draft decision at the January 22<sup>nd</sup> meeting.**

Please contact me if you have any questions. Thanks.

## Susan Affleck-Childs

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**From:** Heidi Sia <hjsia@yahoo.com>  
**Sent:** Thursday, January 10, 2019 1:18 PM  
**To:** Susan Affleck-Childs  
**Subject:** CommCan

Dear Town of Medway Planning Board members,

Although I was unable to attend your board meeting on Jan 8th, I was able to view it on Medway cable access. I am a resident at 18 Main St, living here for the past 12 years and prior to that I lived at 25 Main St for 22 years. I would like to add a little bit of information to the conversation regarding CommCan. Since the Spring of 2018, I have experienced the odor of marijuana in my yard, as well as when walking up Coffee St. I am away at work during the day, so most of my observations are in the evening and at night. However, I have also experienced it during the day on the weekends.

Here are my observations:

- the odor varies by concentration, Sometimes it is very pungent and other times less so. There were times at night over the summer when I was unable to open the windows of my house as my house would then smell badly. When it is strong, it smells like a dead skunk is right outside my window. The strong smell also affected my desire to spend any time in my yard. One time this fall, it was so strong that I could smell it as I was turning onto Coffee St, and my car windows were closed. A few of the times that it was strong, I drove into the parking lot of CommCan and noticed that the smell was not as strong there as it was in my yard.
- I have not noticed it everyday, but it is frequent. Some weeks, it is present every day that week.

In July 2018, I contacted Medway town administrator Michael Boynton, who had me also speak with representatives from the Board of Health and the Conservation Commission. They gave me Ms. Rosenfeld's phone number so I called her to see if there was any possibility of mitigating the odor issue. At that time Ms. Rosenfeld stated that she was surprised I could smell anything, and when I inquired about additional filtration, she said, "it is what it is".

I also contacted the Massachusetts Cannabis Control Commission and was informed that the Mass Dept of Public Health oversaw CommCan as it is a medical marijuana growing facility. I contacted DPH compliance office, but had no response.

I am thankful to one of my neighbors who alerted me to the recent board meeting. I am not opposed to this business being located in close proximity to my home, and I am well accustomed to residing alongside the industrial park. It is my hope that the owners of this business will make every attempt possible to be a responsible and considerate community member and neighbor to all those who have businesses in the industrial park, as well as those of us who live in the vicinity.

While this may be a new concern for the Town of Medway, there are many other communities in other states that have faced similar problems and have made attempts to mitigate them. I thank you for the time and effort you have and will put into working this through.

Heidi Sia  
18 Main St  
Medway

## Susan Affleck-Childs

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**From:** Michael Boynton  
**Sent:** Wednesday, January 16, 2019 3:38 PM  
**To:** Susan Affleck-Childs; Beth Hallal  
**Cc:** Allison Potter  
**Subject:** FW: Updated Noise By-Law  
**Attachments:** Billerica By-laws.pdf

### Thoughts on this???

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**From:** Ron Dempsey [mailto:ron@noise-control.com]  
**Sent:** Wednesday, January 16, 2019 3:37 PM  
**To:** Michael Boynton  
**Subject:** Updated Noise By-Law

Michael,

Here are some basic options for changing the noise by-laws for the Town of Medway. The bare minimum to update the by-laws is to convert the old octave band levels to modern octave band levels. Here is the old table from the by-laws:

Frequency Band (Cycles per Second)	Sound Pressure Level (Decibels re 0.0002 Dyne/cm <sup>2</sup> )
2-72	69
75-150	54
150-300	47
300-600	41
600-1200	37
1200-2400	34
2400-4800	31
4800-10,000	28

Converting the levels to the modern octave bands mathematically we would get the following table:

Octave Band Center Frequency (Hz)	Sound Pressure Level, (dB re 20 micro-Pa)
63	67
125	55
250	48
500	42
1000	38
2000	35
4000	32
8000	28

There is also an EPA document that exists that suggests simply increasing each value by 1 dB, which is effectively the same for most frequencies, but is a little off at the high and low end. Either method will result in effectively the same



noise levels in a format that is easily measurable with today's equipment. If you would like to make any other tweaks to the noise section, I have attached an example of a noise by-law that NCE helped develop for the town where we are located, Billerica MA. The noise limits in it are not as stringent as the current Town of Medway by-laws, but it does cover a number of other cases that are not covered. If there are other items that you would like to see covered, such as different noise limits for industrial-to-industrial noise as per MassDEP, those could be included. I would assume that for the Town Meeting I would prepare a memo detailing the math for the conversion and providing the supporting documents from the EPA so that it is clear and understandable for any questioning.

**Ron Dempsey**

Senior Engineer

[ron@noise-control.com](mailto:ron@noise-control.com)

**Noise Control Engineering, LLC**

85 Rangeway Road

Building 2, 2nd Floor

Billerica, MA 01862

978-584-3025 (direct line)

978-670-5339 (main number)

[www.noise-control.com](http://www.noise-control.com)



**TOWN OF MEDWAY**  
**Planning & Economic Development Board**  
155 Village Street  
Medway, Massachusetts 02053

*Andy Rodenhiser, Chairman  
Robert K. Tucker, Vice-Chairman  
Thomas A. Gay, Clerk  
Matthew J. Hayes, P.E.  
Richard Di Iulio*

REVISED DRAFT – January 18, 2019

***SPECIAL PERMIT***  
***Adult Recreational Marijuana Establishment***  
***Ellen Realty Trust/CommCan, Inc. – 2 Marc Road***  
***with Conditions***

**Decision Date:** \_\_\_\_\_

**Name/Address of Applicant:** Ellen Realty Trust  
730 Main Street, Suite 2A  
Millis, MA 02054

**Name/Address of Property Owner:** Ellen Realty Trust  
730 Main Street, Suite 2A  
Millis, MA 02054

**Location:** 2 Marc Road, 19 Jayar Road and 21 Jayar Road

**Assessors' Reference:** 33-001, 24-015 and 24-016

**Zoning District:** East Industrial

**I. PROJECT DESCRIPTION** – The Applicant seeks a special permit pursuant to sub-section 8.10 of the *Zoning Bylaw* to use a two story, 60,000 sq. ft. industrial facility at 2 Marc Road, and 19 & 21 Jayar Road (*Medway Assessors' Parcels 33-001, 24-015 and 24-016*) on the north side of Marc Road in the East Industrial zoning district for the cultivation, processing and manufacturing of marijuana by CommCan, Inc. for adult recreational use. This project pertains to the fit-out of the second floor of the building to allow for the expanded operation. The property is already subject to a medical marijuana special permit issued June 28, 2016 and an approved site plan endorsed on July 26, 2016. The current application does not include the retail sales of medical or adult recreational marijuana.

**II. VOTE OF THE BOARD** – After reviewing the application and information gathered during the public hearing and review process, the Medway Planning and Economic Development Board, on \_\_\_\_\_, 2019, on a motion made by \_\_\_\_\_ and seconded by \_\_\_\_\_, **voted to \_\_\_\_\_ with CONDITIONS an adult recreational marijuana establishment special permit.**

The vote was \_\_\_\_\_ by a vote of \_\_\_\_\_ in favor and \_\_\_\_\_ opposed.

**Planning & Economic Development Board Member**

**Vote**

Richard Di Iulio  
 Matthew Hayes  
 Thomas A. Gay  
 Andy Rodenhiser  
 Robert Tucker

**III. PROCEDURAL HISTORY**

- A. October 9, 2018 – Special permit filed with the Medway Planning & Economic Development Board; filed with the Town Clerk on October 11, 2018.
- B. October 11, 2018 – Public hearing notice filed with the Town Clerk and posted at the Town of Medway web site.
- C. October 15, 2018 - Public hearing notice mailed to abutters by certified sent mail
- D. October 29 and November 6, 2018 - Public hearing notice advertised in *Milford Daily News*.
- E. November 13, 2018 - Public hearing commenced. The public hearing was continued to November 27 and December 11, 2018 and to January 8, 22 and \_\_\_\_\_ when the hearing was closed and a decision rendered.

**IV. INDEX OF SITE PLAN DOCUMENTS**

- A. The special permit application for the proposed use of the building at 2 Marc Road for an adult recreational marijuana establishment included the following information that was provided to the Planning and Economic Development Board at the time the application was filed:
  1. *2 Marc Road Site Plan of Land in Medway, MA*, dated January 26, 2016, last revised July 18, 2016, prepared by Merrikin Engineering of Millis, MA – ENDORSED July 26, 2016.



2. Sworn statement of ownership of CommCan, Inc. dated October 8, 2018
3. Special permit application submittal letter from Daniel J. Merrikin, P.E. dated October 9, 2018 as official representative of the Applicant.
4. Policy and Procedures document titled *Transportation of Marijuana for CommCan*, received October 9, 2018
5. Floor plan of the CommCan facility, dated May 2, 2016 by Keenan & Kenney Architects, Ltd.

B. During the course of the review, a variety of other materials were submitted to the Board by the Applicant, its representatives, Town staff and the Town's consultants:

1. Results of Noise Study by Acentech, Inc. provided November 13, 2018
2. Noise Survey by Noise Control Engineering, LLC dated November 27, 2018
3. Host Community Agreement between CommCan and the Town of Medway dated May 16, 2016 and the associated amendment dated April 17, 2018.
4. Email communications dated October 23, 2018 from the MA Cannabis Control Commission acknowledging receipt of CommCan's applications for recreational marijuana cultivation and product manufacturing licenses
5. Endorsed CommCan site plan and medical marijuana special permit decision dated June 28, 2016.
6. Marijuana Odor Control Plan Template for Denver, Colorado
7. Email dated January 16, 2019 from Ron Dempsey of Noise Control Engineering converting the existing and long-standing noise measurement standards from the Medway Zoning Bylaw to the current, modern noise measurement standards.
8. *Cannabis-Related Odor Mitigation @1073 Main Street*, Millis, MA by GroThink, Oasis Spring, LLC, and Lynch Associates for the Millis Planning Board.

C. Other Documentation

1. Mullins Rule Certification dated November 27, 2018 for Andy Rodenhiser for the November 13, 2018 hearing
2. Mullins Rule Certification dated December 5, 2018 for Robert Tucker for the November 27, 2018 hearing
3. Mullins Rule Certification dated December 5, 2018 for Thomas Gay for the November 27, 2018 hearing.

V. **TESTIMONY** - In addition to the site plan application materials as submitted and provided during the course of our review, the Planning and Economic Development Board heard and received verbal or written testimony from:

- Gino Carlucci, PGC Associates, the Town's Consulting Planner – Special Permit review letter dated November 7, 2018 and commentary throughout the public hearing process.
- Ellen Rosenfeld, Applicant
- Dan Merrikin, Legacy Engineering, project engineer for the Applicant
- Andy Carballeria, Acentech Inc., acoustic sound consultant for the Applicant
- Ron Dempsey, Noise Control Engineering, acoustic sound consult for the Town

- Resident and abutter John Lally, 35 Coffee Street - Emails dated November 5, November 16, November 26, and December 10, 2018 about noise; Emails dated December 16 and 21, 2018 about odor; and commentary throughout the public hearing process.
- Email communications dated December 10, 2018 between Planning and Economic Development Coordinator Susan Affleck-Childs and Ron Dempsey of Noise Control Engineering, LLC, the Town's noise engineering consultant.
- Email communication with attachments dated January 3, 2019 between Ron Dempsey of Noise Control Engineering and Andy Carballeira of Acentech
- Emails dated December 17 and 27, 2018 between Susan Affleck-Childs and Ellen Rosenfeld about odor.
- Resident, Leany Oliveria, 402 Village Street
- Resident Jane Studennie, address unknown
- Resident Heidi Sia, 8 Main Street, email dated January 10, 2019
- Resident Phil Giangarra, 24 Green Valley Road
- Resident Leigh Knowlton, 11 Green Valley Road - EMAIL
- Resident Jeanette Gibson, 45 Coffee Street
- Selectman Dennis Crowley
- Town Administrator Michael Boynton

## VI. FINDINGS

The Planning and Economic Development Board, at its meeting on \_\_\_\_\_ 2019, on a motion made by \_\_\_\_\_ and seconded by \_\_\_\_\_, voted to approve the following **FINDINGS** regarding the special permit application for adult recreational marijuana establishment for 2 Marc Road. The motion was approved by a vote of \_\_\_\_\_ in favor and \_\_\_\_\_ opposed.

### **FINDINGS from PUBLIC HEARING TESTIMONY**

- (1) The Applicant currently operates a medical cultivation facility at 2 Marc Road and will continue to operate that use at this location. The Applicant now seeks to secure a special permit to also use the facility to grow and process marijuana for adult recreational use.
- (2) Noise Control Engineering LLC (NCE) was retained by the Town of Medway to evaluate the noise levels at the 2 Marc Road facility with respect to Massachusetts Department of Environmental Protection (MassDEP) noise limits. NCE conducted attended noise measurements on the night of October 31, 2018 at the 2 Marc Road facility and at several residences nearby. The measured noise levels were within allowable levels per MassDEP, but when converted to the standard used by the Town of Medway Zoning Bylaw, the measured noise levels were in excess of the Town's criteria. NCE's report and measurements were reviewed by Acentech, sound consultant for the Applicant. Acentech provided an alternative conversion of the measurements and criteria which results in lower noise levels and partial compliance with the Town's Zoning Bylaw. However, these lower noise levels still exceed the Zoning Bylaw limits in the format that they are specified in.

**Commented [SA1]:**

This language was provided by Ron Dempsey of Noise Control Engineering.

**RECREATIONAL MARIJUANA ESTABLISHMENT SPECIAL PERMIT  
FINDINGS (Sub-section 8.10)**

- (1) The recreational marijuana establishment will operate inside the existing medical marijuana cultivation and processing facility at 2 Marc Road, a permanent, standalone building with no doctor's offices or other uses. The site includes driveways, parking areas, utility systems, and stormwater management facilities.
- (2) None of the uses listed in Section 8.10 E. 4. Of the *Zoning Bylaw* are located within 500 feet of the site of the proposed facility.
- (3) Smoking, burning and consumption of marijuana products on the premises is not allowed.
- (4) No drive-through service is proposed; it is not needed as a retail operation is not planned nor does the *Zoning Bylaw* allow for a drive-through facility.
- (5) The proposed signage is in compliance with Section 8.10 E. of the *Zoning Bylaw*
- (6) The Applicant has previously provided the contact information for management staff and key holders of the facility.
- (7) As conditioned herein, the recreational marijuana establishment does not create a nuisance to abutters or to the surrounding area or create any hazard. Both the Applicant and the Town have contracted with noise consultants to monitor the sound from the facility and both found the operation to be within DEP noise regulations.
- (8) The existing building meets the requirements for "openness of premises" since no activities within the building or displays of products are visible from the exterior of the building and the front of the building, which includes the primary entrance to the facility, is fully visible from the street. All operations are within the restricted building and there is no direct consumer access as no retail sales are allowed.
- (9) The special permit authorizes the following adult recreational marijuana establishment activities: cultivation, manufacturing, processing and packaging of marijuana and marijuana products and the transport and delivery of such to other recreational marijuana establishments. The special permit does not authorize retail sales or testing.
- (10) As conditioned, copies of required licenses and permits issued by the Commonwealth will be provided upon approval by the Massachusetts Cannabis Control Commission. The recreational marijuana operation will be operated in strict compliance with Massachusetts Cannabis Control Commission regulations.
- (11) The Applicant, Ellen Realty Trust, is the owner of record of the subject property and building as shown on the Medway Assessor's records. Accordingly, the Applicant has the right to use the site for a registered marijuana establishment.
- (12) A sworn statement disclosing the owner's or other similarly situated individuals' interest in the registered marijuana establishment has been provided.



- (13) A certified list of all abutter and parties of interest was provided. The Planning and Economic Development office coordinated the production and mailing of the required public hearing notice for the special permit application.
- (14) The Applicant secured previous site plan approval for the manufacturing establishment on this site in June 2016. No changes are needed or proposed to that site plan. A detailed floor plan of the premises showing the functional areas of the facility has been provided. Security measures including lighting, fencing, gates and alarms were previously reviewed and approved by the Police Chief during the site plan and special permit process in 2016.
- (15) A copy of the policies/procedures for the transfer, acquisition, or sale of adult recreational marijuana between approved marijuana establishments has been provided.
- (16) The required public hearing and review process for this special permit application has been followed.
- (17) The adult recreational marijuana establishment, as conditioned herein, has been designed to minimize any adverse visual or economic impacts on abutters and other parties in interest. No changes in the existing building or site are proposed other than additional measures to further mitigate noise impacts of the existing HVAC system.
- (18) As conditioned herein, the proposed facility will meet all the permitting requirements of all applicable agencies within the Commonwealth of Massachusetts and will be in compliance with all applicable state laws and regulations.
- (19) As conditioned herein, the Applicant has satisfied the conditions and requirements of this sub-section 8.10 and sub-section 3.4 of the *Zoning Bylaw*.
- (20) The Town of Medway and CommCan, Inc. entered into a Host Community Agreement in May 2016 for the medical marijuana operation. The HCA was amended in April 2018 in anticipation of this application for an adult recreational marijuana establishment.

**GENERAL SPECIAL PERMIT FINDINGS (Sub-section 3.4)**

- (1) *The proposed site is an appropriate location for the proposed use.*

Sub-section 8.10 of the *Zoning Bylaw*, Recreational Marijuana, specifies that recreational marijuana establishments are allowed by special permit in the East and West Industrial Zoning Districts. The subject site at 2 Marc Road is located within the East Industrial and is therefore an eligible location. The site is not within 500 feet of any of the uses from which such facilities are prohibited (existing public or private school serving students in grades K-12).

- (2) *Adequate and appropriate facilities will be provided for the operation of the proposed use.*

The adult recreational marijuana cultivation and manufacturing uses are being added to the previously approved use of the facility for medical marijuana cultivation and manufacturing which was also subject to a site plan review and approval process. The current activities in the building will essentially remain unchanged; the only difference is that the products will be used for adult recreational purposes. No changes are proposed to that previously approved site plan. Due to that prior special permit and associated site plan review process, adequate and appropriate facilities have been provided for the operation of the facility.

- (3) *The proposed use as developed will not create a hazard to abutters, vehicles, pedestrians or the environment.*

The existing site, which has site plan approval dating to June 2016 contains suitable driveways, parking areas and stormwater management systems.

- (4) *The proposed use will not cause undue traffic congestion or conflicts in the immediate area.*

Vehicular activity at the site is minimal; the proposed facility is expected to have 30 employees. The retail sale of marijuana products to the public is not permitted so public access to the site will be minimal and the Industrial Park Road system is adequate to handle it. The Applicant previously reconstructed Marc Road as part of the approval of the medical marijuana special permit so the roadway quality is excellent. Furthermore, the site has easy access from Main Street/ Route 109, a major east-west arterial roadway, so there is no traffic impact on local residential roadways.

- (5) *The proposed use will not be detrimental to the adjoining properties due to lighting, flooding, odors, dust, noise, vibration, refuse materials, or other undesirable visual, site or operational attributes of the proposed use.*

The use itself is not detrimental to adjoining properties, however the operation of the HVAC equipment periodically generates conspicuous noise of great concern to selected residential abutters and nearby neighbors. Noise evaluation reports were provided by consultants for the Applicant (Acentech) and the Town (Noise Control Engineering). Throughout the permitting process, the Applicant has demonstrated a strong commitment to address and mitigate the noise issues as experienced by the residential abutters. The Applicant intends to supplement existing noise mitigation systems as part of the build-out of the second floor. As conditioned herein (Condition \_\_\_\_), the Board finds that suitable monitoring and mitigation measures will be taken to address noise issues.

There is no outside storage of either materials or waste. While vegetation close to the building is limited by the State's security requirements, six trees have been planted around the parking lot and other low vegetation has been added as part of the original building construction site plan to improve aesthetics from the public way and nearby residences.

Testimony was provided from abutters about offensive odors emanating from the subject facility. The Board has discussed the need for the Applicant to institute

**Commented [SA2]:**

The Applicant would like to eliminate "monitoring" from this sentence. The Board needs to decide if it will include a Condition to require some level of noise monitoring.

appropriate odor control measures. The Applicant intends to supplement existing odor mitigation systems as part of the build-out of the second floor. As conditioned herein (Condition #\_\_ ), the Board finds that suitable mitigation measures will be taken to address odors emanating from the facility beyond the property lines.

- (6) *The proposed use as developed will not adversely affect the surrounding neighborhood or significantly alter the character of the zoning district.*

The proposed use is manufacturing and is therefore consistent with the character of the East Industrial zoning district in which the subject property is located. This application pertains to a proposal to produce marijuana for adult recreational use within the existing marijuana cultivation building which is currently limited to the production and processing of medical marijuana. This expansion of use was expected at the time the original site plan and special permit for medical marijuana use was authorized in 2016.

**Applicant proposes the following additional language after the above:**

The applicant will be required to meet the provisions of Section 7.3 of the Zoning Bylaw. As such, it is the finding of the Board that the use of the existing facility for recreational marijuana production will not adversely affect the surrounding neighborhood or significantly alter the character of the zoning district.

- (7) *The proposed use is in harmony with the general purpose and intent of this Zoning Bylaw.*

The Recreational Marijuana section of the *Zoning Bylaw* (Section 8.10) was adopted by the Town in May 2018 with the specific intent of allowing the limited establishment of non-retail recreational marijuana establishments in Medway. The stated purpose of Section 8.10 is to address possible adverse public health and safety consequences and impacts on the quality of life related to this type of facility by providing for them in an appropriate places and under strict conditions, therefore, it meets the purpose of the *Zoning Bylaw*.

- (8) *The proposed use is consistent with the goals of the Medway Master Plan.*

The existing facility and the expanded use of the facility is in compliance with Goals 1 and 6 of the Economic Development Goals and Objectives section of the Medway Master Plan as follows:

- Goal 1: Maximize the area's economic resources
- Goal 6: Attract new (and retain existing) businesses and increase the industrial/manufacturing base.

- (9) *The proposed use will not be detrimental to the public good.*

As a facility in compliance with state and local law, and consistent with the goals of the Medway Master Plan, the proposed use will not be detrimental to the public good.



**VIII. CONDITIONS** The *Special and General Conditions* included in this Decision shall assure that the Board’s approval of this site plan is consistent with the *Site Plan Rules and Regulations*, that the comments of various Town boards and public officials have been adequately addressed, and that concerns of abutters and other town residents which were aired during the public hearing process have been carefully considered

**SPECIFIC CONDITIONS OF APPROVAL**

A. All standard requirements included in Section 8.10 Recreational Marijuana of the *Zoning Bylaw* apply to this permit. These include but are not limited to:

1. The Applicant shall provide an annual report of CommCan’s operations to the Board and other Town officials no later than January 31<sup>st</sup> of each year, providing a copy of all current state licenses and demonstrating continued compliance with the conditions of this special permit. Any change in ownership of CommCan, Inc. or change in management staff and key holders shall also be reported.
2. This special permit is not transferrable to another party. It shall remain exclusively with the Applicant, Ellen Realty Trust, as the owner of the premises.
3. Smoking, burning and consumption of marijuana or marijuana infused products on the premises is not allowed.

B. **Noise Management**

SAC Draft	Alternative Language Proposed by the Applicant
1. The Applicant shall implement the following additional noise mitigation measures presented during the public hearing to address present concerns by <u>    </u> date: <ul style="list-style-type: none"> <li>• Relocate rooftop chiller to ground.</li> <li>• xxx</li> <li>• xxx</li> </ul>	1. As indicated by the Applicant during the hearing, buildout of the second floor is expected to commence in the near future. As part of that effort, the Applicant has indicated that the existing chiller may be modified or replaced. All new equipment will be reviewed with the Building Department at the time the building permit is sought. Regardless, the Applicant shall re-assess noise issues to the satisfaction of the Building Inspector prior to issuance of an occupancy permit for the second floor. The Building Inspector may require the Applicant to provide additional noise studies at that time to demonstrate the satisfactory resolution with respect to the noise complaints.

<p>2. Any new external fans, HVAC equipment, or electrical generators installed on the property shall be fitted with appropriate acoustical shielding and sound dampening measures (specify . . . . .)</p> <p>3. The Applicant shall monitor noise levels (how often??) (where??) to ensure that the operation and all attendant equipment, including HVAC, fans and outside generators are operating within the sound levels set forth in the Town’s Zoning Bylaw, Section 7.3.C.2., as converted per the email document dated January 16, 2019 from Ron Dempsey of Noise Control Engineering.</p> <p>4. The Applicant shall submit an annual report to the Board, Town Administrator, Board of Health, and Building Commissioner from a qualified noise consultant confirming compliance with Section 7.3.C.2. of the Zoning Bylaw. Sound measurements for the annual report shall be taken at _____ (locations) _____ how often ??? and at times when the sound-generating equipment is operating at regular operating capacity. <b>NOTE – Include 35 Coffee Street as one of the locations?</b></p> <p>5. Any documented increase in noise levels beyond the Town’s converted noise standards shall be mitigated by the Applicant within ____ days to the satisfaction of Town staff and the Board.</p>	<p>2. . . . in order to comply with applicable regulations.</p> <p>3. NOTE - Applicant proposes to eliminate item #3 regarding monitoring.</p> <p>4. NOTE - Applicant proposes to eliminate item #4 regarding annual reporting.</p> <p>5. NOTE – Applicant proposes to eliminate item #5</p>
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C. **Odor Management**

<b>SAC Draft</b>	<b>Language Proposed By Applicant</b>
<p>1. The Applicant shall install and maintain at all times effective odor control technology to remove odors and harmful volatile organic compounds (VOCs). The Applicant will complete this through industry best practices and suitable building filtration systems. The Applicant shall ensure proper maintenance of all odor migration equipment to ensure maximum efficiency and effectiveness.</p>	<p>1. NOTE – Applicant is OK with this language.</p>
<p>2. No emission of odorous gases or odoriferous matter in such quantities to be discernable outside the property line shall be permitted. The Applicant shall comply with the provisions of Section 7.3 D of the Zoning Bylaw and Board of Health regulations adopted pursuant to g.l. Chapter 111, Section 31C.</p>	<p>2. NOTE – Applicant is OK with this language.</p>
<p>3. The Applicant shall prepare an Odor Mitigation Plan for the Board’s approval to specify odor mitigation measures and the timetable for implementation of such. TIMETABLE for providing such plan??</p>	
<p>4. Due to unknown circumstances and potentially unforeseen odorous impacts, in order to ensure that odorous emissions shall not be in such quantities that are offensive off-site, the Applicant shall provide an independent assessment _____ months after beginning the expanded use of the facility to cultivate and process marijuana for adult recreational use. The assessment shall include an independent air quality report identifying the type and location of odorous emissions discharged from the facility to the ambient air. Odor measurements shall be taken at times when the odor generating activity is occurring at regular operating capacity.</p>	<p>4. Applicant proposes the following replacement language.</p> <p>The Applicant intends to build out the second floor of the facility, and in doing so, will be supplementing and modifying the facility’s odor control systems. All such equipment will be reviewed with the Building Department at the time the building permit is sought. The Applicant shall re-assess odor issues to the satisfaction of the Building Inspector prior to issuance of an occupancy permit for the second floor.</p>

<p>The report shall include an action plan with recommendations to remediate odorous emissions which may be noticeable beyond the property line of the subject premises. The Applicant shall have ____ days to remediate the identified odorous emissions to the satisfaction of Town staff and the Board.</p>	
<p><b>Language from Groton</b> - All marijuana establishments shall be ventilated in such a manner that</p> <p>a) no pesticides, insecticides, or other chemicals or products used in the cultivation or processing of marijuana are dispersed into the outside atmosphere; and</p> <p>b) no odor from marijuana can be detected by a person with a normal sense of smell at the exterior of the marijuana establishment or at any adjoining use or property.</p>	

- D. Upon receipt, the Applicant shall provide the Town with the approvals of the recreational marijuana establishment licenses from the MA Cannabis Control Commission.
- E. There shall be a valid Host Community Agreement in effect at all times during the operation of the marijuana establishment.
- F. **Hours of operation –**
- G. **Limitations**
1. This special permit is limited to the operation of an adult recreational marijuana cultivation and processing facility. This permit does not authorize operation of a retail outlet for the sale of adult recreational marijuana products nor does this permit authorize the operation of a testing facility.
  2. This special permit shall be for an initial term of \_\_\_\_ from the date of \_\_\_\_ (issuance, state license,???) No later than ninety days prior to its expiration, the Applicant shall apply for a renewal of the Special Permit. The Planning and Economic Development Board shall conduct a limited scope review in connection with the Special Permit renewal application to determine whether the Applicant is in full compliance with all conditions of

**Commented [SA3]:**  
 Applicant proposes to eliminate this section entirely.



this Special Permit. The Board may, in evaluating compliance for renewal, consider any complaints and impose additional conditions necessary to mitigate the impacts of this use on the adjacent residential neighborhoods.

#### **GENERAL CONDITIONS OF APPROVAL**

- A. **Fees** - Prior to site plan endorsement by the Planning and Economic Development Board, the Applicant shall pay:
1. the balance of any outstanding plan review fees owed to the Town for review of the site plan by the Town's engineering, planning or other consultants; and
  2. any construction inspection fee that may be required by the Planning and Economic Development Board; and
  3. any other outstanding expenses or obligations due the Town of Medway pertaining to this property, including real estate and personal property taxes and business licenses.

The Applicant's failure to pay these fees in their entirety shall be reason for the Planning and Economic Development Board to withhold plan endorsement.

- B. **Other Permits** – This permit does not relieve the Applicant from its responsibility to obtain, pay and comply with all other required federal, state and Town permits. The contractor for the Applicant or assigns shall obtain, pay and comply with all other required Town permits.
- C. **Document/Plan Recording** - Within thirty (30) days of recording the Decision, the Applicant or his assign shall provide the Board with a receipt from the Norfolk County Registry of Deeds indicating that all documents have been duly recorded, or supply another alternative verification that such recording has occurred.
- E. All applicable conditions of the previous site plan approval/special permit for the premises shall also apply to this special permit.
- F. **Conflicts** –If there is a conflict between this Decision and the *Zoning Bylaw*, the *Bylaw* shall apply.

**IX. APPEAL** – Appeals if any, from this Decision shall be made to the court within twenty (20) days of the date the Decision is filed with the Town Clerk.

After the appeal period has expired, the Applicant must obtain a certified notice from the Town Clerk that no appeals have been made and provide such certification to the Planning and Economic Development Board before the decision is recorded.

###

**Medway Planning and Economic Development Board  
Adult Recreational Marijuana SPECIAL PERMIT DECISION  
Ellen Realty Trust/CommCan – 2 Marc Road**

Approved by the Medway Planning & Economic Development Board: \_\_\_\_\_

**AYE:**

**NAY:**

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**ATTEST:**

\_\_\_\_\_  
Susan E. Affleck-Childs  
Planning & Economic Development Coordinator

\_\_\_\_\_  
Date

**COPIES TO:** Michael Boynton, Town Administrator  
Dave D'Amico, DPS Director  
Bridget Graziano, Conservation Agent  
Donna Greenwood, Assessor  
Beth Hallal, Health Agent  
Jeff Lynch, Fire Chief  
Jack Mee, Inspector of Buildings and Zoning Enforcement Officer  
Joanne Russo, Treasurer/Collector  
Barbara Saint Andre, Director of Community and Economic Development  
Jeff Watson, Police Department  
Ellen Rosenfeld, Ellen Realty Trust  
Dan Merrikin, Merrikin Engineering  
Steven Bouley, Tetra Tech  
Gino Carlucci, PGC Associates

# 617 THERAPEUTIC HEALTH CENTER

— presents to the —

Town of Millis



## CANNABIS-RELATED ODOR MITIGATION AT 1073 MAIN STREET

—in—

—USDA PLANT HARDINESS ZONE 1B, ECOREGION 59B, & KOPPEN-GEIGER CLIMATE ZONE Dfb—

A HIGHLY CHARGED, COMPLEX ISSUE  
WITH A PRACTICAL, VIABLE SOLUTION

...

**RICHARD GIN**

**TOM CHUNG**

**STEVE CHAN**

...

MARK GOLDBERG	DAVE BAKER	PETER D'AGOSTINO MATTHEW MCKENNA
	OASIS SPRING, LLC	



## INTRODUCTION:

Millis town residents have legitimate concerns about the nuisance of odor leaking into the surrounding area as a necessary byproduct of cannabis cultivation. Creating a horticultural environment inside an industrial warehouse requires the thoughtful engineering of climate control and HVAC systems to operate properly and effectively, under demanding and stressful conditions. 617 Therapeutic Health Center understands and shares in the importance of odor mitigation in its efforts to be good representatives of and partners with the community.

Members of the Millis community and respective committees have expressed their concerns regarding odor loud and clear. This paper is intended to demonstrate not only that we share these concerns, but also that we have the experience, the know-how, and the desire to allay these fears by properly identifying the causes, discussing methods and considerations for determining odor mitigation needs, and by implementing an innovative additional step that improves airflow to more effectively corral and break-down cannabis odors to create our *Hybrid-Solution for Odor Prevention and Mitigation*.

This program combines features of both closed and open climate systems, enabling us to utilize and benefit from the best attributes of each. By creating negative air pressure, the critical component of an open system's advantage in controlling how odor is managed, in an otherwise closed-ecosystem facility, allowing for carbon dioxide enrichment and a more manageable and consistent indoor climate, we are able to head off odor problems as prevention, rather than needing to fix something as a correction. With proper calibration, this small change in air pressure, will drastically reduce the chance that cannabis odor from our facility will ever become a nuisance to the community.

Our *Hybrid-Solution for Odor Prevention and Mitigation* vision includes:

- Closed, looped ecosystem to limit exchange of air with outside
- Pressure-lock, decontamination double entryways to cultivation zone
- Intra-garden industrial charcoal scrubbers and with compatible rust and vibration resistant inline fans rated for full function when operating at 80% capacity
- Inter-room custom negative pressure system to draw air away from garden entryways and direct movement toward centralized Air Estuary for decontamination and purification
- Odor destroying UV light exposure
- Post-garden in-line ozone application
- Stress-climate calculated interplay of cooling, co-gen heating, & dehumidification systems
- Redundantly zoned, multiple gas powered chillers
- Hospital-grade back-up generators
- Centralized, independent climate monitoring with pre-defined emergency protocol triggers
- Annual climate control equipment maintenance and system audit





## A. AN EXAMINATION OF CANNABIS-RELATED ODOR MITIGATION CAUSE AND EFFECT:

Successful odor containment requires an understanding of what often causes otherwise reasonable mitigation efforts to fail:

### 1) Inadequate Consideration for the Impact of Local Climate Extremes on Indoor Environmental Controls

Operational capacity, optimal design, and even function, as envisioned by cultivators, cannot be adequately determined without consideration for differences in regional climates. If neglected, then applying a building's design based on the operation of a facility in Colorado could mean an inability to handle the humid days of summer here in Massachusetts. Choosing equipment based on the climate in Mission Bay, SF, could result in diminished cooling capabilities in Millis. Unfortunately, this type of error, which requires equipment rating upgrades to fix, may be a leading cause behind Massachusetts RMDs experiencing odor problems from the outset. When systems are over-stressed, under powered for the facility, or pushed to their limits, odor mitigation is often compromised.

Excess room heat and humidity can over-burden HVAC systems and lead to an inefficient ability to properly contain odor on days where the equipment can't keep up with the demand. Warmer air holds more moisture. Increased moisture in the air enables odor molecules to travel farther, faster. In some cases, calculations used to determine environmental controls either under-accommodated or even neglected to account for:

- a) heat produced by photosynthesis when determining cooling requirements.
- b) the release of water vapor by plants when calculating dehumidification needs.
- c) heat produced by ballasts in addition to the infrared light produced by lamps.
- d) heat produced by dehumidification.
- e) heat produced by CO<sub>2</sub> generation.
- f) heat and humidity produced by an increased presence of warm-bodies.
- g) moisture produced by the storage and distribution of water related to irrigation in hydroponic-based cultivation.



## 2) Failure to Understand, Install, Use, or Maintain Equipment Correctly

Mis-gauging of capacity ratings for climate regulation, or improper usage of equipment leads to insufficient odor mitigation. Common mistakes include:

- a) Calculating in-line carbon filtration CFM capacity insufficiently for room size.
- b) Over compensating in a stressed system by increasing the speed of air exchange though in-line carbon systems. Resulting capacity is too powerful to properly remove odor as it passes quickly through the system.
- c) Improperly positioning fans to pull air (rather than to push air) through the filtration in closed-system carbon-based scrubbing.
- d) Fan capacity mis-gauged for pulling of air rather than pushing within closed-system.
- e) Closed-system in-room carbon filtration "scrubbing" (push) capacity insufficient due to use of in-line (pull) rating.

Proper maintenance of climate control equipment is critical to a healthy, balanced horticultural eco-system. In a properly run facility, equipment that effectively traps odor molecules before they can escape to create a nuisance in the surrounding environments is an additional critical step in preventing or removing contaminants from infecting the environment. The movement of air through in-line filters or scrubbers alike keeps plants vigorous, and reduces the instances of disease gaining exposure to the garden. Failure to adequately maintain and replace ineffective or expired equipment not only risks the exposure of odor to surrounding environments, but also puts the whole horticultural ecosystem at risk.



### 3) Inability to Properly Pace or Prioritize Build-out Expenditures

This type of mistake is a grievous one, because it is born of inexperience, poor decision making, or hubris. A stable climate, conducive to optimal growing, has the greatest impact on the success of a facility. Yet sometimes industry newcomers misunderstand how best to prioritize a budget or how to structure a phased build-out approach, and the cost of this inexperience can be very high.

Commercial cultivators need to resist the temptation to be easily lured toward misappropriating funds for cosmetically appealing but functionally irrelevant property alterations. Nor should growers risk over-spending on unproven technology if circumstances or compliance requirements don't warrant it.

The sting of poorly prioritized spending often impacts environmental engineering disproportionately. The choice to cut corners can be seen, for example, in choosing to over-reach on the capacity of a phased build-out in lieu of establishing adequate back-up and redundant climate systems. Inexperienced decision-making inevitably leads to delayed, over-budgeted, and poorly functioning facilities. This is what happened in the case of several Massachusetts RMDs whose facilities experienced mold, mildew, and odor problems following long delayed and incredibly over-budget build-outs.



## B. ANALYSIS: THE CONUNDRUM OF CANNABIS-SPECIFIC, CLOSED-SYSTEM ENVIRONMENTS AND AIR PRESSURE

Most types of indoor horticulture thrive under simulation of optimal outdoor conditions. What is unique to cannabis cultivation is that the choices made to achieve this delicate balance of climate, light, water, and air has an overweight impact on a building's ability to contain the odor. The way you might design airflow to grow many other types of plants may, perhaps even by design, fail to contain smell without making additional modifications. The reason this is so is due to air pressure.

### 1) Negative Air Pressure of an Open System Effectively Prevents Odor Nuisance

Traditional indoor cultivation set-ups were most often designed to completely exchange or refresh the air in a room around once every 3 to 5 minutes. This is done in order to replenish depleted carbon dioxide levels that occur naturally in the air, and as all plants require for photosynthesis. In photosynthesis, plants use light energy to combine CO<sub>2</sub> and H<sub>2</sub>O to form carbohydrates for storing energy. This type of system is called an *open system*, and the flow of the air, both in to and out of the garden is controlled by using pressure of a fan to pass air through filters both to keep contaminants such as insects, fungus, or bacteria from entering the environment, as well as to prevent odor from escaping.

*Negative* air pressure is created by pulling air out of the room at a greater capacity than it is entering the room. Thus smell is controlled by directing all airflow to be expelled from the growing environment through a series of in-line, standard industry best practices, including: carbon filtration; ozone generation within exhaust ducting to bind to and breaks down odor molecules; UV light that does the same; and odor neutralizing agents strategically placed by each entryway, the most common point of failure in any system, since air pressure is temporarily disrupted each time a door is opened.

By using negative air pressure, assuming equipment is calibrated and utilized properly, and airflow is calculated correctly, there should be no cannabis odor escaping the garden.





2) *The Benefits of and Demand for CO<sub>2</sub> Enrichment, and the Emergence of State-Regulated Licensing Schemes, has Led to an Unfortunate and Unacceptable De-prioritization of Odor-Nuisance Mitigation*

As cannabis cultivation has come further into the open coupled with complex state-licensing procedures, one of the primary reasons for vigilantly and diligently attending to odor prevention — for fear of being found out, be it by law enforcement or criminals, has as of late become a threat that some people dismiss as a thing of the past. This belief has led to certain modifications to production methods which some may argue has meant prioritizing yields over privacy, safety, or security.

One of the more common modifications added at the commercial level has been the usage of carbon dioxide enrichment to increase the rate of photosynthesis as a way to improve production efficiencies. While doing this in an open system is possible, it is difficult and expensive to maintain consistent, elevated CO<sub>2</sub> levels in the air over extended periods of time; the air in the room is completely refreshed every few minutes. So commercial cultivators turn instead to *closed systems*. In a closed system, the climate in the garden is maintained by limiting the garden environment to as little exchange with or exposure to outside air as possible. Carbon dioxide is injected into looped climate control airflows, always returning air to the room in which it originated. Since there is no air exchange, the negative air pressure that is used to control odor in open systems is not possible.

Some cultivators also switch to closed systems in order to more easily maintain other climate factors such as temperature and humidity for indoor gardens located in areas where weather conditions can be harsh.

A closed system has the potential additional benefit of reducing risk of garden contamination by foreign microbes. This can be done by creating *positive air pressure* in the room to (in effect) seal off any potential for airborne microbes to enter from the outside.

Choosing this system however is not without consequence. For almost any other type of plant grown in an indoor environment, this is the end of the story. But with cannabis cultivation, an additional step or modification is required in order to address its uniquely odoriferous horticultural problem. Otherwise, no level of cleaning, sterilizing, or "scrubbing" the air alone, within a closed system, will sufficiently prevent odor from finding its way to the far reaches and eventually outside of the facility.



Human movement in and out of a positive-pressure closed system facility can actually be cause that disrupts the ability to contain smell. Since the controlled air is only moved as a function of climate control, when the day's light cycle turns off on a cool night and the temperature falls below 70 degrees, dehumidification becomes inefficient, the air stagnates, "scrubbing" cannot keep pace with the saturation levels of odor molecules in the air, and the odor will billow out of the building right from the front door, each time it is opened. And even in facilities with neutral air pressure, based on the principle of *diffusion*, where molecules tend to move from areas of higher concentration to lower, the odor molecules present in the air of a closed system facility would race toward door each time someone enters or leaves.

Unfortunately, in the race to open to be first to market, even as sophisticated, modern cultivation facilities have been emerging from the shadows to begin operating publicly, shoulder to shoulder with neighboring businesses, families, and passersby, most commercial cultivation facilities in Massachusetts have not made the effort to innovate or even address continuing odor nuisance concerns until they are forced to. This is why some local cultivation facilities that are otherwise "sealed" nevertheless continue to exude a present and lingering odor as you drive by the front door. And based on physics, it will only get worse as summer approaches.



### 3) A Simple Solution and our Commitment to the Community

Thanks to extensive knowledge and experience commercially cultivate cannabis in controlled indoors environments under a range of climate extremes, we have been able to employ a surprisingly simple fix to a problem that has confounded both cannabis cultivators and concerned citizens everywhere — taming odor by creating a hybrid ecosystem in order to neutralize its potential to negatively impact our host community.

617 Therapeutic Health Center is committed to implementing this *Hybrid-Solution for Odor Prevention and Mitigation* and vow to quickly and thoroughly resolve any related problems or concerns as they arise.

Subtle physical modifications to the environmental conditions allow us to benefit from the best elements of both closed and open ecosystems. By slightly altering air pressure within a sealed facility we can borrow a key feature of odor prevention utilized in open systems — the ability to contain odor by continually directing the movement of air without regard for whether or not other climate control systems are active. Scrubbing alone isn't enough, there must be constant and consistent, directed airflow.

Development of this combination ecosystem is in-house and based on prior experience under similar utilization. We are not applying someone else theories; our plans draw from over 15 years of commercial cannabis cultivation, including leading or participating in the design, development, and operation of 13 unique industrial facilities across a range of climates. This California-based industry-leading medical marijuana pedigree, motivated by compassion for the sick, an appreciation for cultivation as art, and improved by science, is highly regarded for its adaptability, scalability, and dedication to quality, applied learning, efficiency, and respect for community.

Having this experience, the flexibility to engineer for local climate considerations, and an *all* Massachusetts-native team, we sincerely seek to build a respectful and mutually beneficial, long-term relationship with the Millis community as much as we hope to become a model for success in the cannabis industry. Thus, we present with confidence, our desire and ability to address and resolve concerns that may arise due to our presence, including odor mitigation.



## CONCLUSION

The great success stories of the fledgling Massachusetts cannabis industry have yet to be written; but when they are, we believe Millis and 617 Therapeutic Health Center will have a central role setting the standards for excellence and best practices. Faced with a challenge, our team will always choose to innovate to achieve a viable solution and thus surpass expectations set by and for those who fear trying. As a group we aim to set the industry bar for excellence, and elevate ourselves and the town of Millis through our proud partnership. And in doing so, we will demonstrate that our participation in, respect for, and creation of a positive working, and mutually beneficial relationship with the town of Millis, its people, and the surrounding communities is as important to us as is efficiently producing the finest quality cannabis.

Make no mistake... Odor problems attributed to cannabis cultivation are common, but absolutely preventable. And if a professional cannabis cultivation organization claims otherwise, or is dismissive of such concerns as typical or unavoidable, then they either lack the knowledge or the desire to work with the community to solve it.

*617 Therapeutic Health Center vows that:*

- *By engineering the building at 1073 Main Street with an understanding for cannabis' unique climate control demands;*
- *By properly calculating the impact of local climate extremes on environmental system controls;*
- *By ensuring that our equipment choices are based capacities to contain odor even under sustained conditions that could otherwise push lesser systems to their limits;*
- *By building in back-up systems and redundancies to ensure uninterrupted odor mitigation; and,*
- *By tirelessly innovating with a can-do attitude to fulfill and surpass the expectations we promised the Town of Millis and set for ourselves,...*

*We affirm, with confidence, that we will ably prevent cannabis odors from ever becoming a nuisance to our neighbors and community.*



## Susan Affleck-Childs

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**From:** Lally, John - 0666 - MITLL <jlally@ll.mit.edu>  
**Sent:** Tuesday, January 22, 2019 8:11 AM  
**To:** Susan Affleck-Childs; ellen@rosenfeld-law.com  
**Cc:** Leigh Knowlton  
**Subject:** 2 Marc Rd Nuisances Update

Hi Suzy, Hi Ellen,

I do plan on attending the public hearing this evening. Just in case something happens that prevents me from attending, I'm sending this email along to make sure it's available to the Planning and Economic Development Board as they consider the 2 Marc Rd Special Permit Application, and to make sure the information contained in this email is included in the public record associated with this permit application.

Suzy, please distribute this email to the Planning and Economic Development Board, and anyone else as you see fit, and please include it in the public record for the 2 Marc Rd Special Permit Application.

Ellen, please feel free to distribute this email as you see fit as well.

Ellen, I do not mean to offend or disparage you in any way nor the purpose of the 2 Marc Rd facility, I do hope we can remain on cordial terms, I know how these matters can turn acrimonious very quickly.

It is very important however, that I clearly report how detrimental the noise and odor produced by the 2 Marc Rd facility are to the quality of my life, my family's property, and to the neighborhoods near the facility.

To that end, the purpose of this email is to report nuisances produced by the 2 Marc Rd facility as observed at 2 additional locations and to clarify how severe the detrimental impacts of these nuisances are to my family's property, the quality of my life, and to the neighborhoods near the 2 Marc Rd facility:

- 1.) New Nuisance Observation Locations:
  - a. Along the Private Way at the East/West boundary between my family's property and the Industrial Park:
    - i. During the past week (14Jan2019-21Jan2019), twice a day I've walked along the private way at the east/west boundary between my family's property and the industrial park, observing the noise present. The noise present during these walks along the private way has been very loud and abrasive, especially at the point on the private way near the end of Marc Rd. This noise has NOT been intermittent, it's been very loud and abrasive each and every time I've walked along the private way this past week.
    - ii. On a few of these walks I've smelled that acrid skunky odor that's produced by the facility.
  - b. At the front door of Milara, the building at the top of Marc Rd.
    - i. On some of my walks along the private way, I've walked around the Milara building to the front door to hear what the noise is like at the front of the building as compared to the rear of the building. The noise at this location is extremely loud and abrasive, I struggle to find a word that adequately conveys just how bad the noise is at Milara's front door. This noise was present each and every time I went around to the front of the building.
    - ii. I've talked with 3 Milara folks and they all report this noise is extremely bad. The owner/CEO Krassy Petkov is very upset about this noise.

