EILAR ASSOCIATES, INC.

"Acoustical & Environmental Consulting Services Since 1974"

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June 14, 2013

County of San Diego Job #B10306N3
Planning and Development Services
Attention: Emmet Aquino
5510 Overland Avenue, Suite 110
San Diego, California 92123

SUBJECT: ADDENDUM TO ACOUSTICAL ANALYSIS REPORT FOR T&R STORAGE – INTERIOR NOISE EVALUATION – CASE NUMBER P05-052

At the request of Emmet Aquino of the County of San Diego Planning and Development Services, this document serves as an addendum to the acoustical analysis report previously prepared for the aforementioned project by Eilar Associates, Inc., dated September 27, 2012. The proposed project, Escondido Mini-Storage, consists of the construction of a new storage facility with an on-site residence including a courtyard area. This supplemental document is provided to demonstrate that traffic noise impacts to the on-site residence are not expected to exceed County of San Diego noise standards for Major Use Permit (MUP #P05-052) approval.

Project Description

The proposed project, T&R Mini Storage, consists of the construction of a new storage facility with an on-site residence. The project also involves the adjustment on the boundaries between Parcel A (APN 187-170-48) and Parcel B (APN 187-170-49). The proposed storage facility will be located on Parcel A. For additional information please refer to the project plans provided in Appendix A.

Applicable Noise Standards

The County of San Diego Noise Element to the General Plan requires that residences demonstrate that interior noise levels of 45 CNEL or less are achieved within habitable spaces. This requirement is included in the State of California Building Code as well. Interior noise levels of the proposed residence are addressed within this report.

According to Emmet Aquino of the County of San Diego Planning and Development Services, as this is a primarily commercial site with a residence included, the exterior noise requirements for a mixed use development would apply to the outdoor use areas. Therefore, the courtyard areas shown on the plans are required to meet an exterior noise level of 65 CNEL.

For additional information, please refer to Appendix B: Pertinent Sections of the County of San Diego Noise Element to the General Plan.

Existing Noise Environment

The primary noise sources in the vicinity of the project site include traffic noise from Interstate 15 (I-15), and North Centre City Parkway. Current traffic volumes are given based on information from the San Diego Association of Governments (SanDAG) Series 11 Transportation Forecast Information Center, located on the SanDAG website at http://gis.sandag.org/tficsr11/f2030tfall/viewer.htm. The Caltrans Traffic Data Branch 2009 Traffic on Freeways was also consulted. Future traffic volume research was conducted through the San Diego County General Plan Update – Circulation Element Road Network and Framework – North County Metro Area.

Vehicle Traffic Noise

Interstate 15 (I-15) is an eight-lane, two-way Freeway running north-south to the west of the project site. The posted speed limit is 65 mph. According to SanDAG, in the vicinity of the project site, I-15 currently carries a traffic volume of approximately 66,000 Average Daily Trips (ADT) traveling northbound and 65,000 ADT traveling southbound. Caltrans 2009 traffic counts state that I-15 currently carries an estimated traffic volume of 117,000 ADT traveling northbound and southbound, collectively. As the SanDAG figure exceeds that provided by Caltrans, the higher of the two values will be used for a worst-case analysis.

North Centre City Parkway is a two-lane, two-way Collector running north-south to the east of the project site. The posted speed limit is 55 mph. According to SanDAG, North Centre City Parkway, in the vicinity of the project site, currently carries a traffic volume of approximately 12,000 ADT.

Ivy Dell Lane is currently a two-lane street running east-west to the east of the proposed project site. There is currently no traffic volume information available for Ivy Dell Lane, so manual traffic counts were taken on-site during noise monitoring. Ivy Dell Lane was observed to have an equivalent hourly traffic volume of 84 cars with no medium or heavy trucks. Please refer to Section 3.2 for more details.

Current and future traffic volumes for the roadway sections near the project site are shown in Table 1. For further roadway details and projected future ADT traffic volumes, please refer to Appendix C: Traffic Noise Model (TNM) Data and Results.