- 2.) Clarification of 2 Marc Rd nuisances impact on my family's properties, my home, and my quality of life:

- a. My sisters & I are the owners of well over 50 acres in Medway, west & north of the 2 Marc Rd facility. This property is a valuable asset and the noise and odor from the 2 Marc Rd facility is very detrimental to our family's property value, so much so it calls into question its marketability.
- b. Noise from the facility experienced at my house (my house is ~400 ft from my properties border w/industrial park) continues to be conspicuous on ~(20 to 25)% of the days. To be clear when the facility noise is conspicuous at my house i.e. it's the predominate noise at my house, the irksome characteristics of the noise (sustained & droning) are very abrasive and detrimental to my quality of life and the value of my home.
- c. Please imagine trying to sell property in the presence of these noise and odor nuisances and a prospective buyer asking: "What's that horrible noise and odor?" and having to answer: "It's the facility next door and we've been forced to put up with it, turns out the facility is not required to remedy them". It's so troubling how much we'd have to reduce the sale price, and calls into question just how marketable our property is as long as these nuisances exist.

3.) Clarification of impact on neighbors of the 2 Marc Rd Facility:

- a. I have spoken to the residents at most of the houses (all but 2) on Coffee Street between my house and Main St, plus Ms Heidi Cyr at 20 Main St, plus folks at Micro-Group, and folks at Milara regarding nuisances produced by the 2 Marc Rd facility. All of these people I talked to report detrimental impacts by the noise and/or odor produced by the facility at 2 Marc Rd. In addition, there are folks on Green Valley Rd (Leigh Knowlton, and I think Phil Giangarra) I've spoken with that report detrimental impacts from the noise and/or odor produced by the 2 Marc Rd facility.

Therefore:

- A.) I am pleading with the applicant to please remedy these nuisances as soon as possible, and minimize the chances of recurrence by implementing on site noise and odor monitoring.
- B.) I'm also pleading with the Planning and Economic Development Board (and any other town official/body with the authority to do so), to require the applicant to remedy these nuisances, and minimize the chances of recurrence by requiring the applicant to implement on site noise and odor monitoring.

Respectfully,  
John Lally  
35 Coffee St.  
Medway, MA 02053

## Susan Affleck-Childs

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**From:** LAKnowlton <knowlton@gmail.com>  
**Sent:** Tuesday, January 22, 2019 2:40 PM  
**To:** Susan Affleck-Childs  
**Subject:** CommCan  
**Attachments:** LK\_Comments\_20190122\_to\_Acentech\_memo\_dated\_January\_8\_2019.pdf; LK\_Figures\_20190122.pdf

Dear Susan,

I am sending this email for distribution to the Planning and Economic Development Board and for inclusion in the public record for the CommCan - Adult Recreational Marijuana Special Permit application.

My home at 14 Green Valley Rd is located 1/3 mile from the CommCan facility. I'm happily married with two children enrolled in the Medway school system. I've lived in Medway since 1999, and moved into my current neighborhood in 2008. I selected this location for its quiet nature and low traffic, among other criteria. I have been happy here, and absent any major life changes, I do not anticipate moving again.

However, the noise generated at the CommCan facility has had a detrimental effect on the tranquility of this neighborhood and my quality of life. The facility has been generating environmental noise for over a year now. The noise occurs without relief 24 hours per day. It is particularly vexing at night, when everything else goes quiet. The sound includes tonal noise at harmonics of 300 Hz (sometimes with noticeable beat frequencies) that are especially audible and annoying. The noise varies significantly in perceived loudness based on position and ambient conditions, but is especially irritating on clement nights when I would like to sleep with the windows open. The attenuation measures installed in August 2018 were largely ineffective from my perspective.

There are two attachments to this email message. As a concerned resident and engineering professional, I feel compelled to respond to Acentech's memorandum, dated January 8, 2019, subject "Response to NCE Findings," that has been entered into the public record. An annotated version with my comments is attached.

The second attachment is a small collection of tables and figures that I have generated that are pertinent to discussions of the CommCan facility noise and the Medway Bylaw noise limits. The following is a brief description of the purpose of each figure.

- Table LK1. Medway Bylaw Limits Converted to Preferred Bands — This table shows how the Medway Bylaw noise limits can be easily converted from the old octave bands with cutoff frequencies to the preferred octave bands with center frequencies using the formula in ANSI/ASA S1.11-1966 Appendix A. This method would preserve the intent of the Bylaws while allowing measurement with contemporary equipment.
- Figure LK1. Medway Bylaw Limits Converted to Preferred Bands — This graph compares Medway Bylaw noise limits in their original form and converted to the preferred bands. It should help visualize how the converted limits preserve the intent of the Bylaws.
- Figure LK2. NCE Report Figure 2 with Medway Bylaw Limits in Old Bands — This graph adds the Medway Bylaw noise limits, in their original form, to the data presented in Figure 2 of the NCE report. The purpose of this figure is mostly for comparison to the next figure.
- Figure LK3. NCE Report Figure 2 with Medway Bylaw Limits Converted to Preferred Bands — This graph adds the Medway Bylaw noise limits, converted to the preferred octave bands, to the data presented in Figure 2 of the NCE report. This graph helps to illustrate the magnitude of non-compliance of the CommCan facility.



- Figure LK4. NCE Report Figure 4 with Medway Bylaw Limits (Bands Most Affecting Households Highlighted) — This graph expands on Figure 4 of the NCE report by overlaying the Medway Bylaw night noise limits (converted to one-third octave band levels), highlighting the bands most impacting residents at Coffee St and Green Valley Rd (based Figure 3 of the NCE report), and calling attention to the annoying tonal noise at harmonics of 300 Hz.

I am surprised that the CommCan facility has been allowed to operate so long in violation of the Medway Bylaws, although I realize that the town may not have had the data to understand the degree of non-compliance until the NCE report was submitted. In case it is still not clear, I hope the graphs I have provided, especially Figure LK3, will be helpful to illustrate this problem.

At the last hearing, the PEDB Chainman inquired about my credentials. I am a Mechanical Engineer with 23 years of experience at the U.S. Army Natick Soldier Research, Development and Engineering Center. I currently work on camouflage technology to defeat sensors across the electromagnetic spectrum, but have previously worked on topics including waste to energy power generation, novel combustion processes for distillate fuels, and fuel and water conservation at contingency bases. I do not claim mastery in the field of sound measurement or attenuation, but I am very capable of reviewing literature to expand my knowledge into additional fields.

I believe that CommCan should be held responsible to bring their facility into compliance with the Medway Bylaw noise limits, and to attenuate the tonal noise that permeates nearby neighborhoods. Any approval for expanding use should be strictly contingent on this compliance. Although it will require additional investment from CommCan, I am sure a solution exists that will work out for all parties involved.

Very Respectfully,  
L. Knowlton

## Memorandum

TO Ellen Rosenfeld (CommCan)

FROM Andrew Carballeira

DATE January 8, 2019

PROJECT CommCan Medway Chiller Noise

SUBJECT Response to NCE Findings

PROJECT NO 630410

CC Mike Bahtarian (Acentech)

Dear Ellen,

Acentech has been retained by CommCann to evaluate and mitigate noise produced by a large air-cooled chiller installed on the roof of the facility at 2 Marc Road. The Town of Medway has retained Noise Control Engineering (NCE; Billerica, MA) to provide peer review of our noise control work, and to provide third-party technical expertise on behalf of the citizens of Medway. We have communicated with NCE by phone and email and reviewed the data they provided. Appendix A contains a transcript of our email exchange, quotes from which appear throughout this document.

This memo presents our response to the findings of NCE

**NCE SOUND MEASUREMENTS**

### Measurement Locations

NCE performed sound level measurements at several locations shown in the figure below, which has been excerpted from their report to the town. Note that many of NCE's measurements were at the source property line, not the residential receiver property line.



Neither Acentech nor NCE are in a position to tell the Town of Medway what the intent of their Bylaw is. That said, if the intent is to protect public health, it is our opinion that measuring at a property line shared with another industrial use is not germane toward that goal.

The NCE measurements were initially compared to criteria set forth by MassDEP, and NCE arrived at the conclusion that the CommCann facility is in compliance with the MassDEP noise policy. As they note, "...the facility does not exceed the MassDEP noise policy based on any measurements [we] have seen from either party".

**Commented [LK1]:** This is consistent with the Medway Zoning Bylaws.

**Commented [LK2]:** I believe that measuring at the source property line provides a consistent, objective, and unambiguous way to evaluate noise. Noise radiated from the property will be further attenuated by distance before it is received and will be less likely to become a nuisance to nearby residents.

Attempting to reinterpret the Bylaws to instead apply these same limits much further away (for example, 1/3-mile away at Green Valley Rd) is extremely unfair to residents whose homes are not abutting the industrial park and who had no reason to expect an egregious new noise source would be moving in that would not comply with existing noise regulations.

In case it is not abundantly clear, the noise generated by CommCan is far and above noise previously generated in this industrial park and is especially vexing because it operates continuously, 24 hours/day.

**Commented [LK3]:** For broadband noise only. I do not believe that abandoning the Medway Bylaws for the more permissive MassDEP noise policy is in the best interest of the residents. This should not be a race to the bottom. Would we be satisfied with the minimum acceptable schools, minimum acceptable police department, minimum acceptable air quality, and so forth? MassDEP protects human health, but the town can go further to maintain tranquility and quality of life.

### Medway Noise Bylaw – Limits and Filter Bands

After submitting their letter, a community member raised the issue of the Medway Noise Bylaw, which is expressed using octave-bands which are deprecated and have not been in use since the mid-60s. Acentech described this Bylaw to the Planning Board during a previous presentation, and offered our opinion that reliable measurements in accordance with the Bylaw were not possible. NCE agreed with our opinion, noting "...the frequency bands specified are non-standard and would require custom filtering for any currently available measurement system [we are] aware of". As such, the Bylaw should be considered deprecated and unenforceable.

In an effort to provide context, NCE estimated an adjustment factor (based on solely on filter bandwidth, and not including the effects of differing center frequencies) to be applied to their data, to facilitate comparison to the Medway Bylaw. While we find their adjustments to be reasonable, we strongly agree with their opinion that "...there is no way to directly convert the measurements between the two standards. NCE has provided its best estimation of what the measured levels would be to the standard specified in the Zoning Bylaws. [We] will admit that this is not mathematically exact..."

Acentech has taken a different approach from NCE, by converting the limit values in the Medway Bylaw to the standard octave bands on the basis of equal energy, and then comparing our measured data directly to the converted limits. TABLE I presents our estimate of the Medway Bylaw limits, in the current octave bands. The Bylaw allows for a 5 dB increase during daytime hours, which is the basis of the second line (Day) of the table.

TABLE I. Medway Noise Bylaw (converted to standard octave-bands by Acentech)

Description	63	125	250	500	1000	2000	4000	8000	A
Medway, Night	66	52	45	40	36	33	30	29	45
Medway, Day	71	57	50	45	41	38	35	34	50

As shown in TABLE I, the A-weighted sum of the nighttime octave band limits is 45 dBA, which is similar to broadband limits used in many rural and suburban communities in the US. The limit during daytime hours is 5 dB higher, as noted above.

### Medway Bylaw Sound Descriptor

The Medway Bylaw does not specify the sound level descriptor that should be used in connection with enforcement measurements. When a source of sound such as an air-cooled chiller operates continuously, the maximum, minimum, and average sound level are generally all the same. However, the ambient environment varies considerably with time (e.g., when a car drives by), leading to a condition where the average sound level is often much greater than the minimum (or similarly, the 90<sup>th</sup> percentile) sound level.

The measurements that NCE reported are the average sound level ( $L_{eq}$ ), whereas Acentech reports the ninetieth percentile sound level ( $L_{90}$ ) because it fully describes continuous sound sources, while not being influenced by short term events. Due to a data handling issue, NCE has not been able to report the  $L_{90}$ .

In lieu of the availability of the  $L_{90}$  data, we reviewed our previous measurements and found that the typical difference between the  $L_{eq}$  and  $L_{90}$  in the ambient environment in Medway is between 5 and 10 dB. As such, we recommend that at least 5 dB be subtracted from the NCE-measured levels to account for the presence of time-varying ambient sound not produced by CommCann.

### Review of NCE Measurements

TABLE II presents the data measured by NCE. We have included the converted Medway nighttime limits, and marked those values measured by NCE which exceed said limits in **bold**.

**Commented [LK4]:** The octave bands may be deprecated, but another community member has demonstrated that they are still used elsewhere, including the NYC Zoning Resolution for Manufacturing Districts, 42-213.

**Commented [LK5]:** ANSI/ASA S1.11-1966 Appendix A provides a formula for conversion to preferred bands, which would preserve the intent of the Bylaws while allowing measurement with contemporary equipment. This method produces values very similar to Table I, below.

**Commented [LK6]:** Based on my comments above, the bylaw should NOT be considered deprecated and unenforceable on this basis.

**Commented [LK7]:** These values generally agree with the values found using the ANSI conversion.

**Commented [LK8]:** Although it is interesting to know that the Bylaws are consistent with other communities, A-weighting is not used in the Bylaws and seems to have been introduced here as a straw man to support a misleading argument that the CommCan noise meets the Bylaws.

The A-weighted curve, developed 85 years ago, is widely adopted for environmental noise measurement. It attempts to express a sound pressure level as a single value adjusted to the frequency response of the human ear. However, it does not take into account the spectral nature of a sound, and is a poor predictor of the subjective loudness or annoyance of a sound.

Further, A-weighting is biased towards higher frequencies, and underestimates the loudness of noise with significant low frequency components (the CommCan noise is very strong at 300 Hz). Also, low frequencies propagate better due to lower atmospheric attenuation, which becomes significant over ~1000 Hz (see also ISO 9613-1, Acoustics-Attenuation of sound during propagation outdoors).

For these reasons, it is my strong opinion that A-weighting should not be considered a valid substitute for the spectral-based maximum permissible sound pressure levels specified in the Bylaws.

**Commented [LK9]:** It is hard to take this claim at face value because it is not substantiated here with data or analysis. Although some data is shown graphically in a previous Acentech handout, the differing locations and times make it difficult for a third party to compare and verify these conclusions.



**TABLE II.** Energy-average sound levels,  $L_{eq}$  (as measured by NCE)

Description	63	125	250	500	1000	2000	4000	8000	A
Medway, Night	66	52	45	40	36	33	30	29	45
2 Marc Rd - North Property Line	59	51	50	45	45	40	40	25	50
2 Marc Rd - East Property Line	58	55	56	52	47	48	66	26	67
2 Marc Rd - West Property Line	62	56	56	49	47	43	50	27	55
2 Marc Rd - South Property Line	57	50	52	45	44	39	35	23	49
2 Marc Rd - Loudest Property Line	57	54	52	46	43	39	38	31	49
2 Marc Rd - Loudest Position On Site	60	56	53	49	47	45	61	25	62
45 Coffee Road	54	51	44	42	44	38	31	27	47
14 Green Valley Rd	52	46	42	36	35	31	29	26	41
18 Henry Street	51	47	38	36	34	30	30	26	40

**Commented [LK10]:** This tabular format shows only the number of readings that are non-compliant, and does not show the magnitude of non-compliance. It is not a particularly informative way to present this data.

I will be providing plots, similar to the graphs in the NCE report but including the Bylaw limits, that I believe are more illustrative.

**Commented [LK11]:** The data in this table is not consistent with the data in the NCE report dated November 27, 2018. Absent an explanation, this raises questions about data integrity and chain of custody.

We have the following observations of the data as measured and reported by NCE reproduced in TABLE II:

- Measured sound levels near the facility (at the industrial property lines and on-site) are in excess of the Medway Bylaw by between 4 and 22 dBA. Exceedances of the octave-band provisions are also evidenced.
- Sound levels near the residential community (at the residential property lines) are significantly lower. At 45 Coffee Road, the measured A-weighted level is 2 dB in excess of the Bylaw, and there are exceedances in the 500, 1000, 2000, and 4000 Hz octave-bands of between 1 and 8 dB.
- Because these are average sound levels ( $L_{eq}$ ) at a significant distance from the source, we are of the opinion that non-CommCann sound has had an influence on the measured levels. We recommend that the  $L_{eq} - L_{90}$  margin established by Acentech and described above be applied to the data measured by NCE to account for the influence of ambient sound.

**Commented [LK12]:** Again, the Bylaws do not use A-weighting (which is a flawed metric for evaluating loudness or annoyance of a sound). And the Bylaws specify the limits at the property line of the facility.

However, just for the sake of argument that the sound should be evaluated at the residence (as if the property were teleported to be adjacent to the source), it seems clear that the intent would have been for the noise to be evaluated at the closest (and/or noisiest) property line at that residence. It is my understanding that the NCE measurements were taken from the road in front of this address, not the closest property line to CommCan. Based only on the size of the lot, I estimate an additional attenuation of 2 dB from the back property line to the road. Applying this to the NCE readings, I predict that the levels would have exceeded in 6 octave bands, between 1 and 10 dB, worse than Acentech's claim. This is, of course, academic because it is not how the Bylaws are written.

**Commented [LK13]:** This recommendation is made without providing supporting data or analysis.

**Commented [LK14]:** As with the previous table, this format only shows the incidence of non-compliance and not the magnitude.

TABLE III presents the NCE data with a 5 dB reduction attributable to the measured margin between  $L_{eq}$  and  $L_{90}$ , as recommended above.

**TABLE III.** Estimates of background sound levels  $L_{90}$ , based on NCE-measured  $L_{eq} - 5$  dB

Description	63	125	250	500	1000	2000	4000	8000	A
Medway, Night	66	52	45	40	36	33	30	29	45
2 Marc Rd - North Property Line	54	46	45	40	40	35	35	20	45
2 Marc Rd - East Property Line	53	50	51	47	42	43	61	21	62
2 Marc Rd - West Property Line	57	51	51	44	42	38	45	22	50
2 Marc Rd - South Property Line	52	45	47	40	39	34	30	18	44
2 Marc Rd - Loudest Property Line	52	49	47	41	38	34	33	26	44
2 Marc Rd - Loudest Position On Site	55	51	48	44	42	40	56	20	57
45 Coffee Road	49	46	39	37	39	33	26	22	42
14 Green Valley Rd	47	41	37	31	30	26	24	21	36
18 Henry Street	46	42	33	31	29	25	25	21	35

We have the following observations of the data presented in TABLE III:

- Measured sound levels near the facility (at the industrial property lines and on-site) are still in excess of the Medway Bylaw, irrespective of how the data are viewed. Exceedances of the octave-band provisions are also evidenced. It is up to the Town to determine if the public is served by regulating sound at these non-residential locations.
- Broadband (i.e., A-weighted) sound levels near the residential community are in compliance with the Medway Bylaw. At 45 Coffee Road, the measured 1000 Hz octave-bands level exceeds the Bylaw by 3 dB.

#### CONCLUSION

Acentech and NCE are in agreement that sound produced by the CommCann Medway facility is in compliance with the MassDEP noise policy. When compared to the Medway Noise Bylaw and evaluated as background sound levels ( $L_{90}$ ), A-weighted sound levels produced by the facility are consistent with the deprecated Medway Noise Bylaw. The only apparent exceedance of the Medway Bylaw was observed at 45 Coffee Road, and the amount and breadth of this exceedance was relatively small (3 dB in the 1000 Hz octave-band).

In conclusion, broadband facility sound is generally in compliance with both the State and local noise regulations. A spectral exceedance of the Medway Bylaw in the 1000 Hz band was noted when reviewing the NCE data.

\* \* \* \* \*

I trust this memo provides the information you need at this time. Please contact me with questions at 617-499-8025 or [acarballeira@acentech.com](mailto:acarballeira@acentech.com).

Sincerely,



Andy Carballeira  
Senior Consultant

**Commented [LK15]:** None of this discussion addresses the tonal noise components that are likely to be an important factor in the noise complaints. NCE data shows significant peaks in the 1/3 octave analysis.

**Commented [LK16]:** This is interpreted with data we don't have ( $L_{90}$ ), in a format not written into the Bylaws (A-weighted). And the Bylaw itself should not be considered deprecated simply because the octave bands are in the old format.

**Commented [LK17]:** The conclusion that the facility sound is generally in compliance with the local noise regulations (as written) is not supported by the facts and is disingenuous at best.

**Commented [LK18]:** Additional notes:

Acentech's discussion does not address the issue of tonal sounds. The noise generated by the facility has significant tonal components, most notably 300 Hz, as shown by the NCE Report, Figure 4. I would like to draw attention to a blog entry by Mr. Carballeira himself that touches upon the topic of tonal noise:

<https://www.acentech.com/blog/legal-marijuana-theres-smoke-theres-sound/>

"Tonal sounds tend to be more disturbing to communities than sounds with many frequency components. If a hum (single tone) and a hiss (many frequencies) have exactly the same sound level, people will say the hum is louder and much more annoying. Interestingly, the human ear is very good at detecting tones, even in the presence of other noise, which further increases the potential for community annoyance."

According to ASHRAE guidance, as well as ANSI S12.9-2005/Part 4, pure tones can be identified with 1/3 octave or narrowband analyses. Although the Medway Bylaws do not address pure tones, they are addressed in Massachusetts 310 CMR 7.10:

"The guideline further states that the facility shall not produce a pure-tone condition at the property line (or at the nearest inhabited buildings). A pure-tone exists if the sound pressure level, at any given octave band center frequency, exceeds the levels of the two adjacent octave bands by three (3) or more decibels."

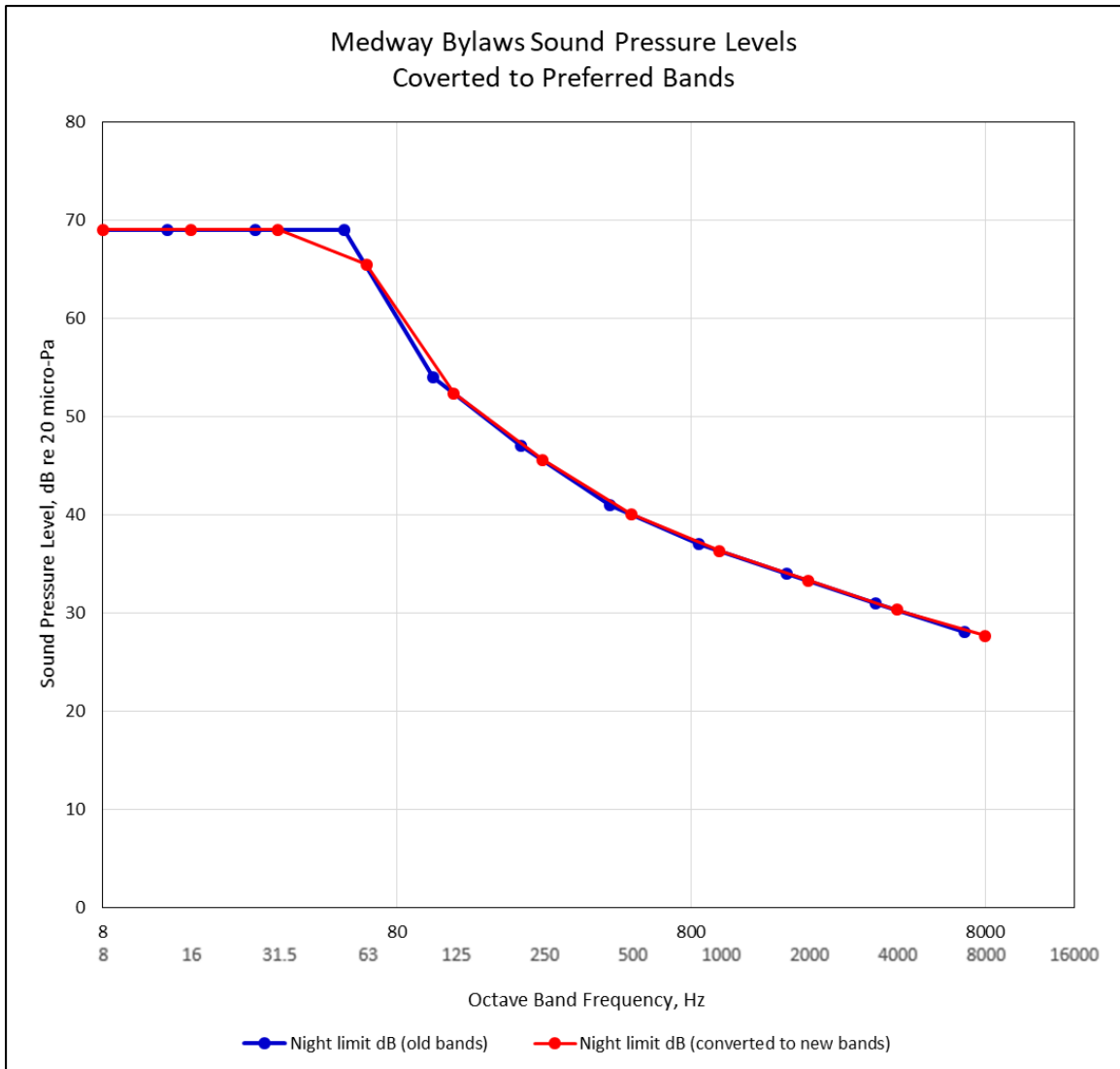
**Table LK1. Medway Bylaw Limits  
Converted to Preferred Bands**

Medway Bylaws					Preferred Bands		
Lower Band Edge (Hz)	Upper Band Edge (Hz)	Calculated Center Frequency (Hz)	Night Limit (dB)	Day Limit (dB)	Preferred Band Center Frequency (Hz)	Converted Night Limit (dB)	Converted Day Limit (dB)
2	72	7	69	74	8	69.0	74.0
		13			16	69.0	74.0
		27			31.5	69.0	74.0
		53			63	65.4	70.4
75	150	106	54	59	125	52.3	57.3
150	300	212	47	52	250	45.6	50.6
300	600	424	41	46	500	40.1	45.1
600	1200	849	37	42	1000	36.3	41.3
1200	2400	1697	34	39	2000	33.3	38.3
2400	4800	3394	31	36	4000	30.3	35.3
4800	10000	6788	28	33	8000	27.6	32.5

*Note: Medway Zoning Bylaw maximum permissible SPLs are expressed in old octave bands with cutoff frequencies. For comparison to preferred octave bands with center frequencies, the level limits are converted in accordance with ANSI/ASA S1.11-1966 by the formula  $L_N = L_O + 0.237 (L_{OH} - L_O)$ .*

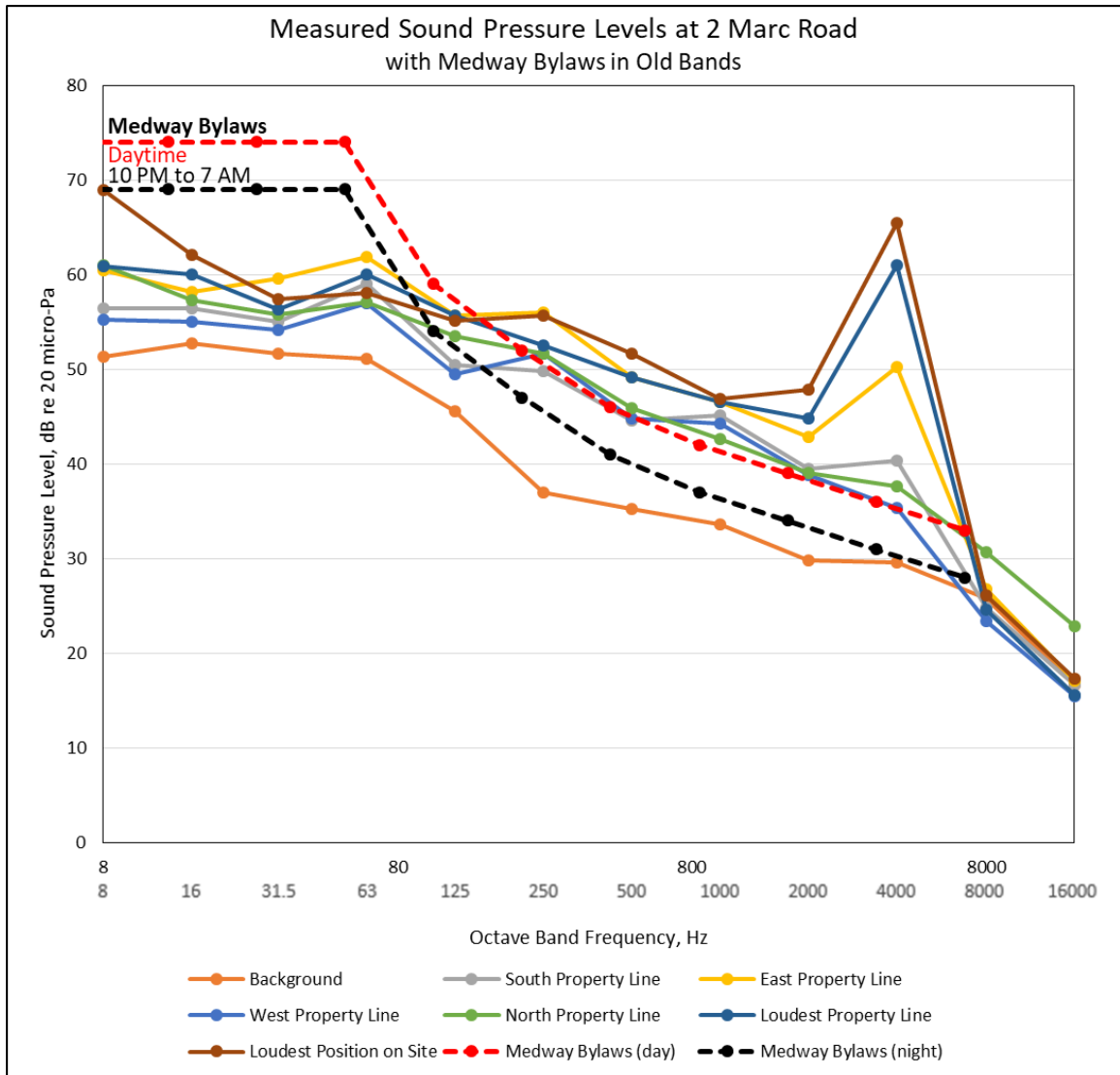


# Figure LK1. Medway Bylaw Limits Converted to Preferred Bands



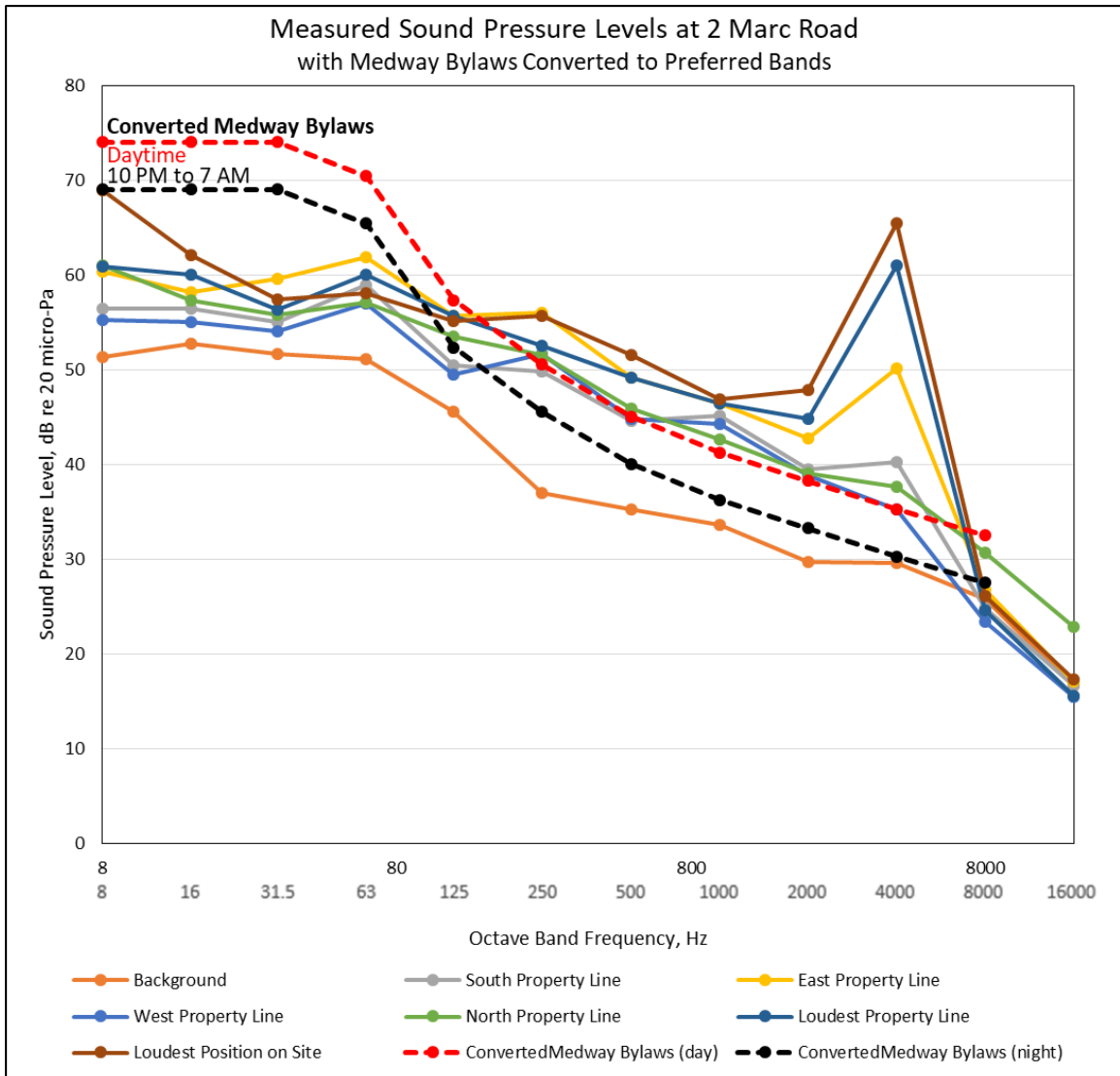
*Note: Medway Zoning Bylaw maximum permissible SPLs are expressed in old octave bands with cutoff frequencies. For comparison to preferred octave bands with center frequencies, the level limits are converted in accordance with ANSI/ASA S1.11-1966 by the formula  $L_N = L_O + 0.237 (L_{OH} - L_O)$ .*

**Figure LK2. NCE Report Figure 2  
with Medway Bylaw Limits  
in Old Bands**



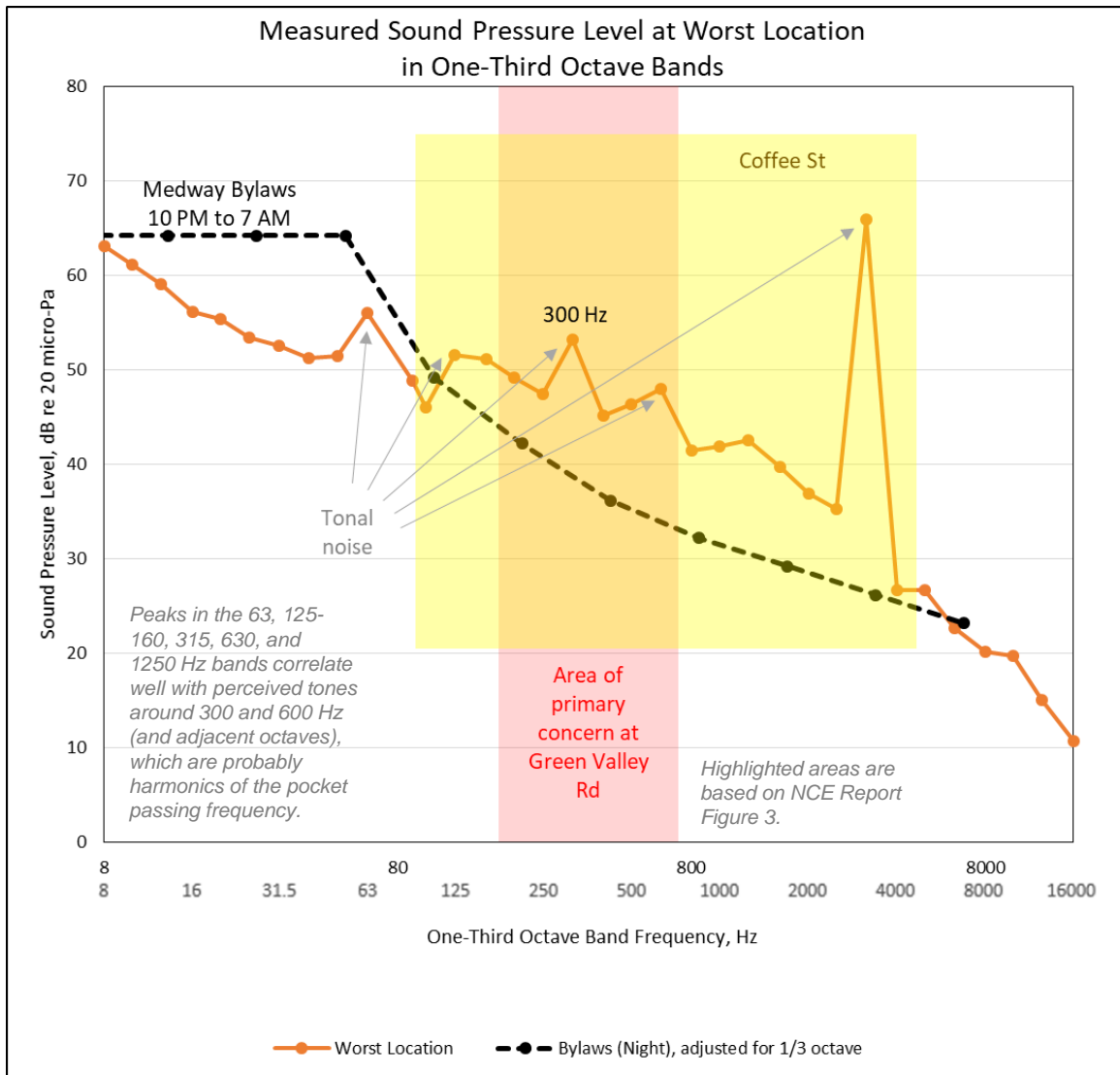
*Note: Medway Zoning Bylaw maximum permissible SPLs are expressed in old octave bands with cutoff frequencies. Corresponding old band center frequencies were calculated and used for plotting the Bylaw limits in their original format.*

**Figure LK3. NCE Report Figure 2  
with Medway Bylaw Limits  
Converted to Preferred Bands**



*Note: Medway Zoning Bylaw maximum permissible SPLs are expressed in old octave bands with cutoff frequencies. For comparison to preferred octave bands with center frequencies, the level limits are converted in accordance with ANSI/ASA S1.11-1966 by the formula  $L_N = L_O + 0.237 (L_{OH} - L_O)$ . The adjusted values are plotted in this chart.*

**Figure LK4. NCE Report Figure 4  
with Medway Bylaw Limits  
(Bands Most Affecting Households Highlighted)**



*Note: The Medway Zoning Bylaw maximum permissible SPLs as plotted have been converted to one-third octave bands by reducing the level by  $10 \cdot \log(1/3)$ , or 4.771 dB.*



# ANSI/ASA S1.11-1966

## Appendix A

### Appendixes

(These Appendixes are not a part of American Standard Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets, S1.11-1966, but are included to facilitate its use.)

### Appendix A

#### Conversion Between Octave Band Levels Measured with Filters Meeting American Standard Z24.10-1953 and Filters Meeting This Standard

##### A1. Basis of Conversion

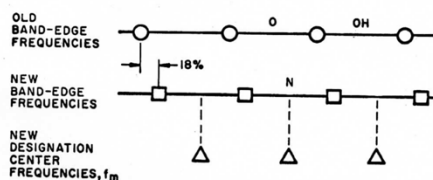
American Standard Z24.10-1953 for an octave band filter set specified a particular series of band-edge frequencies, whereas this standard specifies a series shifted upward approximately 18 percent to be in accordance with the preferred frequencies of American Standard S1.6-1960. Octave band filter measurements are used principally for measuring broadband noises with relatively continuous spectra. This Appendix gives a method of transferring the results of measurements made with one set of filters to corresponding results with the other set, for noises of this Class. In the following discussion, octave bands specified in American Standard Z24.10-1953 are called "old bands," whereas octave bands specified herein are called "new bands."

It is assumed that the frequency spectrum through contiguous octave bands has a continuously sloping characteristic wherein the power per unit frequency varies as a power of the frequency. It can then be shown that for octave bands the level (in dB) in a new band differs from the level in the corresponding old band by a correction that is 0.237 times the difference between the levels of the two old bands that include the new band. The correction is positive if the higher-frequency band has a higher level. Conversely, the level in an old band differs from the level in the corresponding new band by a correction that is 0.237 times the difference between the levels in the two new bands that include the old band. The correction is negative if the higher-frequency band has a higher level.

Computation directions and tabular aids for performing these interpolations are given in A2 and A3. The method is easily applied and its accuracy is considered consistent with the characteristic accuracy obtained in field measurements of noise. For a discussion of the basic problems in conversion, see Reference 8.

##### A2. Interpolation of New Band Level From Old Band Levels

This diagram represents the relationship of a new band,  $N$ , and the corresponding old band,  $O$ .



Let:

$L_O$  = level in any old octave band,  $O$

$L_{OH}$  = level in next higher old octave band,  $OH$

$L_N$  = level in corresponding new octave band,  $N$ , contained in  $O$  and  $OH$ , where  $N$  is 18 percent above  $O$  in frequency

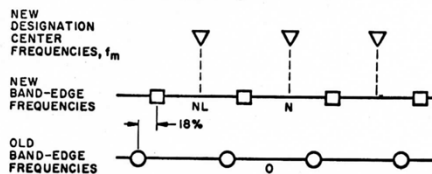
Then:

$$L_N = L_O + 0.237 (L_{OH} - L_O)$$

The correction to be applied to  $L_O$  is shown in Table A1. Table A2 shows corresponding old and new filter bands.

##### A3. Interpolation of Old Band Level From New Band Levels

This diagram represents the relationship of an old band,  $O$ , to the corresponding new band,  $N$ .



Let:

$L_N$  = level in any new octave band,  $N$

$L_{NL}$  = level in next lower new octave band,  $NL$

$L_O$  = level in corresponding old octave band,  $O$ , contained in  $NL + N$ , where  $N$  is 18 percent above  $O$  in frequency

Then:

$$L_O = L_N - 0.237 (L_N - L_{NL})$$

The correction term to be applied to  $L_N$  is shown in Table A3. Table A4 shows corresponding new and old filter bands.

## Susan Affleck-Childs

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**From:** Lally, John - 0666 - MITLL <jlally@ll.mit.edu>  
**Sent:** Tuesday, January 22, 2019 12:44 PM  
**To:** Susan Affleck-Childs  
**Cc:** Leigh Knowlton; John Lally; ellen@rosenfeld-law.com  
**Subject:** Acentech Response Comments  
**Attachments:** 630410\_-\_commcan\_-\_acentech\_response\_to\_nce\_findings-1a\_-\_january\_8\_2019\_\_JLAnnos\_22Jan.pdf; 1-3-19\_emails\_between\_noise\_consultants\_ron\_dempsey\_and\_andy\_carballeira\_with\_attachments.pdf; NYC\_MFG\_Noise\_Regs.PNG; HuntPointWPCP\_FEIS\_Noise\_2007.pdf; StGeorgeWtrFrnt\_FEIS\_Noise\_2013.pdf; ANSI\_ASA\_S1\_11\_1966.pdf

Hi Suzy,

After reviewing Acentech's responses to NCE's findings, felt compelled to respond. I've annotated Acentech's response with my comments in the attached pdf file "630410....JLAnnos\_22Jan"

Also attached are some supporting documents I referenced in my comments:

- a.) The back & forth email between Acentech & NCE.
- b.) Several Docs related to how the "old" octave bands are still in use and ANSI/ ASA standard for converting between "old" & "new" bands.

I also request that this email and attachments be forwarded to the PEDB and included in the public record associated with the 2 Marc Rd [Special Permit](#) application.

Sorry for the lateness,  
-John

## Susan Affleck-Childs

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**From:** Ron Dempsey <ron@noise-control.com>  
**Sent:** Thursday, January 03, 2019 6:02 PM  
**To:** Carballeira, Andy  
**Cc:** ellen@rosenfeld-law.com; Bahtiarian, Michael; Susan Affleck-Childs  
**Subject:** RE: Updated Noise Survey Memo  
**Attachments:** Marc Rd Conversion.xlsx; 2 Marc Rd.jpg

Hello Andy,

Attached you will find a spreadsheet with the measured data used in my report and the conversion used. The conversion only corrects for the difference in bandwidth of the standard octave bands to the non-standard ones used in the Town of Medway Zoning Bylaw. Given that the frequency ranges are different, there is definitely still uncertainty in comparing the measurements to the bylaws. Unfortunately a colleague of mine here wiped the sound level meter I used without backing up the data, so I do not have the additional metrics requested.

I have also replied to the points of your email below in red.

Thank you for taking the time to call and discuss this with me.

I have copied Susan Affleck-Childs from the Town of Medway on this email as she has requested that I keep her informed of our communications.

**Ron Dempsey**  
Noise Control Engineering, LLC  
978-584-3025 (direct line)  
[www.noise-control.com](http://www.noise-control.com)

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**From:** Carballeira, Andy <acarballeira@ACENTECH.com>  
**Sent:** Thursday, January 3, 2019 11:49 AM  
**To:** Ron Dempsey <ron@noise-control.com>  
**Cc:** ellen@rosenfeld-law.com; Bahtiarian, Michael <mbahtiarian@ACENTECH.com>  
**Subject:** FW: Updated Noise Survey Memo

Hi Ron,

Thanks for discussing this with me this morning. Per our conversation, we would like to request the following data from NCE:

1. 1/3 octave band spectra of the Leq and L90 measured at each location
2. An aerial photograph showing the measurement locations
3. The equation or algorithm by which you converted from measured bands to the values in the Medway Bylaw

The following points summarize the current state of this issue. These are intended to be areas where Acentech and NCE are currently in agreement. Please let me know if I have not accurately described NCE's position.

- The facility is in compliance with the MassDEP noise policy. This conclusion is based on both Acentech and NCE's independent measurements, as well as the policy interpretation provided by MassDEP and described below.  
I agree, the facility does not exceed the MassDEP noise policy based on any measurements I have seen from either party.

- The Medway Bylaw is deprecated, and written in such a way that prevents direct measurement using currently available sound measurement instrumentation.

I agree, the frequency bands specified are non-standard and would require custom filtering for any currently available measurement system I am aware of.

The following are my comments, and I would welcome your input:

- The Bylaw does not offer guidance as to which noise descriptor (Leq, L90, etc) should be used. NCE has reported the Leq, which is always greater than or equal to the L90 (which is prescribed in the MassDEP noise policy). This descriptor selection is a bias against the CommCann project. Please describe why NCE has selected Leq to describe a continuously operating source; Acentech is of the opinion that L90 is the more appropriate descriptor.

NCE's measurements were attended measurements with a short time period, taken when no other significant noise could be identified by the engineer taking the measurement. As you mentioned, the Leq and L90 should be equal if there is noise source which is continuously operating and no other significant source are present, which was the case with the reported noise measurements.

- A direct solution to the mathematical problem of converting filter bandwidth and edge frequencies does not exist. NCE has stated that measurements at several locations are in excess of the Bylaw; Acentech is of the opinion that making this statement definitely is mathematically impossible.

You are correct, there is no way to directly convert the measurements between the two standards. NCE has provided its best estimation of what the measured levels would be to the standard specified in the Zoning Bylaws. I will admit that this is not mathematically exact, but it is based on measured levels and I do not believe Acentech has provided any evidence that the noise levels from the facility are expected to meet the bylaws.

- Acentech described the Bylaw and the issues therewith to the Town in a public meeting, during which time we shared our opinion that the Bylaw is deprecated and not amenable to measurement with currently-available equipment. We understood at that time that compliance with the MassDEP policy would be sufficient demonstration of the facility's noise impact.

NCE was not involved with any previous meetings or agreements. I agree that the Bylaw is difficult, although not impossible, to measure to, however this is all outside of NCE's involvement in this project.

- Neither Acentech nor NCE are in a position to tell the Town of Medway what the intent of their Bylaw is. That said, if the intent is to protect public health, it is our opinion that measuring at a property line shared with another industrial use is not germane toward that goal.

While your statement is true and has been accepted by MassDEP, the Town of Medway Zoning Bylaw specifically states that the limits apply at the property line of the facility.

I sincerely appreciate your time and collegiality on this work, Ron. We hold NCE as a respected colleague and look forward to resolving the technical issues. As we discussed, I'm nervous that debating these issues in front of the public will create more confusion than clarity, though I recognize the value of transparency in this regard as well.

Kind regards,  
Andy

**Andy Carballeira**, INCE Bd Cert  
Senior Consultant

**ACENTECH**

d 617 499 8025

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**From:** Ron Dempsey <[ron@noise-control.com](mailto:ron@noise-control.com)>  
**Sent:** Tuesday, November 27, 2018 4:04 PM  
**To:** Beth Hallal <[bhallal@townofmedway.org](mailto:bhallal@townofmedway.org)>  
**Cc:** [mboynton@townofmedway.org](mailto:mboynton@townofmedway.org); [ellen@rosenfeld-law.com](mailto:ellen@rosenfeld-law.com)  
**Subject:** Updated Noise Survey Memo



Hello Beth,

Attached is the revised survey memo which has the facility in compliance per the latest policy interpretation from MassDEP. The policy interpretation was confirmed over the phone by Marc Wolman from MassDEP at 2:37 PM today, 11/27/18. I have also removed the references to potential treatments as they are unnecessary with the facility being in compliance.