Table 1. Overall Roadway Traffic Information

Roadway Name	Speed Limit (mph)	Vehicle Mix (%)[1]		Current ADT	Future ADT (2030)
		Medium Trucks	Heavy Trucks		
Interstate 15 - Northbound	65	4.46	5.64	66,000	249,000
Interstate 15 - Southbound	65	4.46	5.64	65,000	
North Centre City Parkway	55	2.0	1.0	12,000	24,400
Ivy Dell Lane	30	2.0	1.0	N/A[2]	3,600

[1]Vehicle mix for I-15 obtained from 2009 Caltrans Truck Traffic on Freeways. Typical vehicle mix used for all other roadways.
[2]Field traffic counts used for current noise environment.

No current or future truck percentages were available for any of the roadways in the vicinity of the project site other than for Interstate 15. However, based on neighboring and surrounding land use, roadway classification, our professional experience and on-site observations, a truck percentage mix of 2.0% medium and 1.0% heavy trucks was used for North Centre City Parkway and Ivy Dell Lane.

According to traffic counts performed by the Caltrans Traffic Data Branch, the 2009 truck percentage mix on Interstate 15 in the vicinity of the project site is 4.46% medium and 5.64% heavy.

Without mitigation or proposed project structures, the current proposed project site will be exposed to noise levels between 55 and 65 CNEL. These contours are irregularly shaped. For a graphical representation of these contours, please refer to Figure 1: Site Plan Showing Current Traffic CNEL Contours and Noise Measurement Location.

Measured Noise Level

An on-site inspection and traffic noise measurement were made on the afternoon of Thursday, March 24, 2011. The weather conditions were as follows: partly cloudy skies, moderate humidity, temperatures in the mid 50's with winds at 3-5 mph. A "one-hour" equivalent measurement was made at twenty feet from the Ivy Dell Lane centerline, across North Centre City Parkway, to the east of the proposed project site. The microphone position was placed approximately five feet above the existing project site grade. Traffic volumes for Ivy Dell Lane and North Centre City Parkway were recorded for automobiles, medium-size trucks, and large trucks during the measurement period. After a continuous 10-minute sound level measurement, there was no change in the L_{EQ} and results were then recorded. The measured noise level and related weather conditions are found in Table 2. The calculated equivalent hourly vehicle traffic count adjustment and a complete tabular listing of all traffic data recorded during the on-site traffic noise measurement are found in Appendix C: Traffic Noise Model (TNM) Data and Results.

Table 2. On-Site Noise Measurement Conditions and Results	
Date	Thursday, March 24, 2011
Time	7:15 a.m. – 7:25 a.m.
Conditions	Partly Cloudy Skies, Winds at 3-5 mph, Temperature Mid 50's with Moderate Humidity
Measured Noise Level	64.9 dBA L_{EQ}

Calculated Noise Level

Noise levels were calculated for the site using the methodology described in Section 4.1 (see next page) for the location, conditions, and traffic volumes counted during the noise measurements. The calculated noise levels (L_{EQ}) were compared with the measured on-site noise level to determine if adjustments or corrections (calibration) should be applied to the traffic noise prediction model, Traffic Noise Model Version 2.5. Adjustments are intended to account for site-specific differences, such as reflection and absorption, which may be greater or lesser than accounted for in the model.

The measured noise level of 64.9 dBA L_{EQ} was compared to the calculated (modeled) noise level of 63.0 dBA L_{EQ}, for the same conditions and traffic flow. As there was only a 1.9 dB difference between the measured and the calculated noise level, no adjustment was deemed necessary to model future noise levels for this location. Please refer to Table 3, for further evaluation.