**Ron Dempsey**

Senior Engineer

[ron@noise-control.com](mailto:ron@noise-control.com)

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## 2 Marc Road Noise Survey

### Octave Band Conversion

### All Measured Data in dB re 20 micro-Pa

#### Standard Octave Bands

Center Frequency	16	31.5	63	125
Lower Band Limit	11	22	44	88
Upper Band Limit	22	44	88	177
Span	11	22	44	89

#### Town Of Medway Bylaw Octave Bands

Center Frequency	37	112.5
Lower Band Limit	2	75
Upper Band Limit	72	150
Span	70	75

#### Bandwidth Correction Factor

2.016454    -0.74329

#### Measured Data From Marc Rd Noise Survey

	16	31.5	63	125
2 Marc Rd - North Property Line	56.4	55	59	50.5
2 Marc Rd - East Property Line	62.1	57.4	58.1	55.1
2 Marc Rd - West Property Line	58.2	59.6	61.9	55.7
2 Marc Rd - South Property Line	55	54.1	57	49.5
2 Marc Rd - Loudest Property Line	57.3	55.8	57.1	53.5
2 Marc Rd - Loudest Position On Site	60	56.3	60	55.7
45 Coffee Road	54	53.2	53.5	50.5
14 Green Valley Rd	53.1	53.6	51.9	46.3
18 Henry Street	53.2	52.1	51.2	46.5

#### Marc Rd Noise Survey Data Bandwidth Corrected For Medway Bylaws

	2-72 Hz	75-150 Hz
Town of Medway Noise Ordinance Limit	69	54
2 Marc Rd - North Property Line	61.0	49.8
2 Marc Rd - East Property Line	60.1	<b>54.4</b>
2 Marc Rd - West Property Line	63.9	<b>55.0</b>
2 Marc Rd - South Property Line	59.0	48.8
2 Marc Rd - Loudest Property Line	59.1	<b>52.8</b>
2 Marc Rd - Loudest Position On Site	62.0	<b>55.0</b>
45 Coffee Road	55.5	49.8
14 Green Valley Rd	53.9	45.6
18 Henry Street	53.2	45.8

250	500	1000	2000	4000	8000	16000
177	355	710	1420	2840	5680	11360
355	710	1420	2840	5680	11360	22720
178	355	710	1420	2840	5680	11360

225	450	900	1800	3600	7400
150	300	600	1200	2400	4800
300	600	1200	2400	4800	10000
150	300	600	1200	2400	5200

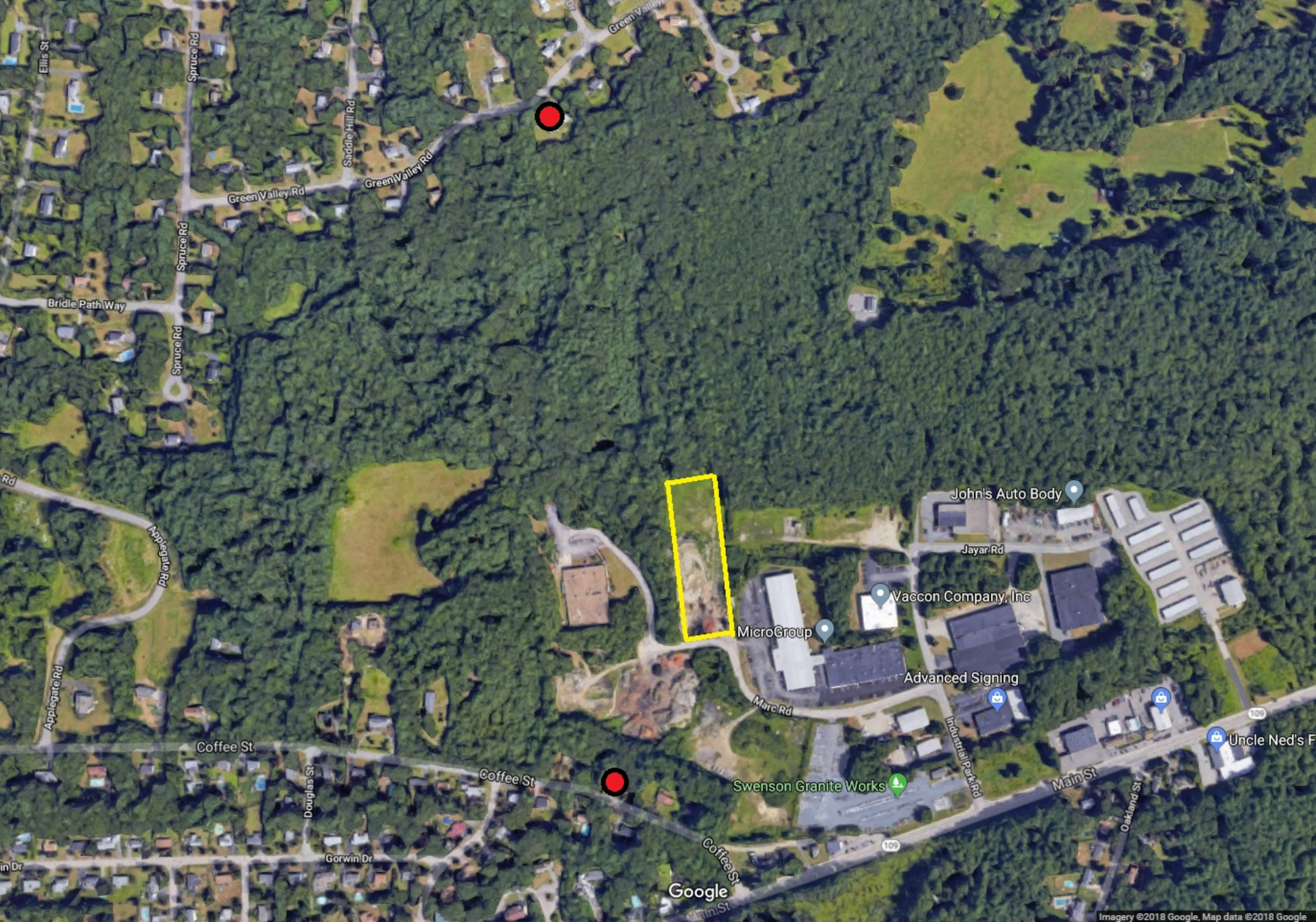
-0.74329	-0.73107	-0.73107	-0.73107	-0.73107	-0.38345
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250	500	1000	2000	4000	8000	16000
49.8	44.6	45.1	39.5	40.3	24.8	16.7
55.7	51.6	46.9	47.9	65.5	26.1	17.3
56	49.2	46.5	42.8	50.2	26.8	17.1
51.7	44.8	44.3	38.8	35.3	23.4	15.5
51.6	45.9	42.6	39.1	37.6	30.7	22.9
52.5	49.2	46.5	44.8	61	24.6	15.6
44.4	41.5	43.5	37.7	30.8	26.9	18.5
42.1	36.4	35	30.9	28.5	25.5	18.1
38.25	35.9	34.3	30.3	29.8	25.5	15.9

150-300 Hz	300-600 Hz	600-1200 H	1200-2400	2400-4800	4800-10,000 Hz
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47	41	37	34	31	28
<b>49.1</b>	<b>43.9</b>	<b>44.4</b>	<b>38.8</b>	<b>39.6</b>	24.4
<b>55.0</b>	<b>50.9</b>	<b>46.2</b>	<b>47.2</b>	<b>64.8</b>	25.7
<b>55.3</b>	<b>48.5</b>	<b>45.8</b>	<b>42.1</b>	<b>49.5</b>	26.4
<b>51.0</b>	<b>44.1</b>	<b>43.6</b>	<b>38.1</b>	<b>34.6</b>	23.0
<b>50.9</b>	<b>45.2</b>	<b>41.9</b>	<b>38.4</b>	<b>36.9</b>	<b>30.3</b>
<b>51.8</b>	<b>48.5</b>	<b>45.8</b>	<b>44.1</b>	<b>60.3</b>	24.2
43.7	40.8	<b>42.8</b>	<b>37.0</b>	30.1	26.5
41.4	35.7	34.3	30.2	27.8	25.1
37.5	35.2	33.6	29.6	29.1	25.1









33 Moulton Street  
Cambridge MA 02138  
617 499 8000  
acentech.com

## Memorandum

TO Ellen Rosenfeld (CommCan)

FROM Andrew Carballeira

DATE January 8, 2019

PROJECT CommCan Medway Chiller Noise

SUBJECT Response to NCE Findings

PROJECT NO 630410

CC Mike Bahtarian (Acentech)

Dear Ellen,

Acentech has been retained by CommCann to evaluate and mitigate noise produced by a large air-cooled chiller installed on the roof of the facility at 2 Marc Road. The Town of Medway has retained Noise Control Engineering (NCE; Billerica, MA) to provide peer review of our noise control work, and to provide third-party technical expertise on behalf of the citizens of Medway. We have communicated with NCE by phone and email and reviewed the data they provided. Appendix A contains a transcript of our email exchange, quotes from which appear throughout this document.

This memo presents our response to the findings of NCE

### NCE SOUND MEASUREMENTS

#### Measurement Locations

NCE performed sound level measurements at several locations shown in the figure below, which has been excerpted from their report to the town. Note that many of NCE's measurements were at the source property line, not the residential receiver property line.



Neither Acentech nor NCE are in a position to tell the Town of Medway what the intent of their Bylaw is. That said, if the intent is to protect public health, it is our opinion that measuring at a property line shared with another industrial use is not germane toward that goal.

The NCE measurements were initially compared to criteria set forth by MassDEP, and NCE arrived at the conclusion that the CommCann facility is in compliance with the MassDEP noise policy. As they note, "...the facility does not exceed the MassDEP noise policy based on any measurements [we] have seen from either party"

**Commented [J1]:** JL - NCE Email Pg2: "Town of Medway Zoning Bylaw specifically states that the limits apply at the property line of the facility". That's the intent.

**Commented [J2]:** JL - If NOT regulating sound at these non-residential locations allows for the existing noise, then YES, the public is served by regulating sound at these non-residential locations.

**Commented [J3]:** JL- Not DEP, but it does exceed Medway's Bylaw. See NCE Email Pg2: "I do not believe Acentech has provided any evidence that the noise levels from the facility are expected to meet the bylaws."



### Medway Noise Bylaw – Limits and Filter Bands

After submitting their letter, a community member raised the issue of the Medway Noise Bylaw, which is expressed using octave-bands which are deprecated and have not been in use since the mid-60s. Acentech described this Bylaw to the Planning Board during a previous presentation, and offered our opinion that reliable measurements in accordance with the Bylaw were not possible. NCE agreed with our opinion, noting “...the frequency bands specified are non-standard and would require custom filtering for any currently available measurement system [we are] aware of”. As such, **the Bylaw should be considered deprecated and unenforceable.**

In an effort to provide context, NCE estimated an adjustment factor (based on solely on filter bandwidth, and not including the effects of differing center frequencies) to be applied to their data, to facilitate comparison to the Medway Bylaw. While we find their adjustments to be reasonable, we strongly agree with their opinion that “...there is no way to directly convert the measurements between the two standards. NCE has provided its best estimation of what the measured levels would be to the standard specified in the Zoning Bylaws. [We] will admit that **this is not mathematically exact.**”

Acentech has taken a different approach from NCE, by converting the limit values in the Medway Bylaw to the standard octave bands on the basis of equal energy, and then comparing our measured data directly to the converted limits. TABLE I presents our estimate of the Medway Bylaw limits, in the current octave bands. The Bylaw allows for a 5 dB increase during daytime hours, which is the basis of the second line (Day) of the table.

TABLE I. Medway Noise Bylaw (converted to standard octave-bands by Acentech)

Description	63	125	250	500	1000	2000	4000	8000	A
Medway, Night	66	52	45	40	36	33	30	29	45
Medway, Day	71	57	50	45	41	38	35	34	50

As shown in TABLE I, the A-weighted sum of the nighttime octave band limits is 45 dBA, which is similar to broadband limits used in many rural and suburban communities in the US. The limit during daytime hours is 5 dB higher, as noted above.

### Medway Bylaw Sound Descriptor

The Medway Bylaw does not specify the sound level descriptor that should be used in connection with enforcement measurements. When a source of sound such as an air-cooled chiller operates continuously, the maximum, minimum, and average sound level are generally all the same. However, the ambient environment varies considerably with time (e.g., when a car drives by), leading to a condition where the average sound level is often much greater than the minimum (or similarly, the 90<sup>th</sup> percentile) sound level.

The measurements that NCE reported are the average sound level ( $L_{eq}$ ), whereas Acentech reports the ninetieth percentile sound level ( $L_{90}$ ) because it fully describes continuous sound sources, while not being influenced by short term events. Due to a data handling issue, NCE has not been able to report the  $L_{90}$ .

In lieu of the availability of the  $L_{90}$  data, we reviewed our previous measurements and found that the typical difference between the  $L_{eq}$  and  $L_{90}$  in the ambient environment in Medway is between 5 and 10 dB. As such, **we recommend that at least 5 dB be subtracted from the NCE-measured levels** to account for the presence of time-varying ambient sound not produced by CommCann.

### Review of NCE Measurements

TABLE II presents the data measured by NCE. We have included the converted Medway nighttime limits, and marked those values measured by NCE which exceed said limits **in bold**.

**Commented [J4]:** JL: NYC Mfg Districts still use “old” octave bands.

See:

1.) NYC Zoning Resolution 08Aug18, Section 42-213 on pg 1017 of pdf.

2.) St George Waterfront Redevelopment FEIS (2013) Chapter 17, Noise: Pg 17-4 Old Band Limits & old/new band conversion method per ANSI standard is the applicable standard. Pg 17-13 confirmation noise levels must meet the noise limits in Section 42-213 of Zoning Resolution (i.e. the old bands).

3.) Hunts Point WPCP FEIS (2007) Chapter 11, Noise: Pgs 11-5,6,7, 11-6, Noise Performance Standard is: NYC Zoning Resolution Section 42-213 (i.e. old bands), and the ANSI standard to convert between old/new bands. . IMPACT DEFINITION on pge 11-7 confirms the NYC Zoning Resolution (i.e. old bands) are used to assess impacts.

**Commented [J5]:** JL: Acentech omits the last clause of the referenced sentence: “...is not mathematically exact, but it is based on measured levels and I do not believe Acentech has provided any evidence that the noise levels from the facility are expected to meet the bylaws”. See NCE Email pg 2.

**Commented [J6]:** JL: NCE does not agree with this recommendation. See NCE Email Pg 2.

TABLE II. Energy-average sound levels,  $L_{eq}$  (as measured by NCE)

Description	63	125	250	500	1000	2000	4000	8000	A
Medway, Night	66	52	45	40	36	33	30	29	45
2 Marc Rd - North Property Line	59	51	50	45	45	40	40	25	50
2 Marc Rd - East Property Line	58	55	56	52	47	48	66	26	67
2 Marc Rd - West Property Line	62	56	56	49	47	43	50	27	55
2 Marc Rd - South Property Line	57	50	52	45	44	39	35	23	49
2 Marc Rd - Loudest Property Line	57	54	52	46	43	39	38	31	49
2 Marc Rd - Loudest Position On Site	60	56	53	49	47	45	61	25	62
45 Coffee Road	54	51	44	42	44	38	31	27	47
14 Green Valley Rd	52	46	42	36	35	31	29	26	41
18 Henry Street	51	47	38	36	34	30	30	26	40

**Commented [J7]:** JL: Exceedances made red and highlighted to illuminate the degree of Bylaw non-compliance

We have the following observations of the data as measured and reported by NCE reproduced in TABLE II:

- Measured sound levels near the facility (at the industrial property lines and on-site) are in excess of the Medway Bylaw by between 4 and 22 dBA. Exceedances of the octave-band provisions are also evidenced.
- Sound levels near the residential community (at the residential property lines) are significantly lower. At 45 Coffee Road, the measured A-weighted level is 2 dB in excess of the Bylaw, and there are exceedances in the 500, 1000, 2000, and 4000 Hz octave-bands of between 1 and 8 dB.
- Because these are average sound levels ( $L_{eq}$ ) at a significant distance from the source, we are of the opinion that non-CommCann sound has had an influence on the measured levels. We recommend that the  $L_{eq} - L_{90}$  margin established by Acentech and described above be applied to the data measured by NCE to account for the influence of ambient sound.

**Commented [J8]:** JL: Acentech observes that measured and reported levels by NCE exceed the Bylaw.

**Commented [J9]:** JL: Acentech observes Bylaw exceedances exist at residents.

**Commented [J10]:** JL: NCE does not agree with this recommendation. See NCE E-mail pg 2: "NCE's measurements were attended measurements with a short time period, taken when no other significant noise could be identified by the engineer taking the measurement. As you mentioned, the  $L_{eq}$  and  $L_{90}$  should be equal if there is noise source which is continuously operating and no other significant source are present, which was the case with the reported noise measurements."

TABLE III presents the NCE data with a 5 dB reduction attributable to the measured margin between  $L_{eq}$  and  $L_{90}$ , as recommended above.

TABLE III. Estimates of background sound levels  $L_{90}$ , based on NCE-measured  $L_{eq} - 5$  dB

Description	63	125	250	500	1000	2000	4000	8000	A
Medway, Night	66	52	45	40	36	33	30	29	45
2 Marc Rd - North Property Line	54	46	45	40	40	35	35	20	45
2 Marc Rd - East Property Line	53	50	51	47	42	43	61	21	62
2 Marc Rd - West Property Line	57	51	51	44	42	38	45	22	50
2 Marc Rd - South Property Line	52	45	47	40	39	34	30	18	44
2 Marc Rd - Loudest Property Line	52	49	47	41	38	34	33	26	44
2 Marc Rd - Loudest Position On Site	55	51	48	44	42	40	56	20	57
45 Coffee Road	49	46	39	37	39	33	26	22	42
14 Green Valley Rd	47	41	37	31	30	26	24	21	36
18 Henry Street	46	42	33	31	29	25	25	21	35

**Commented [J11]:** JL: Exceedances made red and highlighted to illuminate the degree of Bylaw non-compliance which remain after 5dB is subtracted (which NCE does not recommend).

We have the following observations of the data presented in TABLE III:

- Measured sound levels near the facility (at the industrial property lines and on-site) are still in excess of the Medway Bylaw, irrespective of how the data are viewed. Exceedances of the octave-band provisions are also evidenced. It is up to the Town to determine if the public is served by regulating sound at these non-residential locations.
- Broadband (i.e., A-weighted) sound levels near the residential community are in compliance with the Medway Bylaw. At 45 Coffee Road, the measured 1000 Hz octave-bands level exceeds the Bylaw by 3 dB.

#### CONCLUSION

Acentech and NCE are in agreement that sound produced by the CommCann Medway facility is in compliance with the MassDEP noise policy. When compared to the Medway Noise Bylaw and evaluated as background sound levels ( $L_{90}$ ), A-weighted sound levels produced by the facility are consistent with the deprecated Medway Noise Bylaw. The only apparent exceedance of the Medway Bylaw was observed at 45 Coffee Road, and the amount and breadth of this exceedance was relatively small (3 dB in the 1000 Hz octave-band).

In conclusion, broadband facility sound is generally in compliance with both the State and local noise regulations. A spectral exceedance of the Medway Bylaw in the 1000 Hz band was noted when reviewing the NCE data.

JL: **In summary, this report and conclusions seem questionable to the extent:**

- They compare sound measurements at resident locations to the Bylaw, the Bylaw specifically states noise measurements are at the property line nearest to the noise source.
- They subtract 5dB from measured sound Levels, NCE has stated this is incorrect because in this situation  $L_{eq}=L_{90}$ .
- They use Single-Value-Sound-Representations. The Bylaw specifies octave band sound levels shall be used. It is well established that Single-Value-Sound-Representations can be confusing and misleading, this is especially true in this situation where the sound has tonal content that is detrimental to residents.

I trust this memo provides the information you need at this time. Please contact me with questions at 617-499-8025 or [acarballeira@acentech.com](mailto:acarballeira@acentech.com).

Sincerely,



Andy Carballeira  
Senior Consultant

**Commented [J12]:** JL: Acentech observes exceedances exist irrespective of how the data is viewed.

**Commented [J13]:** JL: My property is residentially zoned and in the direct path of the noise which is extremely detrimental at my property line and at my house. Therefore, if NOT regulating sound at these non-residential locations allows for the existing noise, then YES, the public is served by regulating sound at these non-residential locations.

**Commented [J14]:** JL:

- The Bylaw applies at the worst case facility property line, sound levels near the residential community are irrelevant with respect to the Bylaw
- Sound levels are in fact experienced as detrimental at resident's houses which is "defacto" non-compliance

**Commented [J15]:** JL: Ignoring the fact that applying the Bylaw at residents is irrelevant, if NEC's recommendation of not subtracting 5dB is followed, then 45 Coffee Street exceeds the Bylaw at: 500Hz, 1000Hz, 2000Hz, 4000Hz. Measurements were done in front of the house on the public way so it's likely that sound levels are much higher and more non-compliant at the resident's border with the Industrial Park.

**Commented [J16]:** JL:

- What is the basis for this conclusion?
  - NCE does not agree with this approach, it is their opinion that in this case  $L_{eq}$  and  $L_{90}$  are approximately equal and therefore 5dB should not be subtracted.
  - The Bylaw applies at the facility property line not at resident homes, and therefore Table 1 applies which has exceedances at the vast majority of all locations and all octaves.
  - Ignoring the fact that NCE recommends not subtracting 5dB, Table III shows exceedances at all locations at octave bands 1000, & 2000, and 5 locations with exceedances at octave bands 250 & 4000, and 4 locations with exceedances at octave band 500.

**Commented [J17]:** JL:

- What is meant by "broadband facility sound" and what's the basis of this conclusion?
  - If broadband facility sound refers to the "Single-Value-Sound-Representations" identified as column "A" in tables II & III, then there are non-compliance levels at all locations in Table II and at 3 out of 6 locations in Table III.
  - If broad band facility sound is a reference to Single Value Sound Representations they are confusing and misleading because they



**American Standard Specification for  
Octave, Half-Octave, and Third-Octave  
Band Filter Sets**

Sponsor  
**Acoustical Society of America**

Approved May 4, 1966  
**AMERICAN STANDARDS ASSOCIATION**  
INCORPORATED

**04035**

# Foreword

(This Foreword is not a part of American Standard Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets, S1.11-1966.)

This American Standard comprises part of a group of definitions, standards, and specifications prepared for use in acoustical work. It has been developed under the Sectional Committee Method of ASA procedure, and has been sponsored by the Acoustical Society of America which has been the leader in standardization activities in this area since 1932.

This standard comes under the jurisdiction of Sectional Committee S1 on Acoustics. The S1 Sectional Committee has the following scope:

Standards, specifications, methods of measurement and test, and terminology, in the fields of physical acoustics, including architectural acoustics, electroacoustics, sonics and ultrasonics and underwater sound, but excluding those aspects which pertain to safety, tolerance, and comfort.

Suggestions for improvement gained through the use of this standard will be welcome. They should be sent to the American Standards Association, Incorporated, 10 East 40th Street, New York, N.Y. 10016.

The ASA Sectional Committee on Acoustics, S1, which reviewed and approved this standard, had the following personnel at the time of approval:

R. K. Cook, *Chairman*

W. Koidan, *Vice-Chairman*

S. D. Hoffman, *Secretary*

## Organization Represented

## Name of Representative

Acoustical Materials Association .....	W. A. Jack
Acoustical Society of America .....	R. W. Benson
Air-Conditioning & Refrigeration Institute .....	R. B. Watson
Air Moving & Conditioning Association .....	J. R. Schreiner
American Society of Heating, Refrigerating & Air-Conditioning Engineers .....	R. J. Evans ( <i>Alt</i> )
American Society for Testing and Materials .....	R. E. Parker
Canadian Standards Association ( <i>Liaison</i> ) .....	R. A. Gerlitz ( <i>Alt</i> )
Electric Light and Power Group .....	R. E. Parker
Electronic Industries Association .....	H. P. Tinning ( <i>Alt</i> )
Institute of Electrical and Electronic Engineers .....	R. Huntley
National Bureau of Standards .....	R. W. Boltz ( <i>Alt</i> )
National Electrical Manufacturers Association .....	T. D. Northwood
Society of Motion Picture and Television Engineers .....	C. S. Murray
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# American Standard Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets

## Introduction

### General Objective

Noises and related signals are subjected to spectrum analysis for various purposes. These purposes include scientific, technological, legal, and artistic areas. The types of signals involved cover wide variations of such factors as waveform, amplitude, frequency bandwidth, coherence, etc. Currently, no practical single instrument can render the optimum or most economical analysis for all signals. For this reason, the present standard includes the concept of several instruments, each adapted to the needs of a user having certain interests.

### Spectrum Analysis.

From the standpoint of human acceptability, there is a great distinction between desired sounds, such as speech, music, or testing signals, and acoustical noise which is defined as unwanted sound. However, for measurement purposes they are merely different types of the same phenomenon and for brevity will be called noise in this document. Because noises may differ widely in spectrum, waveform, and time variation, no single number, such as that given by the reading of a sound-level meter, can describe a noise to the extent required for use in many situations. The meter measurement is often supplemented by other measurements, important among which is spectrum analysis. The spectrum analyses may be made by a continuously adjustable narrow-band wave analyzer, by a series of contiguous broadband filters, or by some system intermediate between these two. Suitable standards are required for these analysis systems, so that satisfactorily uniform results can be obtained by using any analyzer that meets the standard for its type.

The selective networks used in spectrum analyzers fall into two broad classes: (1) constant bandwidth filters where the upper band-edge<sup>1</sup> frequency remains a constant number of cycles per second (c/s) above the lower band-edge frequency over the tuning range of the analyzer; and (2) constant percentage bandwidth filters where the upper band-edge frequency bears a constant ratio to the lower band-edge frequency over the tuning range. This specification is concerned with the latter type of filter, which has been found particularly applicable to the analysis of sounds extending over a broad frequency range.

<sup>1</sup>See Note to 2.2.

### Selection of Frequency Bands

An octave band filter set divides the spectrum into a series of octave bands, each of which has a nominal upper band-edge frequency that is twice the nominal lower band-edge frequency. A particular set of band-edge frequencies was specified in the previous American Standard Z24.10-1953 for octave-band filter sets in the interest of uniformity, since for broadband noises the choice of the band-edge frequencies is arbitrary. In January 1960, Preferred Frequencies for Acoustical Measurements, S1.6-1960, established preferred frequencies for acoustical measurements, and the filter band-edge frequencies in the present standard have been adjusted upward approximately 18 percent to conform to the preferred frequency series. The filters in the new specified series are identified by the midband frequency,  $f_m$ , which is the geometric mean of the nominal band-edge frequencies.

It is appreciated that the frequency bands and filter characteristics specified in American Standard Z24.10-1953 have been specified in many documents of legal significance and many organizations are equipped with filter sets conforming to that standard. For the class of noises for which octave band analysis is appropriate, covering a broad frequency range, measurements made with either the former series or with the series specified herein are compatible. A method of transferring measurements of continuous spectrum broadband noise made with filters of one series to the equivalent readings with filters in the other series is given in Appendix A.

Experience has shown that in many cases greater resolution of the frequency spectrum than is provided by octave band filters is desirable and justifiable. This need resulted in extensive use of half-octave band and third-octave band filters although no performance standards were available. The present standard, therefore, includes specifications for half-octave band and third-octave band filters, which have a ratio of upper to lower band-edge frequency of  $2^{1/2}$  and  $2^{1/3}$ , respectively. Frequency designations for these filters have been specified in concurrence with the preferred number series and with those chosen for the octave band series. As stressed in American Standard S1.6-1960, a certain amount of rounding was done in selecting the preferred number series to secure compatible sets of frequencies progressing both by powers of two (for octaves) and by powers of ten. Any deviations caused by the rounding are less than the frequency tolerances permitted by this specification. For all filters,

the specifications for characteristics are given in terms of frequency ratios and could be applied to units based on other midband frequency series.

### Designation of Filter Sets

For many purposes of standardization, it is desirable to specify a filter set containing a particular number of filters covering the usual audio-frequency range, as was done in American Standard Z24.10-1953. However, other applications require fewer filters than this, or filters at frequencies in a different combination above or below the usual range. To extend the basic characteristic specifications to include all of these situations, filter sets of three types have been delineated in this standard:

Type R (restricted range)

Type E (extended range)

Type O (optional range)

The Type R filter set contains a moderate number of filter bands and is intended to satisfy user requirements similar to those for which the former set specified by American Standard Z24.10-1953 is appropriate. The Type E filter set includes additional filter bands which experience has shown to be desirable for many research problems and more extensive industrial and military investigations. In Type O filter sets, the manufacturer may provide any set of filter bands he specifies, but each filter furnished must meet the performance requirements of this standard. Type O, therefore, allows special-purpose filter sets to qualify under the standard, adding needed flexibility.

### Designation of Filter Characteristics

In view of the great variety of sounds to be measured, it is necessary to select for a standard the characteristics that are judged to be useful for the greatest number of cases. The committee preparing this standard has approached the problem by reviewing many spectra taken on a wide variety of acoustic sources. This review was necessary to ensure that the filter characteristics to be specified would be adequate to measure the spectra that occur in practice. At the same time, the group reviewed the filter characteristics that are economically obtainable, so that an adequate filter that is also reasonable in cost could be specified. Unless the specifications are made sufficiently restrictive, many users may be unable to obtain a reasonable spectrum analysis of commonly encountered noises by the use of filters that meet the standard. The serious aspect of this situation is that they may be misled into thinking that the result is correct, because they are using a standard filter. On the other hand, some hardship would result to those with minimal needs if only the requirements of the most severe usage were to be placed on the filter characteristics. The

### AMERICAN STANDARD SPECIFICATION FOR

filters would then be more costly, their use not be as widespread as is desirable, and the development of the field of noise evaluation and control not be as rapid as would otherwise be possible.

The committee concluded that the use of filters for noise and signal analysis has become so extensive and varied that it is no longer practicable to meet all needs with a standard specifying a single transmission loss characteristic for each bandwidth. In this standard, three grades of performance are specified, two for each bandwidth. The nomenclature selected allots a Class number to each grade of performance. This system allows the specification of additional, more rigid requirements in future standards, if this proves necessary to meet advancing technological needs, without invalidating those Classes specified herein.

The standard includes minimum performance specifications for three Classes of filters as follows:

<u>Bandwidth</u>	<u>Class Designation</u>	<u>Qualitative Description of Transmission Loss Slope</u>
Octave	Class I	Low
	Class II	Moderate
Half Octave	Class II	Moderate
	Class III	High
Third Octave	Class II	Moderate
	Class III	High

The Class II characteristic as specified for octave, half-octave, and third-octave band filters is considered to meet the majority of needs for each bandwidth. For the octave band filter, it is similar to the characteristic specified in the former American Standard Z24.10-1953. A Class I characteristic of lower slope has also been specified for octave band filters to provide a measurement standard for a large class of field tests that can be conducted with such economical filters. For half-octave and third-octave filters, a Class III with higher slope has been specified to meet the needs of users requiring greater discrimination.

These are the Classes which the committee believed should be specified at the time of preparation of this standard. Additional characteristics with appropriate Class numbers can be added at any time they become sufficiently needed. The specification requires that the Type and Class symbols be included in the designation of a filter.

The choice of filter for a given measurement is based upon the accuracy required. The bandwidth error of a filter depends upon its transmission loss at the band edges, the slope of the transmission loss characteristic outside the band, and the input noise spectrum slope. Appendix B discusses this subject and gives data and

references allowing selection of filter characteristics which will yield measurements falling within specified error limits at various noise spectrum slopes.

### Specification of Filter Characteristic Shape

From the standpoint of simplicity in wording a specification, a small number of straight-line segments is desirable to describe the shapes of limiting transmission loss characteristics. Experience has shown, however, that this often complicates the design of economical real filters, since real filters do not yield characteristics approximating long straight-line segments. It was decided that the limiting characteristics would be specified by mathematical expressions based upon the design formulas of modern maximally-flat band-pass filters. This makes it easier for the designer to provide filters that meet both the transmission loss slope characteristic specification and the equivalent bandwidth and nominal mean frequency requirements. Consequently, it was considered feasible to be more strict in these requirements.

In the body of the standard the mathematical statement of each characteristic is the basic requirement. It is unambiguous and not subject to errors of curve plotting, interpretation, or reproduction. In each case, however, the mathematical requirement is accompanied by a graphical representation which is convenient and will be adequate for most engineering comparisons. To meet the requirements of the standard, not only must all points on a filter characteristic lie between the two curves shown, but the other requirements on effective bandwidth, nominal mean frequency, maximum ripple, etc, must also be met.

### Transient Response

The transient response characteristics of a filter set are not of primary concern in this standard. It is assumed that an rms (root-mean-square) indicating device of the type specified in American Standard Specification for General-Purpose Sound Level Meters, S1.4-1961, is used to determine filtered levels and that the effect of any transient distortion introduced by the set on the indicated filtered level is negligible. The characteristics and tolerances have been selected by the Committee to represent physically attainable results according to current advanced theory and manufacturing processes. With the specified characteristics, when the filtered output is applied to an oscillograph, a transient response, particularly damped oscillations sometimes called "ringing," may be observed even though the filters meet the requirements of this standard. However, a limit is placed upon the allowable amount of this type of response in the standard.

### Influence of External Conditions

Requirements for temperature and humidity are included. The Writing Group concluded, however, that available knowledge when the standard was written could not support rigid numerical requirements for the influence of magnetic and electrostatic fields, sonic excitation, and vibration, with any assurance that they would be both adequate and nonhampering to future development. The specification includes a qualitative statement on these influences, and recommends the development of objective tests and specifications so that future standards may include effective quantitative requirements.

## 1. Purpose and Scope

**1.1 Purpose.** The purpose of this standard for filter sets is to specify particular bandwidths and characteristics which may be used to ensure that all analyses of noise will be consistent within known tolerances when made with similar filter sets meeting these specifications.

**1.2 Scope.** The standard for filter sets is suited to the requirements for analyzing, as a function of frequency, a broadband electrical signal. For acoustical measurements an electro-acoustic-transducer and amplifier are employed to convert the acoustic signal to be analyzed into the required electrical signal.

## 2. Definitions

These definitions are based upon those given in American Standard Acoustical Terminology (Including Mechanical Shock and Vibration), S1.1-1960.

**2.1 Wave Filter (Filter).** A wave filter is a transducer for separating waves on the basis of their frequency. It introduces relatively small insertion loss to waves in one or more frequency bands, and relatively large insertion loss to waves of other frequencies. (See 6.12 of American Standard S1.1-1960.)

**2.2 Band-Pass Filter.** A band-pass filter is a wave filter that has a single transmission band extending from a lower band-edge frequency greater than zero to a finite upper band-edge frequency.

NOTE: This definition is identical to the definition in 6.15 of American Standard S1.1-1960 except that the words "band-edge frequency" are substituted for "cutoff frequency." Cutoff frequency in 6.16 of American Standard S1.1-1960 is restricted to a frequency at which the response is 3 dB below the maximum response. In this standard the restriction does not apply to the frequencies limiting the passband. Therefore, the term "band-edge frequency" is used to avoid confusion. See 3.3 and Appendix B.

**2.3 Filter Bandwidth.** The bandwidth of a filter is the difference between the upper and lower band-edge frequencies, and defines the transmission band or pass band. In this specification the bandwidth is described by the interval in octaves between the upper and lower band-edge frequencies.

**2.4 Spectrum.** The spectrum of a function of time is a description of its resolution into components, each of a different frequency and (usually) different in amplitude and phase. [See 1.34 (1) of American Standard S1.1-1960.] A *Continuous Spectrum* is the spectrum of a wave the components of which are continuously distributed over a frequency region. (See 1.37 of American Standard S1.1-1960.) A *White Noise Spectrum* is a continuous spectrum whose spectrum density (mean-square amplitude per unit frequency) is independent of frequency over a specified frequency range.

**2.5 Transmission Loss.** Transmission Loss is the reduction in the magnitude of some characteristic of a

signal, between two stated points in a transmission system. (See 4.29 of American Standard S1.1-1960.)

NOTE 1: In this specification the *Transmission Loss* is the reduction in power level or voltage level between the input applied to the filter in series with its proper input terminating impedance, and the output delivered by the filter to its proper load impedance.

NOTE 2: In this specification the *Transmission Loss Characteristic* of a filter, representing the change of Transmission Loss with frequency, is specified with respect to the minimum Transmission Loss in the passband measured when the filter is inserted between the proper terminating impedances.

NOTE 3: *Attenuation* (not defined in American Standard S1.1-1960) is frequently used as synonymous with Transmission Loss as defined above, in connection with filter characteristics.

NOTE 4: *Insertion Loss* is a term also frequently used in connection with filters. The Insertion Loss resulting from insertion of a transducer in a transmission system is 10 times the logarithm to the base 10 of the power delivered to that part of the system that will follow the transducer, before insertion of the transducer, to the power delivered to that same part of the system after insertion of the transducer. (See 7.2 of American Standard S1.1-1960.) For passive filters operated between resistive terminating impedances, the *Insertion Loss Characteristic* employing the minimum value as referent is the same as the *Transmission Loss Characteristic*.

**2.6 Terminating Impedances.** The terminating impedances are the impedances of the external input and output circuits between which the filter is connected.

**2.7 Peak-to-Valley Ripple.** When the transmission loss characteristic in the transmission band contains a series of maxima and minima, or ripples, the peak-to-valley ripple is defined as the difference in decibels between the extremes of minimum and maximum transmission loss in the pass band region.

## 3. Requirements

**3.1 Filter Sets.** The filter set shall provide a number of filter bands according to the schedules listed in Table 1, and shall bear the corresponding Type symbol:

R for Restricted Range

E for Extended Range

O for Optional Range

The filter bands are identified by the designation mean frequency  $f_m$  of the band as defined in 3.2.

### 3.2 Nominal Mean Frequency, $f_m$

**3.2.1 Band Designation Frequencies.** The values of mean frequency,  $f_m$ , used for band designation in Table 1 are based upon the recommendations of 5.2, page 3, of American Standard S1.6-1960. Band designation frequencies shall be rounded according to American Standard S1.6-1960.

**3.2.2 Precise Values of  $f_m$ .** Precise values of nominal mean frequency  $f_m$  shall be calculated from the formulas given in Table 2.

**3.3 Nominal Frequency Bandwidths.** The nominal band-edge frequencies and bandwidths for the octave, half-octave, and third-octave band filters are defined by the relations given in Table 3. The frequency  $f_m$  in each band is the geometric mean of the upper and lower



OCTAVE, HALF-OCTAVE, AND THIRD-OCTAVE BAND FILTER SETS

nominal band-edge frequencies,  $f_1$  and  $f_2$ , which are defined by Table 3.

**3.4 Transmission Loss vs Frequency Characteristics of Individual Filters.** When tested as specified in Section 4, the separate filters of a set shall conform to the requirements in the paragraphs below. For each filter characteristic, transmission loss is specified with respect to the minimum transmission loss in the frequency range  $f_1$  to  $f_2$  delineated in Table 3. Transmission loss characteristics are grouped under three classes (I, II, or III)

depending upon the steepness of the slope of the transmission loss vs frequency curve. Filter designations must bear the appropriate Class symbol.

NOTE: In the transmission loss characteristics specified below, the mathematical statement is the governing consideration. The graphical representation accompanying each characteristic requirement is added for convenience. The actual filter characteristic, in addition to falling within the transmission loss limits shown, must simultaneously meet the requirements on *Passband Uniformity* (see 3.6) and on *Effective Bandwidth* (see 3.7). On each plot a dotted curve is shown as an example of a characteristic meeting all requirements.

**Table 1**  
**Table of Filter Bands To Be Provided**

Band Number	Mean Frequency $f_m$ (c/s)	Octave Bands		Half-Octave Bands		Third-Octave Bands		Any Band Type O
		Type R	Type E	Type R	Type E	Type R	Type E	
14	25						x	
15	31.5		x		x		x	
16	40						x	
16.5	45				x			
17	50						x	
18	63		x		x		x	
19	80						x	
19.5	90				x			
20	100					x	x	
21	125	x	x	x	x	x	x	
22	160					x	x	
22.5	180			x	x			
23	200					x	x	
24	250	x	x	x	x	x	x	
25	315					x	x	
25.5	355			x	x			
26	400					x	x	
27	500	x	x	x	x	x	x	
28	630					x	x	
28.5	710			x	x			
29	800					x	x	
30	1000	x	x	x	x	x	x	
31	1250					x	x	
31.5	1400			x	x			
32	1600					x	x	
33	2000	x	x	x	x	x	x	
34	2500					x	x	
34.5	2800			x	x			
35	3150					x	x	
36	4000	x	x	x	x	x	x	
37	5000					x	x	
37.5	5600				x			
38	6300						x	
39	8000		x		x		x	
40	10000						x	
40.5	11200				x			
41	12500						x	
42	16000						x	
43	20000						x	

Filter Bands as Specified by the Manufacturer

**Table 2**  
**Nominal Mean Frequencies,  $f_m$**

Octave Bands	$f_m = 10^{3n/10}$
Half-Octave Bands	$f_m = 10^{3n/20}$
Third-Octave Bands	$f_m = 10^{3n/30}$

NOTE:  $n$  is any integer, positive, negative, or zero.

**Table 3**  
**Nominal Band-Edge Frequencies  
and Frequency Bandwidths**

	Octave Band	Half-Octave Band	Third-Octave Band
Formula	$f_1 = 2^{-1/2}f_m$ $f_2 = 2^{1/2}f_m$	$f_1 = 2^{-1/4}f_m$ $f_2 = 2^{1/4}f_m$	$f_1 = 2^{-1/6}f_m$ $f_2 = 2^{1/6}f_m$
Numerical Value	$f_1 = 0.7071f_m$ $f_2 = 1.4142f_m$	$f_1 = 0.8409f_m$ $f_2 = 1.1892f_m$	$f_1 = 0.8909f_m$ $f_2 = 1.1225f_m$
Bandwidth $f_2 - f_1$	$0.7071f_m$	$0.3483f_m$	$0.2316f_m$

$f_1$  = nominal lower band-edge frequency  
 $f_2$  = nominal upper band-edge frequency  
 $f_m$  = calculated from formulas of Table 2

### 3.4.1 Octave Band Filters — Class I

(1) At any frequency,  $f$ , in the range from  $\frac{3f_m}{4}$  to  $\frac{4f_m}{3}$  the transmission loss shall not be more than

$$10 \log_{10} \frac{8}{5} \left[ 1 + 3 \left( \frac{f}{f_m} - \frac{f_m}{f} \right)^2 \right] \text{ decibels.}$$

(2) At any frequency,  $f$ , in the range from  $\frac{f_m}{5}$  to  $\frac{f_m}{\sqrt{2}}$  the transmission loss shall be more than

$$10 \log_{10} \left[ \frac{1}{8} \left( \frac{f_m}{f} \right)^6 \right] \text{ decibels.}$$

(3) At any frequency,  $f$ , in the range from  $\frac{f_m}{10}$  to  $\frac{f_m}{5}$  the transmission loss shall be more than

$$10 \log_{10} \left[ 1 + \frac{25}{8} \left( \frac{f}{f_m} \right)^4 \right] \text{ decibels.}$$

(4) At any frequency,  $f$ , in the range from  $\sqrt{2}f_m$  to  $5f_m$  the transmission loss shall be more than

$$10 \log_{10} \left[ \frac{1}{8} \left( \frac{f}{f_m} \right)^6 \right] \text{ decibels.}$$

(5) At any frequency,  $f$ , in the range from  $5f_m$  to  $10f_m$  the transmission loss shall be more than

$$10 \log_{10} \left[ 1 + \frac{25}{8} \left( \frac{f}{f_m} \right)^4 \right] \text{ decibels.}$$

(6) At any frequency,  $f$ , below  $\frac{f_m}{10}$  or above  $10f_m$  the transmission loss shall be more than 45 decibels.

(7) A graphical representation of the allowable limits is given in Fig. 1.

### 3.4.2 Octave Band Filters — Class II

(1) At any frequency,  $f$ , in the range from  $\frac{3f_m}{4}$  to  $\frac{4f_m}{3}$  the transmission loss shall not be more than

$$10 \log_{10} \frac{5}{4} \left[ 1 + 30 \left( \frac{f}{f_m} - \frac{f_m}{f} \right)^6 \right] \text{ decibels.}$$

(2) At any frequency,  $f$ , in the range from  $\frac{f_m}{8}$  to  $\frac{f_m}{\sqrt{2}}$  and from  $\sqrt{2}f_m$  to  $8f_m$  the transmission loss shall be more than

$$10 \log_{10} \frac{2}{3} \left[ 1 + 4 \left( \frac{f}{f_m} - \frac{f_m}{f} \right)^6 \right] \text{ decibels.}$$

(3) At any frequency,  $f$ , below  $\frac{f_m}{8}$  or above  $8f_m$  the transmission loss shall be more than 60 decibels.

(4) A graphical representation of the allowable limits is given in Fig. 2.

### 3.4.3 Half-Octave Band Filters — Class II

(1) At any frequency,  $f$ , in the range from  $\frac{6f_m}{7}$  to  $\frac{7f_m}{6}$  the transmission loss shall not be more than

$$10 \log_{10} \frac{5}{4} \left[ 1 + 200 \left( \frac{f}{f_m} - \frac{f_m}{f} \right)^4 \right] \text{ decibels.}$$

(2) At any frequency,  $f$ , in the range from  $\frac{9f_m}{100}$  to  $2^{-1/4}f_m$  and from  $2^{1/4}f_m$  to  $\frac{100f_m}{9}$  the transmission loss shall be more than

$$10 \log_{10} \left[ 68 \left( \frac{f}{f_m} - \frac{f_m}{f} \right)^4 \right] \text{ decibels.}$$

(3) At any frequency,  $f$ , below  $\frac{9f_m}{100}$  or above  $\frac{100f_m}{9}$  the transmission loss shall be more than 60 decibels.

(4) A graphical representation of the allowable limits is given in Fig. 3.

### 3.4.4 Half-Octave Band Filters — Class III

(1) At any frequency,  $f$ , in the range from  $\frac{6f_m}{7}$  to  $\frac{7f_m}{6}$  the transmission loss shall not be more than

$$10 \log_{10} \frac{5}{4} \left[ 1 + 200 \left( \frac{f}{f_m} - \frac{f_m}{f} \right)^4 \right] \text{ decibels.}$$

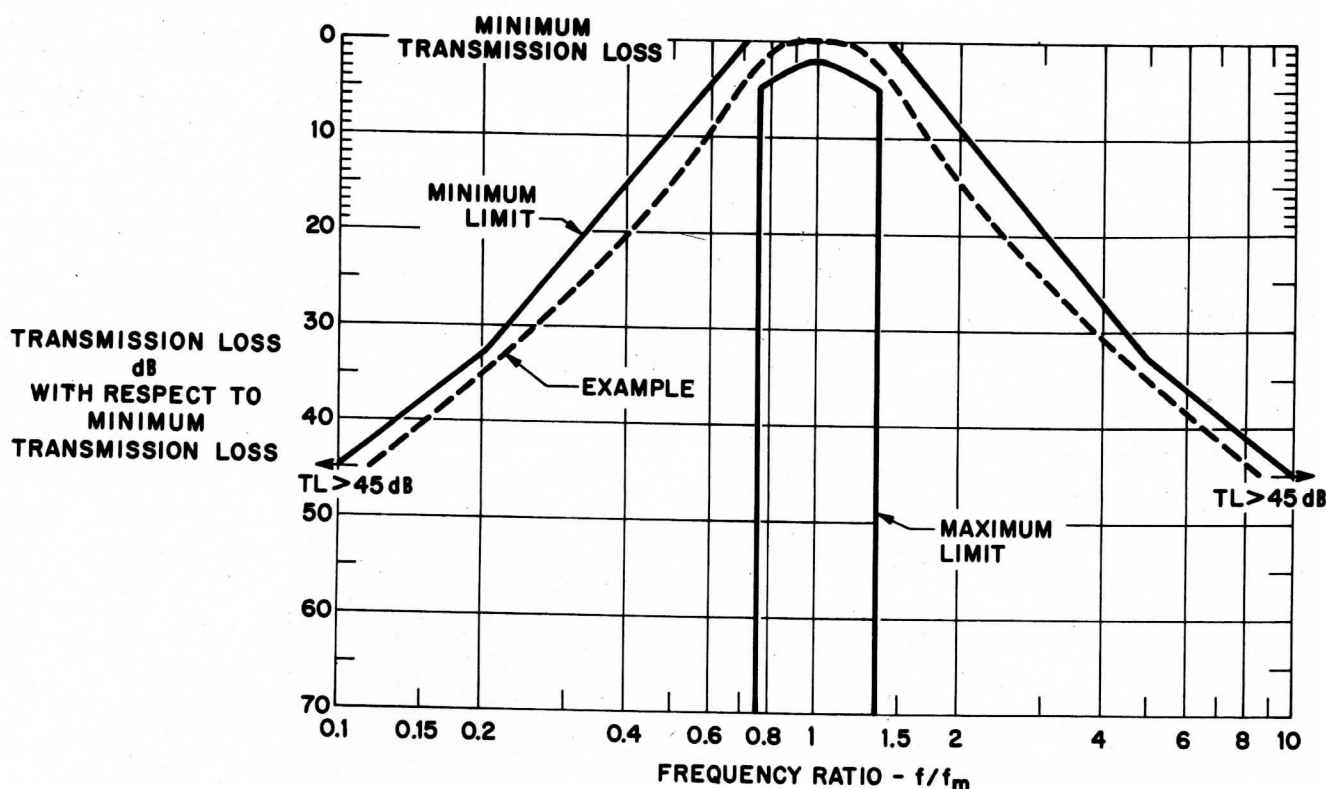


Fig. 1

**Transmission Loss Limits — Octave Band Filter, Class I**  
(Filter Characteristic Must Also Meet Requirements in 3.6 and 3.7)

(2) At any frequency,  $f$ , in the range from  $\frac{f_m}{6}$  to  $2^{-1/4}f_m$  and from  $2^{1/4}f_m$  to  $6f_m$  the transmission loss shall be more than

$$10 \log_{10} \left[ \frac{5}{9} + 250 \left( \frac{f}{f_m} - \frac{f_m}{f} \right)^6 \right] \text{ decibels.}$$

(3) At any frequency,  $f$ , below  $\frac{f_m}{6}$  or above  $6f_m$  the transmission loss shall be more than 70 decibels.

(4) A graphical representation of the allowable limits is given in Fig. 4.

### 3.4.5 Third-Octave Band Filters — Class II

(1) At any frequency,  $f$ , in the range from  $\frac{9f_m}{10}$  to  $\frac{10f_m}{9}$  the transmission loss shall not be more than

$$10 \log_{10} \frac{5}{4} \left[ 1 + 1040 \left( \frac{f}{f_m} - \frac{f_m}{f} \right)^4 \right] \text{ decibels.}$$

(2) At any frequency,  $f$ , in the range from  $\frac{f_m}{8}$  to  $2^{-1/6}f_m$  and from  $2^{1/6}f_m$  to  $8f_m$  the transmission loss shall be more than

$$10 \log_{10} \frac{1}{4} \left[ 1 + 1040 \left( \frac{f}{f_m} - \frac{f_m}{f} \right)^4 \right] \text{ decibels.}$$

(3) At any frequency,  $f$ , below  $\frac{f_m}{8}$  or above  $8f_m$  the transmission loss shall be more than 60 decibels.

(4) A graphical representation of the allowable limits is given in Fig. 5.

### 3.4.6 Third-Octave Band Filters — Class III

(1) At any frequency,  $f$ , in the range from  $\frac{9f_m}{10}$  to  $\frac{10f_m}{9}$  the transmission loss shall not be more than

$$10 \log_{10} \frac{5}{4} \left[ 1 + 1040 \left( \frac{f}{f_m} - \frac{f_m}{f} \right)^4 \right] \text{ decibels.}$$

(2) At any frequency,  $f$ , in the range from  $\frac{f_m}{5}$  to  $2^{-1/6}f_m$  and from  $2^{1/6}f_m$  to  $5f_m$  the transmission loss shall be more than

$$10 \log_{10} \left[ \frac{8}{13} + 2500 \left( \frac{f}{f_m} - \frac{f_m}{f} \right)^6 \right] \text{ decibels.}$$

(3) At any frequency,  $f$ , below  $\frac{f_m}{5}$  or above  $5f_m$  the transmission loss shall be more than 75 decibels.

(4) A graphical representation of the allowable limits is given in Fig. 6.

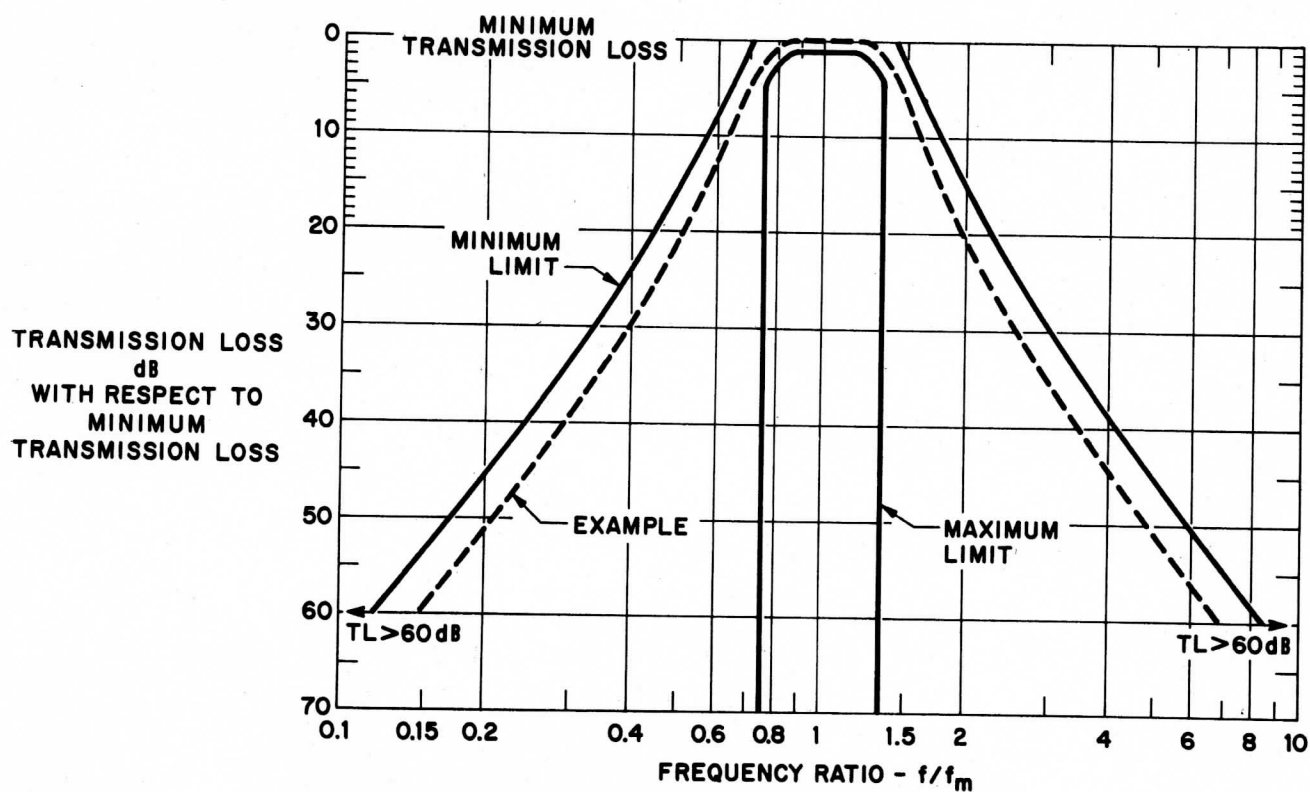


Fig. 2

**Transmission Loss Limits — Octave Band Filter, Class II**  
(Filter Characteristic Must Also Meet Requirements in 3.6 and 3.7)

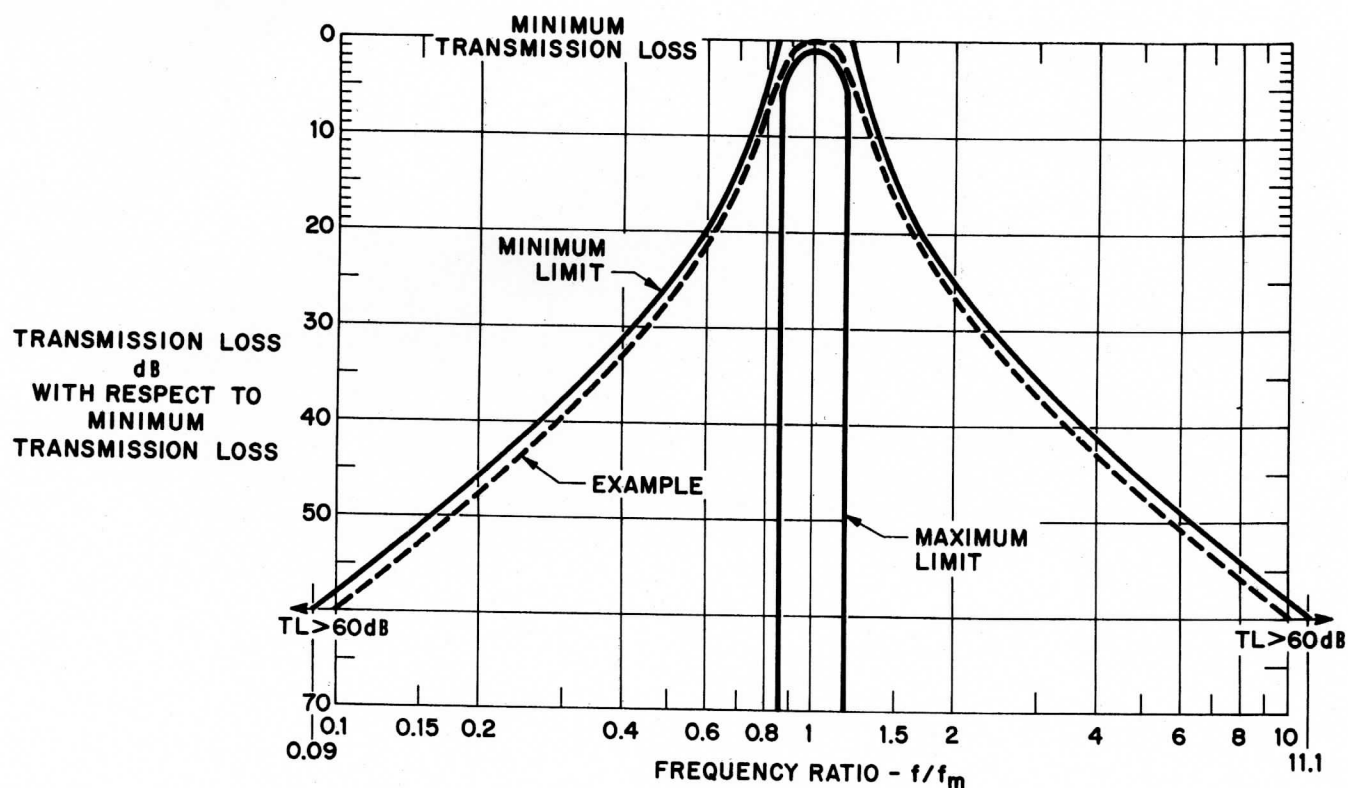


Fig. 3

**Transmission Loss Limits — Half-Octave Band Filter, Class II**  
(Filter Characteristic Must Also Meet Requirements in 3.6 and 3.7)



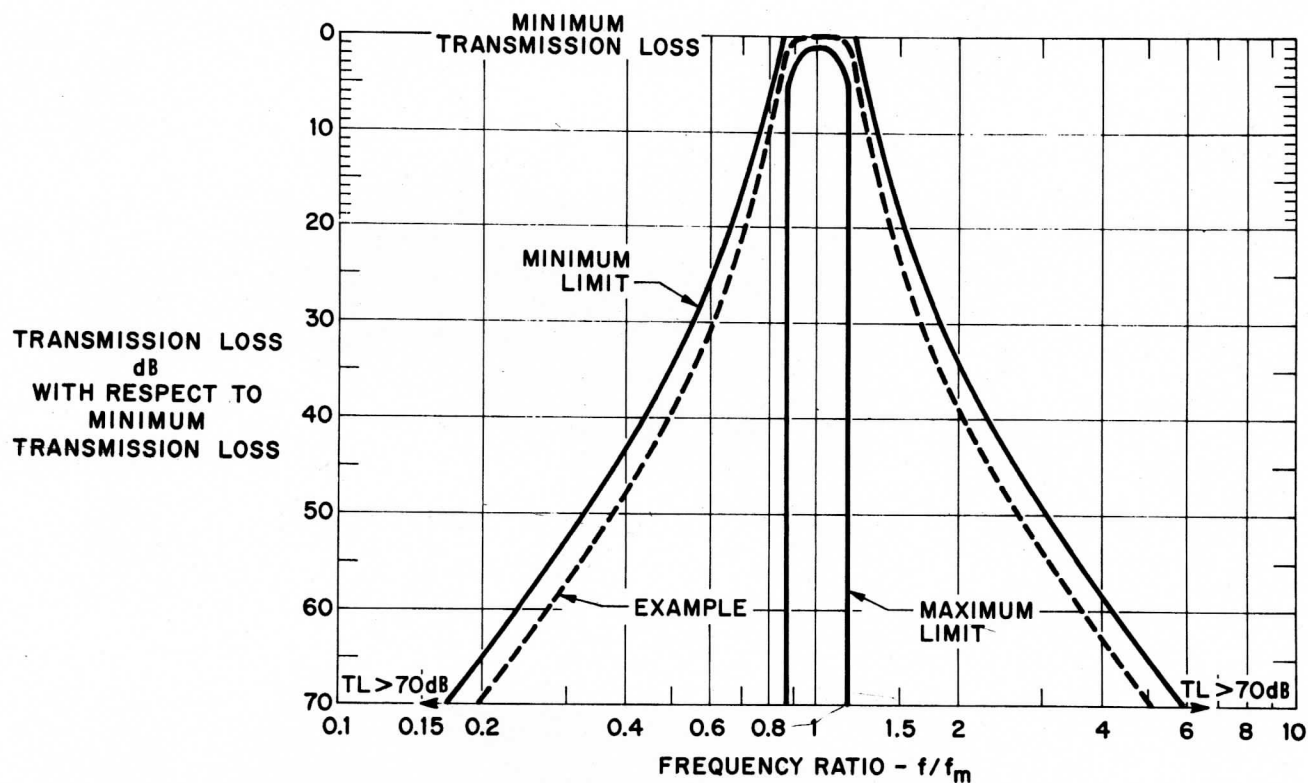


Fig. 4

**Transmission Loss Limits — Half-Octave Band Filter, Class III**

(Filter Characteristic Must Also Meet Requirements in 3.6 and 3.7)

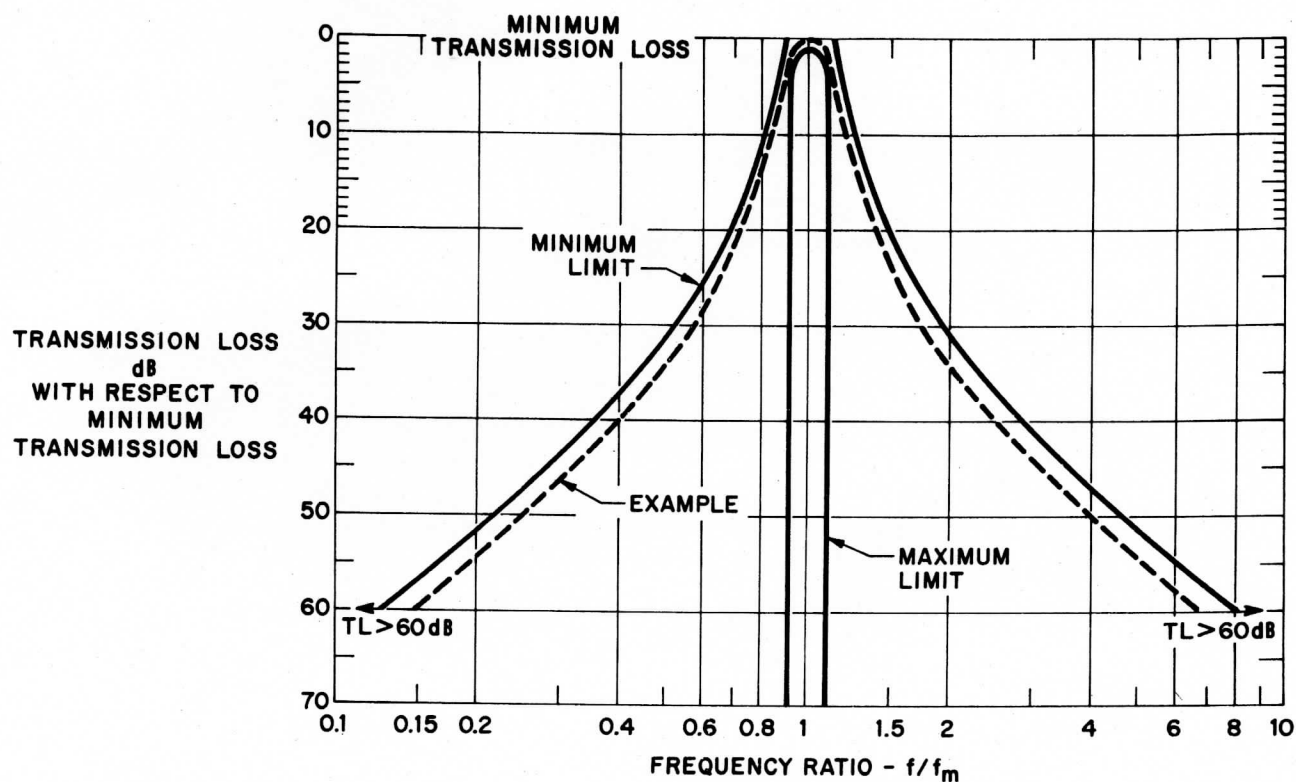


Fig. 5

**Transmission Loss Limits — Third-Octave Band Filter, Class II**

(Filter Characteristic Must Also Meet Requirements in 3.6 and 3.7)

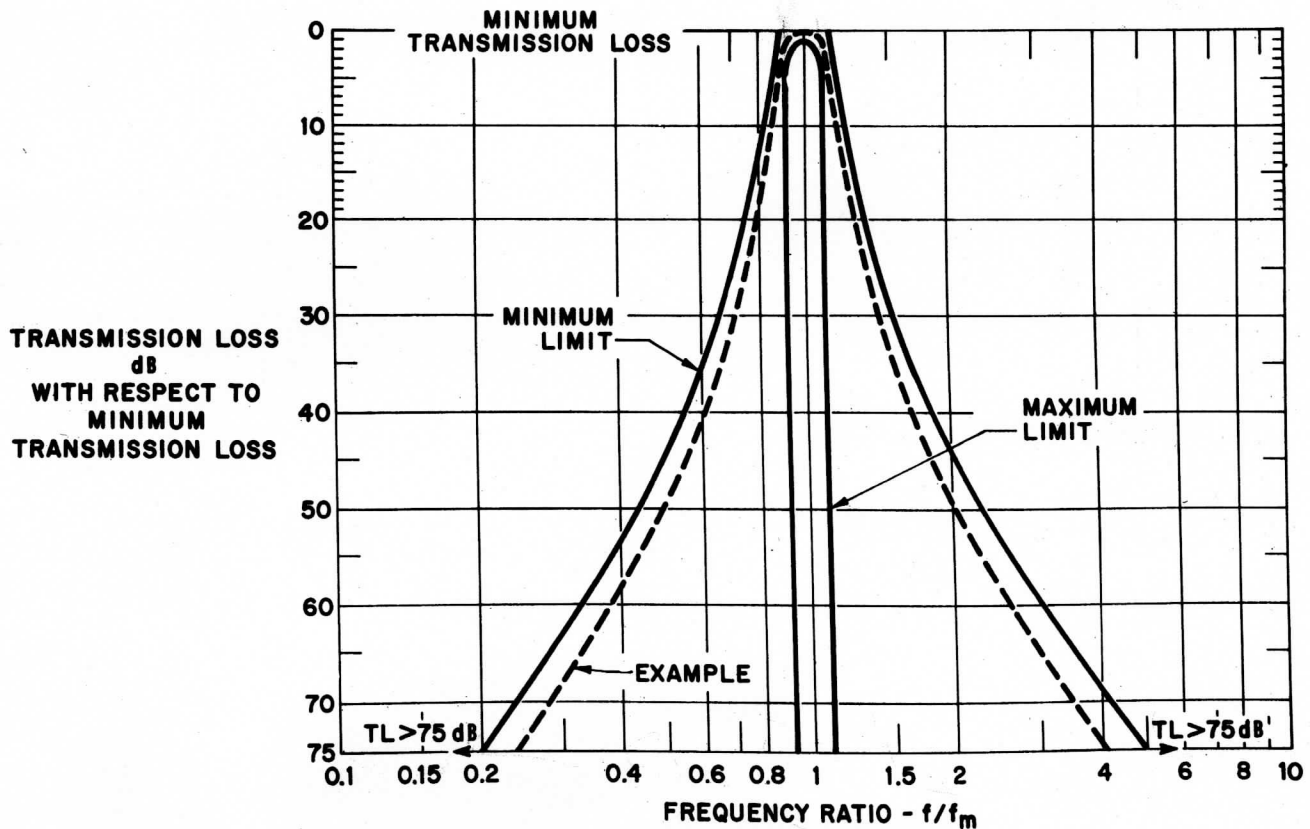


Fig. 6

**Transmission Loss Limits — Third-Octave Band Filter, Class III**  
(Filter Characteristic Must Also Meet Requirements in 3.6 and 3.7)

**3.5 Frequency Tolerance on Geometric Mean Frequency.** For each band designated on the filter set in accordance with Table 1 of 3.1 or its extension, the geometric mean of the two frequencies where the transmission loss is 6 dB greater than the minimum transmission loss shall not depart by more than the tolerances shown in Table 4 from the designated preferred frequency nominal  $f_m$  calculated by the formulas of Table 2.

**Table 4**  
**Frequency Tolerances**  
**on Geometric Mean Frequency,  $f_m$**

	Octave Bands	Half-Octave Bands	Third-Octave Bands
Tolerance	± 5%	± 3%	± 3%

**3.6 Tolerance on Passband Uniformity.** The peak-to-valley ripple in the transmission loss characteristic between the upper and lower nominal band-edge frequencies shall not exceed the values given in Table 5 for filters of the indicated bandwidths and classes.

**3.7 Effective Bandwidth.** For each filter band, the total integrated random white noise power (constant noise power per unit frequency) passed by the filter shall be within ±10 percent of that which would be passed by an ideal filter with flat passband between the nominal

band-edge frequencies of 3.3 and infinite attenuation outside the passband. The white noise power passed by such an ideal filter is given by:

$$2^{-1/2} f_m P_m = 0.7071 f_m P_m \text{ for Octave bands}$$

$$(2^{1/4} - 2^{-1/4}) f_m P_m = 0.3483 f_m P_m \text{ for Half-Octave bands}$$

$$(2^{1/6} - 2^{-1/6}) f_m P_m = 0.2316 f_m P_m \text{ for Third-Octave bands}$$

where  $P_m$  is the noise power per unit frequency at the filter midband frequency  $f_m$ . The minimum transmission loss in the passband shall be used as the reference for calculating the effective bandwidth.

NOTE: See Appendix B for the nominal band-edge frequency transmission loss required to produce zero bandwidth error for Butterworth filters.

**Table 5**  
**Tolerance on Passband Uniformity**

Filter Band	Filter Class	Maximum Allowable Peak-to-Valley Ripple dB
Octave	all	2
Half-Octave	II	1
	III	0.5
Third-Octave	II	1
	III	0.5

**3.8 Tolerance on Variation of Minimum Transmission Loss.** The minimum transmission loss of any filter band in a set shall not differ from the minimum transmission loss of any other filter band by more than 2 dB for Class I and II filters, or by more than 1 dB for Class III filters. If this difference exceeds these values, conformance with this specification may be achieved by determining the difference by measurement to an accuracy of 0.5 dB and by making the information available to the user of the filter set.

**3.9 Removal of Filters From Circuit.** If means are incorporated in the filter set to remove all filter bands from the circuit, the manufacturer shall explicitly state the characteristics of the substituted broadband circuit as to midband transmission loss and frequency characteristic. It is recommended that the midband transmission loss fall within the tolerance on minimum transmission loss given for the individual filter bands in 3.8.

**3.10 Filter Terminating Impedances.** The input and output terminating impedances necessary to ensure proper operation of the filters shall be purely resistive and constant, preferably equal to 600 or 10,000 ohms. The filter shall satisfy the requirements of this specification with  $\pm 5$  percent deviation in value of the terminating impedances. If the filter is designed to operate with special connections, the necessary terminating conditions shall be explicitly stated by the manufacturer.

**3.11 Maximum Input.** The manufacturer shall state the maximum input (power or voltage) for which the filter set will meet the performance requirements of this specification. It is recommended that general purpose filter sets be capable of accepting at least one milliwatt, or one volt, input.

**3.12 Transient Response.** When a sinusoidal signal of nominal mean frequency  $f_m$  is suddenly applied to the properly terminated input of a filter, the peak of the envelope of signal appearing at its properly terminated output shall not exceed the steady state value by more than a factor of 1.26, or 2 dB.

### 3.13 Influence of External Conditions

**3.13.1 Temperature.** The transmission loss characteristic shall conform to the applicable sections of this standard over the temperature range of  $-10^\circ$  to  $50^\circ\text{C}$ , but with all tolerances increased by 0.5 dB. If the influence of temperature exceeds this value, conformance with this specification may be achieved by determining the influence by measurement to an accuracy of 0.5 dB and by making the information available to the user of the filter set.

The manufacturer shall indicate the ambient temperature limits and corresponding periods of exposure which cannot be exceeded without risk of permanent damage to the apparatus.

**3.13.2 Humidity.** The manufacturer shall specify the hygrometric values between which the filter set will function correctly and the corresponding permissible exposure periods. The transmission loss characteristic shall conform to the applicable sections of this standard over the range of relative humidities of 0 to 90 percent, but with all tolerances increased by 0.5 dB.

**3.13.3 Radiation Fields.** The influence of magnetic and electrostatic fields, vibration, and sonic excitation shall be reduced to a level consistent with satisfactory usage in the environmental situations for which the filter set is intended.

NOTE: Manufacturers are encouraged to develop objective tests and state specifications for this category of influence.

**3.14 Filter Designation.** To meet the requirements of this standard, a filter set designation shall include the applicable Type and Class symbols. No filter set shall be stated to be in accord with this standard unless its Type and Class symbols are given. (Example: American Standard Octave Band Filter Type E Class II.)

## 4. Method of Test

**4.1 Filter Transmission Loss Characteristic.** The transmission loss characteristic of each filter band and the broadband circuit of 3.9 shall be measured according to the following basic procedure. The input terminals of the filter shall be connected to a variable-frequency, sine-wave oscillator of zero equivalent source impedance in series with an input terminating impedance of the value specified by 3.10. The oscillator output voltage shall be measured on a suitable, accurate voltmeter,  $V_1$ . The output terminals of the filter shall be connected to an output terminating impedance of the value specified by 3.10, and the output voltage across this impedance shall be measured with a second suitable, accurate voltmeter,  $V_2$ . The ratio  $V_1/V_2$  shall be determined at appropriate frequencies throughout the frequency range necessary to demonstrate compliance with this specification, and the minimum value of  $V_1/V_2$  shall be noted. Then:

Reference Transmission Loss =

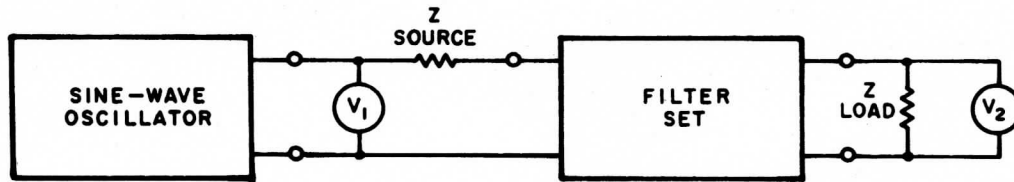
$$20 \log \frac{V_1}{V_2}, \text{ Minimum Value}$$

Filter Transmission Loss at Any Frequency =

$$20 \log \frac{V_1}{V_2} - \text{Reference Transmission Loss}$$

### 4.1.1 Characteristics of Sine-Wave Test Signal.

When the transmission loss at frequencies below the passband is being measured, a suitable technique must be employed for removing the effects of oscillator harmonics from the apparent response of the filter. A tuned voltmeter at the output of the filter is not to be used for removing these effects, since it would simultaneously



$$\text{Reference Transmission Loss} = 20 \log_{10} \frac{V_1}{V_2}, \text{ Minimum Value}$$

$$\text{Filter Band Transmission Loss at Any Frequency} = 20 \log_{10} \frac{V_1}{V_2} - \text{Reference Transmission Loss}$$

Fig. 7

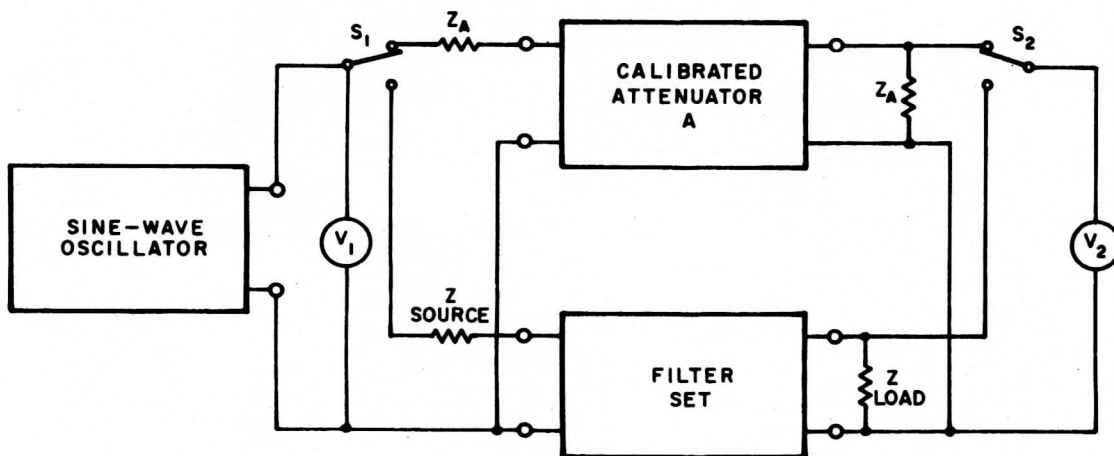
Schematic of Two-Voltmeter Test Arrangement

remove any distortion or noise introduced by the filter set, which should properly be ascribed to analysis error of the set.

**4.1.2 Input Level During Test.** In establishing compliance with this standard, the filter set shall be measured at the maximum input specified by the manufacturer according to 3.11 and also at input levels of 10 decibels and 30 decibels below the maximum input level. Compliance shall be obtained at all three input levels except that at 10 decibels and 30 decibels below the maximum level the ultimate transmission loss may be limited by noise and hum to 10 decibels and 30 decibels, respectively, less than that required for maximum level.

#### 4.2 Test Circuits

**4.2.1 Two-Voltmeter Method.** The two-voltmeter method of measuring transmission loss of the filter set may be carried out as shown in Fig. 7. Connect a suitable, accurate, sine-wave oscillator to the input of the filter with a series impedance equal to that from which the filter set is normally expected to operate. The oscillator source impedance is not a part of this series impedance. The output of the oscillator is measured by a suitable, accurate voltmeter  $V_1$ , which then makes the apparent source impedance at the voltmeter equal to zero. Terminate the filter by its rated terminating impedance and determine the output voltage using a suit-



For any measurement point:

$V_1$  must be identical for Filter and Attenuator positions of  $S_1$  and  $S_2$ .

Attenuator is adjusted to make  $V_2$  identical for Filter and Attenuator positions of  $S_1$  and  $S_2$ .

Then:

Reference Transmission Loss = Smallest  $A$  found =  $A_{\min}$

Filter Band Transmission Loss at Any Frequency =  $A_{\text{Any Frequency}} - A_{\min}$

Fig. 8

Schematic of Alternate Substitution Test Arrangement



able, accurate voltmeter  $V_2$ . The parallel combination of load impedance and voltmeter impedance constitutes this terminating impedance. The transmission loss characteristic of the filter at any frequency is calculated in relation to the minimum absolute transmission loss by the formulas given in Fig. 7.

NOTE: With available test equipment it is possible to instrument this basic circuit for direct-reading or automatic test operation.

**4.2.2 Substitution Method.** Use of an adjustable, calibrated attenuator, properly terminated, in a substitution method is a suitable alternate for determining the transmission loss characteristic. This substitution process avoids the need for accurately calibrated voltmeters of a wide range of sensitivity. The technique of measurement and calculation is given in Fig. 8.

## 5. References

[1] American Standards Association. *American Standard Specification for Octave-Band Filter Set for Analysis of Noise and Other Sounds*, Z24.10-1953. New York: 1953. (Superseded by American Standard S1.11-1966.)

[2] American Standards Association. *American Standard Acoustical Terminology (Including Mechanical Shock and Vibration)*, S1.1-1960. New York: 1960.

[3] American Standards Association. *American Standard Preferred Frequencies for Acoustical Measurements*, S1.6-1960. New York: 1960.

[4] Sepmeyer, L. W. Bandwidth error of symmetrical band-pass filters used for analysis of noise and vibration. *Journal of the Acoustical Society of America*, vol 34, 1962, p 1653.

[5] Sepmeyer, L. W. On bandwidth error of Butterworth band-pass filters. *Journal of the Acoustical Society of America*, vol 35, 1963, p 404.

[6] International Telephone and Telegraph Corporation. *Reference Data for Radio Engineers*. New York, Chapters 5 to 8.

[7] White Electromagnetics, Inc. *A Handbook on Electrical Filters, Synthesis, Design and Application*. Rockville, Maryland: 1963. Contains extensive bibliography.

[8] Schultz, T. J. Conversion between old and new octave band levels. *Journal of the Acoustical Society of America*, vol 36, no. 12, Dec 1964, p 2415.

# Appendixes

(These Appendixes are not a part of American Standard Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets, S1.11-1966, but are included to facilitate its use.)

## Appendix A

### Conversion Between Octave Band Levels Measured with Filters Meeting American Standard Z24.10-1953 and Filters Meeting This Standard

#### A1. Basis of Conversion

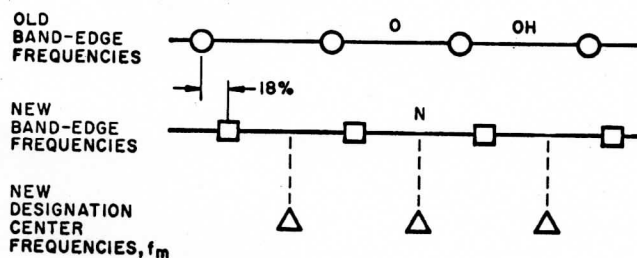
American Standard Z24.10-1953 for an octave band filter set specified a particular series of band-edge frequencies, whereas this standard specifies a series shifted upward approximately 18 percent to be in accordance with the preferred frequencies of American Standard S1.6-1960. Octave band filter measurements are used principally for measuring broadband noises with relatively continuous spectra. This Appendix gives a method of transferring the results of measurements made with one set of filters to corresponding results with the other set, for noises of this Class. In the following discussion, octave bands specified in American Standard Z24.10-1953 are called "old bands," whereas octave bands specified herein are called "new bands."

It is assumed that the frequency spectrum through contiguous octave bands has a continuously sloping characteristic wherein the power per unit frequency varies as a power of the frequency. It can then be shown that for octave bands the level (in dB) in a new band differs from the level in the corresponding old band by a correction that is 0.237 times the difference between the levels of the two old bands that include the new band. The correction is positive if the higher-frequency band has a higher level. Conversely, the level in an old band differs from the level in the corresponding new band by a correction that is 0.237 times the difference between the levels in the two new bands that include the old band. The correction is negative if the higher-frequency band has a higher level.

Computation directions and tabular aids for performing these interpolations are given in A2 and A3. The method is easily applied and its accuracy is considered consistent with the characteristic accuracy obtained in field measurements of noise. For a discussion of the basic problems in conversion, see Reference 8.

#### A2. Interpolation of New Band Level From Old Band Levels

This diagram represents the relationship of a new band,  $N$ , and the corresponding old band,  $O$ .



Let:

$L_O$  = level in any old octave band,  $O$

$L_{OH}$  = level in next higher old octave band,  $OH$

$L_N$  = level in corresponding new octave band,  $N$ , contained in  $O$  and  $OH$ , where  $N$  is 18 percent above  $O$  in frequency

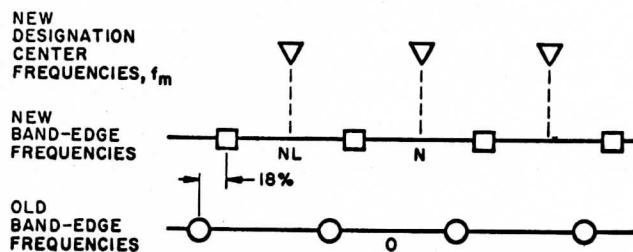
Then:

$$L_N = L_O + 0.237(L_{OH} - L_O)$$

The correction to be applied to  $L_O$  is shown in Table A1. Table A2 shows corresponding old and new filter bands.

#### A3. Interpolation of Old Band Level From New Band Levels

This diagram represents the relationship of an old band,  $O$ , to the corresponding new band,  $N$ .



Let:

$L_N$  = level in any new octave band,  $N$

$L_{NL}$  = level in next lower new octave band,  $NL$

$L_O$  = level in corresponding old octave band,  $O$ , contained in  $NL + N$ , where  $N$  is 18 percent above  $O$  in frequency

Then:

$$L_O = L_N - 0.237(L_N - L_{NL})$$

The correction term to be applied to  $L_N$  is shown in Table A3. Table A4 shows corresponding new and old filter bands.

**Table A1**  
**Corrections to  $L_O$  To Obtain  $L_N$**

Upward Spectrum Slope (Higher Frequency Band Has Higher Level) $L_{OH} - L_O$ in dB	Correction ADD to $L_O$ dB	Downward Spectrum Slope (Higher Frequency Band Has Lower Level) $L_{OH} - L_O$ in dB	Correction SUBTRACT from $L_O$ dB
0	0	0	0
1	0.2	- 1	0.2
2	0.5	- 2	0.5
3	0.7	- 3	0.7
4	1.0	- 4	1.0
5	1.2	- 5	1.2
6	1.4	- 6	1.4
7	1.7	- 7	1.7
8	1.9	- 8	1.9
9	2.1	- 9	2.1
10	2.4	-10	2.4
11	2.6	-11	2.6
12	2.8	-12	2.8

**Table A2**  
**Old Octave-Band Levels To Be Used for Calculating  
New Octave-Band Levels**

Use Levels for These Old Octave Bands		To Calculate Levels For New Octave Band Centered on $N$ (c/s)
$O$ (c/s)	$OH$ (c/s)	
37-75	75-150	63
75-150	150-300	125
150-300	300-600	250
300-600	600-1200	500
600-1200	1200-2400	1000
1200-2400	2400-4800	2000
2400-4800	4800-9600	4000
4800-9600	—*	8000

\* Take same  $L_{OH} - L_O$  as for next band.

**Table A3**  
**Corrections to  $L_N$  To Obtain  $L_O$**

Upward Spectrum Slope (Higher Frequency Band Has Higher Level) $L_N - L_{NL}$ in dB	Correction SUBTRACT from $L_N$ dB	Downward Spectrum Slope (Higher Frequency Band Has Lower Level) $L_N - L_{NL}$ in dB	Correction ADD to $L_N$ dB
0	0	0	0
1	0.2	- 1	0.2
2	0.5	- 2	0.5
3	0.7	- 3	0.7
4	1.0	- 4	1.0
5	1.2	- 5	1.2
6	1.4	- 6	1.4
7	1.7	- 7	1.7
8	1.9	- 8	1.9
9	2.1	- 9	2.1
10	2.4	-10	2.4
11	2.6	-11	2.6
12	2.8	-12	2.8

**Table A4**  
**New Octave-Band Levels To Be Used for Calculating**  
**Old Octave-Band Levels**

Use Levels for New Octave Band Centered on		To Calculate Levels For Old Octave Bands
$N$ (c/s)	$NL$ (c/s)	$O$ (c/s)
63	—*	37-75
125	63	75-150
250	125	150-300
500	250	300-600
1000	500	600-1200
2000	1000	1200-2400
4000	2000	2400-4800
8000	4000	4800-9600

\*Take same  $L_N - L_{NL}$  as for next band.

## Appendix B

### Band-Edge Transmission Loss for Minimum Bandwidth Error

Traditionally, filter bandwidths have been expressed in terms of the half-power or 3 dB down frequencies of the filter. However, when random noise is analyzed the energy which is transmitted by a band-pass filter depends not only on the frequency interval between two points of equal transmission loss, but also on the steepness of the transmission loss characteristic of the filter and the slope of the spectrum being analyzed. Thirty representative spectra examined by the Writing Group revealed spectrum level slopes ranging from +6 to -21 dB per octave.

The bandwidth error\* for a number of filter characteristics and spectrum level slopes was first computed for an idealized filter (see Reference 4) and then for the maximally flat or Butterworth filter characteristic (see Reference 5). In addition, the band-edge attenuation for Butterworth filters required to give zero bandwidth error when analyzing white and pink noise was computed. The

results of the latter two investigations are given in Table B1.

The bandwidth error curves for fractional octave filters are symmetrical about the -3 dB per octave slope in spectrum level (pink noise). This is the slope which provides equal power in each band of a series of constant percentage bandwidth filters. However, Table B1 reveals that a very small difference is involved between correcting for zero bandwidth error on pink or white noise. In addition, it was found that the analytical solution for zero error in white noise analysis gave the same band-edge attenuation for all bandwidths of the same filter complexity, while the zero pink noise error adjustment produced a slightly different band-edge attenuation for each filter bandwidth of the same complexity. For third-octave filters, the two criteria differ only one part in the second decimal place. Owing to the much greater simplicity in carrying out numerical integration to determine the effective bandwidth for white noise and the slight shifting in the bandwidth error axis toward plus and minus errors, the Committee decided on white noise for the effective bandwidth referent.

\*Bandwidth error refers to the difference between the noise power transmitted by the real filter and that transmitted by an ideal filter of nominal bandwidth.



**Table B1**  
**Performance of Butterworth Bandpass Filters**

	$n$	$\delta$ dB/octave	$H_1$ dB	$H_2$ dB	$A_1$ dB	$A_2$ dB
For one-octave bandwidth	2	-3	0.37	0	3.84	4.02
		- 6, 0	0.46	0.07		
		- 9, +3	0.78	0.32		
		-12, +6	1.55	0.92		
	3	-3	0.16	0	3.56	3.65
		- 6, 0	0.20	0.03		
		- 9, +3	0.31	0.11		
		-12, +6	0.50	0.26		
	4	-3	0.08	0	3.42	3.48
		- 6, 0	0.11	0.014		
		- 9, +3	0.17	0.056		
		-12, +6	0.26	0.128		
For half-octave bandwidth	2	-3	0.43	0	3.96	4.02
		- 6, 0	0.46	0.023		
		- 9, +3	0.56	0.10		
		-12, +6	0.78	0.26		
	3	-3	0.18	0	3.63	3.65
		- 6, 0	0.20	0.007		
		- 9, +3	0.23	0.030		
		-12, +6	0.25	0.070		
	4	-3	0.10	0	3.46	3.48
		- 6, 0	0.11	0.003		
		- 9, +3	0.13	0.015		
		-12, +6	0.15	0.035		
For third-octave bandwidth	2	-3	0.44	0	4.03	4.02
		- 6, 0	0.46	0.011		
		- 9, +3	0.51	0.047		
		-12, +6	0.61	0.120		
	3	-3	0.19	0	3.64	3.65
		- 6, 0	0.20	0.003		
		- 9, +3	0.21	0.014		
		-12, +6	0.24	0.032		
	4	-3	0.10	0	3.48	3.48
		- 6, 0	0.11	0.001		
		- 9, +3	0.12	0.007		
		-12, +6	0.13	0.016		

$n$  = number of resonant elements or pole pairs

$\delta$  = spectrum level slope in dB/octave

$H_1$  = bandwidth error for filter 3 dB down at nominal cutoff or band-edge frequencies

$H_2$  = bandwidth error for filter adjusted for zero bandwidth error on pink noise

$A_1$  = nominal band-edge frequency transmission loss required to give zero bandwidth error on pink noise

$A_2$  = nominal band-edge frequency transmission loss required to give zero bandwidth error on white noise

## **A. INTRODUCTION**

Noise pollution in an urban area comes from many sources. Some are activities essential to the health, safety, and welfare of the city's inhabitants, such as noise from emergency vehicle sirens, garbage collection operations, and construction and maintenance equipment. Other sources, such as traffic, stem from the movement of people and goods, activities that are essential to the viability of the city as a place to live and do business. Although these and other noise-producing activities are necessary to a city, the noise they produce is undesirable. Urban noise detracts from the quality of the living environment and there is increasing evidence that excessive noise represents a threat to public health.

The proposed action would not result in any additional plant workers. Approximately 2 additional trucks per day for the removal of sludge cake (biosolids), which under New York City Department of Environmental Protection's (NYCDEP's) current sludge management plan is transferred out of the region for land application, and an additional 6 trucks per day for delivery of chemicals for plant operations would be expected with the proposed action. Based on the detailed noise impact analysis for an even greater number of truck trip estimates during the peak period of construction for the proposed action, the lesser number of truck trips associated with the operation of the proposed action would not result in significant adverse impacts, and no further analysis of noise impacts from mobile sources during operations is warranted.

With the proposed action, the additional treatment processes would result in increased ambient noise levels near the Hunts Point Water Pollution Control Plant (WPCP) from the operation of new mechanical equipment. This analysis examines the impacts of these stationary noise sources and the change in noise levels at sensitive receptor locations where maximum increases in noise levels would be expected to occur as a result of mechanical equipment operation. The egg-shaped digesters and associated equipment would not generate significant noise levels. The noise analysis provided in this chapter addresses the potential operational noise impacts from all four digesters (the two that would be constructed as part of the proposed action and the additional two that could be constructed under the four-digester scenario). The potential adverse noise impacts under the two-digester scenario for the proposed action would essentially be the same as those determined for the four-digester scenario.

Noise impacts associated with construction activities are discussed in Chapter 17, "Construction."

## **NOISE FUNDAMENTALS**

Quantitative information on the effects of airborne noise on people is well documented. If sufficiently loud, noise may adversely affect people in several ways. For example, noise may interfere with human activities, such as sleep, speech communication, and tasks requiring concentration or coordination. It may also cause annoyance, hearing damage, and other

physiological problems. Although it is possible to study these effects on people on an average or statistical basis, it must be remembered that all the stated effects of noise on people vary greatly with the individual. Several noise scales and rating methods are used to quantify the effects of noise on people. These scales and methods consider such factors as loudness, duration, time of occurrence, and changes in noise level with time.

#### NOISE MEASUREMENT

A number of factors affect sound, as it is perceived by the human ear. These include the actual level of the sound (or noise), the frequencies involved, the period of exposure to the noise, and changes or fluctuations in the noise levels during exposure. Levels of noise are measured in units called decibels (dB). Since the human ear cannot perceive all pitches or frequencies equally well, these measures are adjusted or weighted to correspond to human hearing. A measurement system that simulates the response of the human ear, the “A-weighted sound level” or “dBA,” is used in view of its widespread recognition and its close correlation with human judgment of loudness and annoyance. In the current study, all measured levels are reported in dBA or A-weighted decibels. Sound levels for typical daily activities are shown in Table 11-1.

**Table 11-1**  
**Common Noise Levels**

Sound Source	(dBA)
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Freight train at 30 meters	95
Train horn at 30 meters	90
Heavy truck at 15 meters	80
Busy city street, loud shout	80
Busy traffic intersection	70
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Light car traffic at 15 meters, city or commercial areas or residential areas close to industry	50
Background noise in an office	50
Suburban areas with medium density transportation	40
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0
<b>Note:</b> A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness. <b>Source:</b> Cowan, James P. Handbook of Environmental Acoustics. Van Nostrand Reinhold, New York, 1994. Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.	

Although sound levels from a sound level meter are generally given in dBA, measurements are sometimes made in octave band format. An octave band is one of a series of bands that cover the normal range of frequencies included in sound measurements. Such octave bands serve to define the sound in term of its pitch components. Octave band levels are “unweighted” levels corresponding to the overall acoustical energy in the corresponding octave band.

#### RESPONSE TO CHANGES IN NOISE LEVELS

The average ability of an individual to perceive changes in noise levels is well documented (see Table 11-2). Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners, whereas 10 dBA changes are normally perceived as doublings (or halvings) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

**Table 11-2**  
**Average Ability to Perceive Changes in Noise Levels**

Change (dBA)	Human Perception of Sound
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A dramatic change
40	Difference between a faintly audible sound and a very loud sound
<b>Source:</b> Bolt Beranek and Neuman, Inc., <i>Fundamentals and Abatement of Highway Traffic Noise</i> , Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.	