Table 3. Calculated versus Measured Traffic Noise Data				
Receiver Location	**Calculated**	**Measured**	**Difference**	**Correction**
20' from Ivy Dell Lane CL	63.0 dBA L_{EQ}	64.9 dBA L_{EQ}	1.9 dB	None

Future Noise Environment

The future (2030) traffic volumes for these roadways are based on numbers obtained from the San Diego County General Plan Update – Circulation Element Road Network and Framework – North County Metro Area. By the year 2030, future traffic volume on I-15 is projected to have a capacity of 249,000 Average Daily Trips (ADT) traveling northbound and southbound, collectively. The SanDAG Series 11 Transportation Forecast Information Center predicts traffic volumes on I-15 to increase to 108,000 ADT traveling northbound and 110,000 traveling southbound. As the anticipated capacity of 249,000 ADT exceeds these estimates, a traffic volume of 124,500 ADT was used for both northbound and southbound I-15 for 2030 predictions.

The future traffic volume of North Centre City Parkway is expected to increase to 24,400 ADT by the year 2030. The roadway classification is planned to be upgraded to a Major Road with Intermittent Turn Lanes. According to the County of San Diego Public Road Standards, this gives North Centre City Parkway a minimum design speed of 55 miles per hour.

The future traffic volume of Ivy Dell Lane is expected to increase to 3,600 ADT by the year 2030. For further roadway details and projected future ADT traffic volumes, please refer to Appendix C: Traffic Noise Model (TNM) Data and Results.

Without mitigation or proposed project structures, the future noise contours will shift from their current positions, exposing the project site to higher noise levels due to increases in traffic volume and the addition of traffic noise from trips on I-15 and North Centre City Parkway. The future proposed project site will be exposed to noise levels between 60 and 70 CNEL. These contours are irregularly shaped. For a graphical representation of these contours, please refer to Figure 2: Site Plan Showing Future Traffic CNEL Contours and Noise Measurement Location.

Methodology

Field Measurement

Typically, a “one-hour” equivalent sound level measurement (L_{EQ}, A-Weighted) is recorded for at least one noise-sensitive location on the site. During the on-site noise measurement, start and end times are recorded, vehicle counts are made for cars, medium trucks (double-tires/two axles), and heavy trucks (three or more axles) for the corresponding road segment(s). Supplemental sound measurements of one hour or less in duration are often made to further describe the noise environment of the site.

For measurements of less than one hour in duration, the measurement time is long enough for a representative traffic volume to occur and the noise level (L_{EQ}) to stabilize. The vehicle counts are then converted to one-hour equivalent volumes by using the appropriate multiplier. Other field data gathered includes measuring or estimating distances, angles-of-view, slopes, elevations, roadway grades, and vehicle speeds. This data was checked against the available maps and records.

Roadway Noise Calculation

The Traffic Noise Model, Version 2.5 program released by the U.S. Department of Transportation was used for calculate the future daytime average hourly noise level (HNL) at various locations at the project site. The daytime average hourly traffic volume is calculated as 0.058 times the ADT, based on the studies made by Wyle Laboratories (see reference). The HNL is equivalent to the L_{EQ}, and both are converted to the CNEL by adding 2.0 decibels, as shown in the Wyle Study. Future CNEL is calculated for desired receptor locations using future road alignment, elevations, lane configurations, projected

traffic volumes, estimated truck mixes, and vehicle speeds. Noise attenuation methods may be analyzed, tested, and planned with TNM, as required. Further explanation can be supplied on request.

Measurement Equipment

Some or all of the following equipment was used at the site to measure existing noise levels:

- Larson Davis Model 720 Integrating Sound Level Meter, Serial # 0462
- Larson Davis Model CA150 Calibrator, Serial # 2056
- Hand-bearing magnetic compass, microphone with windscreen, tripods
- Distance measurement wheel, digital camera

The sound level meter was field-calibrated immediately prior to the noise measurement and checked afterward, to ensure accuracy. All sound level measurements conducted and presented in this report, in accordance with the regulations, were made with a sound level meter that conforms to the American National Standards Institute specifications for sound level meters ANSI S1.4-1983 (R2001). All instruments are maintained with National Bureau of Standards traceable calibration, per the manufacturers' standards.