It is also possible to characterize the effects of noise on people by studying the aggregate response of people in communities. The rating method used for this purpose is based on a statistical analysis of the fluctuations in noise levels in a community, and integrates the fluctuating sound energy over a known period of time, most typically during 1 hour or 24 hours. Various government and research institutions have proposed criteria that attempt to relate changes in noise levels to community response. One commonly applied criterion for estimating this response is incorporated into the community response scale proposed by the International Standards Organization (ISO) of the United Nations (see Table 11-3). This scale relates changes in noise level to the degree of community response and permits direct estimation of the probable response of a community to a predicted change in noise level.

**Table 11-3**  
**Community Response to Increases in Noise Levels**

Change (dBA)	Category	Description
0	None	No observed reaction
5	Little	Sporadic complaints
10	Medium	Widespread complaints
15	Strong	Threats of community action
<b>Source:</b> International Standards Organization, <i>Noise Assessment with Respect to Community Responses</i> , ISO/TC 43 (New York: United Nations, November 1969).		



### *STATISTICAL NOISE LEVELS*

Since dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise over extended periods are needed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific time period, as if it had been a steady, unchanging sound. For this condition, a descriptor called the equivalent sound level,  $L_{eq}$  can be computed.  $L_{eq}$  is the constant sound level that, in a given situation and time period (e.g., 1 hour,  $L_{eq(1)}$ , or 24 hours,  $L_{eq(24)}$ ), conveys the same sound energy as the actual time-varying sound. Statistical sound level descriptors such as  $L_1$ ,  $L_{10}$ ,  $L_{50}$ ,  $L_{90}$ , and  $L_x$  are sometimes used to indicate noise levels that are exceeded 1, 10, 50, 90 and x percent of the time, respectively. Discrete event peak levels are given as  $L_1$  levels.  $L_{eq}$  is used in the prediction of future noise levels, by adding the contributions from new sources of noise (i.e., increases in traffic volumes) to the existing levels and in relating annoyance to increases in noise levels.

The relationship between  $L_{eq}$  and levels of exceedance is worth noting. Because  $L_{eq}$  is defined in energy rather than straight numerical terms, it is simply related to the levels of exceedance. If the noise fluctuates very little,  $L_{eq}$  will approximate  $L_{50}$  or the median level. If the noise fluctuates broadly, the  $L_{eq}$  will be approximately equal to the  $L_{10}$  value. If extreme fluctuations are present, the  $L_{eq}$  will exceed  $L_{90}$  or the background level by 10 or more decibels. Thus the relationship between  $L_{eq}$  and the levels of exceedance will depend on the character of the noise. In community noise measurements, it has been observed that the  $L_{eq}$  is generally between  $L_{10}$  and  $L_{50}$ . The relationship between  $L_{eq}$  and exceedance levels has been used in the current studies to characterize the noise sources and to determine the nature and extent of their impact at all receptor locations.

### *NOISE DESCRIPTORS USED IN IMPACT ASSESSMENT*

For the purposes of this project, the maximum 1-hour equivalent sound level ( $L_{eq(1)}$ ) has been selected as the noise descriptor to be used in the noise impact evaluation.  $L_{eq(1)}$  is the noise descriptor used in the City Environmental Quality Review (CEQR) standards. Hourly statistical noise levels were used to characterize the relevant noise sources and their relative importance at each receptor location.

## **NOISE STANDARDS AND CRITERIA**

### *NEW YORK CITY NOISE CODE*

The revised New York City Noise Control Code becomes effective July 1, 2007. It contains octave band standards that must be met at residences and commercial uses, sound-level standards for motor vehicles, circulation equipment, air compressors, and paving breakers (e.g., jackhammers), requires that all exhausts be muffled, and prohibits all unnecessary noise adjacent to schools, hospitals, or courts. When effective, the revised Noise Control Code will require noise mitigation plans for construction work (consistent with the guidance set by NYCDEP), and additional noise mitigation measures will be required when work does not occur on weekdays between 7 AM and 6 PM.

In addition, the Noise Control Code states that in residential buildings and commercial buildings interior sound pressure levels at a receiving property due to commercial and business enterprises shall not exceed the maximum permitted sound level for the designated octave band indicated in Table 11-4. While this section of the Noise Control Code is not applicable to the Hunts Point WPCP (since it is not a commercial or business enterprise) and the Hunts Point WPCP is not located in a

commercial or residential district, as discussed later in this chapter, comparisons were made to the Noise Control Code maximum sound pressure levels for the nearest residential building.

**Table 11-4**

**City of New York Maximum Sound Pressure Levels (dB)**

Octave Bands (Hz)	Residential Building*	Commercial Building**
31.5	70	74
63	61	64
125	53	56
250	46	50
500	40	45
1000	36	41
2000	34	39
4000	33	38
8000	32	37
<b>Note:</b> * Residential receiving property for mixed use buildings and residential buildings (as measured within any room of the building with windows open, if possible). ** Commercial receiving property (as measured within any room containing offices within the building with windows open, if possible). <b>Source:</b> City of New York Noise Control Code Subchapter 5, effective July 1, 2007.		

#### *NEW YORK CEQR NOISE CRITERIA*

NYCDEP has set external noise exposure standards. These standards are shown in Table 11-5. Noise Exposure is classified into four categories: acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable. The standards shown are based on maintaining an interior noise level for the worst-case hour  $L_{10}$  less than or equal to 45 dBA.

In addition, the *CEQR Technical Manual* uses the following criteria to determine whether a proposed action would result in a significant adverse noise impact. The impact assessments compare the proposed action condition  $L_{eq(1)}$  noise levels to those calculated for the future without the proposed action condition, for receptors potentially affected by the project. If the future without the proposed action levels are less than 60 dBA  $L_{eq(1)}$  and the analysis period is not a nighttime period, the threshold for a significant impact would be an increase of at least 5 dBA  $L_{eq(1)}$ . For the 5 dBA threshold to be valid, the resultant Action condition noise level would have to be equal to or less than 65 dBA. If the future without the proposed action noise level is equal to or greater than 62 dBA  $L_{eq(1)}$ , or if the analysis period is a nighttime period (defined in the CEQR standards as being between 10 PM and 7 AM), the incremental significant impact threshold would be 3 dBA  $L_{eq(1)}$ . If the future without the proposed action noise level is 61 dBA  $L_{eq(1)}$ , the maximum incremental increase would be 4 dBA, since an increase higher than this would result in a noise level higher than the 65 dBA  $L_{eq(1)}$  threshold.

#### *PERFORMANCE STANDARDS FOR MANUFACTURING DISTRICTS*

The City of New York's Zoning Resolution Section 42-213 states that in all manufacturing districts, the sound pressure level resulting from any activity, whether open or enclosed, shall not exceed, at any point on or beyond any lot line, the maximum permitted sound level for the designated octave band indicated in Table 11-6 for M3 zone.

**Table 11-5**  
**Noise Exposure Guidelines**  
**for Use in City Environmental Impact Review<sup>1</sup>**

Receptor Type	Time Period	Acceptable General External Exposure	Airport <sup>3</sup> Exposure	Marginally Acceptable General External Exposure	Airport <sup>3</sup> Exposure	Marginally Unacceptable General External Exposure	Airport <sup>3</sup> Exposure	Clearly Unacceptable General External Exposure	Airport <sup>3</sup> Exposure
1. Outdoor area requiring serenity and quiet <sup>2</sup>		$L_{10} \leq 55$ dBA	Ldn $\leq 60$ dBA		60 < Ldn $\leq 65$ dBA		(1) 65 < Ldn $\leq 70$ dBA, (II) 70 $\leq$ Ldn		Ldn $\leq 75$ dBA
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 65$ dBA		$65 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
3. Residence, residential hotel or motel	7 AM to 10 PM	$L_{10} \leq 65$ dBA		$65 < L_{10} \leq 70$ dBA		$70 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
	10 PM to 7 AM	$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 70$ dBA		$70 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
4. School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, out-patient public health facility		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)	
5. Commercial or office		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)	
6. Industrial, public areas only <sup>4</sup>	Note 4	Note 4		Note 4		Note 4		Note 4	
<b>Notes:</b> (i) In addition, any new activity shall not increase the ambient noise level by 3 dBA or more; Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by American National Standards Institute (ANSI) Standards; all values are for the worst hour in the time period. 2 Tracts of land where serenity and quiet are extraordinarily important and serve an important public need and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and old-age homes. 3 One may use the FAA-approved L <sub>dn</sub> contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using flight data supplied by the Port Authority of New York and New Jersey. 4 External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards). <b>Source:</b> New York City Department of Environmental Protection (adopted policy 1983).									

**Table 11-6**  
**City of New York Noise Performance Standards**  
**for M3 Manufacturing District**

Old Octave Bands		Current Octave Bands	
Octave Band (Hz)	M3 District (dB)	Octave Band (Hz)	M3 District (dB)
20 to 75	80	63	79
75 to 150	75	125	74
150 to 300	70	250	69
300 to 600	64	500	63
600 to 1200	58	1000	57
1200 to 2400	53	2000	52
2400 to 4800	49	4000	48
Above 4800	46	8000	45
<b>Source:</b> City of New York Performance Standards for Manufacturing Districts			

The Performance Standards are specified in “old” octave bands. These bands have not been used in almost 40 years, and instrumentation is no longer available to measure per these specifications. ANSI (American National Standards Institute) has promulgated a standard on the conversion of old octave bands to the current preferred values (and vice versa), to allow measurement and assessment. This conversion was done and the converted criteria are provided in Table 11-6

### **ANALYSIS YEAR**

The future analysis year for purposes of determining operational noise is 2014, the year construction would be completed at the site and the plant would be fully upgraded.

### **IMPACT DEFINITION**

For purposes of impact assessment, the proposed action will have a potential significant adverse noise impact if the *CEQR Technical Manual* relative noise criteria are exceeded or if noise levels due to plant operation (i.e., the total noise generated by all mechanical equipment at the entire plant including the planned Phase I and II Upgrades and the proposed action) exceed the octave band noise levels specified in the performance standards for manufacturing districts contained in both the New York City Zoning Resolution and the City of New York Noise Control Code.

### **NOISE PREDICTION METHODOLOGY**

#### *STATIONARY NOISE SOURCES*

To determine potential noise impacts from stationary sources with the proposed action, the analysis followed the procedure listed below:

- Determine receptor locations on the property line and at the closest sensitive land uses in the future without the proposed action within the adjacent study area where the maximum project noise levels would be likely to occur;
- Measure the existing ambient noise levels at the closest sensitive receptors within the adjacent study area;
- Determine individual equipment sound power noise levels based on available data and published material;
- Determine the location of individual equipment on the project sites;
- Estimate noise attenuation due to building structures and enclosures, and other factors;
- Calculate noise levels at the property lines and other sensitive receptor locations using attenuation correction terms under the proposed action and future without the proposed action; and
- Compare calculated noise levels with standards.

Plant equipment lists were prepared for the proposed action for the Hunts Point WPCP. These lists included the number of operating units and the sound power levels generated by each piece of equipment. Equipment considered capable of producing significant noise levels included emergency generators, emergency generator stacks, process air blowers, channel air blowers, and rooftop HVAC fans. This equipment was then located in the plant coordinate system.



Octave band sound pressure levels,  $L_p$ , at receptor sites were calculated based on sound power levels using the following formula:

$$L_p = L_w - A_{div} - A_{atm} - A_{ground} - A_{screen} - A_{TL} - A_D - 0.6$$

where:

$L_w$  is the point source sound power level, in dB re 1 picowatt;

$A_{div}$  is the attenuation due to geometrical divergence;

$A_{atm}$  is the attenuation due to atmospheric absorption;

$A_{ground}$  is the attenuation due to the ground effects;

$A_{screen}$  is the attenuation due to screening;

$A_{TL}$  is the attenuation due to sound transmission loss due to building partition (for equipment located inside a structure only); and

$A_D$  is the attenuation due to acoustical design features.

Sound power levels were determined based on data from manufacturers, published material, and professional experience with similar equipment. Where sufficient information was available regarding potential equipment, manufacturers were contacted and information on expected sound pressure levels was requested. In many cases the data were available. In cases where either the manufacturer could not provide specific information, or sufficient detailed information regarding the equipment were not available, data from the literature<sup>1,2</sup> and other sources for similar equipment were used.

The analysis included the following: attenuation due to geometrical divergence, attenuation due to absorption in the air, attenuation due to ground effects (i.e., for hard ground absorption), attenuation due to shielding or obstructions, attenuation due to sound transmission loss due to building partitions, and attenuation due to acoustical design features, such as enclosures or silencers for emergency generators.

To account for the loss in sound power for equipment located within enclosed structures, a noise attenuation factor of 35 dBA was utilized. This factor was considered to be reasonable since structures at the Hunts Point WPCP would have exterior walls constructed of 4-inch brick units at total eight inches thick. Based on a review of U.S. Environmental Protection Agency (EPA) documents discussing the transmission of noise through walls and floors, a reasonable attenuation factor for a block/plaster unit four inches thick (as compared to the minimum eight inches at the plant) is 45 dBA. Further, EPA has published field measured transmission loss values for common building materials. Of these common building materials, the material most closely matching that to be employed at the Hunts Point WPCP is a 7-inch wall (4-inch brick, 1-inch cavity, and 2-inch rigid insulation). Field measured transmission loss values ranged from 44 dBA through 70 dBA based upon a corresponding range of frequencies in hertz. Based upon these evaluations, it was determined that 35 dBA was a reasonable attenuation factor for equipment completely located within a structure. For any other equipment, either in the open or within a structure but with an opening to the outside (e.g., vents) a factor of zero was employed.

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<sup>1</sup> Electric Power Plant Environmental Noise Guide, Edison Electric Institute, 1984

<sup>2</sup> Noise and Vibration Control for Mechanical and Electrical Sources in Buildings, Laymon Miller, 1974

Reductions in sound power due to the “loss of line of sight” within the plant (i.e., noise reductions from intervening structures in the plant) were not included in the analysis. By not including this attenuation in the analysis, the analysis becomes more conservative and might overestimate the noise to the receptor.

The noise levels at receptor locations were calculated using distance correction terms and attenuation. The EPA-recommended method of adding sound levels from separate sources which is described in *Direct Environmental Factors at Municipal Wastewater Treatment Works, Evaluation and Control of Site Aesthetics, Air Pollutants, Noise and Other Operation and Construction Factors*, was used to determine the total noise level at the receptor locations.

Total stationary source noise levels at each receptor site were determined by adding the contribution from each piece of equipment and comparing the total calculated noise levels to the applicable impact criteria.

## **B. EXISTING CONDITIONS**

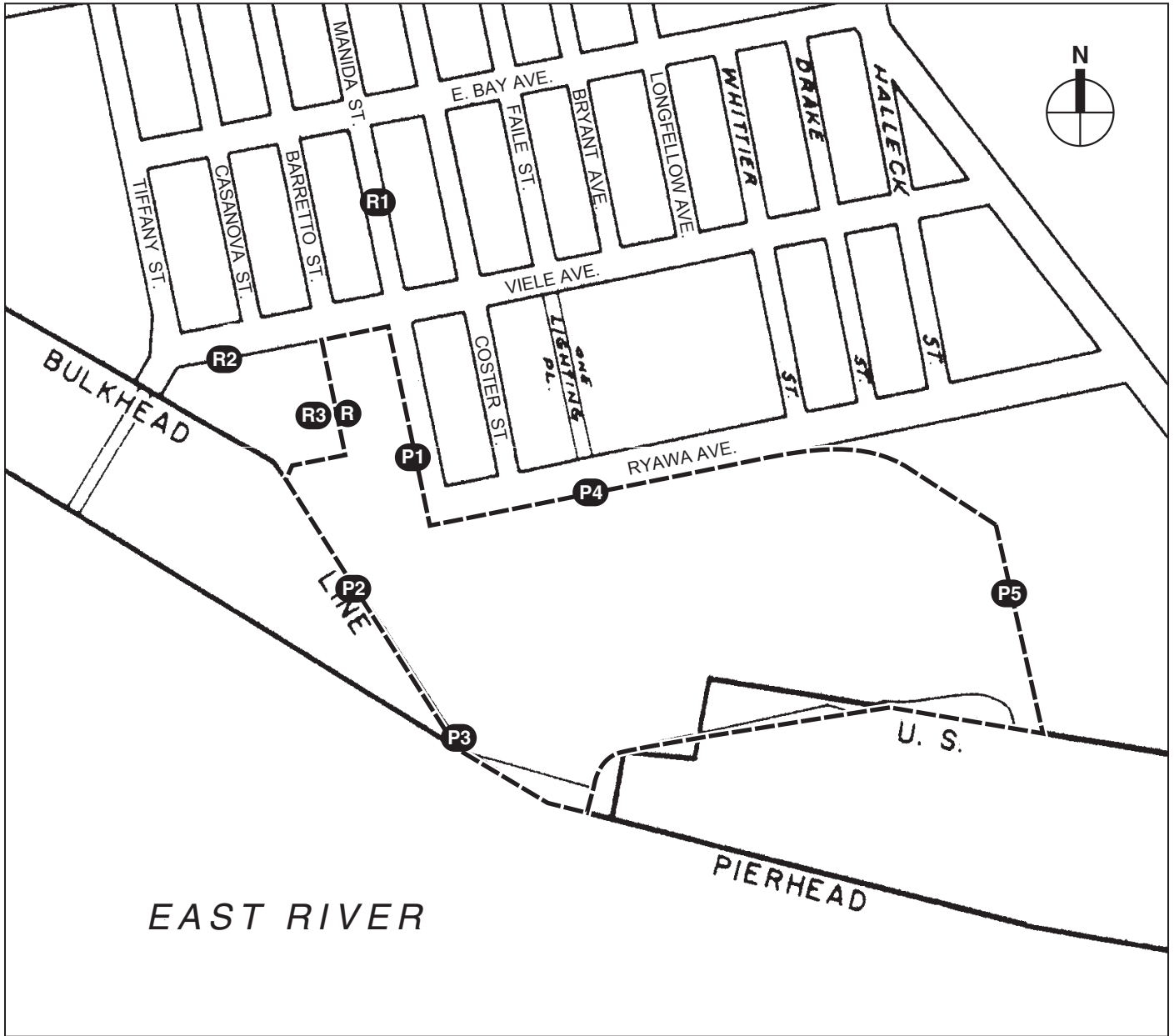
### **SITE DESCRIPTION**

The Hunts Point WPCP project site is located in the Bronx in an area bordered by Viele Avenue and Ryawa Avenue to the north, East River to the south, Halleck Street to the east, and Barretto Street to the west. The Vernon C. Bain Center, a Department of Corrections facility, lies to the east, and the Barretto Point Park borders the site on the northwest boundary. The site is zoned M3-1. Traffic is the dominant noise source.

### **SELECTION OF NOISE RECEPTOR LOCATIONS**

Three (3) sensitive receptor sites were selected as representative existing ambient conditions adjacent to the Hunts Point WPCP project site for the noise impact analysis. Site R1 was located on Manida Street between East Bay Avenue and Viele Avenue (closest residential receptor), Site R2 was located on Viele Avenue between Tiffany Street and Casanova Street adjacent to Barretto Point Park, and Site R3, which is the closest sensitive receptor, was located in Barretto Point Park at 50 feet away from the plant west property line. These receptor sites are representative of other sensitive receptors in the immediate area, and are generally the locations where maximum project impacts would be expected. The Vernon C. Bain Center was not selected as a receptor site, because of the distance from both the plant’s property line and additional equipment being proposed under the Phase III Upgrade, which is located on the opposite end of the plant. The only equipment proposed on the east side of the plant is the carbon addition facility, which would not affect the Center because the equipment consists of underground storage tanks with submersible pumps.

In addition, five (5) receptor sites located on the plant property line were selected to determine compliance with the Performance Standards contained in the New York City Zoning Resolution. Site P1 was located on the project property line on Manida Street, sites P2 and P3 were located on the west project property line, Site P4 was located on the north property line on Ryawa Avenue, and Site P5 was located on the east property line. These sites are the worst-case receptor locations with regard to noise from the plant’s equipment (see Figure 11-1).



- Project Site Boundary
- R1** Operational Noise Sensitive Receptor Location
- P1** Operational Noise Property Line Receptor Location

0 800 FEET  
SCALE

## **NOISE MONITORING**

Spot noise measurements were performed for 20-minute periods at Sites R1 and R2 on November 11th and 17th, December 15th and 16th, 2004, and continuous (24-hour) noise monitoring was performed at Site R (situated on the property line with Barretto Point Park at a location setback from Viele Avenue), which is representative of Site R3, on November 15th, 16th, and 17th, 2004. Appendix 11 contains the measured noise levels at these four sites. No noise monitoring was done at Sites P1 through P5 because the performance standards analysis is not based on existing ambient conditions.

## **EQUIPMENT USED**

The instrumentation used for the noise measurements was a Brüel & Kjær Type 4176 ½-inch microphone connected to a Brüel & Kjær Model 2260 Type 1 (according to ANSI Standard S1.4-1983) sound level meter. This assembly was mounted at a height of five feet above the ground surface on a tripod and at least six feet away from any large sound-reflecting surface to avoid major interference with sound propagation. The meter was calibrated before and after readings with a Brüel & Kjær Type 4231 sound-level calibrator using the appropriate adaptor. Measurements at each location were made on the A-scale (dBA). The data were digitally recorded by the sound level meter and displayed at the end of the measurement period in units of dBA. Measured quantities included  $L_{eq}$ ,  $L_{eq(1)}$ ,  $L_{10}$ ,  $L_{50}$ , and  $L_{90}$ . A windscreen was used during all sound measurements except for calibration. Only traffic related noise was measured; noise from other sources (e.g. emergency sirens, aircraft flyovers, etc.) was excluded from the measured noise levels. This procedure was used in all noise monitoring, and valid acoustical data were obtained under acceptable weather and street surface conditions.

Weather conditions were noted to ensure a true reading as followed: wind speed under 12 mph; relative humidity under 90 percent; and temperature above 14°F and below 122°F. All measurement procedures conformed to the requirements of ANSI Standard S1.13-1971 (R1976).

## **RESULTS OF MEASUREMENTS**

The measured noise levels are shown in Table 11-7. The noise levels at each site are considered to be representative of the quietest ambient noise levels near the project site. The quietest noise levels were selected to provide a conservative assessment and identify the largest incremental change. At Site R, which is representative of Site R3 in Barretto Point Park, the lowest measured value during time periods when users could be expected to be in the park was selected (i.e., between 7 AM and 9 PM). In terms of New York City CEQR guideline levels, the noise levels at Sites R1 and R3 are considered to be in the “acceptable” range, and the noise levels at Site R2 are considered to be in the “marginally acceptable” range.

**Table 11-7**  
**Existing Noise Levels (in dBA)**

Site	Location	Time	$L_{eq}$	$L_{10}$
R1	Manida Street between East Bay Avenue and Viele Avenue (residential receptor)	7:00-8:00 PM	55.3	58.0
R2	Viele Avenue between Tiffany and Casanova Street	1:00-2:00 AM	64.7	66.4
*R (park property line)	Barretto Point Park property line - R3 is located in the park, 50 feet west of Site R (park property line)	11:00 AM-12:00 NOON	58.5	60.4
<b>Note:</b> Field measurements were performed by AKRF, Inc. on November 11, 15, 16 and 17, December 15 and 16, 2004.				
* The measured noise levels at Site R are representative for noise levels at Site R3.				



## C. THE FUTURE WITHOUT THE PROPOSED ACTION

In the future without the proposed action, or the No Action condition, the existing plant would operate as upgraded under the Phase I and Phase II conditions. Noise levels due to stationary sources as part of the Phase I and Phase II Upgrades were determined using the methodology described previously.

Table 11-8 shows noise levels in the Future without the Proposed Action at receptor Sites R1, R2, and R3. At all three Sites, the Phase I and Phase II Upgrades would increase the maximum noise level by 0.4 dBA compared to the existing ambient noise levels. In terms of New York City CEQR guideline levels, the noise levels at Site R1 would remain in the “acceptable” range, the noise levels at Site R2 would remain in the “marginally acceptable” range, and the noise levels at Site R3 would remain in the “acceptable” range.

**Table 11-8**  
**2014 Noise Levels Without the Proposed Action (in dBA)**

Site	Location	Quietest Existing Noise Levels $L_{eq(1)}$	Plant Generated Future without the Proposed Action Noise Levels $L_{eq(1)}$	Total Future without the Proposed Action Levels $L_{eq(1)}$	Change
R1	Manida Street between East Bay Avenue and Viele Avenue (Residential receptor)	55.3	42.1	55.5	0.2
R2	Viele Avenue between Tiffany and Casanova Street (Barretto Point Park)	64.7	46.1	64.8	0.1
R3	In Barretto Point Park, 50 feet west of plant property line	58.5	48.5	58.9	0.4

As discussed in Chapter 2, “Land Use, Zoning, Neighborhood Character, and Open Space,” in the future without the proposed action, the South Bronx Greenway could be constructed by the year 2011. The Ryawa-Viele Connection would involve the implementation of improvements along a portion of Viele Avenue (between Barretto Point Park and Manida Street), Manida Street (between Viele and Ryawa Avenues), and Ryawa Avenue (from Manida Street to approximately Halleck Street). The conceptual plan shown in the master plan for this element of the greenway includes improvements consisting of a 24-foot planted buffer between the plant site and the sidewalk along Ryawa Avenue, the introduction of a bikeway along all three streets, and extensive street plantings. The use of this section of the South Bronx Greenway would be transient by individuals. Noise emanating from the plant under future conditions without the proposed action would not be disruptive of the types of activities that would occur along the greenway.

## D. PROBABLE IMPACTS OF THE PROPOSED ACTION

### STATIONARY NOISE SOURCES

An assessment of potential noise impacts from stationary sources for the proposed action was performed using the methodology described previously. The Hunts Point WPCP with the proposed action would utilize noise control measures, such as enclosures or silencers for emergency generators. Appendix 11 provides additional information on the location of sources.

Table 11-9 shows noise levels with the proposed action at receptor Sites R1, R2, and R3. The maximum predicted incremental  $L_{eq(1)}$  noise level from the proposed action, 1.1 dBA, would occur at Site R3 (Barretto Point Park). These maximum predicted  $L_{eq(1)}$  incremental changes would be less than 3 dBA, and therefore, would not result in predicted significant adverse impacts. Reviewing the results of Tables 11-8 and 11-9, the combined impacts of the maximum predicted  $L_{eq(1)}$  operational noise increases from the entire plant as upgraded under the Phases I and II Upgrades and the proposed action would result in incremental noise impacts less than 3 dBA. As discussed above, noise sources from the carbon addition facility are not significant. The carbon addition facility is not located near the Phase III upgrade noise sources, and thus, would not contribute to the incremental noise levels reported in Table 11-9. In terms of New York City CEQR guideline levels, the noise levels at Site R1 would remain in the “acceptable” range, the noise levels at Site R2 would remain in the “marginally acceptable” range, and the noise levels at Site R3 would remain in the “acceptable” range.

**Table 11-9**  
**2014 Noise Levels With the Proposed Action (in dBA)**

<b>Site</b>	<b>Location</b>	<b>Total Future without the Proposed Action Levels <math>L_{eq(1)}</math></b>	<b>Proposed Action Generated Noise Levels <math>L_{eq(1)}</math></b>	<b>Total Future with the Proposed Action Noise Levels <math>L_{eq(1)}</math></b>	<b>Change</b>
R1	Manida Street between East Bay Avenue and Viele Avenue (Residential receptor)	55.5	35.2	55.5	0.0
R2	Viele Avenue between Tiffany and Casanova Street (Barretto Point Park)	64.8	47.3	64.8	0.0
R3	In Barretto Point Park, 50 feet west of plant property line	58.9	53.6	60.0	1.1

Table 11-10 shows octave band noise levels from the entire plant as upgraded under the proposed action at the closest residential receptor location near the project site, and compares them to the maximum permitted Octave Band Sound Pressure Levels in the New York City Noise Control Code. The entire plant including the operation of all the plant equipment with the proposed action results in sound pressure levels at the nearest residential receptor site that would not exceed the maximum permitted decibel limits under the octave band noise level standards contained in the New York City Noise Code.

Table 11-11 shows octave band noise levels at the five worst-case receptor locations on the property lines of the project site. With the proposed action, the sound pressure levels at all five receptor sites (and thus at the property line of the plant) would not exceed the maximum permitted decibel limits under the performance standards contained in the New York City Zoning Resolution.

In addition, as described above, in the future without the proposed action, the South Bronx Greenway could be constructed by the year 2011. Along Viele Avenue, noise levels generated by the proposed action would be low as indicated in Table 11-9 (see Site R2). The maximum predicted incremental  $L_{eq(1)}$  noise level along Ryawa Avenue is predicted to be 0.1 dBA with the proposed action. This is based on predicted noise levels near Site P4 of 58.6 dBA with a background level of 58.5 dBA. Further, the use of this section of the South Bronx Greenway would be transient by individuals. Noise emanating from the plant under future conditions with the proposed action would not be disruptive of the types of activities that would occur along the greenway.

**Table 11-10**  
**Octave Band Sound Pressure Levels at Nearby Residential**  
**Receptor Locations (in dB)**

Octave Bands (Hz)	Maximum Sound Pressure Level for Residential Buildings (dB)	Receptor R1- Manida Street between East Bay Avenue and Viele Avenue (dB)
31.5	70	52*
63	61	49
125	53	47
250	46	42
500	40	35
1000	36	28
2000	34	24
4000	33	19
8000	32	17

\* Estimated noise level  
**Source:** City of New York Noise Control Code Subchapter 5, effective July 1, 2007.

**Table 11-11**  
**Octave Band Sound Pressure Levels at Property Line (in dB)**

Octave Band (Hz)	Manufacturing District Regulation (M3)	P1 (Manida Street Property Line)	P2 (West Property Line)	P3 (West Property Line)	P4 (Ryawa Property Line)	P5 (East Property Line)
63	79	71	66	73	76	60
125	74	68	64	72	73	60
250	69	62	61	68	68	57
500	63	55	56	62	62	53
1000	57	52	50	55	55	48
2000	52	51	47	52	50	43
4000	48	47	42	48	46	37
8000	45	41	36	45	44	32

**Source:** City of New York's Zoning Resolution Section 42-213.

## CONCLUSIONS

Based on the analyses presented above, the proposed action (for both the two-digester and four-digester scenarios) would not result in any predicted exceedances of the suggested incremental thresholds in the City's *CEQR Technical Manual* at nearby sensitive receptors, and would not create exceedances of the octave band limits contained in the New York City Noise Code or the performance standards of the New York Zoning Resolution. Therefore, there would be no predicted significant adverse noise impacts from the proposed action. \*

**Maximum permitted decibel levels**

In all #Manufacturing Districts#, the sound pressure level resulting from any activity, whether open or enclosed, shall not exceed, at any point on or beyond any #lot line#, the maximum permitted #decibel# levels for the designated #octave band# as set forth in the following table for the district indicated.

In the enforcement of this regulation, sounds produced by the operation of motor vehicles or other transportation facilities shall not be included in determining the maximum permitted #decibel# levels.

MAXIMUM PERMITTED SOUND PRESSURE LEVEL  
(in #decibels#)

#Octave Band# (cycles per second)	District		
	M1	M2	M3
20 to 75	79	79	80
75 to 150	74	75	75
150 to 300	66	68	70
300 to 600	59	62	64
600 to 1,200	53	56	58
1,200 to 2,400	47	51	53
2,400 to 4,800	41	47	49
Above 4,800	39	44	46



## A. INTRODUCTION

The noise analysis for the proposed project consists of three components—a screening analysis to determine whether traffic generated by the proposed project would have the potential to result in significant noise impacts; an analysis to determine whether the proposed project’s Wheel-related activities (i.e., operation of the Wheel) would have the potential to result in significant noise impacts; and an analysis to determine the level of building attenuation necessary to ensure that the proposed project’s interior noise levels satisfy applicable interior noise criteria.

### PRINCIPAL CONCLUSIONS

With the proposed project completed in 2016, the increase in  $L_{eq(1)}$  noise levels would be less than 3 dBA at all five receptor sites. Changes of these magnitudes would be considered imperceptible to barely perceptible, and they would be below the City Environmental Quality Review (CEQR) threshold for a significant adverse impact. In terms of CEQR Noise Exposure Guidelines, noise levels at receptor sites 1, 2, and 3 would remain in the “marginally unacceptable” category, noise levels would remain above the 55 dBA  $L_{10(1)}$  noise level guideline for outdoor areas requiring serenity and quiet provided in the *CEQR Technical Manual* noise exposure guidelines at receptor Site 4, and noise levels would remain in the “marginally acceptable” category at Site 5. These values are based on the predicted  $L_{10(1)}$  values.

For the open space locations (i.e., North Shore Waterfront Esplanade), existing noise levels are currently above the 55 dBA  $L_{10(1)}$  *CEQR Technical Manual* noise level for outdoor areas. While the proposed project would exacerbate these exceedances, the noise levels would remain comparable to noise levels in portions of other public open spaces in this area (i.e., Tompkinsville Play Center, Nicholas Memorial Park, Mahoney Playground, and Davis Playground). This condition would also be expected for the new open spaces that would be created by the proposed project. Although the 55 dBA  $L_{10(1)}$  guideline is a worthwhile goal for outdoor areas requiring serenity and quiet, this relatively low noise level is typically not achieved in parks and open space areas in New York City. Therefore, the change is not considered a significant adverse impact and no mitigation is proposed.

In terms of noise attenuation, the *CEQR Technical Manual* has set noise attenuation quantities for buildings based on exterior  $L_{10(1)}$  noise levels, and in order to maintain interior noise levels of 45 dBA  $L_{10(1)}$  or lower for residential or hotel uses and 50 dBA  $L_{10(1)}$  or lower for commercial uses. The west facing facades of the North and South Sites (including the hotel) would require noise attenuation of between 28 and 31 dBA.

## B. ACOUSTICAL FUNDAMENTALS

Sound is a fluctuation in air pressure. Sound pressure levels are measured in units called “decibels” (“dB”). The particular character of the sound that we hear (a whistle compared with a French horn, for example) is determined by the speed, or “frequency,” at which the air pressure fluctuates, or “oscillates.” Frequency defines the oscillation of sound pressure in terms of cycles

per second. One cycle per second is known as 1 Hertz (“Hz”). People can hear over a relatively limited range of sound frequencies, generally between 20 Hz and 20,000 Hz, and the human ear does not perceive all frequencies equally well. High frequencies (e.g., a whistle) are more easily discernable and therefore more intrusive than many of the lower frequencies (e.g., the lower notes on the French horn).

#### **“A”-WEIGHTED SOUND LEVEL (DBA)**

In order to establish a uniform noise measurement that simulates people’s perception of loudness and annoyance, the decibel measurement is weighted to account for those frequencies most audible to the human ear. This is known as the A-weighted sound level, or “dBA,” and it is the descriptor of noise levels most often used for community noise. As shown in **Table 17-1**, the threshold of human hearing is defined as 0 dBA; very quiet conditions (as in a library, for example) are approximately 40 dBA; levels between 50 dBA and 70 dBA define the range of noise levels generated by normal daily activity; levels above 70 dBA would be considered noisy, and then loud, intrusive, and deafening as the scale approaches 130 dBA.

**Table 17-1**  
**Common Noise Levels**

<b>Sound Source</b>	<b>(dBA)</b>
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Freight train at 30 meters	95
Train horn at 30 meters	90
Heavy truck at 15 meters	80–90
Busy city street, loud shout	80
Busy traffic intersection	70–80
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Light car traffic at 15 meters, city or commercial areas, or residential areas close to industry	50–60
Background noise in an office	50
Suburban areas with medium-density transportation	40–50
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0
<b>Note:</b> A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.	
<b>Sources:</b> Cowan, James P. <i>Handbook of Environmental Acoustics</i> , Van Nostrand Reinhold, New York, 1994. Egan, M. David, <i>Architectural Acoustics</i> . McGraw-Hill Book Company, 1988.	

In considering these values, it is important to note that the dBA scale is logarithmic, meaning that each increase of 10 dBA describes a doubling of perceived loudness. Thus, background noise at 50 dBA is perceived as twice as loud as at 40 dBA. For most people to perceive an increase in noise, it must be at least 3 dBA. At 5 dBA, the change will be readily noticeable.

#### **ABILITY TO PERCEIVE CHANGES IN NOISE LEVELS**

The average ability of an individual to perceive changes in noise levels is well-documented (see **Table 17-2**). Generally, changes in noise levels of less than 3 dBA are barely perceptible to most listeners, whereas changes in noise levels of 10 dBA are normally perceived as doubling (or

halving) of noise loudness. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

**Table 17-2**  
**Average Ability to Perceive Changes in Noise Levels**

Change (dBA)	Human Perception of Sound
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A "dramatic change"
40	Difference between a faintly audible sound and a very loud sound
<b>Source:</b> Bolt Beranek and Neuman, Inc., <i>Fundamentals and Abatement of Highway Traffic Noise</i> , Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.	

## EFFECTS OF DISTANCE ON SOUND

Sound varies with distance. For example, highway traffic 50 feet away from a receptor (such as a person listening to the noise) typically produces sound levels of approximately 70 dBA. The same highway noise measures 66 dBA at a distance of 100 feet, assuming soft ground conditions. This decrease is known as "drop-off." The outdoor drop-off rate for line sources, such as traffic, is a decrease of approximately 4.5 dBA (for soft ground) for every doubling of distance between the noise source and receiver (for hard ground the outdoor drop-off rate is 3 dBA for line sources). Assuming soft ground, for point sources, such as amplified rock music, the outdoor drop-off rate is a decrease of approximately 7.5 dBA for every doubling of distance between the noise source and receiver (for hard ground the outdoor drop-off rate is 6 dBA for point sources).

## SOUND LEVEL DESCRIPTORS

Because the sound pressure level unit of dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise that fluctuates over extended periods have been developed. One way is to describe the fluctuating sound heard over a specific time period as if it had been a steady, unchanging sound. For this condition, a descriptor called the "equivalent sound level,"  $L_{eq}$ , can be computed.  $L_{eq}$  is the constant sound level that, in a given situation and time period (e.g., 1 hour, denoted by  $L_{eq(1)}$ , or 24 hours, denoted by  $L_{eq(24)}$ ), conveys the same sound energy as the actual time-varying sound. Statistical sound level descriptors such as  $L_1$ ,  $L_{10}$ ,  $L_{50}$ ,  $L_{90}$ , and  $L_x$ , are used to indicate noise levels that are exceeded 1, 10, 50, 90, and x percent of the time, respectively.

The relationship between  $L_{eq}$  and levels of exceedance is worth noting. Because  $L_{eq}$  is defined in energy rather than straight numerical terms, it is not simply related to the levels of exceedance. If the noise fluctuates very little,  $L_{eq}$  will approximate  $L_{50}$  or the median level. If the noise fluctuates broadly, the  $L_{eq}$  will be approximately equal to the  $L_{10}$  value. If extreme fluctuations are present, the  $L_{eq}$  will exceed  $L_{90}$  or the background level by 10 or more decibels. Thus, the relationship between  $L_{eq}$  and the levels of exceedance will depend on the character of the noise. In community noise measurements, it has been observed that the  $L_{eq}$  is generally between  $L_{10}$  and  $L_{50}$ .

For purposes of the proposed project, the maximum 1-hour equivalent sound level ( $L_{eq(1)}$ ) has been selected as the noise descriptor to be used in this noise impact evaluation.  $L_{eq(1)}$  is the noise descriptor recommended for use in the *CEQR Technical Manual* for vehicular traffic and construction noise impact evaluation, and is used to provide an indication of highest expected

sound levels. The 1-hour  $L_{10}$  is the noise descriptor used in the *CEQR Technical Manual* noise exposure guidelines for City environmental impact review classification.

### C. NOISE STANDARDS AND CRITERIA

Noise levels associated with the operation of the proposed project would be subject to Performance Standards for Manufacturing Districts contained in the New York City Zoning Resolution, noise standards contained in the New York City Noise Control Code, and to noise impact criteria set forth in the *CEQR Technical Manual*.

#### PERFORMANCE STANDARDS FOR MANUFACTURING DISTRICTS

The City of New York's Zoning Resolution Section 42-213 states that in all manufacturing districts, the sound pressure level resulting from any activity within the project site (an M1 zone), whether open or enclosed, shall not exceed, at any point on or beyond any lot line, the maximum permitted sound level for the designated octave band indicated in **Table 17-3**.

**Table 17-3**  
**City of New York Noise Performance Standards**  
**for M1 Manufacturing District**

Old Octave Bands		Current Octave Bands	
Octave Band (Hz)	M1 District (dB)	Octave Band (Hz)	M1 District (dB)
20 to 75	79	63	78
75 to 150	74	125	72
150 to 300	66	250	64
300 to 600	59	500	58
600 to 1200	53	1000	52
1200 to 2400	47	2000	46
2400 to 4800	41	4000	41
Above 4800	39	8000	39
<b>Source:</b> City of New York Performance Standards for Manufacturing Districts Section 42-213.			

The Performance Standards are specified in “old” octave bands. These bands have not been used in almost 40 years, and instrumentation is no longer available to measure per these specifications. The American National Standards Institute (ANSI) has promulgated a standard on the conversion of old octave bands to the current preferred values (and vice versa), to allow measurement and assessment. This conversion was done and the converted criteria are also provided in **Table 17-3**.

#### NEW YORK CITY NOISE CONTROL CODE

The New York City Noise Control Code, amended in December 2005, contains prohibitions regarding unreasonable noise, requirements for noise due to construction activities, and specific noise standards, including plainly audible criteria for specific noise sources. In addition, the amended code specifies that no sound source operating in connection with any commercial or business enterprise may exceed the decibel levels in the designated octave bands shown in **Table 17-4** at the specified receiving properties.



**Table 17-4**  
**New York City Noise Code**

Octave Band Frequency (Hz)	Maximum Sound Pressure Levels (dB) as Measured Within a Receiving Property as Specified Below	
	<i>Residential receiving property for mixed-use building and residential buildings (as measured within any room of the residential portion of the building with windows open, if possible)</i>	<i>Commercial receiving property (as measured within any room containing offices within the building with windows open, if possible)</i>
31.5	70	74
63	61	64
125	53	56
250	46	50
500	40	45
1000	36	41
2000	34	39
4000	33	38
8000	32	37

**Source:** Section 24-232 of the Administrative Code of the City of New York, as amended December 2005.

### NEW YORK CEQR NOISE CRITERIA

The 2012 *CEQR Technical Manual* sets external noise exposure standards; these standards are shown in **Table 17-5**. Noise exposure is classified into four categories: acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable. The noise level specified for outdoor areas requiring serenity and quiet is 55 dBA  $L_{10(1h)}$ .

The 2012 *CEQR Technical Manual* also defines attenuation requirements for buildings based on exterior noise level (see **Table 17-6**). Recommended noise attenuation values for buildings are designed to maintain interior noise levels of 45 dBA or lower for noise sensitive uses and 50 dBA or lower for commercial/office uses and are determined based on exterior  $L_{10(1)}$  noise levels.

In addition, the 2012 *CEQR Technical Manual* compares the proposed project's With-Action condition  $L_{eq(1)}$  noise levels to those calculated for the No-Action condition, for receptors potentially affected by the project using the following criteria to determine whether a proposed project would result in a significant adverse noise impact:

- An increase of 5 dBA, or more, in With-Action  $L_{eq(1)}$  noise levels at sensitive receptors (including residences, play areas, parks, schools, libraries, and houses of worship) over those calculated for the No-Action condition, if the No-Action levels are less than or equal to 60 dBA  $L_{eq(1)}$  and the analysis period is not a nighttime period.
- An increase in With-Action  $L_{eq(1)}$  noise levels at sensitive receptors of such that the total Build  $L_{eq(1)}$  noise levels would be 65 dBA or greater, if the No-Action levels are between 60 and 62 dBA  $L_{eq(1)}$  and the analysis period is not a nighttime period.
- An increase of 3 dBA, or more, in With-Action  $L_{eq(1)}$  noise levels at sensitive receptors over those calculated for the No-Action condition, if the No-Action levels are greater than or equal to 62 dBA  $L_{eq(1)}$  and the analysis period is not a nighttime period.
- An increase of 3 dBA, or more, in With-Action  $L_{eq(1)}$  noise levels at sensitive receptors over those calculated for the No-Action condition, if the analysis period is a nighttime period (defined by the *CEQR Technical Manual* criteria as being between 10 PM and 7 AM).

Table 17-5

## Noise Exposure Guidelines For Use in City Environmental Impact Review

Receptor Type	Time Period	Acceptable General External Exposure	Airport <sup>3</sup> Exposure	Marginally Acceptable General External Exposure	Airport <sup>3</sup> Exposure	Marginally Unacceptable General External Exposure	Airport <sup>3</sup> Exposure	Clearly Unacceptable General External Exposure	Airport <sup>3</sup> Exposure
Outdoor area requiring serenity and quiet <sup>a</sup>		L <sub>10</sub> ≤ 55 dBA	----- Ldn ≤ 60 dBA -----	NA	NA	NA	NA	NA	NA
Hospital, nursing home		L <sub>10</sub> ≤ 55 dBA		55 < L <sub>10</sub> ≤ 65 dBA	----- 60 < Ldn ≤ 65 dBA -----	65 < L <sub>10</sub> ≤ 80 dBA	(i) 65 < Ldn ≤ 70 dBA, (ii) 70 ≤ Ldn	L <sub>10</sub> > 80 dBA	----- Ldn ≤ 75 dBA -----
Residence, residential hotel, or motel	7 AM to 10 PM	L <sub>10</sub> ≤ 65 dBA		65 < L <sub>10</sub> ≤ 70 dBA		70 < L <sub>10</sub> ≤ 80 dBA		L <sub>10</sub> > 80 dBA	
	10 PM to 7 AM	L <sub>10</sub> ≤ 55 dBA		55 < L <sub>10</sub> ≤ 70 dBA		70 < L <sub>10</sub> ≤ 80 dBA		L <sub>10</sub> > 80 dBA	
School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, outpatient public health facility		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)	
Commercial or office		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)	
Industrial, public areas only <sup>a</sup>	Note 4	Note 4		Note 4		Note 4		Note 4	

**Notes:**

(i) In addition, any new activity shall not increase the ambient noise level by 3 dBA or more; (ii) *CEQR Technical Manual* noise criteria for train noise are similar to the above aircraft noise standards: the noise category for train noise is found by taking the L<sub>dn</sub> value for such train noise to be an L<sub>dn</sub><sup>y</sup> (L<sub>dn</sub> contour) value.

**Table Notes:**

<sup>1</sup> Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by American National Standards Institute (ANSI) Standards; all values are for the worst hour in the time period.

<sup>2</sup> Tracts of land where serenity and quiet are extraordinarily important and serve an important public need, and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.

<sup>3</sup> One may use FAA-approved L<sub>dn</sub> contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using flight data supplied by the Port Authority of New York and New Jersey.

<sup>4</sup> External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).

**Source:** New York City Department of Environmental Protection (adopted policy 1983).

Table 17-6

## Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Unacceptable				Clearly Unacceptable
Noise Level With the proposed project	$70 < L_{10} \leq 73$	$73 < L_{10} \leq 76$	$76 < L_{10} \leq 78$	$78 < L_{10} \leq 80$	$80 < L_{10}$
Attenuation <sup>A</sup>	(I) 28 dB(A)	(II) 31 dB(A)	(III) 33 dB(A)	(IV) 35 dB(A)	$36 + (L_{10} - 80)^B$ dB(A)
<b>Notes:</b> <sup>A</sup> The above composite window-wall attenuation values are for residential dwellings and community facility development. Commercial office spaces, retail, and meeting rooms would be 5 dB(A) less in each category. All the above categories require a closed window situation and hence an alternate means of ventilation. <sup>B</sup> Required attenuation values increase by 1 dB(A) increments for $L_{10}$ values greater than 80 dBA. <b>Source:</b> New York City Department of Environmental Protection.					

## IMPACT DEFINITION

For purposes of impact assessment, the proposed project would have a significant noise impact if one or more of the following criteria are exceeded: the *CEQR Technical Manual* relative noise criteria; the octave band noise levels specified in the Performance Standards for Manufacturing Districts contained in the New York City Zoning Resolution; or the octave band noise levels specified in the City of New York Noise Control Code.

## D. NOISE PREDICTION METHODOLOGY

The noise impact assessment predicted separately the effects of noise from the project-generated traffic and the proposed project's Wheel-related activities (i.e., operation of the Wheel and people noise). Total noise levels with the proposed project (With-Action values) were obtained by adding noise due to the project-generated traffic and the project's Wheel-related activities to noise levels without the proposed project (No-Action values). The methodologies used to determine noise effects from the project-generated traffic and the project's Wheel-related activities are discussed below. Impacts were determined based upon the combined effects of both of these noise sources.

### MOBILE NOISE SOURCES

Proportional modeling was used to determine locations which had the potential for having significant noise impacts and to quantify the magnitude of those potential impacts. Proportional modeling is one of the techniques recommended in the *CEQR Technical Manual* for mobile source analysis.

Using this technique, the prediction of future noise levels, where traffic is the dominant noise source, is based on a calculation using measured existing noise levels and predicted changes in traffic volumes to determine No-Action and With-Action levels. Using this methodology, vehicular traffic volumes were converted into passenger car equivalent (PCE) values, for which one medium-duty truck (having a gross weight between 9,900 and 26,400 pounds) is assumed to generate the noise equivalent of 13 cars; one heavy-duty truck (having a gross weight of more than 26,400 pounds) is assumed to generate the noise equivalent of 47 cars; and one bus (vehicles designed to carry more than nine passengers) is assumed to generate the noise equivalent of 18 cars. Future noise levels are calculated using the following equation:

$$F\ NL - E\ NL = 10 * \log_{10} (F\ PCE / E\ PCE)$$

where:

F NL = Future Noise Level

E NL = Existing Noise Level

F PCE = Future PCEs

E PCE = Existing PCEs

With this methodology, assuming traffic is the dominant noise source at a particular location if the existing traffic volume on a street is 100 PCE and if the future traffic volume were increased by 50 PCE to a total of 150 PCE, the noise level would increase by 1.8 dBA. Similarly, if the future traffic were increased by 100 PCE, or doubled to a total of 200 PCE, the noise level would increase by 3.0 dBA.

## STATIONARY NOISE SOURCES

In the study area, noise from the proposed project's Wheel-related activities is one of the major noise sources that would contribute to the total ambient noise levels. The major noise sources include the Wheel's operation. For the Wheel's operation, a total of 32 electric motor gear boxes would be expected to run simultaneously. Since the Wheel's drive system has been neither designed nor selected, the designated octave band sound pressure levels for the Wheel's drive system are not available. However, an emission level generated by each gear box would be less than 70 dBA at a distance of 3 feet, provided by Starneth (the engineer of the Observation Wheel). Conservatively, 70 dBA at 3 feet for each gear box was used for noise analysis. Calculations of noise levels from the Wheel's operation on receptor sites in the study area are based on the emission levels using the following equation:

$$L_{eq1} = L_{eq2} - 10 * \text{Log} (d_1/d_2) - A_{screen}$$

where:

- $L_{eq1}$  is the noise level at the receptor location;
- $L_{eq2}$  is the emission noise level;
- $d_1$  is the distance from the emission source to the receptor;
- $d_2$  is the reference distance; and
- $A_{screen}$  is the attenuation due to screening.

It is noted that using the equation above for the noise impact analysis would be conservative since attenuation effects from environmental factors (i.e., atmospheric absorption, terrain, and meteorological conditions) were not included in calculations.

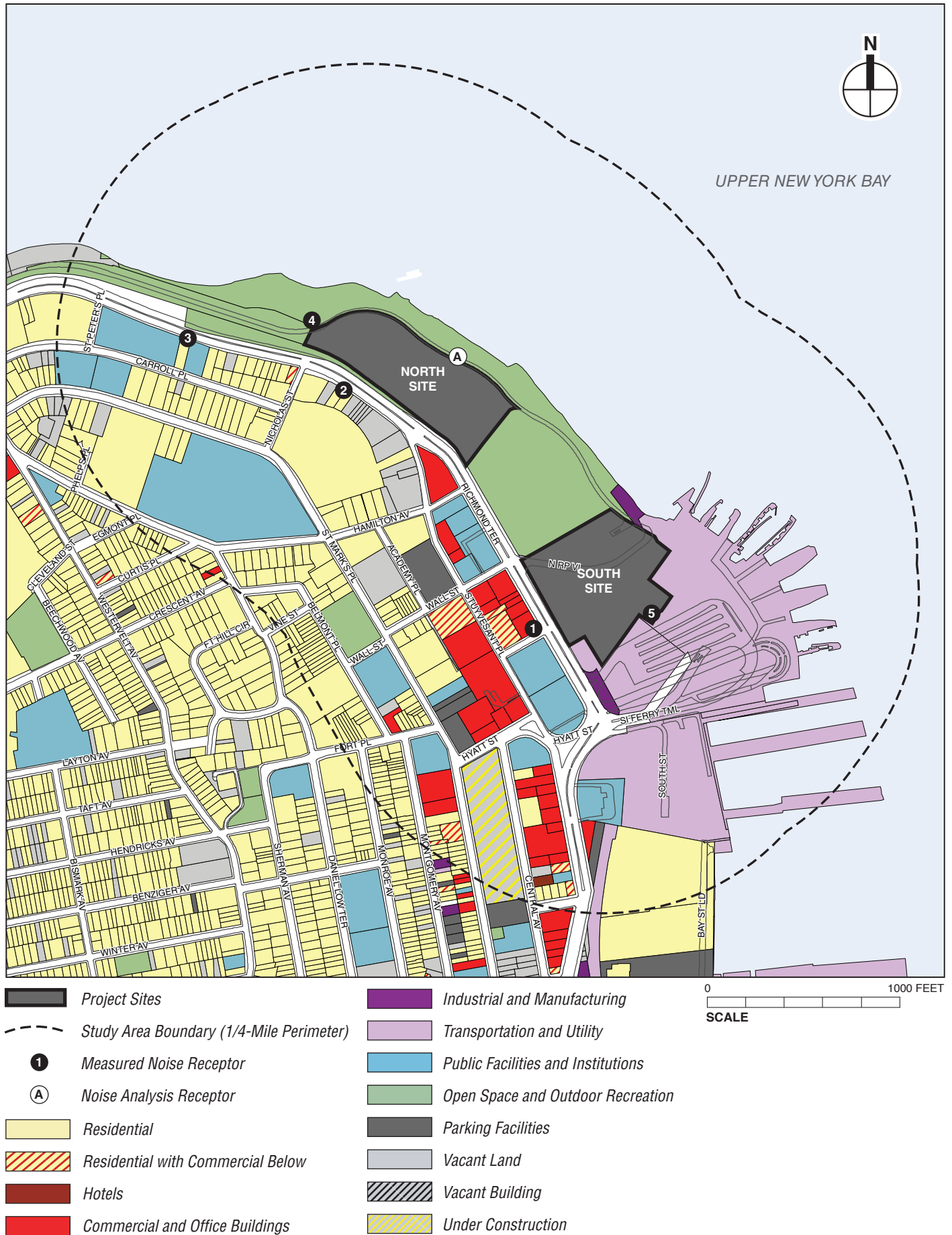
## E. EXISTING NOISE LEVELS

Existing noise levels were measured at five (5) locations near the project sites (see **Figure 17-1**). **Table 17-7** lists the receptor site locations and their representative uses. All five receptor sites were used to evaluate potential noise impacts due to the project-generated traffic and the proposed project's Wheel-related activities. Receptor sites 1, 2, 4, and 5 were also used to determine CEQR building attenuation requirements for the project's buildings. These five receptors, due to their proximity to the project sites, represent the nearby sensitive noise receptors with the greatest potential to experience significant noise increases as a result of the proposed project. Sensitive receptors further from the project sites would be less likely to experience significant noise increases as a result of the proposed project.

**Table 17-7**  
**Noise Receptor Locations**

Receptor	Location	Land Use
1	Richmond Terrace between Schuyler and Wall Streets	Commercial
2	Richmond Terrace between Stuyvesant Place and Nicholas Street	Residential
3	Richmond Terrace between Nicholas Street and St. Peter's Place	Residential and School
4	North Shore Waterfront Esplanade	Open Space
5	Parking lot near the Staten Island Ferry	Transportation and Utility

At receptor sites 1, 2, 3, and 4, noise monitoring was conducted for three weekday conditions: AM, midday, and PM time periods, and two Saturday conditions: midday and PM time periods. At





these receptor sites, existing noise levels were measured for 20-minute periods during three weekday periods—AM (8:00 AM to 9:30 AM), midday (MD) (1:00 PM to 2:30 PM), and PM (4:30 to 6:00 PM)—as well as two Saturday periods—midday (MD) (1:00 PM to 2:30 PM), and PM (6:00 PM to 7:30 PM). Measurements were taken on June 11 and 16, 2012. At receptor Site 5, 11-hour (8:00 AM to 7:00 PM) continuous noise monitoring was performed to determine existing noise levels at the parking lot near the Staten Island Ferry. Measurements were taken on October 6 (Saturday) and 16 (Weekday), 2012. The selected time periods are when the proposed project would have maximum traffic generation and/or the maximum potential for significant adverse noise impacts based on the traffic studies presented in Chapter 14, “Transportation.”

### **EQUIPMENT USED DURING NOISE MONITORING**

Measurements were performed using a Brüel & Kjær Sound Level Meter (SLM) Type 2260, a Brüel & Kjær ½-inch microphone Type 4189), and a Brüel & Kjær Sound Level Calibrator Type 4231. The Brüel & Kjær SLM is a Type 1 instrument according to ANSI Standard S1.4-1983 (R2006). For all receptor sites the instrument/microphone was mounted on a tripod at a height of approximately 5 feet above the ground. Microphones were mounted at least approximately 5 feet away from any large reflecting surfaces. The SLM was calibrated before and after readings with a Brüel & Kjær Type 4231 Sound Level Calibrator using the appropriate adaptor. Measurements at each location were made on the A-scale (dBA). The data were digitally recorded by the sound level meter and displayed at the end of the measurement period in units of dBA. Measured quantities included  $L_{eq}$ ,  $L_1$ ,  $L_{10}$ ,  $L_{50}$ ,  $L_{90}$ , and 1/3 octave band levels. A windscreen was used during all sound measurements except for calibration. All measurement procedures were based on the guidelines outlined in ANSI Standard S1.13-2005.

### **RESULTS**

The results of the existing noise level measurements are summarized in **Table 17-8** for receptor sites 1 through 4 and **Table 17-9** for receptor Site 5. At all receptor sites, vehicular traffic noise on adjacent roadways was the dominant noise source. Measured levels were moderate to relatively high and reflect the level of vehicular activity on the adjacent streets. In terms of the CEQR criteria, the existing noise levels are in the “marginally unacceptable” category at sites 1, 2, and 3, the existing noise levels exceed the 55 dBA  $L_{10(1)}$  noise level guideline for outdoor areas requiring serenity and quiet provided in the *CEQR Technical Manual* noise exposure guidelines at Site 4, and the existing noise levels are in the “marginally acceptable” category at Site 5.

**Table 17-8**  
**Existing Noise Levels (in dBA)**

Site	Measurement Location			L <sub>eq</sub>	L <sub>1</sub>	L <sub>10</sub>	L <sub>50</sub>	L <sub>90</sub>
1	Richmond Terrace between Schuyler and Wall Streets	Weekday	AM	68.5	77.0	72.8	64.0	53.2
			MD	68.1	74.6	71.2	66.9	62.0
			PM	68.5	76.5	72.6	65.4	55.0
		Saturday	MD	67.2	76.0	71.5	61.6	56.0
			PM	66.4	75.8	70.3	61.5	53.9
2	Richmond Terrace between Stuyvesant Place and Nicholas Street	Weekday	AM	64.2	73.5	68.1	60.9	54.2
			MD	69.4	79.0	73.5	65.2	54.1
			PM	70.3	79.9	74.2	66.4	50.1
		Saturday	MD	67.1	77.3	70.9	61.6	49.1
			PM	66.7	75.1	71.3	62.2	49.4
3	Richmond Terrace between Nicholas Street and St. Peter's Place	Weekday	AM	66.1	76.0	70.9	58.8	51.1
			MD	66.0	75.3	70.8	58.3	51.9
			PM	68.5	77.0	72.8	64.0	53.2
		Saturday	MD	66.1	75.7	71.5	57.7	51.9
			PM	67.5	77.3	71.3	55.6	50.5
4	North Shore Waterfront Esplanade	Weekday	AM	58.0	64.7	61.7	55.9	52.8
			MD	59.4	67.2	62.7	57.4	53.6
			PM	58.7	65.7	62.6	56.4	52.2
		Saturday	MD	60.5	70.2	63.3	57.5	54.6
			PM	60.3	68.3	64.6	56.9	53.5

**Note:** Field measurements were performed by AKRF, Inc. on June 11 and 16, 2012.

**Table 17-9**  
**Receptor Site 5— Existing Noise Levels (in dBA)**

Start Time	Measurement Location	Leq	L <sub>1</sub>	L <sub>10</sub>	L <sub>50</sub>	L <sub>90</sub>
Saturday (October 6, 2012)						
8 AM	Parking lot near the Staten Island Ferry	62.3	65.4	64.1	61.9	60.7
9 AM		62.3	66.4	64.0	61.7	60.6
10 AM		62.5	71.6	64.0	61.0	59.6
11 AM		61.9	67.4	63.7	60.7	59.2
Noon		61.4	65.5	63.5	60.7	59.5
1 PM		61.5	66.0	63.5	60.8	58.9
2 PM		60.6	65.7	62.1	59.7	58.1
3 PM		60.4	64.3	61.6	59.6	58.2
4 PM		60.9	64.3	62.4	60.3	59.3
5 PM		61.4	68.3	62.6	60.2	59.2
6 PM	59.7	64.6	61.5	58.8	57.5	
7 PM	58.3	62.7	60.2	57.6	56.2	
Weekday (October 16, 2012)						
8 AM	Parking lot near the Staten Island Ferry	61.9	69.5	63.7	60.4	58.9
9 AM		63.4	70.2	64.7	62.5	61.0
10 AM		66.5	78.2	66.3	63.1	61.5
11 AM		66.7	78.6	67.9	62.6	61.0
Noon		61.9	67.2	62.9	61.1	60.4
1 PM		65.5	76.7	66.2	63.1	60.8
2 PM		64.3	71.4	65.9	63.3	59.9
3 PM		60.9	71.1	62.9	57.3	54.8
4 PM		57.6	63.5	59.2	56.6	55.1
5 PM		59.8	72.9	61.6	56.4	52.6
6 PM	59.0	67.0	62.2	56.6	52.7	
7 PM	63.0	73.2	63.5	61.8	56.7	
<b>Notes:</b> Field measurements were performed by AKRF, Inc. on October 6 and 16, 2012.						

**Notes:** Field measurements were performed by AKRF, Inc. on October 6 and 16, 2012.

## F. THE FUTURE WITHOUT THE PROPOSED PROJECT

Using the methodology previously described—adding expected background traffic growth to existing noise levels—future noise levels without the proposed project were calculated for the five analysis receptors for the 2016 analysis year. These No-Action values are shown in **Table 17-10**.

**Table 17-10**  
**The Future without the Proposed Project Noise Levels (in dBA)**

Receptor	Location	Date	Time	Existing Noise Levels		No-Action Noise Levels		
				$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	Change
1	Richmond Terrace between Schuyler and Wall Streets	Weekday	MD	68.1	71.2	69.5	72.6	1.4
			PM	68.5	72.6	70.0	74.1	1.5
		Saturday	MD	67.2	71.5	69.1	73.4	1.9
			PM	66.4	70.3	67.7	71.6	1.3
2	Richmond Terrace between Stuyvesant Place and Nicholas Street	Weekday	MD	69.4	73.5	70.3	74.4	0.9
			PM	70.3	74.2	71.0	74.9	0.7
		Saturday	MD	67.1	70.9	68.3	72.1	1.2
			PM	66.7	71.3	67.5	72.1	0.8
3	Richmond Terrace between Nicholas Street and St. Peter's Place	Weekday	MD	66.0	70.8	66.9	71.7	0.9
			PM	68.5	72.8	69.2	73.5	0.7
		Saturday	MD	66.1	71.5	67.3	72.7	1.2
			PM	67.5	71.3	68.3	72.1	0.8
4	North Shore Waterfront Esplanade	Weekday	MD	59.4	62.7	59.8	63.1	0.4
			PM	58.7	62.6	59.5	63.4	0.8
		Saturday	MD	60.5	63.3	61.1	63.9	0.6
			PM	60.3	64.6	60.8	65.1	0.5
5	Parking lot near the Staten Island Ferry	Weekday	MD	64.3	65.9	64.3	65.9	0.0
			PM	63.0	63.5	63.0	63.5	0.0
		Saturday	MD	60.6	62.1	60.6	62.1	0.0
			PM	61.4	62.6	61.4	62.6	0.0

In 2016, the increase in  $L_{eq(1)}$  noise levels without the proposed project would be less than 2 dBA at all five receptor sites. Changes of these magnitudes would be considered imperceptible, and they would be below the CEQR threshold for a significant adverse impact. In terms of CEQR Noise Exposure Guidelines, noise levels at receptor sites 1, 2, and 3 would remain in the “marginally unacceptable” category, noise levels would remain above the 55 dBA  $L_{10(1)}$  noise level guideline for outdoor areas requiring serenity and quiet provided in the *CEQR Technical Manual* noise exposure guidelines at receptor Site 4, and noise levels would remain in the “marginally acceptable” category at Site 5. These values are based on the predicted  $L_{10(1)}$  values.

## G. THE FUTURE WITH THE PROPOSED PROJECT

### CEQR IMPACT CRITERIA

Using the methodology previously described, future noise levels with the proposed project were calculated for the five analysis receptors for the 2016 analysis year. These With-Action values are shown in **Table 17-11**.

**Table 17-11**

**The Future with the Proposed Project Noise Levels (in dBA)**

Receptor	Location	Date	Time	No-Action Noise Levels		With-Action Noise Levels		
				$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	Change
1	Richmond Terrace between Schuyler and Wall Streets	Weekday	MD	69.5	72.6	70.7	73.8	1.2
			PM	70.0	74.1	70.8	74.9	0.8
		Saturday	MD	69.1	73.4	70.9	75.2	1.8
			PM	67.7	71.6	68.7	72.6	1.0
2	Richmond Terrace between Stuyvesant Place and Nicholas Street	Weekday	MD	70.3	74.4	70.9	75.0	0.6
			PM	71.0	74.4	71.5	75.4	0.5
		Saturday	MD	68.3	72.1	69.5	73.3	1.2
			PM	67.5	72.1	68.5	73.1	1.0
3	Richmond Terrace between Nicholas Street and St. Peter's Place	Weekday	MD	66.9	71.7	67.3	72.1	0.4
			PM	69.2	73.6	69.5	73.9	0.3
		Saturday	MD	67.3	72.7	68.2	73.7	0.9
			PM	68.3	72.1	69.1	72.9	0.8
4	North Shore Waterfront Esplanade	Weekday	MD	59.8	63.1	61.6	64.4	1.8
			PM	59.5	63.4	61.5	65.9	2.0
		Saturday	MD	61.1	63.9	63.9	66.7	2.8
			PM	60.8	65.1	62.2	66.9	1.4
5	Parking lot near the Staten Island Ferry	Weekday	MD	64.3	65.9	64.3	65.9	0.0
			PM	63.0	63.5	63.0	63.5	0.0
		Saturday	MD	60.6	62.1	60.6	62.1	0.0
			PM	61.4	62.6	61.4	62.6	0.0
A*	Open Space adjacent to the Wheel	Weekday	MD	59.8	63.1	62.0	65.8	2.2
			PM	59.5	63.4	61.9	66.3	2.4
		Saturday	MD	61.1	63.9	64.2	67.4	3.1
			PM	60.8	65.1	62.6	67.2	1.8

\* No-Action noise levels at Site 4 were used at Site A.

In 2016, the increase in  $L_{eq(1)}$  noise levels with the proposed project would be less than 3.2 dBA at all five receptor sites 1, 2, 3, and 5. Changes of these magnitudes would be considered imperceptible to barely perceptible, and they would be below the CEQR threshold for a significant adverse impact. At receptor site 4, the increase in  $L_{eq(1)}$  noise levels with the proposed project would be up to 3.3 dBA. Changes of these magnitudes would be considered barely perceptible, and they would be below the CEQR threshold for a significant adverse impact. In terms of CEQR Noise Exposure Guidelines, noise levels at receptor sites 1, 2, and 3 would remain in the “marginally unacceptable” category, noise levels would remain above the 55 dBA  $L_{10(1)}$  noise level guideline for outdoor areas requiring serenity and quiet provided in the *CEQR Technical Manual* noise exposure guidelines at receptor Site 4, and noise levels would remain in the “marginally acceptable” category at Site 5. These values are based on the predicted  $L_{10(1)}$  values.

Regarding open space locations (i.e., North Shore Waterfront Esplanade), noise levels at these locations are currently above the 55 dBA  $L_{10(1)}$  *CEQR Technical Manual* noise level for outdoor areas. The proposed project would exacerbate these exceedances. To identify a worst case of noise increases due to the proposed project, noise levels were calculated at the nearest open space location adjacent to the proposed Wheel (i.e., Site A). As a result, the maximum increase in noise levels at Site A would be up to 3.13.5 dBA compared with No-Action noise levels. Changes of these magnitudes would be considered barely perceptible, and they would be below the CEQR threshold for a significant adverse impact. More information on the noise calculations is provided in **Appendix GF**.

In summary, the noise magnitudes due to the project on any of the closest sensitive receptor locations would be below the CEQR threshold for a significant adverse impact.

In addition, as described in Chapter 1, “Project Description,” it is possible that the project sites could be developed with a No Catering Facility Scenario. Future noise levels for the No Catering Facility Scenario were also calculated for all analysis receptor sites for the 2016 analysis year. Similar to the predicted noise levels with the proposed project, the predicted noise levels for the No Catering Facility Scenario would be below the CEQR threshold for a significant adverse impact at all analysis receptor sites. More information on the noise calculations for this scenario is provided in Appendix G.

#### **PERFORMANCE STANDARDS FOR MANUFACTURING DISTRICTS CONTAINED IN THE NEW YORK CITY ZONING RESOLUTION**

The City of New York’s Zoning Resolution has set sound pressure levels resulting from the Wheel’s operation within the project site (an M1 zone) that shall not exceed the maximum permitted sound level for the designated octave band indicated in **Table 17-3**. Since the Wheel’s drive system has been neither designed nor selected, the designated octave band sound pressure levels for the Wheel’s drive system are not available. However, the Wheel’s drive system would be designed to meet the maximum permitted sound levels of the City of New York’s Zoning Resolution Section 42-213 and to avoid producing levels by the Wheel’s drive system that would result in any significant adverse noise impacts.

#### **NEW YORK CITY NOISE CODE**

As shown in **Table 17-4**, the New York City Noise Control Code has set that no sound source operating in connection with any commercial or business enterprise may exceed the decibel levels in the designated octave bands shown in **Table 17-4** at the specified receiving properties. Since the Wheel’s drive system has been neither designed nor selected, the designated octave band sound pressure levels for the Wheel’s drive system are not available. However, the Wheel’s drive system would be designed to meet the maximum permitted sound levels of the New York City Noise Control Code and to avoid producing levels that would result in any significant adverse noise impacts.

#### **NOISE ATTENUATION MEASURES**

As shown in **Table 17-6**, the *CEQR Technical Manual* has set noise attenuation quantities for buildings, based on exterior  $L_{10(1)}$  noise levels, and in order to maintain interior noise levels of 45 dBA  $L_{10(1)}$  or lower for residential or hotel uses and 50 dBA  $L_{10(1)}$  or lower for commercial uses. The results of the proposed building attenuation analysis are summarized in **Table 17-12**.

The attenuation of a composite structure is a function of the attenuation provided by each of its component parts and how much of the area is made up of each part. Normally, a building façade is comprised of the wall, glazing, and any vents or louvers for air conditioning units in various ratios of area. At the specific locations identified in **Table 17-12** where a CEQR attenuation requirement is necessary, the proposed building would include acoustically rated windows and an alternate means of ventilation. At these specific locations, the proposed building would need to be designed to provide a composite Outdoor-Indoor Transmission Class (OITC) rating greater than or equal to the attenuation requirements listed in **Table 17-12**. The OITC classification is defined by ASTM International (ASTM E1332-10a) and provides a single-number rating that is used for designing a building façade including walls, doors, glazing, and combinations thereof. The OITC rating is designed to evaluate building elements by their ability to reduce the overall loudness of ground and air transportation noise. By adhering to these design requirements, the proposed project will provide sufficient attenuation to achieve the CEQR interior noise level requirements.

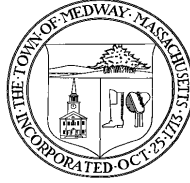


**Table 17-12**  
**CEQR Attenuation Requirements**

Building Façade Location	Applicable Noise Receptor	Maximum Predicted L <sub>10</sub> (in dBA)	Attenuation Required (in dBA)
<b>North Site (Wheel Terminal Building)</b>			
North, South	4	66.7/67.2	N/A <sup>2</sup>
East	A <sup>3</sup>	67.0/67.4	N/A <sup>2</sup>
West	2	75.4	28
<b>South Site (Hotel)</b>			
North, South, East	5	67.9 <sup>1</sup>	N/A <sup>2</sup>
West	1	75.2	31
<b>South Site (Commercial)</b>			
North, South, East	5	67.9 <sup>1</sup>	N/A <sup>2</sup>
West	1	75.2	28
<b>Notes:</b> <sup>(1)</sup> Based on the measured L <sub>10</sub> values. <sup>(2)</sup> "N/A" indicates that the L <sub>10</sub> value is less than 70 dB(A) for residential or hotel uses and less than 73 dBA for commercial uses. The <i>CEQR Technical Manual</i> does not specify noise attenuation requirements when noise levels are less than 70 dBA for residential or hotel uses and 73 dBA for non-noise sensitive uses such as the Wheel Terminal Building. Therefore, there is no minimum attenuation requirement necessary at these locations. <sup>(3)</sup> Noise levels were calculated at the nearest open space location adjacent to the proposed Wheel (i.e., Receptor A)			

## MECHANICAL SYSTEMS

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



**January 22, 2019**

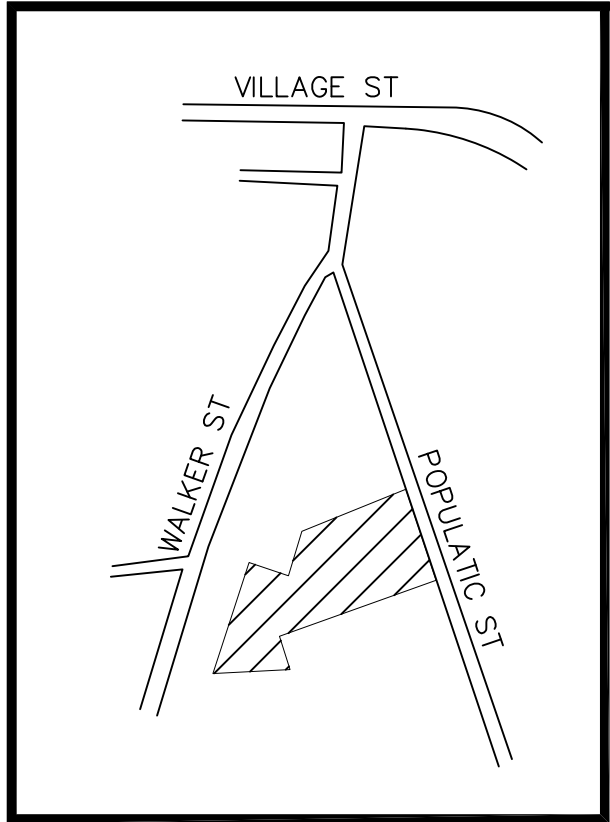
**Medway Planning & Economic Development Board  
Meeting**

**Town Line Estate Definitive Subdivision  
Plan – Plan Endorsement and Signing of  
Covenant**

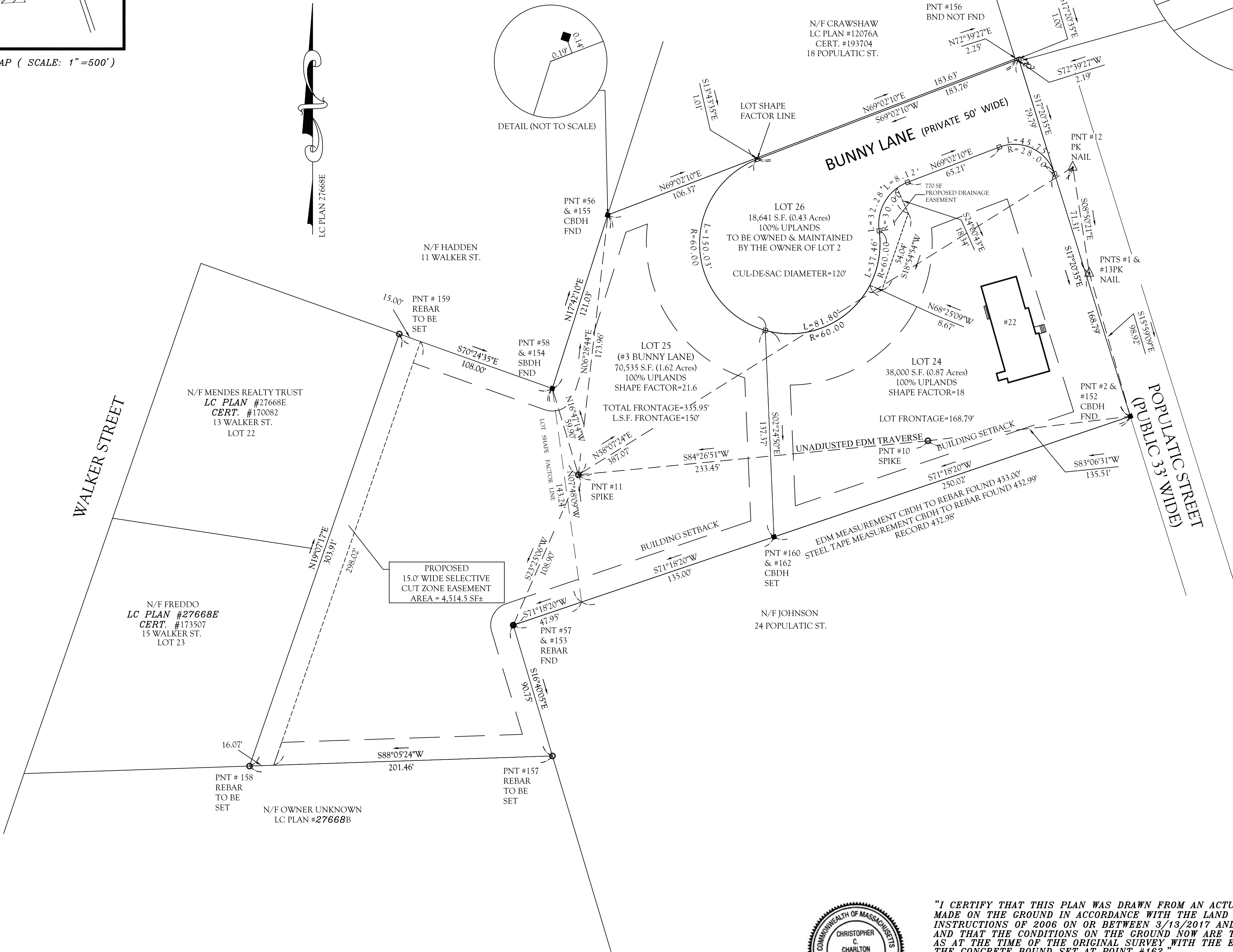
- Plan of Land in Medway, MA, Town Line Estate, Definitive Subdivision Plan, Lot Designation Plan, last revised 12/4/2018 by L.A.L. Engineering Group and Continental Land Survey. (For Land Court)
- Town Line Estate Permanent Private Way Definitive Subdivision Plan, last revised June 8, 2018 by L.A.L. Engineering Group and Continental Land Survey. (For Town use.
- Covenant and Private Roadway Agreement

The Board needs to sign the one sheet plan for Land Court which is the official legal document to divide the land as this is Registered property. The Board also needs to sign the 10 sheet definitive subdivision plan which we will use for our purposes to monitor the construction of the infrastructure.

We have the Certificate of No Appeal from the Town Clerk and verification that taxes have been paid from the Town Treasurer/Collector's office. The Applicant has not yet paid the Construction Observation Invoice. Hopefully, they will provide a check before Tuesday's meeting. If not, perhaps you could sign the plans and I would not release them until the funds are paid.



LOCUS MAP ( SCALE: 1"=500' )



- NOTES:
- ELEVATIONS REFER TO NAVD88.
  - BENCHMARK USED - NORFOLK COUNTY ENGINEERING DEPARTMENT DISK - MW13
  - WE IDENTIFIED NO CURRENT OR PENDING LITIGATION WITH ANY COURT THAT HAS AN IMPACT ON THE PROPOSED SUBDIVISION.

SURVEY INSTRUMENT: TOPCON GPT-1003 (Total Station)  
Angle accuracy: 5"  
EDM: Distance measurement precision: ±(3mm+2ppm)  
Unadjusted Traverse  
Distance: Course: S 15-59-09 E  
Distance: Course: S 83-06-31 W  
Distance: Course: S 84-26-51 W  
Distance: Course: N 58-07-24 E  
Distance: Course: S 08-50-21 E  
Distance: 71.31  
Perimeter: 926.26  
Area: 31043.00  
0.713 acres  
Mapcheck Closure - (Uses listed courses & COGO Units)  
Error of Closure: 0.01  
Course: S 82-16-28 W  
Precision 1: 60722.96

-THIS SUBDIVISION IS SUBJECT TO A CERTIFICATE OF ACTION SIGNED BY THE MEDWAY PLANNING AND ECONOMIC DEVELOPMENT BOARD, DATED APRIL 24, 2018 TO BE RECORDED AT THE NORFOLK COUNTY REGISTRY OF DEEDS.

-ALL PRESENT AND FUTURE OWNERS OF LOT 25 ARE SUBJECT TO A DECLARATION OF PROTECTIVE COVENANTS & RESTRICTIONS AND PRIVATE ROADWAY AGREEMENT GOVERNING TOWN LINE ESTATE SUBDIVISION.

LOT SHAPE FACTOR CALCULATIONS

LOT 1  
PERIMETER=826.8'  
AREA=38,000 S.F.  
L.S.F.=PERIMETER<sup>2</sup>/AREA=  
(826.8')<sup>2</sup>/38,000 S.F.=18

LOT 2  
PERIMETER=1403'  
L.S.F. PERIMETER=794.0'  
AREA=70,535 S.F.  
L.S.F. AREA=29,155.5 S.F.  
L.S.F.=PERIMETER<sup>2</sup>/AREA=  
(794.0')<sup>2</sup>/29155.5 S.F.=21.6

PLAN OF LAND  
IN  
MEDWAY, MASSACHUSETTS

BEING A DIVISION OF LOT 21, SHOWN ON LC PLAN 27668E  
CREATING 2 LOTS AND 1 PARCEL

"TOWN LINE ESTATE"

DEFINITIVE SUBDIVISION PLAN  
LOT DESIGNATION PLAN  
MEDWAY, MASSACHUSETTS

SHEET NO. 3  
SCALE 1"=40'  
JOB NO. 5332



"I CERTIFY THAT THIS PLAN WAS DRAWN FROM AN ACTUAL SURVEY MADE ON THE GROUND IN ACCORDANCE WITH THE LAND COURT INSTRUCTIONS OF 2006 ON OR BETWEEN 3/13/2017 AND 3/24/2017 AND THAT THE CONDITIONS ON THE GROUND NOW ARE THE SAME AS AT THE TIME OF THE ORIGINAL SURVEY WITH THE EXCEPTION OF THE CONCRETE BOUND SET AT POINT #162."

CHRIS CHARLTON P.L.S. No. 48649 12-04-18 DATE

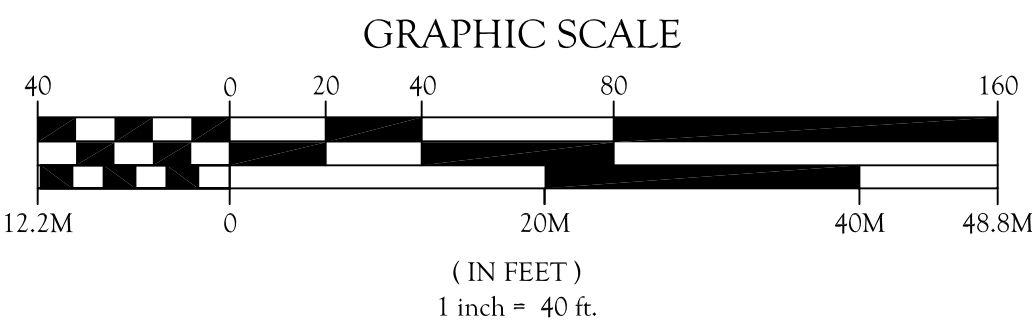
Engineer:  
**L.A.L. Engineering Group**  
DESIGN ~ PERMITTING ~ PEER REVIEW ~ LAYOUT  
730 Main St, Suite 1F  
Millis MA 02054  
P: (781) 248-1133 F: (508) 376-8440

Surveyor:  
**CONTINENTAL LAND SURVEY, LLC**  
105 BEAVER STREET, FRANKLIN, MA  
(508) 528 - 2528

OWNERS:  
ROBERT J. RONALD E. &  
RICHARD K. WASNEWSKY  
DEED REFERENCE: LCC 128967

SITE LOCATION:  
22 POPULATIC STREET  
MEDWAY, MASSACHUSETTS  
PREPARED FOR:  
ROBERT & LISA LAPINSKY  
62 ALLSTON AVE.  
WORCESTER, MASSACHUSETTS

ASSESSORS REFERENCE  
MAP 71, PARCEL 020  
ZONING REFERENCE  
AR-II



6	12/04/2018	PROJECT REVIEW REVISION
5	11/06/2018	PROJECT REVIEW REVISION
4	9/26/2018	PROJECT REVIEW REVISION
3	9/11/2018	PROJECT REVIEW REVISION
2	5/15/2018	PROJECT REVIEW REVISION
1	2/23/2018	PROJECT REVIEW REVISION
NO.	DATE	REFERENCE
REVISIONS		
DATE: MARCH 24, 2017		

**DECLARATION OF PROTECTIVE COVENANTS AND RESTRICTIONS AND  
PRIVATE ROADWAY AGREEMENT  
TOWN LINE ESTATE SUBDIVISION**

This Covenant and Private Roadway Agreement ("Covenant") is entered into this \_\_\_\_\_ day of \_\_\_\_\_ 2019 by and between Robert Lapinsky, Jr. and Lisa Lapisnky, of 62 Allston Avenue, Worcester, Massachusetts 01604 ("Applicants" ) and Robert J.Wasnewsky and Ronald G.Wasnewsky of 22 Populatic Street, Medway, Massachusetts 02053, and Richard K. Wasnewsky of 123 Freedom Street, Hopedale, Massachusetts 01747 (the "Owners") (collectively, with the Applicants, the "Declarant"), and the Town of Medway (the "Town"), a Massachusetts municipal corporation, acting through its Planning and Economic Development Board, with an address of 155 Village Street, Medway, Massachusetts 02053 (the "Planning Board")

**KNOW ALL MEN BY THESE PRESENTS**

WHEREAS, the Owners are the owners of a parcel of land located on Populatic Street, Medway, containing 2.92 acres, more or less, shown as Lot 21 on Land Court Plan No. 27668E, and described more particularly in Certificate of Title No. 128967 (the "Property");

WHEREAS, the Applicants, being duly authorized by the Owners, submitted an application dated January 3, 2018 to the Planning and Economic Development Board for approval of the subdivision of the Property into two (2) lots (Lots 24 and 25) and a way referred to as "Bunny Lane" (Lot 26) (the "Subdivision"), all as shown on a Definitive Plan entitled "'Town Line Estate' Definitive Subdivision Plan Medway, Massachusetts," prepared for Robert & Lisa Lapinsky (Wasnewski) 62 Allston Ave., Worcester, Massachusetts, prepared by L.A.L. Engineering Group, dated March 24, 2017, as revised December 4, 2018 and filed with the Land Registration Department of the Norfolk County Registry of Deeds herewith as Plan Number 27668F (the "Plan");

WHEREAS, by a Certificate of Action dated April 24, 2018 and filed with the Medway Town Clerk on April 27, 2018 (the "Decision"), the Planning and Economic Development Board approved the Subdivision with waivers and conditions. No appeal of the Decision was filed and the Decision is final;

WHEREAS, G.L. c. 41, § 81U requires the Planning Board and Economic Development Board to secure the construction of ways and the installation of municipal services in an approved subdivision before endorsing its approval on the approved definitive subdivision plan;

WHEREAS, Declarant has decided to secure the installation of municipal services in the Subdivision by means of a Covenant and the Planning and Economic Development Board has determined that the form of Covenant is sufficient to secure the installation of municipal services in the Subdivision;

WHEREAS, Declarant's installation of municipal services within the Subdivision is subject to the requirements of G.L. c. 41, §§ 81K-81GG, the Town's Planning Board Rules

and Regulations, the application submitted by the Applicants for the Subdivision, the Decision and all conditions thereto, the recommendation, if any, of the Board of Health, the Plan, all conditions subsequent to approval of the Subdivision due to any amendment, modification, or rescission, all of the provisions of this Covenant and any amendments thereto (hereinafter referred to collectively as "Approval Instruments");

WHEREAS, it is a condition of the Decision that Bunny Lane as shown on the Plan shall remain a private way and be owned by the owner of Lot 2 on the Plan in perpetuity.

NOW, THEREFORE. THIS AGREEMENT WITNESSETH that in consideration of the mutual promises set forth below, and for good and valuable consideration, the parties agree as follows:

1. The Declarant shall not sell or convey Lot 25 as depicted on the Plan or erect or place any permanent building on such Lot 25 until the construction and installation of ways and municipal services has been completed in accordance with the Approval Instruments or the Declarant has provided the Planning and Economic Development Board with another method of securing installation of the ways and municipal services described in G.L., c.41, §81U so long as such security is deemed sufficient by the Planning Board to secure performance of the construction and installation.
2. This Covenant shall run with the land and shall be binding upon the Declarant and their executors, administrators, devisees, heirs, successors and assigns in title, right and interest in and to any portion of the Property.

It is the intention of the Declarant and it is hereby understood and agreed that this Covenant shall constitute a covenant running with the land included in the aforesaid Subdivision and shall operate as restrictions upon said.

It is understood and agreed that said Lot 25 within the subdivision shall be released from the forgoing conditions upon the recording of a Certificate of Performance executed by a majority of the Planning and Economic Development Board and enumerating said specific lot to be so released.

3. The undersigned Owners represent and covenant that the undersigned are the Owner in fee simple of all the land included in the aforesaid Subdivision and that there are no mortgages of record or otherwise on any of land.
4. Nothing herein shall be deemed to prohibit a conveyance by a single deed subject to this covenant of the entire Property shown on the Plan. Further, nothing herein shall be deemed to prohibit (and Declarant expressly reserves the right to make) a conveyance, by a single deed subject to this Covenant, of both Lot 25 and the fee to Bunny Lane as shown on the Plan, but with the Declarant retaining title to Lot 24.
5. A mortgagee who acquires title to the entire Property by foreclosure or otherwise and any succeeding owner of the Property may sell or convey said Property in its entirety, subject to the requirements herein including, without limitation, that portion of this Covenant



which provides that Lot 25 shall not be sold or conveyed or shall be built upon until ways and services have been provided to serve such Lot 25.

6. The Declarant agrees to file the Decision and this Covenant with the Land Registration Department of the Norfolk County Registry of Deeds contemporaneously with the filing of the Plan. The Declarant shall also file any certificates of release of this Covenant at the Registry. The Declarant shall forthwith provide the Planning and Economic Development Board with written evidence of all such filings and shall pay the costs thereof.
7. The Declarant agrees and understands that the Planning and Economic Development Board will not release this Covenant, unless another method of security is provided, or until the ways and municipal services have been deemed by the Planning Board to be installed in accordance with the Approval Documents.
8. Upon installation of the way and municipal services in accordance with the Approval Instruments, the Planning and Economic Development Board may, pursuant to G.L. c. 41 §81U, release Declarant from this Covenant and shall issue a Certificate of Completion and Release that shall be executed by a majority of the members of the Planning Board and shall be filed with said Registry by Declarant.
9. The Planning and Economic Development Board may rescind approval of the Plan for breach of any provision of this Covenant or any amendments thereto. Said rescission shall be in accordance with G.L. c. 41, § 81W.
10. The Applicant shall construct the way and related infrastructure, including, without limitation, the stormwater management system, and install the municipal services to the satisfaction of the Planning and Economic Development Board within three (3) years of the date of endorsement of the Plan. Failure to do so shall result in automatic rescission of approval of the Plan. The time for such construction and installation may be extended upon the written request of the applicant prior to the expiration of the three (3) year period, upon a vote of the majority of the Planning Board then present.
11. Bunny Lane as shown on the Plan shall remain a private way owned in perpetuity by the owner of Lot 25. The owner of said Lot 25 and Bunny Lane (Lot 26) shall be solely and exclusively responsible for maintaining, repairing and improving Bunny Lane so as to keep the roadway good, safe and passable condition, including, without limitation, repairs and paving, snow plowing and sanding and maintenance and operation of the stormwater detention/infiltration system and related infrastructure within the roadway right of way and in the easement area shown on Lot 24 on the Plan in accordance with the approved Long Term Stormwater Operations and Maintenance Plan attached hereto as Exhibit A, entitled "Drainage Calculations for Town Line Estates Permeant Private Way," dated December 2017, by L.A.L. Engineering Group, last revised February 23, 2018.

The land in the Subdivision is authorized to be used for no more than two single-family dwelling lots and shall not be further subdivided. That use may include in-home occupations as allowed by the Town of Medway Zoning By-law.

By accepting a deed to Lot 25 and Bunny Lane, (Lot 26) the owner thereof agrees to be bound by the terms and conditions hereof.

Notwithstanding anything set forth in this Covenant to the contrary, the provisions of paragraph 11 shall survive any release of this Covenant pursuant to paragraph 8 herein.

12. This Covenant may be amended, in writing, by agreement of all of the parties to this Covenant.

For Owners' title see Norfolk County Registry of Deeds Land Court Certificate of Title 128967.

Executed as a sealed instrument this \_\_\_\_\_ day of \_\_\_\_\_, 2019.

Applicants:

\_\_\_\_\_  
Robert Lapinsky, Jr.

\_\_\_\_\_  
Lisa Lapinsky

### COMMONWEALTH OF MASSACHUSETTS

Norfolk County, ss

On this \_\_\_\_\_ day of \_\_\_\_\_, 2019, before me, the undersigned notary public, personally appeared Robert Lapinsky, Jr. and Lisa Lapinsky, proved to me through satisfactory evidence of identification, which were ☐ Driver's License; ☐ State ID; ☐ Passport; ☐ Other Government Issued ID; ☐ Other \_\_\_\_\_, (or personally known to me), to be the person whose name is signed on the preceding or attached document, and acknowledged to me that they signed it voluntarily for its stated purpose.

\_\_\_\_\_  
Notary Public:  
My Commission Expires:

Executed as a sealed instrument this \_\_\_\_\_ day of \_\_\_\_\_, 2019.

Owners:

\_\_\_\_\_  
Robert J. Wasnewsky

\_\_\_\_\_  
Richard K. Wasnewsky

\_\_\_\_\_  
Ronald G. Wasnewsky

**COMMONWEALTH OF MASSACHUSETTS**

Norfolk County, ss

On this \_\_\_\_\_ day of \_\_\_\_\_, 2018, before me, the undersigned notary public, personally appeared Ronald G. Wasnewsky proved to me through satisfactory evidence of identification, which were ☐ Driver's License; ☐ State ID; ☐ Passport; ☐ Other Government Issued ID; ☐ Other \_\_\_\_\_, (or personally known to me), to be the person whose name is signed on the preceding or attached document, and acknowledged to me that they signed it voluntarily for its stated purpose.

\_\_\_\_\_  
Notary Public:  
My Commission Expires:

Executed as a sealed instrument this \_\_\_\_\_ day of \_\_\_\_\_, 2019.

Town of Medway Planning and  
Economic Development Board

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**COMMONWEALTH OF MASSACHUSETTS**

Norfolk County, ss

On this \_\_\_\_\_ day of \_\_\_\_\_, 2019, before me, the undersigned notary public, personally appeared \_\_\_\_\_ proved to me through satisfactory evidence of identification, which were ☐ Driver's License; ☐ State ID; ☐ Passport; ☐ Other Government Issued ID; ☐ Other \_\_\_\_\_, (or personally known to me), to be the person whose name is signed on the preceding or attached document, and acknowledged to me that they signed it voluntarily for its stated purpose as a member of the Town of Medway Planning and economic Development Board.