Noise Impacts at Building Facades

Future traffic noise impacts were calculated for the worst-case facade of the proposed on-site residence. Traffic noise impacts at the east facade of the residence are expected to be approximately 68.8 CNEL. This noise impact represents the worst-case noise exposure as it does not consider the obstruction of the proposed buildings. For a graphical representation of the receiver location, please refer to Figure 3.

Interior Noise Impacts

The State of California and the County of San Diego require an acoustical analysis for any noise sensitive land use proposed in an area that has or will have exterior noise levels in excess of 60 CNEL for residential properties. Contemporary exterior building construction is expected to achieve at least 15 decibels of exterior-to-interior noise attenuation with windows opened. As a result, exterior noise levels of more than 60 CNEL can result in interior conditions that fail to meet the 45 CNEL requirements for residential space.

An exterior-to-interior noise analysis was conducted on units to evaluate the sound reduction properties of proposed exterior wall, window, and door construction designs. No building plans were available to show the exterior wall assembly, therefore a typical exterior wall assembly was used for this analysis. For detailed calculations, please refer to Appendix D: Exterior-to-Interior Noise Analysis. Please refer to Table 4, showing future interior noise levels with the acoustical mitigation recommendations made herein.

Table 4. Future Interior Traffic Noise Levels with Mitigation Recommendations					
Room	**Maximum Exterior Facade Impact (CNEL)**	**Minimum STC Rating for Windows**	**Interior CNEL (windows/doors open)**	**Interior CNEL (windows/ doors closed)**	**Mechanical Ventilation**
Living Room/Kitchen	68.8	20	59.0	41.7	Required
Den	68.8	20	60.1	42.9	Required

As shown above, with the proposed exterior wall assembly, typical doors, and windows with a minimum rating of STC 20, interior noise levels are expected to remain below 45 CNEL with windows and doors closed. The rating of STC 20 for windows is easily achievable with single pane glass.

In instances where interior habitable space is exposed to noise levels greater than 45 CNEL with all windows in the open position, appropriate means of air circulation and provision of fresh air must be present to allow windows to remain closed for extended intervals of time so that acceptable levels of noise can be maintained on the interior. Therefore, a mechanical ventilation system is required that will service all rooms.

The mechanical ventilation system shall meet the criteria of the most current California Mechanical Code, including the capability to provide appropriate ventilation rates. The ventilation system shall not compromise the sound insulation capability of the exterior wall or be dependent on ventilation through windows. A Forced Air Unit (FAU) or its equivalent meeting the criterion described should be installed in these spaces to satisfy code requirements.

Exterior door installation should include all-around weather-tight door stop seals and an improved threshold closure system. The additional hardware will improve the doors' overall sound reduction properties. The transmission loss (TL) of an exterior door without weather-tight seals is largely a factor of sound leakage, particularly at the bottom of the door if excessive clearance is allowed for air transfer. By equipping exterior doors with all-around weather-tight seals and an airtight threshold closure at the bottom, a loss of up to 10 STC points can be prevented.

Additionally, it is imperative to seal and caulk between the rough opening and the finished door frame for all doors by applying an acoustically resilient, non-skinning butyl caulking compound. Sealant application should be as generous as needed to ensure effective sound barrier isolation. The OSI Green Series and the Pecora AC-20 FTR acoustic sound sealants are products specifically designed for this purpose. For additional information on these products, please refer to Appendix E: Recommended Products.

The proposed residence was analyzed for worst-case exterior traffic noise impacts. With exterior wall assemblies and the window and door configurations specified above, as well as mechanical ventilation meeting the appropriate requirements, all habitable rooms will comply with County of San Diego and California Building Code noise requirements, with windows closed.