\_\_\_\_\_  
Notary Public:

My Commission Expires:



”TOWN LINE ESTATE”  
 PERMANENT PRIVATE WAY  
 DEFINITIVE SUBDIVISION PLAN  
 MEDWAY, MASSACHUSETTS

FOR REGISTRY USE ONLY:

SHEET NUMBER	DRAWING TITLE
1	COVER SHEET
2	EXISTING CONDITIONS PLAN
3	LOT DESIGNATION PLAN
4	SITE & UTILITY PLAN
5	GRADING & DRAINAGE PLAN
6	PROFILE
7	INTERSECTION SIGHT DISTANCE PLAN
8	EROSION CONTROL PLAN
9	SITE DETAILS & GENERAL NOTES
10	SITE DETAILS

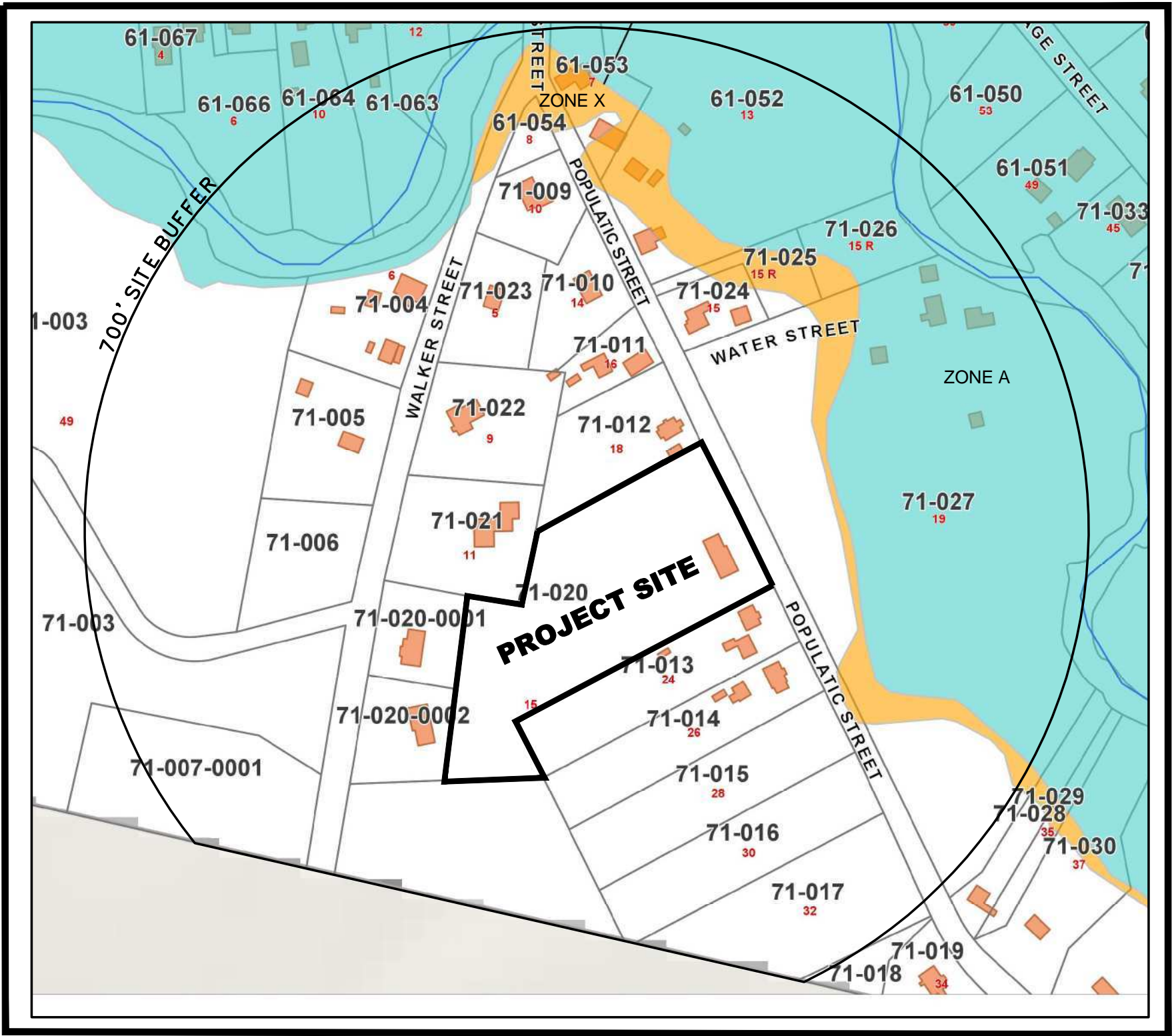
SUBDIVISION AREA CHART

TOTAL AREA OF EXIST LOT = 127,174 S.F.  
 TOTAL # OF LOTS & PARCLES = 2  
 TOTAL AREAS OF LOTS & PARCELS = 127,174 S.F.  
 TOTAL AREA OF RIGHT-OF-WAY = 22,483 S.F.  
 TOTAL AREA DEDICATED TO EASEMENTS = 800 S.F.  
 TOTAL AREA DEDICATED TO OPEN SPACE = 0

ABUTTING STREET INFORMATION

POPULATIC STREET    33' PUBLIC WAY    21'± WIDE  
    PAVEMENT

NOTES:  
 1) ELEVATIONS BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1988.  
 2) THE PARCEL IS OUTSIDE ALL MAPPED FEMA FLOOD PLAINS PER THE FLOOD INSURANCE RATE MAP (FIRM) PANEL No. 25021C0144E FOR THE TOWN OF MEDWAY, MASSACHUSETTS, NORFOLK COUNTY.  
 3) THE SITE IS NOT LOCATED WITHIN A DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) RESOURCE AREA.  
 4) THE SITE IS LOCATED WITHIN A ZONE II GROUNDWATER PROTECTION AREA.  
 5) UTILITY SERVICES:  
   TELEPHONE, CABLE AND ELECTRIC – TO BE INSTALLED UNDERGROUND  
   SEWER – TO BE CONNECTED TO INDIVIDUAL ON SITE TITLE 5 SEWAGE DISPOSAL SYSTEMS.  
   DRAINAGE – TO MEET MA DEP 2008 STORMWATER POLICY & TOWN REGULATIONS.  
   WATER – TO BE CONNECTED TO THE TOWN WATER SUPPLY LINE



SITE OVERVIEW  
 SCALE: 1" = 200' ±

LOCUS NOTES  
 SOILS ON SITE:  
 HSG    ID  
   A    HINCKLEY SANDY LOAM  
   A    WINDSOR LOAMY SAND

ZONING AR II DISTRICT

OWNER:  
 ROBERT, RONALD & RICHARD WASNEWSKI  
 22 POPULATIC ST.  
 MEDWAY MASSACHUSETTS

PREPARED FOR:  
 ROBERT & LISA LAPINSKY (WASNEWSKI)  
 62 ALLSTON AVE.  
 WORCESTER, MASSACHUSETTS

- APPROVED WAIVER LIST  
(FROM TOWN OF MEDWAY MASSACHUSETTS PLANNING BOARD RULES & REGULATIONS)
- 7.6.2 B. WATER FACILITIES INSTALLATION - WAIVER FROM INSTALLATION OF WATER MAIN, HYDRANT AND VALVES AND OTHER EQUIPMENT REQUIRED FOR WATER MAIN TIE IN.
  - 7.6.2 D. SEWER - WAIVER FROM REQUIREMENT TO PROVIDE ALL LOTS ADEQUATE MUNICIPAL SEWER SERVICE.
  - 7.7.2 STORM WATER - WAIVER FROM REQUIREMENT THAT DETENTION/RETENTION BASINS AND ANY RELATED DRAINAGE STRUCTURES SHALL BE LOCATED ON SEPARATE PARCELS AND SHALL NOT BE INCLUDED ON INDIVIDUAL HOUSE/BUILDING LOTS.
  - 7.7.2 STORM WATER - WAIVER FROM REQUIRED 30' SETBACK FROM PROPERTY LINE.
  - 7.7.4 D. CONSTRUCTION - WAIVER FROM REQUIRED INSTALLATION OF AN INDEPENDENT HOUSE FOUNDATION DRAINAGE SYSTEM.
  - 7.9.1 D. STREET AND ROADWAY LOCATION - WAIVER FROM PROHIBITING RESERVE STRIP PROHIBITING ACCESS TO STREETS OR ADJOINING PROPERTY.
  - 7.9.2 ALIGNMENT- WAIVER FROM REQUIRED CURB RADIUS OF 40' TO 12' AT ROADWAY ENTRANCE.
  - 7.9.5 C. GRADE- WAIVER FROM 100' LEVELING AREA AT THE INTERSECTION OF STREET RIGHT OF WAY LINES.
  - 7.9.7 G. ROADWAY CONSTRUCTION- WAIVER FROM THE REQUIRED 18' MINIMUM WIDTH OF THE ROADWAY PAVEMENT FOR A PERMANENT PRIVATE WAY.
  - 7.10.2 CURBS AND BERMS - WAIVER FROM REQUIRED HOT MIX ASPHALT CAPE COD BERM.
  - 7.13.3 SIDEWALKS - WAIVER FROM PROVIDING SIDEWALK ALONG ENTIRE SUBDIVISION PARCEL AND FROM PAYMENT IN LIEU OF SIDEWALK CONSTRUCTION.
  - 7.17.1 FIRE PREVENTION - WAIVER FROM REQUIRED INSTALLATION OF FIRE ALARM SYSTEM.
  - 7.19.2 TREES & SLOPE STABILIZATION - WAIVER FROM REQUIRED INSTALLATION OF STREET TREES.
  - 7.21 STREET LIGHTS - WAIVER FROM REQUIRED INSTALLATION OF STREET LIGHTS.

DATE APPROVED: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 MEDWAY PLANNING AND ECONOMIC  
 DEVELOPMENT BOARD

DATE ENDORSED: \_\_\_\_\_

APPROVED \_\_\_\_\_ SUBJECT  
 TO COVENANT CONDITIONS SET  
 FORTH IN A COVENANT EXECUTED  
 BY \_\_\_\_\_  
 DATED \_\_\_\_\_, AND TO  
 BE RECORDED HEREWITH.

I CERTIFY THAT 20 DAYS HAVE  
 PASSED SINCE PLANNING BOARD  
 APPROVAL AND NO APPEAL HAS  
 BEEN FILED IN THIS OFFICE.

DATE : \_\_\_\_\_

TOWN CLERK OF MEDWAY

THIS SUBDIVISION IS SUBJECT TO A CERTIFICATE OF ACTION  
 SIGNED BY THE MEDWAY PLANNING AND ECONOMIC  
 DEVELOPMENT BOARD, DATED APRIL 24, 2018 TO BE RECORDED  
 AT THE NORFOLK COUNTY REGISTRY OF DEEDS.

ALL PRESENT AND FUTURE OWNERS OF LOT 2 ARE SUBJECT TO A  
 DECLARATION OF PROTECTIVE COVENANTS & RESTRICTIONS AND  
 PRIVATE ROADWAY AGREEMENT GOVERNING TOWN LINE ESTATE  
 SUBDIVISION.

”TOWN LINE ESTATE”

ASSESSORS REFERENCE  
 MAP 71, PARCEL 020  
 ZONING REFERENCE  
 AR-II



NO.	DATE	REFERENCE
2	6/8/18	PROJECT ENDORSEMENT
1	2/23/18	PROJECT REVIEW REVISIONS
REVISIONS		
DATE: DECEMBER 12, 2017		

Engineer:  
**L.A.L. Engineering Group**  
 DESIGN ~ PERMITTING ~ PEER REVIEW ~ LAYOUT  
 730 Main St, Suite 1F  
 Millis MA 02054  
 P: (781) 248-1133 F: (508) 376-8440

Surveyor:  
**CONTINENTAL LAND SURVEY, LLC**  
 105 BEAVER STREET, FRANKLIN, MA  
 (508) 528 - 2528

SITE LOCATION:  
 22 POPULATIC STREET  
 MEDWAY, MASSACHUSETTS

DEFINITIVE SUBDIVISION PLAN  
 COVER SHEET  
 MEDWAY, MASSACHUSETTS

SHEET NO.	SCALE	JOB NO.
1	AS NOTED	5332



This Subdivision is subject to a Certificate of Action Signed by the Medway Planning and Economic Development Board, Dated April 24, 2018 to be Recorded at the Norfolk County Registry of Deeds.

All Present and Future Owners of Lot 2 are subject to a Declaration of Protective Covenants & Restrictions and Private Roadway Agreement Governing Town Line Estate Subdivision.

DATE APPROVED: \_\_\_\_\_

MEDWAY PLANNING AND ECONOMIC DEVELOPMENT BOARD

DATE ENDORSED: \_\_\_\_\_

APPROVED \_\_\_\_\_ SUBJECT TO COVENANT CONDITIONS SET FORTH IN A COVENANT EXECUTED BY \_\_\_\_\_

DATED \_\_\_\_\_, AND TO BE RECORDED HEREWITH.

I CERTIFY THAT 20 DAYS HAVE PASSED SINCE PLANNING BOARD APPROVAL AND NO APPEAL HAS BEEN FILED IN THIS OFFICE.

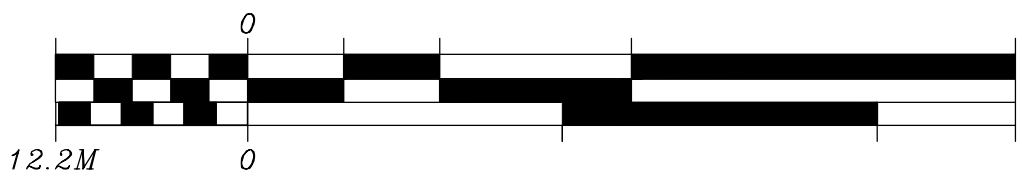
DATE : \_\_\_\_\_

TOWN CLERK OF MEDWAY



- NOTES:
- 1.) ELEVATIONS REFER TO NAVD88.
  - 2.) BENCHMARK USED - NORFOLK COUNTY ENGINEERING DEPARTMENT DISK - MW13

GRAPHIC SCALE



( IN FEET )  
1 inch = 40 ft.

ASSESSORS REFERENCE

MAP 71, PARCEL 020

ZONING REFERENCE

AR-II

LEGEND

- TEL/ELEC. HAND HOLE
- ⊗

TEST HOLE
- THH

TELEPHONE HANDHOLE
- EHH

ELECTRIC HANDHOLE
- WSO

WATER SHUTOFF
- GG

GAS GATE
- SWL

SOLID WHITE LINE

⊗

HYDRANT

⊗

STONE CHECK DAM

⊗

STONE WALL

●

DRILL HOLE

□

BOUND

○

IRON PIN/PIPE

2	6/8/18	PROJECT ENDORSEMENT
1	2/23/18	PROJECT REVIEW REVISIONS
NO.	DATE	REFERENCE
REVISIONS		
DATE: DECEMBER 12, 2017		

Engineer:

**L.A.L. Engineering Group**  
DESIGN ~ PERMITTING ~ PEER REVIEW ~ LAYOUT

730 Main St, Suite 1F  
Millis MA 02054  
P: (781) 248-1133 F: (508) 376-8440

Surveyor:

**CONTINENTAL LAND SURVEY, LLC**  
105 BEAVER STREET, FRANKLIN, MA  
(508) 528 - 2528

SITE LOCATION:  
22 POPULATIC STREET  
MEDWAY, MASSACHUSETTS  
PREPARED FOR:  
ROBERT & LISA LAPINSKY  
62 ALLSTON AVE.  
WORCESTER, MASSACHUSETTS

"TOWN LINE ESTATE"  
DEFINITIVE SUBDIVISION PLAN  
EXISTING CONDITIONS PLAN  
MEDWAY, MASSACHUSETTS

SHEET NO.

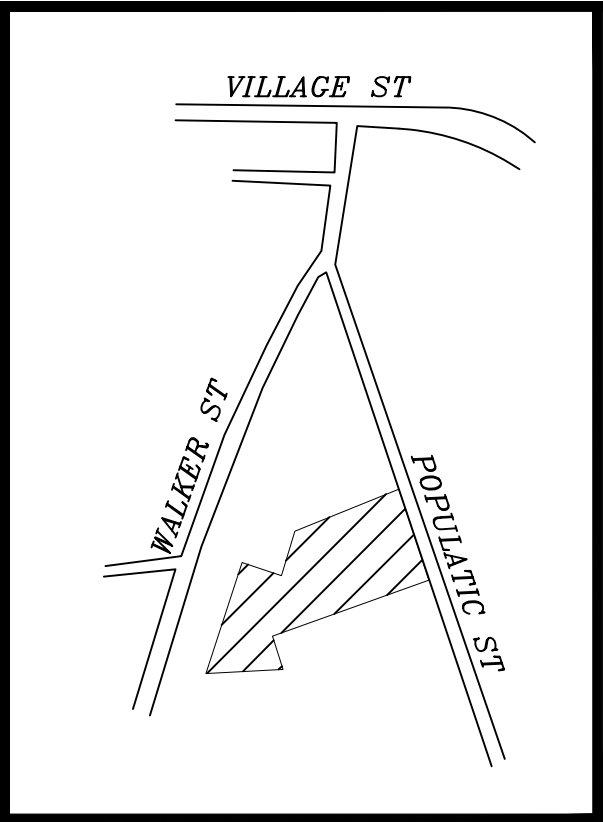
2

SCALE

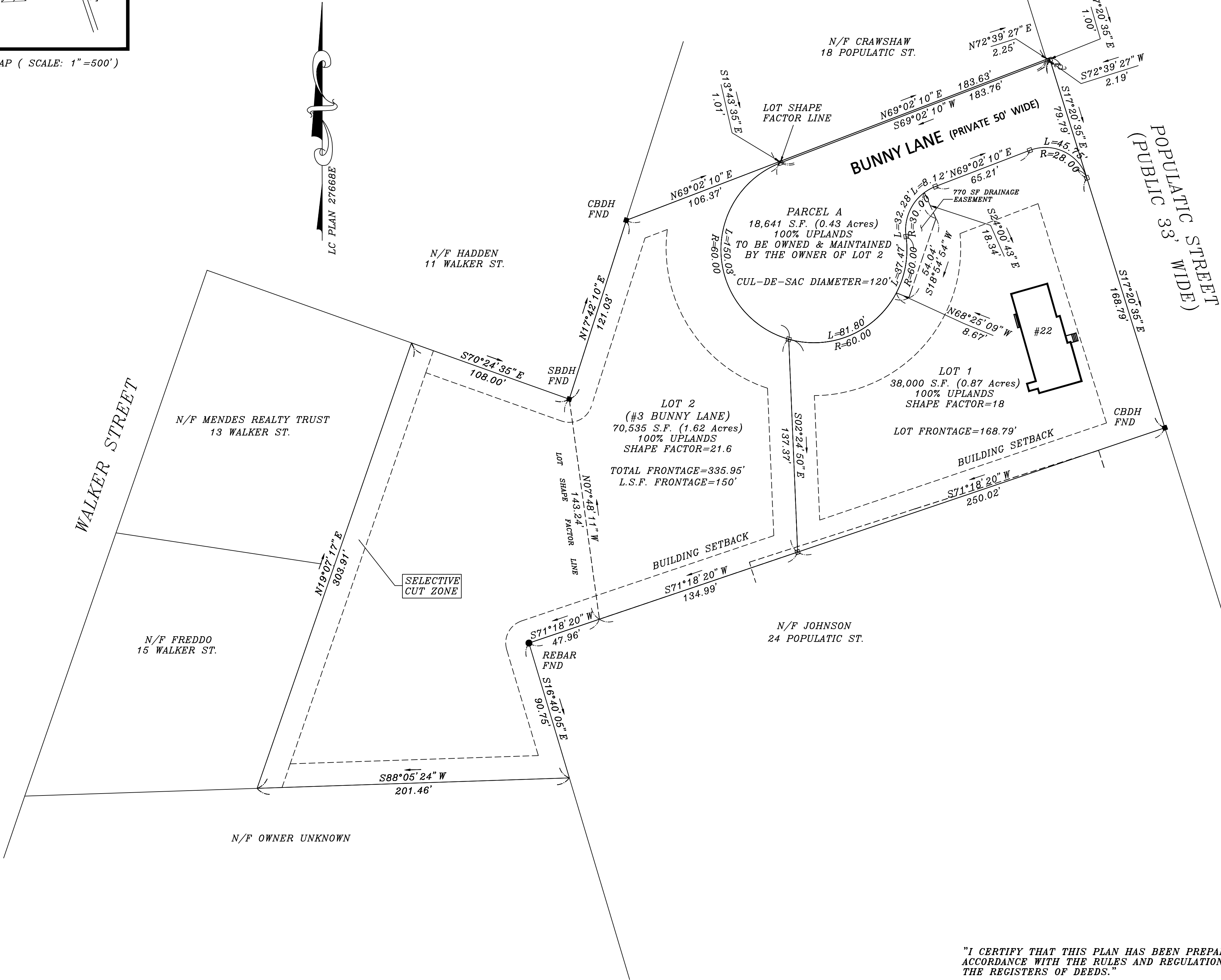
1"=40'

JOB NO.

5332



LOCUS MAP ( SCALE: 1"=500' )



-THIS SUBDIVISION IS SUBJECT TO A CERTIFICATE OF ACTION SIGNED BY THE MEDWAY PLANNING AND ECONOMIC DEVELOPMENT BOARD, DATED APRIL 24, 2018 TO BE RECORDED AT THE NORFOLK COUNTY REGISTRY OF DEEDS.

-ALL PRESENT AND FUTURE OWNERS OF LOT 2 ARE SUBJECT TO A DECLARATION OF PROTECTIVE COVENANTS & RESTRICTIONS AND PRIVATE ROADWAY AGREEMENT GOVERNING TOWN LINE ESTATE SUBDIVISION.

SUBDIVISION OF LOT 21  
LC PLAN 27668E

- NOTES:
- 1.) ELEVATIONS REFER TO NAVD88.
  - 2.) BENCHMARK USED - NORFOLK COUNTY ENGINEERING DEPARTMENT DISK - MW13

- LEGEND:
- LARGE TREES
  - WATER VALVE
  - UTILITY POLE
  - SEWER MANHOLE
  - REBAR FOUND
  - BOUND FOUND
  - BOUND TO BE SET
  - SETBACK LINES

APPROVED BY THE MEDWAY  
PLANNING AND ECONOMIC  
DEVELOPMENT BOARD.

DATE APPROVED:

DATE ENDORSED:

I CERTIFY THAT 20 DAYS HAVE  
PASSED SINCE PLANNING BOARD  
APPROVAL AND NO APPEAL HAS  
BEEN FILED IN THIS OFFICE.

DATE :

TOWN CLERK OF MEDWAY

ZONING: AR-II  
REQUIREMENTS:  
AREA - 22,500 SF  
FRONTAGE - 150'  
SETBACKS:  
FRONT - 35'  
SIDE - 15'  
REAR - 15'

LOT SHAPE FACTOR CALCULATIONS

LOT 1 PERIMETER=826.8' AREA=38,000 S.F. L.S.F.=PERIMETER <sup>2</sup> /AREA= (826.8') <sup>2</sup> /38,000 S.F.=18	LOT 2 PERIMETER=1403' L.S.F. PERIMETER=794.0' AREA=70,535 S.F. L.S.F. AREA=29,155.5 S.F.  L.S.F.=PERIMETER <sup>2</sup> /AREA= (794.0') <sup>2</sup> /29155.5 S.F.=21.6
--	--

"I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN  
ACCORDANCE WITH THE RULES AND REGULATIONS OF  
THE REGISTERS OF DEEDS."

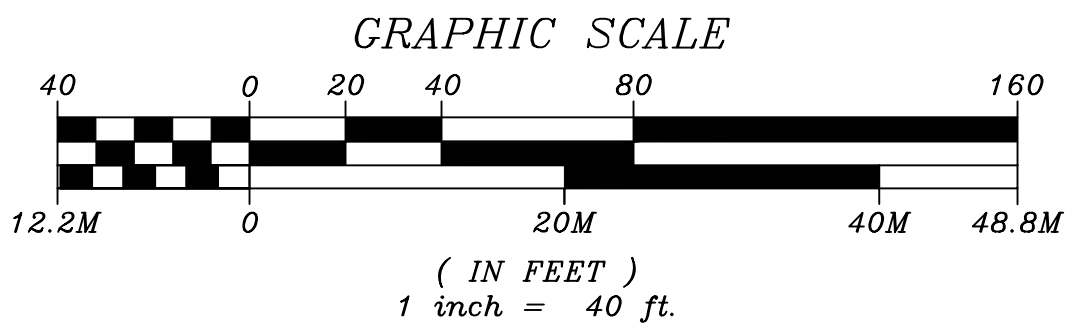
CHRIS CHARLTON P.L.S. No. 48649 DATE

OWNERS:  
ROBERT J., RONALD E. &  
RICHARD K. WASNEWSKY  
DEED REFERENCE: LCC 128967

PLAN OF LAND  
IN  
MEDWAY, MASSACHUSETTS  
"TOWN LINE ESTATE"

ASSESSORS REFERENCE  
MAP 71, PARCEL 020

ZONING REFERENCE  
AR-II



2	6/8/2018	PROJECT ENDORSEMENT
1	2/23/2018	PROJECT REVIEW REVISION
NO.	DATE	REFERENCE
REVISIONS		
DATE: MARCH 7, 2016		

Engineer:  
**L.A.L. Engineering Group**  
DESIGN ~ PERMITTING ~ PEER REVIEW LAYOUT  
730 Main St, Suite 1F  
Millis MA 02054  
P: (781) 248-1133 F: (508) 376-8440

Surveyor:  
CONTINENTAL LAND SURVEY, LLC  
105 BEAVER STREET, FRANKLIN, MA  
(508) 528 - 2528

SITE LOCATION:  
22 POPULATIC STREET  
MEDWAY, MASSACHUSETTS  
  
PREPARED FOR:  
ROBERT & LISA LAPINSKY  
62 ALLSTON AVE.  
WORCESTER, MASSACHUSETTS

DEFINITIVE SUBDIVISION PLAN  
LOT DESIGNATION PLAN  
MEDWAY, MASSACHUSETTS

SHEET NO.	SCALE	JOB NO.
3	1"=40'	5332

This Subdivision is subject to a Certificate of Action Signed by the Medway Planning and Economic Development Board, Dated April 24, 2018 to be Recorded at the Norfolk County Registry of Deeds.

All Present and Future Owners of Lot 2 are subject to a Declaration of Protective Covenants & Restrictions and Private Roadway Agreement Governing Town Line Estate Subdivision.

DATE APPROVED: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

MEDWAY PLANNING AND ECONOMIC  
DEVELOPMENT BOARD

DATE ENDORSED: \_\_\_\_\_

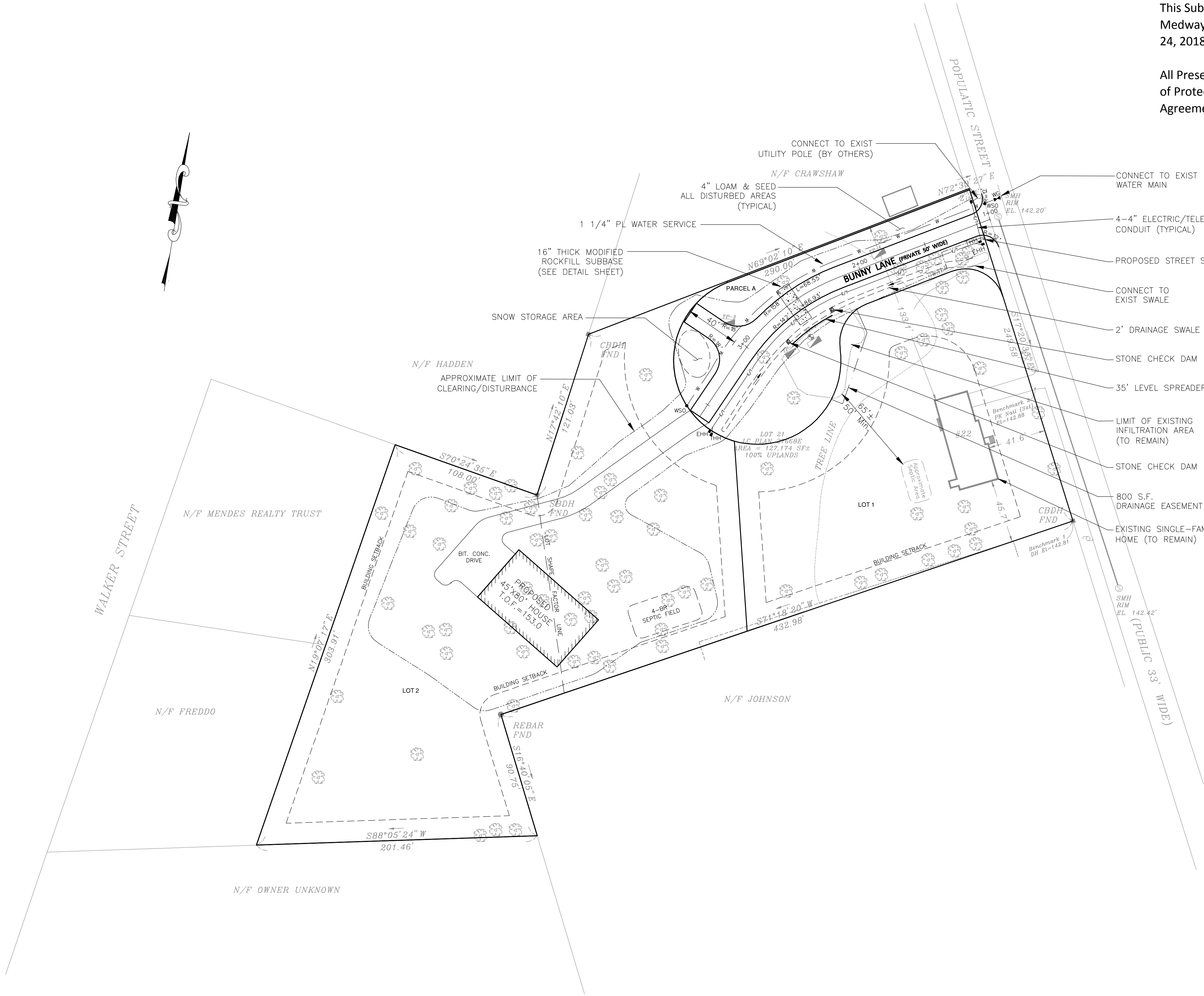
APPROVED \_\_\_\_\_ SUBJECT  
TO COVENANT CONDITIONS SET  
FORTH IN A COVENANT EXECUTED  
BY \_\_\_\_\_

DATED \_\_\_\_\_, AND TO  
BE RECORDED HEREWITH.

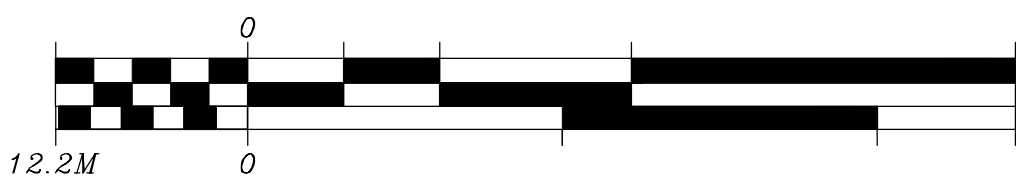
I CERTIFY THAT 20 DAYS HAVE  
PASSED SINCE PLANNING BOARD  
APPROVAL AND NO APPEAL HAS  
BEEN FILED IN THIS OFFICE.

DATE : \_\_\_\_\_

TOWN CLERK OF MEDWAY



GRAPHIC SCALE



( IN FEET )  
1 inch = 40 ft.

ASSESSORS REFERENCE  
MAP 71, PARCEL 020

ZONING REFERENCE

AR-II

LEGEND	
	TEL/ELEC. HAND HOLE
	TEST HOLE
	TELEPHONE HANDHOLE
	ELECTRIC HANDHOLE
	WATER SHUTOFF
	GAS GATE
	SOLID WHITE LINE
	HYDRANT
	STONE CHECK DAM
	STONE WALL
	DRILL HOLE
	BOUND
	IRON PIN/PIPE

NO.	DATE	REFERENCE
2	6/8/18	PROJECT ENDORSEMENT
1	2/23/18	PROJECT REVIEW REVISIONS
REVISIONS		
DATE: DECEMBER 12, 2017		

Engineer:  
**L.A.L. Engineering Group**  
DESIGN ~ PERMITTING ~ PEER REVIEW ~ LAYOUT  
**730 Main St, Suite 1F**  
**Millis MA 02054**  
**P: (781) 248-1133 F: (508) 376-8440**

Surveyor:  
**CONTINENTAL LAND SURVEY, LLC**  
**105 BEAVER STREET, FRANKLIN, MA**  
**(508) 528 - 2528**

**SITE LOCATION:**  
**22 POPULATIC STREET**  
**MEDWAY, MASSACHUSETTS**  
**PREPARED FOR:**  
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**62 ALLSTON AVE.**  
**WORCESTER, MASSACHUSETTS**

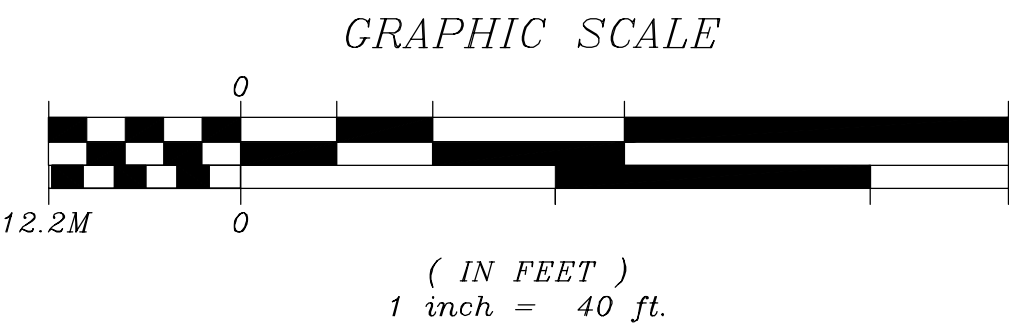
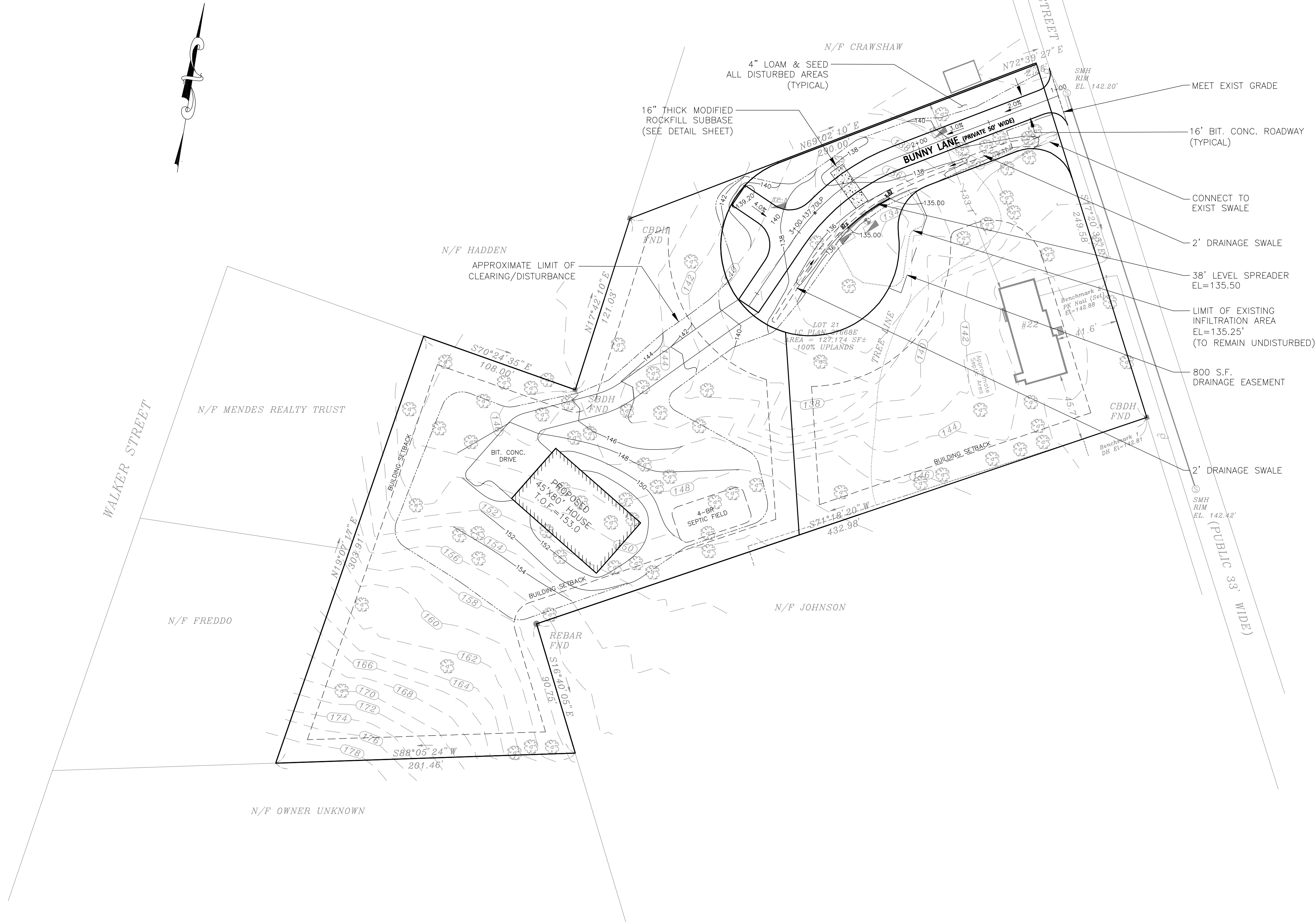
"TOWN LINE ESTATE"  
DEFINITIVE SUBDIVISION PLAN  
SITE & UTILITY PLAN  
MEDWAY, MASSACHUSETTS

SHEET NO.	SCALE	JOB NO.
4	1"=40'	5332



This Subdivision is subject to a Certificate of Action Signed by the Medway Planning and Economic Development Board, Dated April 24, 2018 to be Recorded at the Norfolk County Registry of Deeds.

All Present and Future Owners of Lot 2 are subject to a Declaration of Protective Covenants & Restrictions and Private Roadway Agreement Governing Town Line Estate Subdivision.



ASSESSORS REFERENCE  
MAP 71, PARCEL 020

ZONING REFERENCE  
AR-II

LEGEND	
	TEL/ELEC. HAND HOLE
	TEST HOLE
	THH TELEPHONE HANDHOLE
	EHH ELECTRIC HANDHOLE
	WSO WATER SHUTOFF
	GG GAS GATE
	SWL SOLID WHITE LINE
	HYDRANT
	STONE CHECK DAM
	STONE WALL
	DRILL HOLE
	BOUND
	IRON PIN/PIPE

NO.	DATE	REFERENCE
2	6/8/18	PROJECT ENDORSEMENT
1	2/23/18	PROJECT REVIEW REVISIONS
REVISIONS		
DATE: DECEMBER 12, 2017		

Engineer:  
**L.A.L. Engineering Group**  
DESIGN ~ PERMITTING ~ PEER REVIEW ~ LAYOUT  
**730 Main St, Suite 1F**  
**Millis MA 02054**  
**P: (781) 248-1133 F: (508) 376-8440**

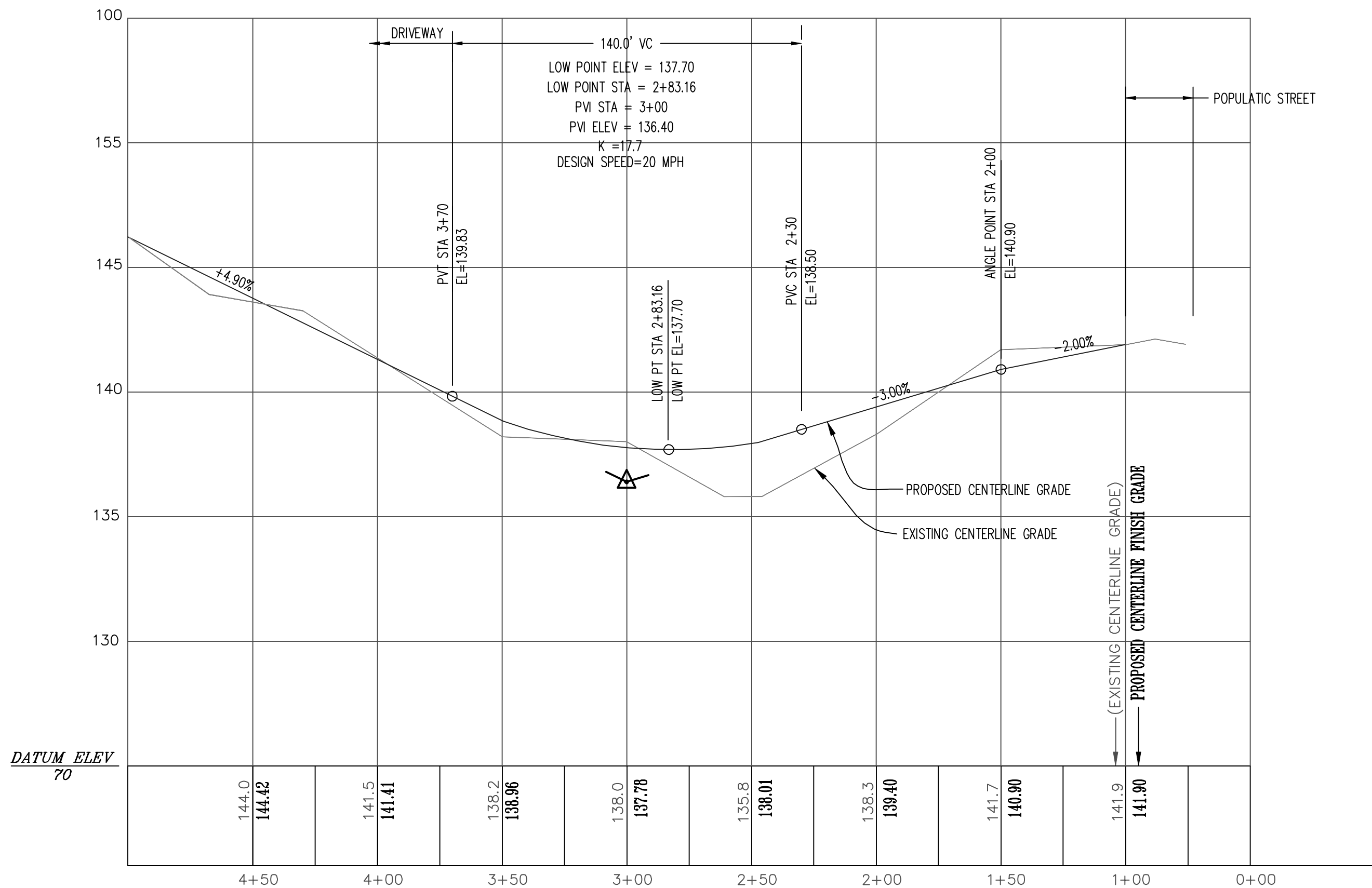
Surveyor:  
**CONTINENTAL LAND SURVEY, LLC**  
**105 BEAVER STREET, FRANKLIN, MA**  
**(508) 528 - 2528**

**SITE LOCATION:**  
**22 POPULATIC STREET**  
**MEDWAY, MASSACHUSETTS**  
**PREPARED FOR:**  
**ROBERT & LISA LAPINSKY**  
**62 ALLSTON AVE.**  
**WORCESTER, MASSACHUSETTS**

DEFINITIVE SUBDIVISION PLAN GRADING & DRAINAGE PLAN MEDWAY, MASSACHUSETTS		
SHEET NO.	SCALE	JOB NO.
5	1"=40'	5332

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### BUNNY LANE PROFILE

SCALE: HORIZONTAL 1"=40'  
VERTICAL 1"=4'

DATE APPROVED: \_\_\_\_\_

MEDWAY PLANNING AND ECONOMIC  
DEVELOPMENT BOARD

DATE ENDORSED: \_\_\_\_\_

APPROVED \_\_\_\_\_ SUBJECT  
TO COVENANT CONDITIONS SET  
FORTH IN A COVENANT EXECUTED  
BY \_\_\_\_\_

DATED \_\_\_\_\_, AND TO  
BE RECORDED HERewith.

I CERTIFY THAT 20 DAYS HAVE  
PASSED SINCE PLANNING BOARD  
APPROVAL AND NO APPEAL HAS  
BEEN FILED IN THIS OFFICE.

DATE : \_\_\_\_\_

TOWN CLERK OF MEDWAY

### "TOWN LINE ESTATE"

#### DEFINITIVE SUBDIVISION PLAN PROFILE MEDWAY, MASSACHUSETTS

SHEET NO.

6

SCALE

AS NOTED

JOB NO.

5332

ASSESSORS REFERENCE  
MAP 71, PARCEL 020

ZONING REFERENCE

AR-II

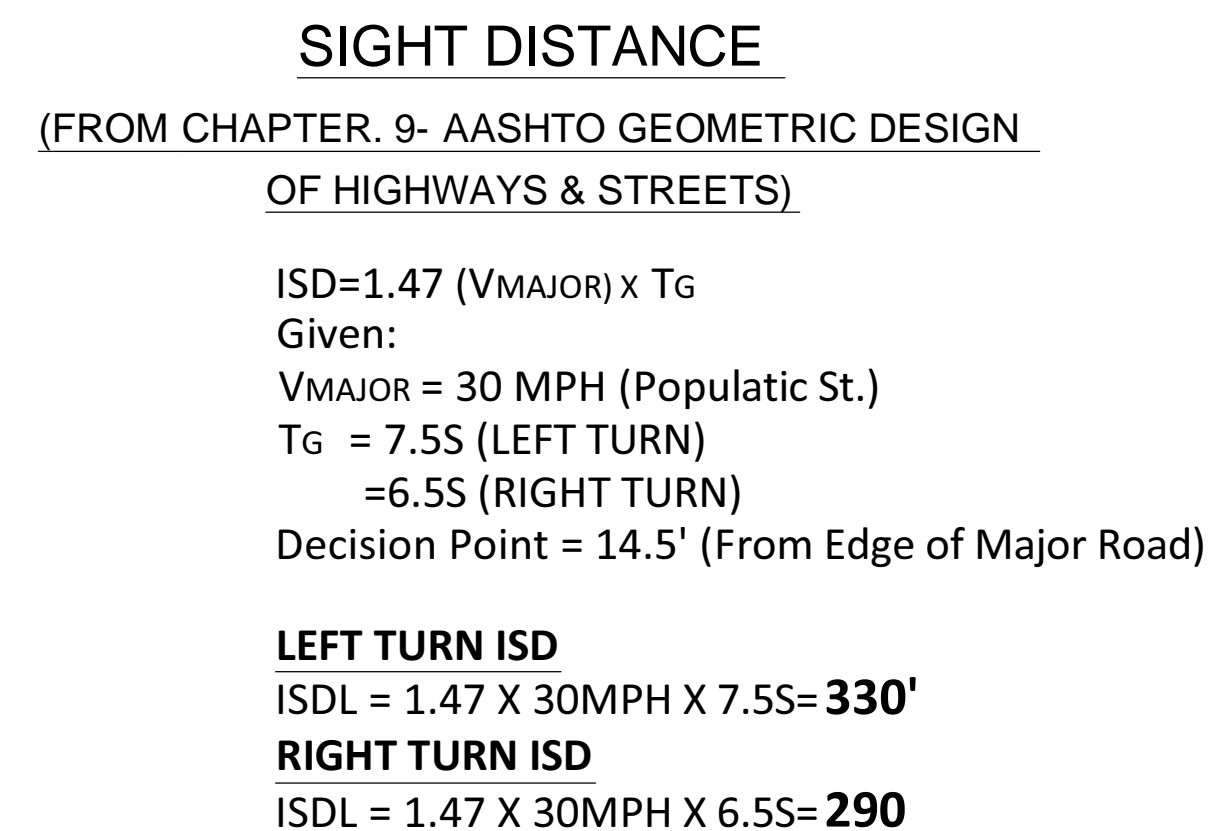
2	6/8/18	PROJECT ENDORSEMENT
1	2/23/18	PROJECT REVIEW REVISIONS
NO.	DATE	REFERENCE
REVISIONS		
DATE: DECEMBER 12, 2017		

*L.A.L. Engineering Group*  
DESIGN ~ PERMITTING ~ PEER REVIEW ~ LAYOUT  
**730 Main St, Suite 1F**  
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Surveyor:  
**CONTINENTAL LAND SURVEY, LLC**  
**105 BEAVER STREET, FRANKLIN, MA**  
**(508) 528 - 2528**

SITE LOCATION:  
22 POPULATIC STREET  
MEDWAY, MASSACHUSETTS  
PREPARED FOR:  
ROBERT & LISA LAPINSKY  
62 ALLSTON AVE.  
WORCESTER, MASSACHUSETTS





TOWN CLERK OF MEDWAY

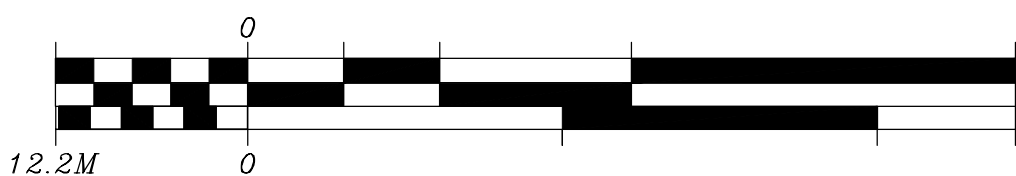
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"TOWN LINE ESTATE"

ASSESSORS REFERENCE		LEGEND				Engineer:	Surveyor:		SITE LOCATION:		DEFINITIVE SUBDIVISION PLAN		
MAP 71, PARCEL 020		TEL/ELEC. HAND HOLE	HYDRANT			<b>L.A.L. Engineering Group</b> DESIGN ~ PERMITTING PEER REVIEW LAYOUT  <b>730 Main St, Suite 1F</b> <b>Millis MA 02054</b>  <b>P: (781) 248-1133 F: (508) 376-8440</b>	<b>CONTINENTAL LAND SURVEY, LLC</b> <b>105 BEAVER STREET, FRANKLIN, MA</b> <b>(508) 528 - 2528</b>	<b>22 POPULATIC STREET</b> <b>MEDWAY, MASSACHUSETTS</b>	<b>PREPARED FOR:</b> <b>ROBERT &amp; LISA LAPINSKY</b> <b>62 ALLSTON AVE.</b> <b>WORCESTER, MASSACHUSETTS</b>	<b>SIGHT DISTANCE PLAN</b>			
ZONING REFERENCE		TEST HOLE	STONE CHECK DAM	2	6/8/18					PROJECT ENDORSEMENT	<b>MEDWAY, MASSACHUSETTS</b>		
	THH TELEPHONE HANDHOLE	STONE WALL	DRILL HOLE	1	2/23/18					PROJECT REVIEW REVISIONS			
	EHH ELECTRIC HANDHOLE	BOUND	IRON PIN/PIPE	NO.	DATE					REFERENCE			
	WSO WATER SHUTOFF			REVISIONS									
	GG GAS GATE			DATE: DECEMBER 12, 2017									
AR-II		SOLID WHITE LINE								SHEET NO.	SCALE	JOB NO.	
										7	1"=40'	5332	



GRAPHIC SCALE



( IN FEET )  
1 inch = 40 ft.