Exterior Noise Impacts

According to Emmet Aquino of the County of San Diego Planning and Development Services, as this is a primarily commercial site with a residence included, the exterior noise requirements for a mixed use

development would apply to the outdoor use areas. Therefore, the courtyard areas shown on the plans are required to meet an exterior noise level of 65 CNEL. The noise impact at the building facade is approximately 68.8 CNEL. The courtyard areas are proposed to be surrounded by a six-foot barrier wall. A barrier of this height is anticipated to attenuate noise impacts to the courtyard areas below the 65 CNEL threshold, as a noise reduction of greater than 3.8 dB can reasonably be expected.

A noise barrier can be solid and constructed of wood, steel, or a combination of those materials, with no cracks or gaps, through or below the wall. Any seams or cracks must be filled or caulked. If wood is used, it can be tongue and groove and must be at least ⅞-inch thick or have a density of at least 32 pounds per square foot. Sheet metal of 18-gauge (minimum) may be used, if it meets the other criteria and is properly supported and stiffened so that it does not rattle or create noise itself from vibration or wind.

Conclusion & Certification

The County of San Diego and the State of California require interior noise levels not exceeding 45 CNEL in residential habitable space. Calculations show that with the proposed exterior wall assembly, typical doors, windows with a minimum rating of STC 20, interior noise levels of 45 CNEL can be achieved with windows and doors closed. As all rooms have interior noise levels that exceed 45 CNEL with windows opened, a mechanical ventilation system is required for the project. The proposed courtyard areas are anticipated to have noise impacts below 65 CNEL with the proposed six-foot barrier walls in place and constructed according to the requirements detailed above.

All recommendations for noise control are based on the best information available at the time our consulting services are provided. However, as there are many factors involved in sound transmission, and Eilar Associates has no control over the construction, workmanship or materials, Eilar Associates is specifically not liable for final results of any recommendations or implementation of the recommendations.

The findings and recommendations of this addendum are based on the information available and are a true and factual analysis of the potential acoustical issues associated with the T&R Storage Facility project, located in the unincorporated North County Metro community, County of San Diego, California. This document serves as addendum to the previous acoustical analysis, dated September 27, 2012. This report was prepared by Jeff Russert and reviewed by Charles Terry.

EILAR ASSOCIATES, INC.

Jeff Russert, Acoustical Consultant

HELIX Environmental Planning, Inc.

Charles Terry,
County of San Diego Approved Consultant

FIGURES

1. Site Plan Showing Current Traffic CNEL Contours and Noise Measurement Location
2. Site Plan Showing Future Traffic CNEL Contours and Noise Measurement Location
3. Site Plan Showing Future Traffic CNEL Impacts at Facades

APPENDICES

A. Project Plans
B. Pertinent Sections of the County of San Diego Noise Element to the General Plan
C. Traffic Noise Model (TNM) Data and Results
D. Exterior-to-Interior Noise Analysis
E. Recommended Products

REFERENCES

1. 2007 California Building Code, Based on the 2006 International Building Code, Chapter 12, Section 1207 - *Sound Transmission Control*.

2. Federal Highway Administration, Traffic Noise Model Version 2.5.

3. County of San Diego Noise Element to the General Plan.

4. County of San Diego Noise Ordinance.

5. Harris, Cyril M., Handbook of Acoustical Measurements and Noise Control, 3rd Edition, Acoustical Society of America, 1998.

6. Heeden, Robert A., Compendium of Materials for Noise Control, U.S. Department of Health, Education and Welfare, National Institute for Occupational Safety and Health, November 1978.

7. Irvine, Leland K., Richards, Roy L., Acoustics and Noise Control Handbook for Architects and Builders, Kreiger Publishing Company, 1998.

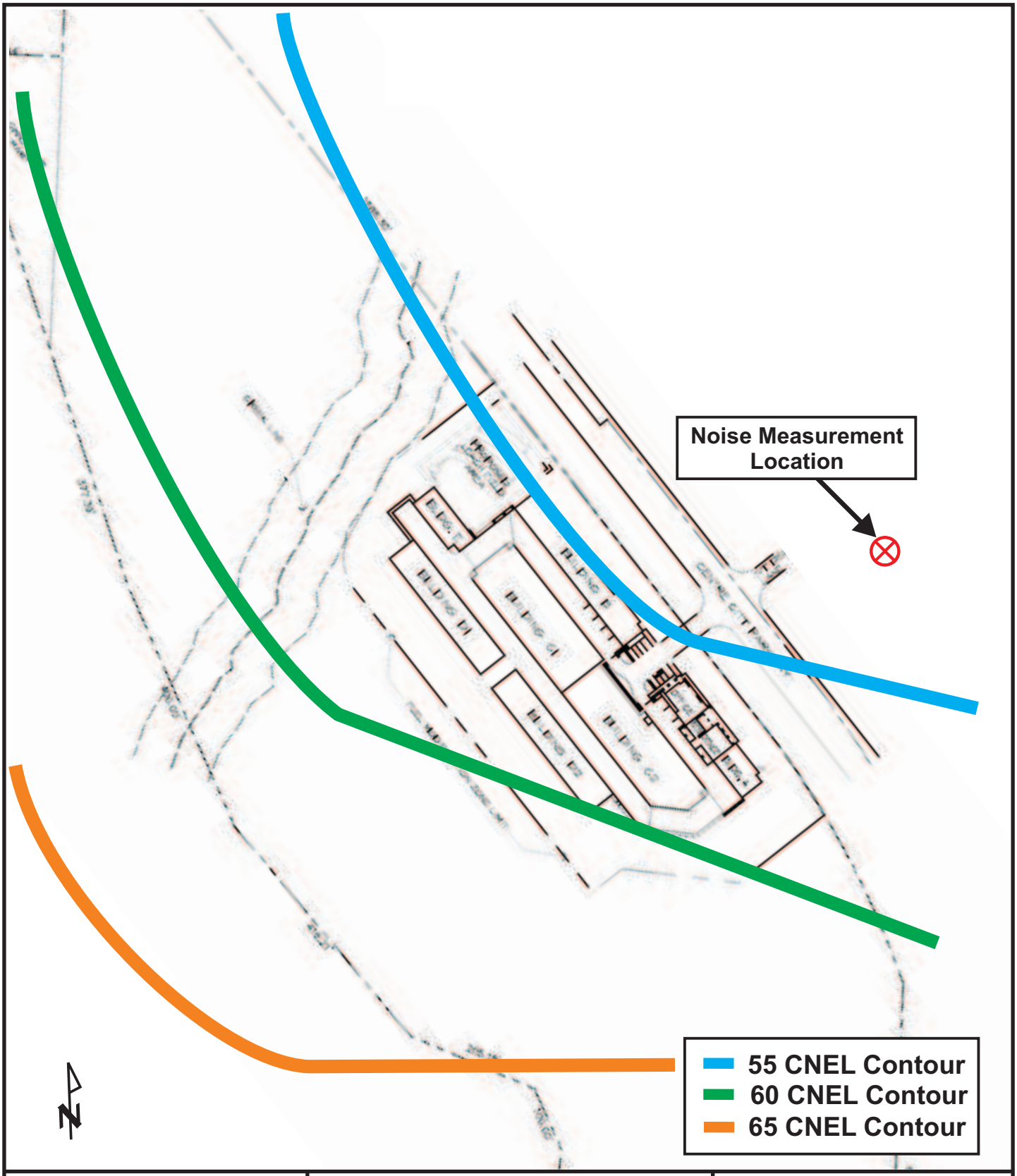
8. NBS Building Sciences Series 77, Acoustical and Thermal Performance on Exterior Residential Walls, U.S. Department of Commerce/National Bureau of Standards, November 1976.

9. Western Electro-Acoustic Laboratory, Inc., 1711 Sixteenth Street, Santa Monica, California 90404, 213-80-9268, Sound Transmission Loss Vs. Glazing Type, Window Size and Air Filtration, January 1985. The research described in this report was prepared for the California Association of Window Manufacturers, 823 North Harbor Boulevard, Suite E, Fullerton, California 92632, 714-525-7088.