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## EROSION CONTROL NOTES

### CONSTRUCTION SPECIFICATION

EROSION CONTROL MEASURES SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS TO PREVENT DOWN GRADIENT OR ADJACENT AREAS FROM BEING ADVERSELY IMPACTED:

1. BARRIERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HAY BALE AND SILT FENCE DETAIL SHOWN IN THE CONSTRUCTION STANDARDS.
2. ONCE INSTALLED, THE SEDIMENT BARRIERS SHALL BE MAINTAINED IN PLACE UNTIL ALL AREAS UP GRADIENT FROM THE BARRIERS HAVE BEEN STABILIZED AS SPECIFIED HEREIN. UPON COMPLETION AND STABILIZATION OF THE PROJECT, THE SEDIMENT BARRIERS SHALL BE REMOVED.
3. THE SEDIMENT BARRIERS ARE INTENDED TO ACT AS A LIMIT OF DISTURBANCE. ANY LAND DOWN GRADIENT FROM THE BARRIER ACCIDENTALLY DISTURBED SHALL BE IMMEDIATELY REPAIRED AND RESTORED TO ITS ORIGINAL CONDITION.

4. ALL DISTURBED AREAS THAT ARE NOT OTHERWISE DEVELOPED OR INCORPORATING SPECIAL STABILIZATION MEASURES OR LANDSCAPE PLANTINGS SHALL BE LOAMED AND SEEDED. NO LESS THAN 4 INCHES OF LOAM TOPSOIL SHALL BE SPREAD AND THE AREA SHALL BE SEEDED WITH NORTHEAST GRASS MIX.

5. ALL AREAS OUTSIDE THE LIMIT OF WORK SHALL BE UNDISTURBED. DURING SITE WORK ALL PERSONS AND EQUIPMENT SHALL STAY OUTSIDE THESE AREAS. EXISTING VEGETATION SHALL BE PRESERVED.

6. ALL SLOPES CAUSED BY EXCAVATION OF EXISTING GROUND CONDITIONS OR FILL PLACEMENT OVER EXISTING GROUND TO CREATE BERMS OF EARTH MATERIALS OR RESULT FROM RECONTOURING LAND FOR PROPOSED HOUSE LOCATIONS SHALL BE NO GREATER THAN 2:1 HORIZONTAL TO VERTICAL.

7. CONTRACTOR SHALL ENSURE ANY/ALL SEDIMENT TRACKED ONTO ADJACENT ROADWAYS IS SUFFICIENTLY REMOVED PRIOR TO THE END OF THE WORK DAY.

8. A NATIONAL POLLUTANT DISCHARGE ELIMINATION (NPDES) NOTICE OF INTENT (NOI) IS NOT REQUIRED FOR THIS PROJECT (NO DISCHARGE).

DATE APPROVED: \_\_\_\_\_

MEDWAY PLANNING AND ECONOMIC  
DEVELOPMENT BOARD

DATE ENDORSED: \_\_\_\_\_

APPROVED \_\_\_\_\_ SUBJECT  
TO COVENANT CONDITIONS SET  
FORTH IN A COVENANT EXECUTED  
BY \_\_\_\_\_

DATED \_\_\_\_\_, AND TO  
BE RECORDED HERewith.

I CERTIFY THAT 20 DAYS HAVE  
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DATE : \_\_\_\_\_

TOWN CLERK OF MEDWAY

## "TOWN LINE ESTATE"

### DEFINITIVE SUBDIVISION PLAN EROSION CONTROL PLAN MEDWAY, MASSACHUSETTS

SHEET NO.

8

SCALE

1"=40'

JOB NO.

5332

ASSESSORS REFERENCE  
MAP 71, PARCEL 020

ZONING REFERENCE

AR-II

LEGEND	
	TEL/ELEC. HAND HOLE
	TEST HOLE
	THH TELEPHONE HANDHOLE
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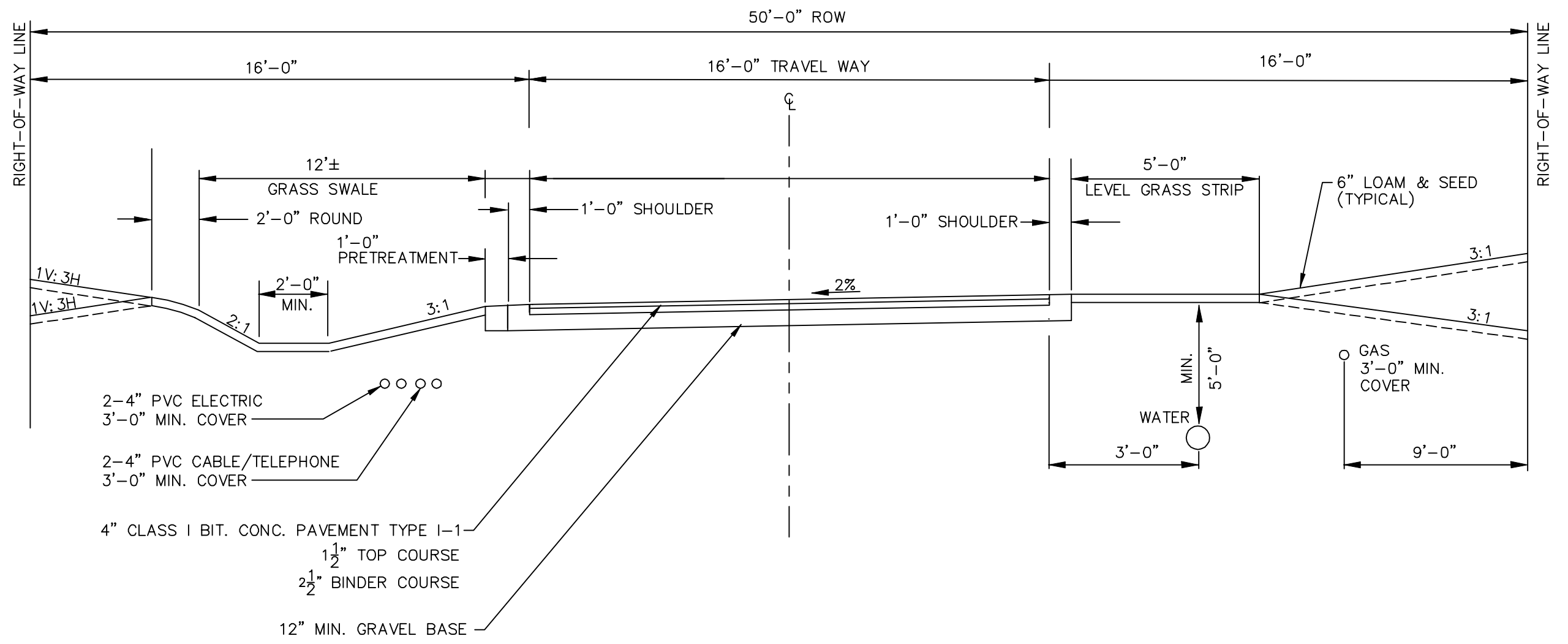
NO.	DATE	REFERENCE
2	6/8/18	PROJECT ENDORSEMENT
1	2/23/18	PROJECT REVIEW REVISIONS
REVISIONS		
DATE: DECEMBER 12, 2017		

Engineer:  
**L.A.L. Engineering Group**  
DESIGN ~ PERMITTING ~ PEER REVIEW ~ LAYOUT  
**730 Main St, Suite 1F**  
**Millis MA 02054**  
**P: (781) 248-1133 F: (508) 376-8440**

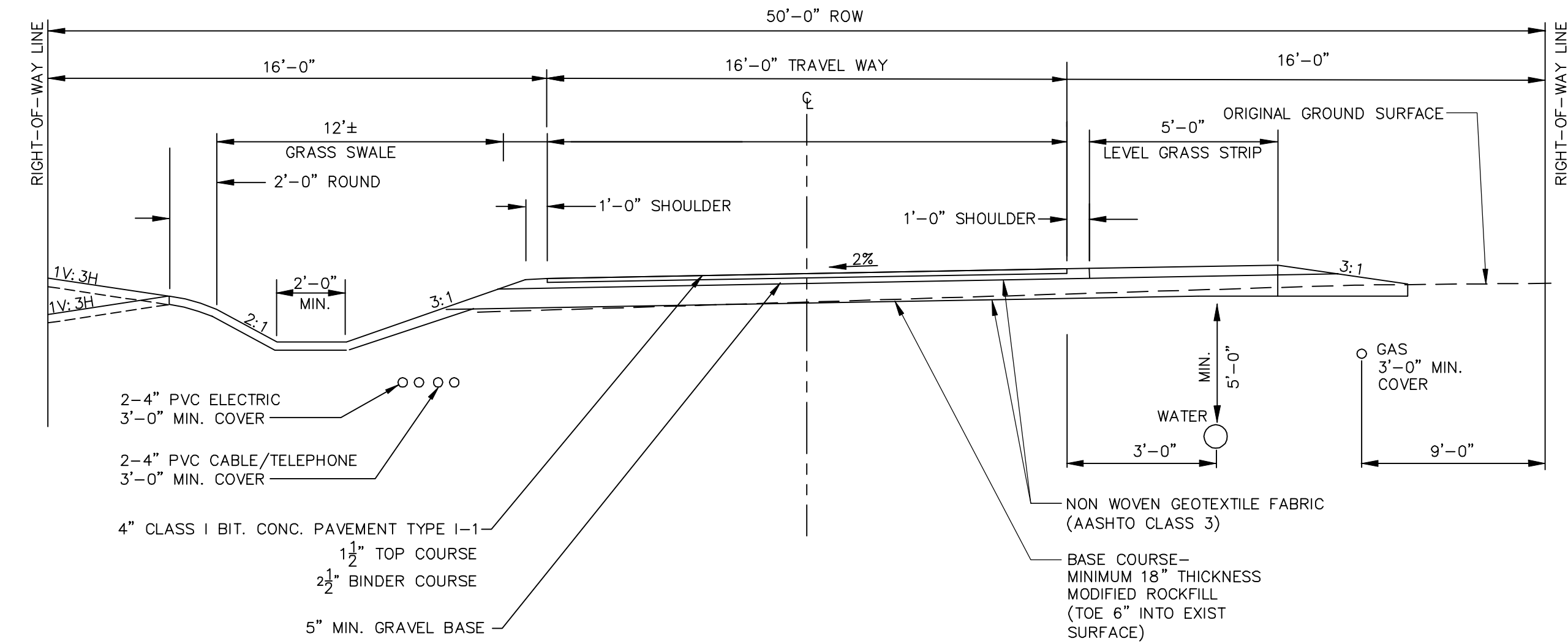
Surveyor:  
**CONTINENTAL LAND SURVEY, LLC**  
**105 BEAVER STREET, FRANKLIN, MA**  
**(508) 528 - 2528**

**SITE LOCATION:**  
**22 POPULATIC STREET**  
**MEDWAY, MASSACHUSETTS**  
**PREPARED FOR:**  
**ROBERT & LISA LAPINSKY**  
**62 ALLSTON AVE.**  
**WORCESTER, MASSACHUSETTS**

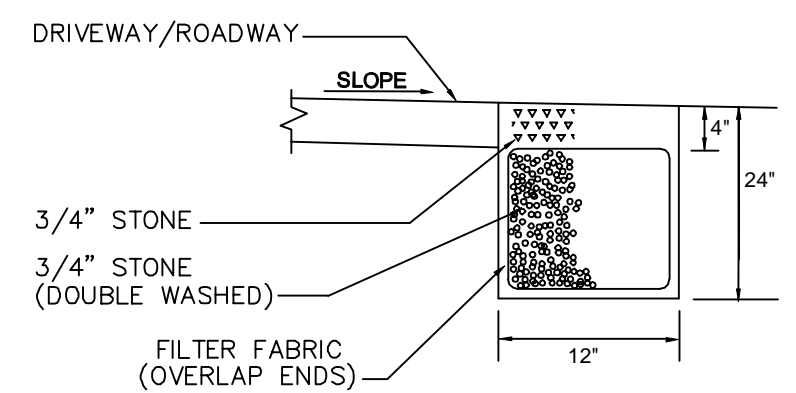




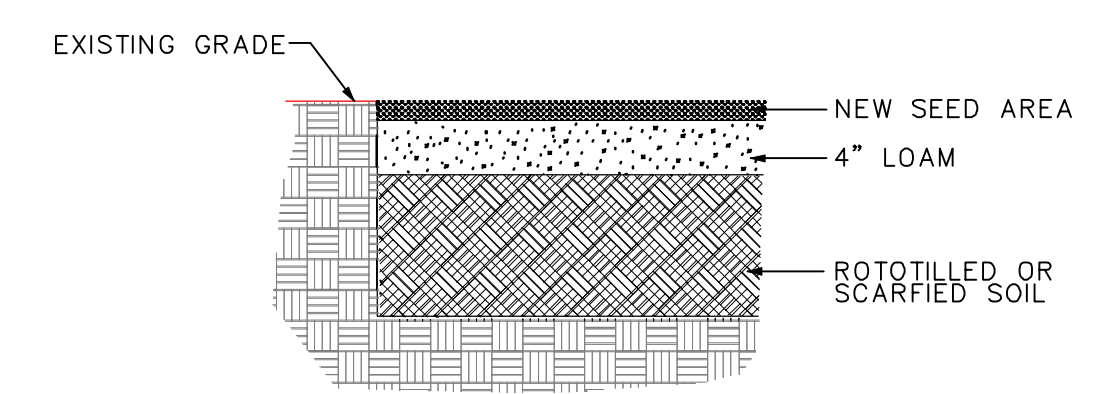
TYPICAL ROAD SECTION STA 1+00± TO STA 2+40  
AND STA 2+70 TO STA P TO STA 4+44±  
NOT TO SCALE



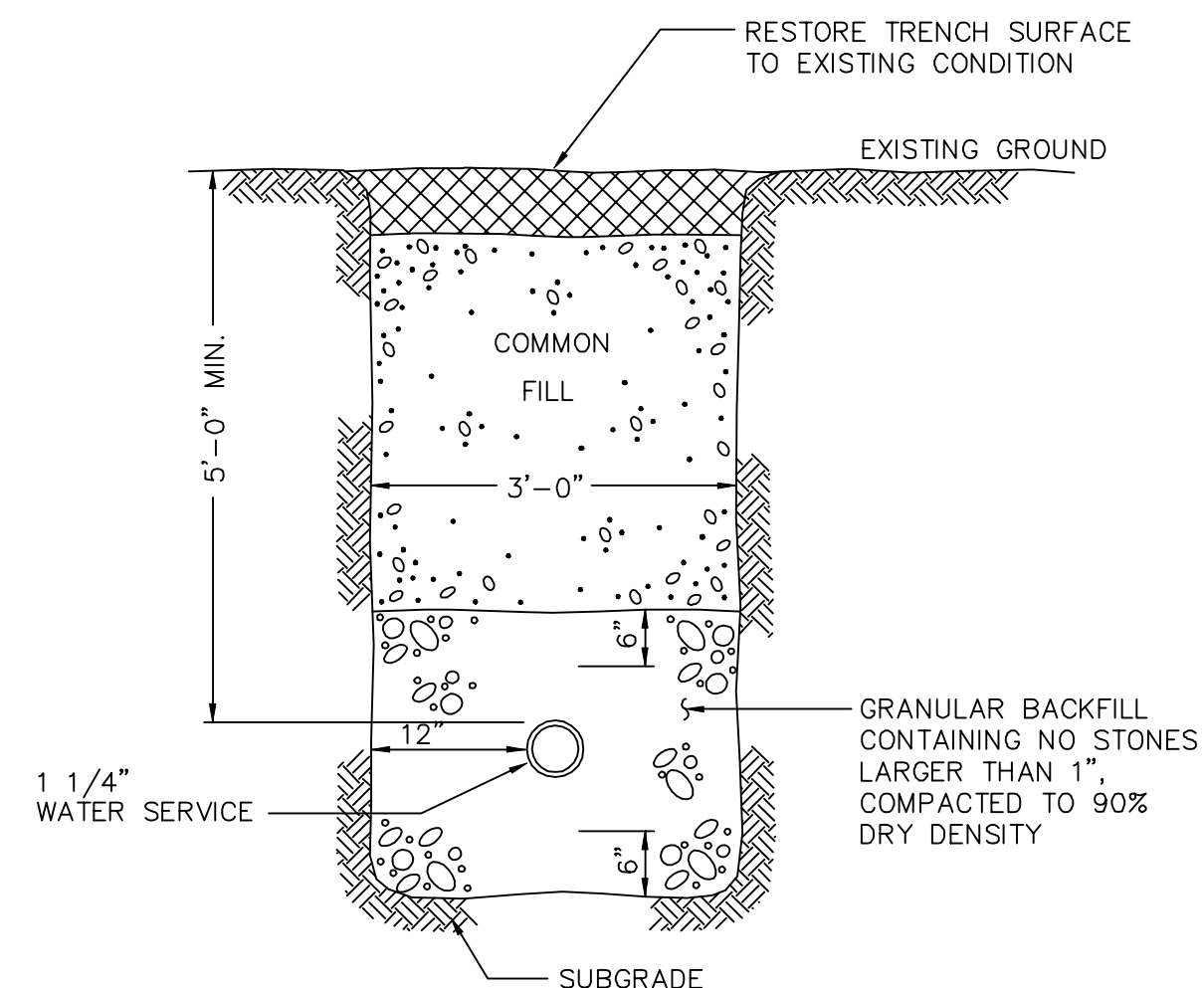
TYPICAL ROAD SECTION STA 2+49 TO STA 2+59  
NOT TO SCALE



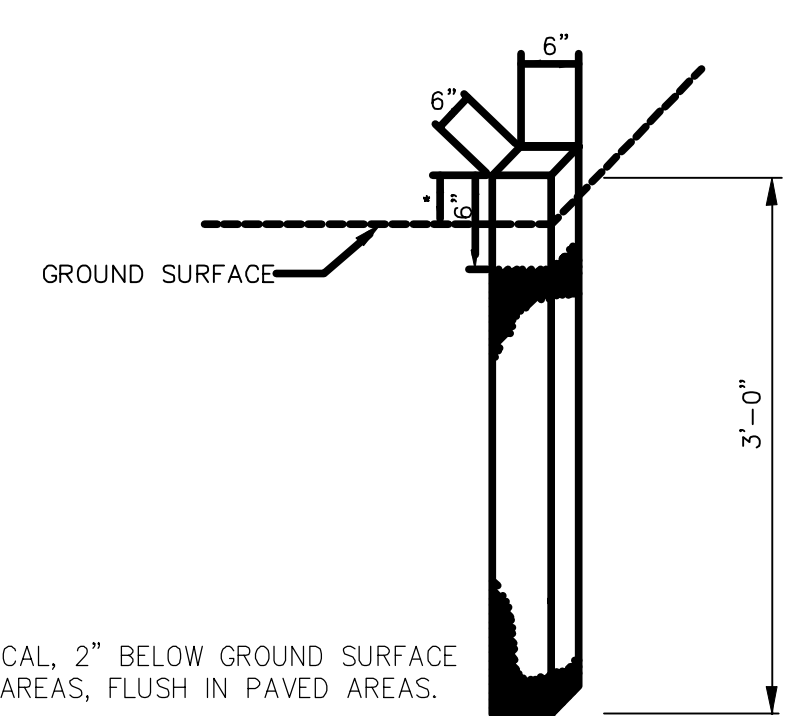
PRETREATMENT  
FILTER DRAIN  
DETAIL  
NOT TO SCALE



TYPICAL SEEDING DETAIL  
NOT TO SCALE



WATER SERVICE TRENCH DETAIL



TYPICAL CONCRETE BOUND DETAIL  
NOT TO SCALE

## GENERAL NOTES

- ALL CONSTRUCTION OF ALL SITE ELEMENTS SHALL MEET THE REQUIREMENTS OF THE TOWN OF MEDWAY, AND THE MASSDOT FOR WORK WITHIN THE ROADWAY RIGHT-OF-WAY. THE CONTRACTOR SHALL OBTAIN ANY PERMITS NOT PROVIDED BY THE OWNER PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN THESE DOCUMENTS AND BE AWARE OF THEIR REQUIREMENTS PRIOR TO CONSTRUCTION.
- LOCATION OF EXISTING UNDERGROUND UTILITIES/OBSTRUCTIONS/SYSTEMS SHOWN HEREON ARE APPROXIMATE ONLY. ALL UTILITIES/OBSTRUCTIONS/SYSTEMS MAY NOT BE SHOWN. LOCATE AND PROTECT ALL UNDERGROUND UTILITIES/OBSTRUCTIONS/SYSTEMS, WHETHER OR NOT SHOWN HEREON.
- EMPLOY A LICENSED PROFESSIONAL LAND SURVEYOR TO LAY OUT BUILDING AND SITE FOR CONSTRUCTION.
- THE CONTRACTOR IS SOLELY RESPONSIBLE FOR CONSTRUCTION PLANNING, TRAINING, METHODS AND JOB SITE SAFETY.
- REPAIRS AND/OR REPLACEMENT OF ANY EXISTING ITEMS DAMAGED DURING CONSTRUCTION THAT ARE NOT DESIGNATED FOR DEMOLITION AND/OR REMOVAL HEREON ARE THE RESPONSIBILITY OF THE CONTRACTOR. REPAIR SUCH DAMAGE TO THE SATISFACTION OF THE OWNER(S).
- PRIOR TO IMPLEMENTATION, SEEK ENGINEERING REVIEW AND APPROVAL OF ANY INTENDED REVISION OF HORIZONTAL AND/OR VERTICAL DESIGN LOCATION OF IMPROVEMENTS SHOWN HEREON.
- PROMPTLY NOTIFY TOWN OF MEDWAY UPON COMMENCEMENT OF CONSTRUCTION IN ORDER TO ENSURE THAT REQUIRED INSPECTIONS ARE PERFORMED IN A TIMELY AND EFFICIENT MANNER.
- NOTIFY ENGINEER UPON DISCOVERY OF UNFORESEEN SURFACE OR SUBSURFACE CONDITIONS THAT MAY IMPACT SITE CONSTRUCTION, REGULATORY APPROVAL OR FUNCTION.
- INSTALL FINISH RIM ELEVATIONS TO MATCH FINISH PAVEMENT, GRADING, OR LANDSCAPING SURFACE, UNLESS SPECIFICALLY INDICATED OTHERWISE.
- PLUG/CAP/FILL EXISTING UTILITY LINES/STRUCTURES THAT ARE TO BE CUT/BROKEN DOWN/ABANDONED, IN ACCORDANCE WITH UTILITY OWNER REQUIREMENTS.
- INSTALL EROSION CONTROL MEASURES, SUCH AS SILT FENCE OR HAY BALES AS MAY BE SHOWN HEREON, BEFORE EARTH DISTURBANCE OCCURS.
- ALL SYSTEM COMPONENTS SHALL BE MARKED WITH MAGNETIC MARKING TAPE OR A COMPARABLE MEANS IN ORDER TO LOCATE THEM ONCE BURIED.
- THE DESIGNER MUST PREPARE AND SUBMIT AN AS-BUILT PLAN OF THE INSTALLED WORK.

DATE APPROVED: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

MEDWAY PLANNING AND ECONOMIC  
DEVELOPMENT BOARD

DATE ENDORSED: \_\_\_\_\_

APPROVED \_\_\_\_\_ SUBJECT  
TO COVENANT CONDITIONS SET  
FORTH IN A COVENANT EXECUTED  
BY \_\_\_\_\_

DATED \_\_\_\_\_, AND TO  
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APPROVAL AND NO APPEAL HAS  
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DATE : \_\_\_\_\_

TOWN CLERK OF MEDWAY

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Certificate of Action Signed by the  
Medway Planning and Economic  
Development Board, Dated April 24,  
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All Present and Future Owners of Lot  
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Protective Covenants & Restrictions  
and Private Roadway Agreement  
Governing Town Line Estate  
Subdivision.

## "TOWN LINE ESTATE"

ASSESSORS REFERENCE  
MAP 71, PARCEL 020

ZONING REFERENCE  
AR-II



NO.	DATE	REVISIONS
2	6/8/18	PROJECT ENDORSEMENT
1	2/23/18	PROJECT REVIEW REVISIONS
		REFERENCE
DATE: APRIL 18, 2017		

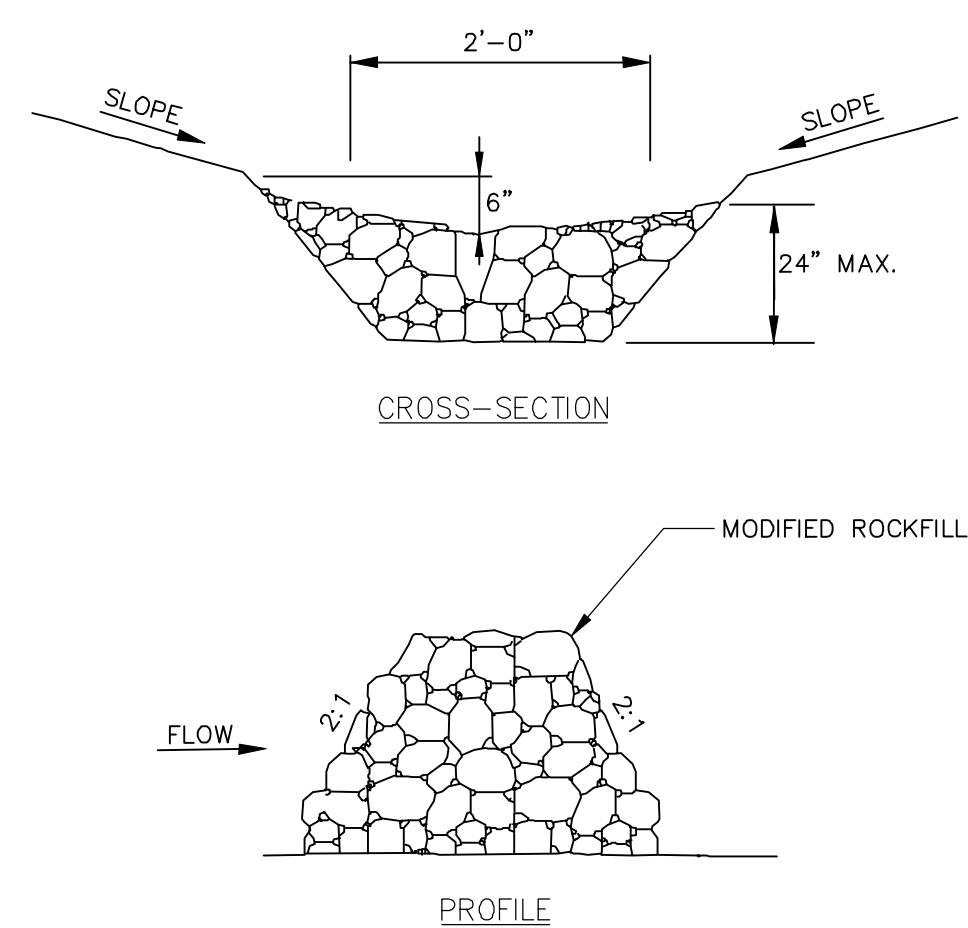
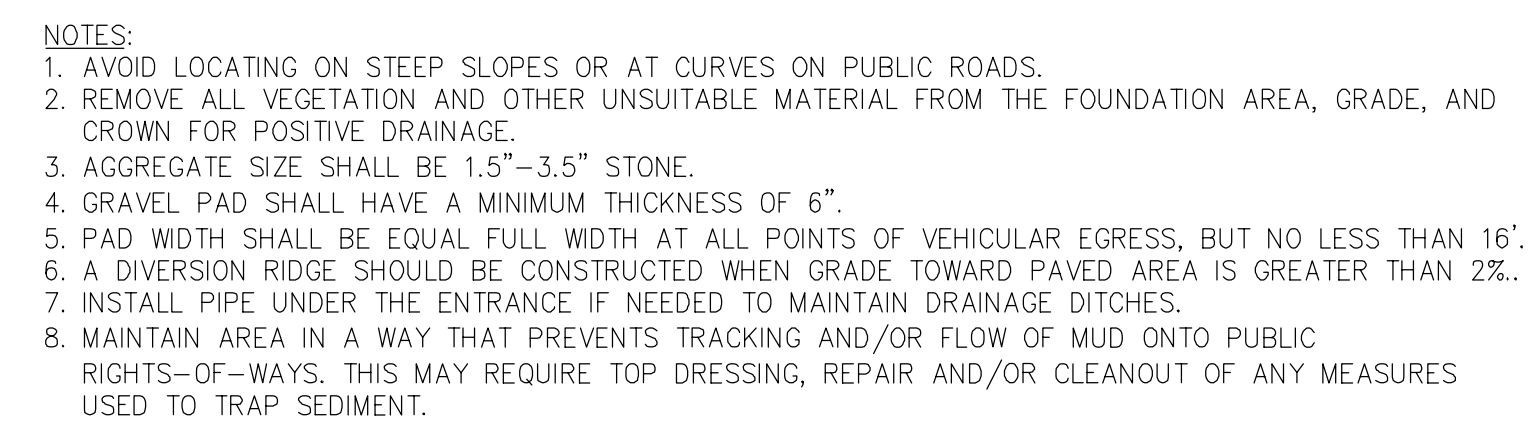
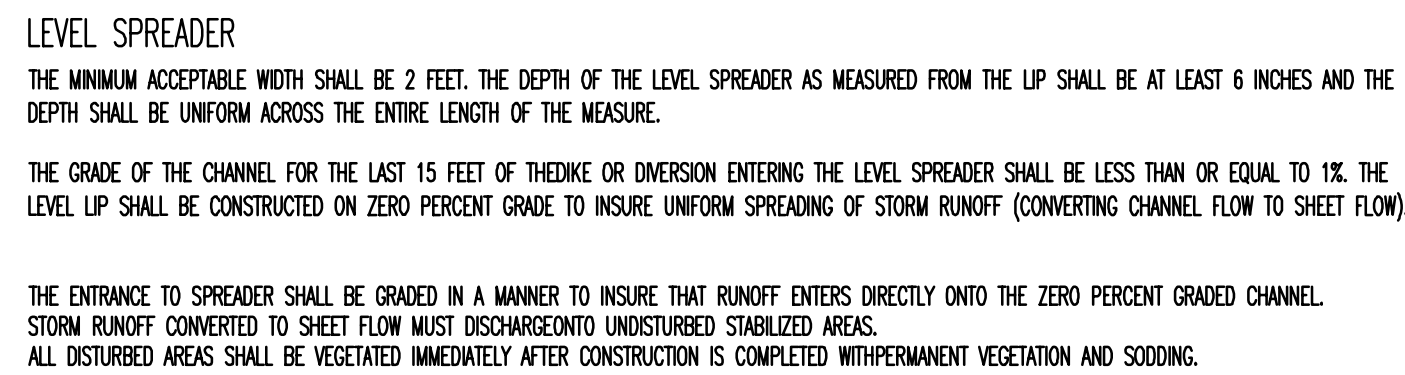
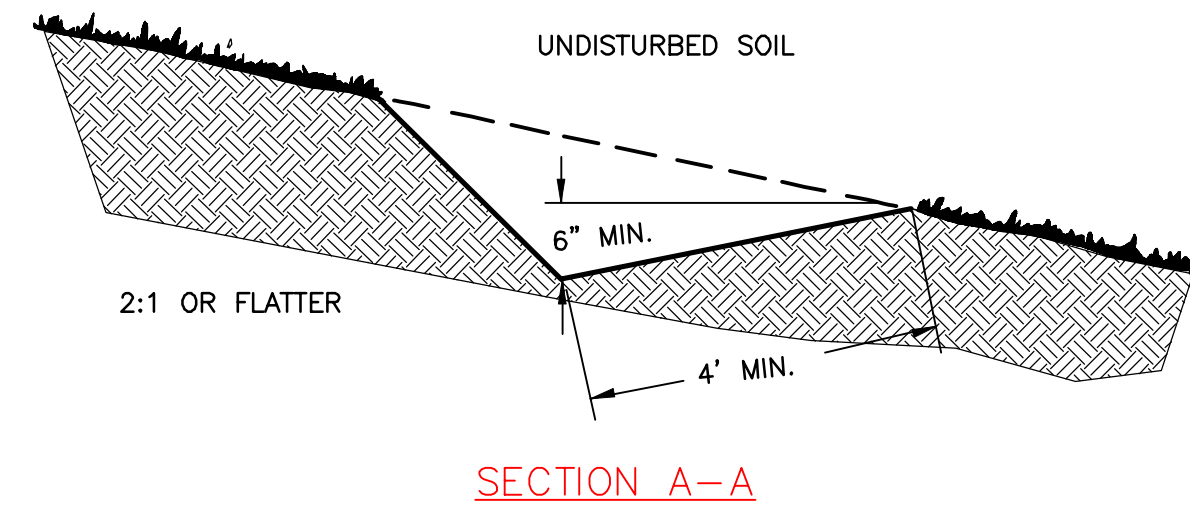
Engineer:  
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DESIGN - PERMITTING PEER REVIEW LAYOUT  
730 Main St, Suite 1F  
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P: (781) 248-1133 F: (508) 376-8440

Surveyor:  
**CONTINENTAL LAND SURVEY, LLC**  
105 BEAVER STREET, FRANKLIN, MA  
(508) 528 - 2528

SITE LOCATION:  
22 POPULATIC STREET  
MEDWAY, MASSACHUSETTS  
PREPARED FOR:  
ROBERT & LISA LAPINSKY  
62 ALLSTON AVE.  
WORCESTER, MASSACHUSETTS

DEFINITIVE SUBDIVISION PLAN SITE DETAILS & GENERAL NOTES MEDWAY, MASSACHUSETTS		
SHEET NO.	SCALE	JOB NO.
9	AS NOTED	5332





APPROVED \_\_\_\_\_ SUBJECT \_\_\_\_\_  
TO COVENANT CONDITIONS SET  
FORTH IN A COVENANT EXECUTED  
BY \_\_\_\_\_  
DATED \_\_\_\_\_, AND TO  
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I CERTIFY THAT 20 DAYS HAVE PASSED SINCE PLANNING BOARD APPROVAL AND NO APPEAL HAS BEEN FILED IN THIS OFFICE.

DATE : \_\_\_\_\_

\_\_\_\_\_  
TOWN CLERK OF MEDWAY

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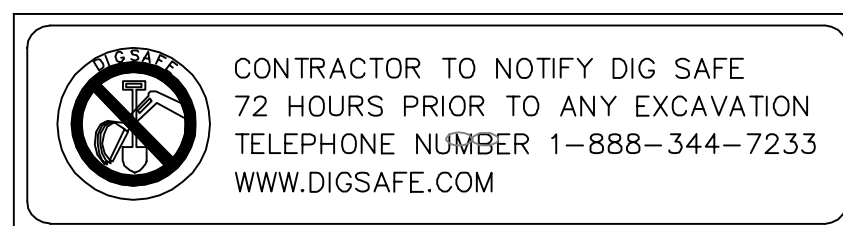
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"TOWN LINE ESTATE"

DEFINITIVE SUBDIVISION PLAN  
SITE DETAILS  
MEDWAY, MASSACHUSETTS

SHEET NO.	SCALE	JOB NO.
10	AS NOTED	5332

ZONING REFERENCE  
AR-II



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NO.	DATE	REFERENCE
REVISIONS		
DATE: APRIL 18, 2017		

Engineer:

*L.A.L. Engineering Group*

DESIGN - PERMITTING PEER REVIEW LAYOUT

730 Main St, Suite 1F  
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ROBERT & LISA LAPINSKY  
62 ALLSTON AVE.  
WORCESTER, MASSACHUSETTS



**January 22, 2019**  
**Medway Planning & Economic Development Board**  
**Meeting**

**Exelon Bond Revision**

- DRAFT revised bond agreement to reflect full amount of \$363,691.25
- BETA Group's bond estimate dated 12-14-18.

I am informed that the revised bond agreement has been signed by Exelon and is being overnighted to us along with the Rider from the insurance company. I hope to have that for you on Tuesday.



***Performance Secured by Surety Agreement***  
***Planning & Economic Development Board – Town of Medway, MA***

Bond No. 800006039

This Surety Agreement is entered into this \_\_\_\_ day of January, 2019, among the Town of Medway, acting through its Planning and Economic Development Board, with an address of 155 Village Street, Medway, MA 02053 (hereinafter referred to as “the Board”), and EXELON WEST MEDWAY II, LLC of 300 Exelon Way, Kennett Square, PA 19384 (“Owner”), and ATLANTIC SPECIALTY INSURANCE COMPANY a corporation duly organized and existing under the laws of the state of New York, licensed and registered to do business in the Commonwealth of Massachusetts, and with a usual place of business and address of 605 Highway 169 North, Suite 800, Plymouth, MN, 55441, (“Surety”), to secure completion of the installation of required site improvements and landscaping as shown on the approved site plan described below.

WHEREAS, on July 26, 2016, after a duly noticed public hearing, the Board issued a major site plan approval decision (attached) and subsequently endorsed a major site plan, which is entitled *West Medway II Facility*, dated February 9, 2016, last revised August 17, 2016 prepared by Beals and Thomas, Inc., of Southborough, MA on August 23, 2016 (hereinafter referred to as “the Site Plan”); and

WHEREAS, the Owner has requested the issuance of an occupancy permit for the administration building on the premises; and

WHEREAS, the Board is required by the site plan approval decision to secure completion of the required site improvements and landscaping (shrubs, and rain garden) before an occupancy permit is issued; and

WHEREAS, the value of the remaining required site improvements and landscaping is \$363,691.25 as specified in the bond estimate dated December 14, 2018 prepared by the Town’s engineering consultant, BETA Group, Inc. (attached).

WHEREAS, the Owner has decided to secure the installation of the required site improvements and landscaping by means of a SURETY BOND in the penal sum of Three Hundred Sixty Three Thousand, Six Hundred and Nine-One and 25/100 (\$363,691.25) dollars.

NOW, THEREFORE, the parties agree as follows:

1. The Owner and Surety hereby bind and obligate themselves and their successors and assigns to the Town of Medway in the sum of \$363,691.25 and have secured this obligation by means of a SURETY BOND to be used to secure the performance by the Owner of required site improvements and landscaping contained in the site plan decision and the endorsed site plan and the bond estimate dated December 14, 2018 prepared by the Town’s engineering consultant, BETA Group, Inc.

2. The Surety shall deliver a surety bond in a form acceptable to the Board to the Treasurer of the Town of Medway, at the time of the execution of this agreement, in the amount of \$363,691.25 for purpose of securing completion of the required site improvements and landscaping.
3. The Owner shall complete the installation of the required site improvements and landscaping by September 30, 2019.
4. Upon completion of all obligations as specified herein on or before the required completion date, or such later date as may be specified by vote of the Board with the concurrence of the Owner, the Board shall release the Owner and Surety from this surety agreement.
5. In the event the Owner should fail to complete the installation of the required site improvements and landscaping as specified in the approved Site Plan and Decision and within the time herein specified, the Board may apply the bond held by the Treasurer of the Town of Medway, in whole or in part, for the benefit of the Town of Medway to the extent of the reasonable costs to the Town of Medway to complete the required site improvements and landscaping as provided in this agreement. Any portion of the bond that is not applied as set forth above, shall be returned to the Surety upon completion of the required site improvements and landscaping by the Town of Medway
6. The Board, at its discretion, may grant an extension of time and/or reduce the penal amount of the bond and notify the Owner, the Surety and the Treasurer of the Town of Medway of any authorized adjustment.
7. The Owner and Surety agree and understand that the Board will not release this surety bond in full until the required site improvements and landscaping have been deemed by the Board to be constructed and installed in accordance with this agreement. This agreement does not expire until the Board releases the surety bond in full.
8. Failure to complete the required site improvements and landscaping may result in the Board's rescission of approval of the Site Plan.
9. If a court of competent jurisdiction determines that any provision of this agreement is unenforceable, such determination shall not affect the remaining provisions, which shall remain in full force and effect.

IN WITNESS WHEREOF we have hereunto set our hands and seals this \_\_\_\_\_ day of January, 2019.

**TOWN OF MEDWAY  
PLANNING & ECONOMIC DEVELOPMENT BOARD**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

COMMONWEALTH OF MASSACHUSETTS

NORFOLK, SS

On this \_\_\_\_\_ day of \_\_\_\_\_, 2019, before me, the undersigned  
notary public, personally appeared the Members of the Medway Planning and

Economic Development Board, \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

proved to me through satisfactory evidence of identification, which was (personal  
knowledge) (Massachusetts driver's license), to be the persons whose names are  
signed on the preceding document, and acknowledged to me that it was signed  
voluntarily for its stated purpose as members of the Medway Planning and  
Economic Development Board.

\_\_\_\_\_  
Notary Public  
My commission expires: \_\_\_\_\_

**OWNERS**

EXELON WEST MEDWAY, LLC

EXELON WEST MEDWAY II, LLC

By: \_\_\_\_\_

Title/Position: \_\_\_\_\_

Organization: \_\_\_\_\_

COMMONWEALTH OF PENNSYLVANIA

\_\_\_\_\_, SS

On this \_\_\_\_ day of \_\_\_\_\_, 2019, before me, the undersigned notary public, personally appeared the above-named \_\_\_\_\_, proved to me through satisfactory evidence of identification, which was \_\_\_\_\_, to be the person whose name is signed on the preceding document, and acknowledged to me that it was signed voluntarily for its stated purpose as \_\_\_\_\_ of Exelon West Medway II, LLC.

\_\_\_\_\_  
Notary Public

My commission expires: \_\_\_\_\_

***SURETY COMPANY*** - ATLANTIC SPECIALTY INSURANCE COMPANY

By: \_\_\_\_\_

Title/Position: \_\_\_\_\_

Organization: Rosenberg & Parker, Inc.

COMMONWEALTH OF PENNSYLVANIA

\_\_\_\_\_, SS

On this \_\_\_\_\_ day of \_\_\_\_\_, 2019, before me, the undersigned notary public, personally appeared the above-named \_\_\_\_\_, proved to me through satisfactory evidence of identification, which was \_\_\_\_\_ to be the person whose name is signed on the preceding document, and acknowledged to me that it was signed voluntarily for its stated purpose as attorney in fact of Atlantic Specialty Insurance Company.

\_\_\_\_\_  
Notary Public

My commission expires: \_\_\_\_\_



## ***APPENDICES***

***(Site Plan Decision and BETA Bond Estimate dated 12-14-18)***

Exelon Power  
West Medway Facility  
Civil Punch list as of 12/14/2018



Item	Total Quantity	Unit	Percent Complete	Quantity Remaining	massDOT Item	massDOT Median Price	Value
Infiltration Basin 01	1	LS	100%	0%	na	na	\$ -
Infiltration Basin 02	1	LS	100%	0%	na	na	\$ -
Excavation/Grading Restore Trailer site		CY		1500	120	\$ 15.00	\$ 22,500.00
Drainage	1	LS			See breakdown		\$ 10,000.00
Rain Garden Plantings	1	LS	0%	100%	See breakdown		\$ 15,194.50
Site Plantings	1	LS	0%	100%	See breakdown		\$ 111,149.00
Top Soil/Loam	3800	CY		1827	751	\$ 43.50	\$ 79,474.50
Seeding	34000	SY		16500	765	\$ 0.55	\$ 9,075.00
Pavement, surface course	650	TON	95%	35	455.23	\$ 96.00	\$ 3,360.00
Pavement Bituminous Berm	4150	LF	95%	200	470.2	\$ 6.00	\$ 1,200.00
Steel Beam Guard Rail	850	LF	100%	0	620.12	\$ 41.50	\$ -
Chain Link Fence	3015	LF	90%	300	645.12	\$ 45.00	\$ 13,500.00
Double Swing Gate	2	EA	0%	2	na	na	\$ 3,000.00
Cant. Slide Gate	1	EA	0%	1	na	na	\$ 10,000.00
Site Cleanup	1	LS	0%	100%	na	na	\$ 5,000.00
As-Built Drawings	1	LS	0%	100%	na	na	\$ 7,500.00
Sub Total*							\$ 290,953.00
25% Contingency							\$ 72,738.25
Total							\$ 363,691.25

1. \* Does not include building amenities such as pipe bollards, wheel stops, signage, sidewalks etc.

2. Deleted

3. Town of Medway to coordinate Medway Water, Sewer, Conservation, Building Departments for additional requirements.

4. All quantities are approximate.

BETA GROUP, INC.

6 Blackstone Valley Place, Suite 101, Lincoln, RI 02865

P: 401.333.2382 | F: 401.333.9225 | W: www.BETA-Inc.com



**January 22, 2019**

**Medway Planning & Economic Development Board  
Meeting**

**Construction Reports**

- January 4, 2019 Exelon Construction Report

## Susan Affleck-Childs

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**From:** Rodgers, Mark J:(BSC) <Mark.Rodgers@exeloncorp.com>  
**Sent:** Sunday, January 13, 2019 6:27 PM  
**To:** Rodgers, Mark J:(BSC)  
**Subject:** Monthly Construction Update: Exelon Generation Medway Peaker Project

### **Exelon Generation Medway Peaker Project: Monthly Construction Update, 1/4/19**

Recent construction and site activities have included:

- Installation of the acoustic barriers and doors around Compressor Station is complete.
- Installation of guardrails along site driveways throughout the site is complete.
- Installation of final perimeter fencing is in progress.
- Grading of Infiltration Basin-01 in the southern central portion of the site is complete.
- Grading and hydroseeding of Infiltration Basin-02 in the southern central portion of the site is in progress.
- Installation of the ammonia tank enclosure is in progress.
- Finish grading and loaming of the central portion of the site is in progress.
- On-site soil stockpiles are greatly reduced in volume.
- Concrete pours have diminished with only a few small miscellaneous pours remaining.
- Various components of the power generating system are being plumbed, wired, and tested.
- Various soil stockpiles are actively stabilized via tarps and seeding where necessary.
- Silt fences, straw bales, and straw wattles are being routinely monitored and maintained as needed.
- Silt sacks in the catch basins in Summer Street are being routinely monitored and maintained as needed.
- 24/7 security details remain in place at site entrance.



Aerial view facing east. Work continues in the central portion of the site. Various components of the power generating system are being plumbed, wired, and tested.



Aerial view facing northwest. Grading of Infiltration Basin-01 is substantially complete and stabilization is in progress.

Construction updates are also posted to our project website: [www.medwayenergy.com](http://www.medwayenergy.com).

*Please note, you are receiving this because you signed up to receive our monthly construction updates. If you wish to no longer receive these emails, please reply and write Unsubscribe in the subject line.*

**Thank you for your interest in our project. If you ever have any questions, concerns, or complaints, we have a 24x7 hotline you can call: 508-321-7311. We respond to all calls within 24 hours. Alternatively, you can use our online contact form, we also respond to those inquiries within 24 hours, that link is:**  
<http://www.medwayenergy.com/submit-project-construction-message>.

You can also feel free to reach out directly to me at the contact information below.

Thank you.

Best,

Mark

Mark Rodgers



Manager, Generation Communications – NE Region

617-381-2214 (desk)

617-699-6327 (cell)

[mark.rodgers@exeloncorp.com](mailto:mark.rodgers@exeloncorp.com)

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