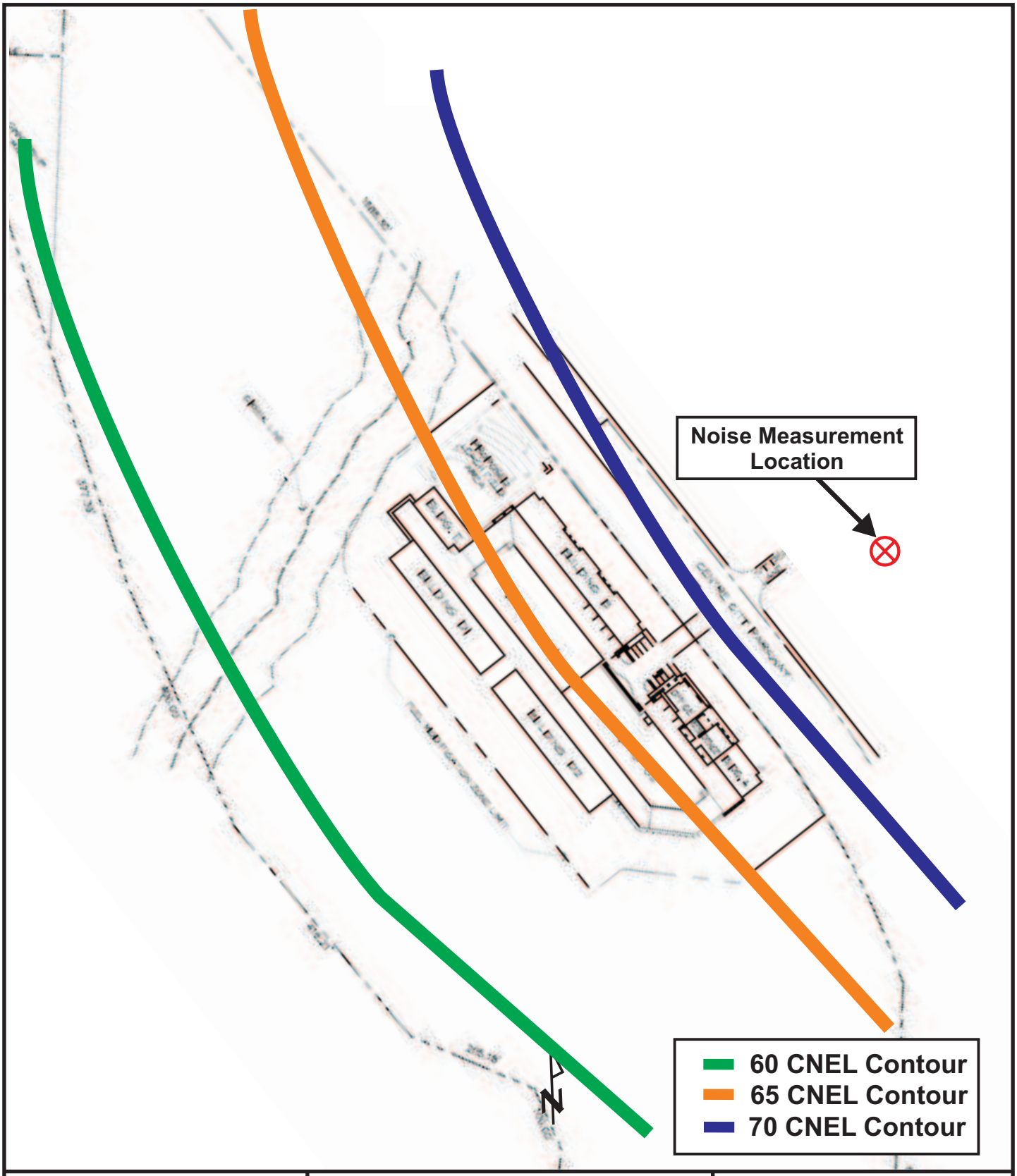
10. United States Department of Transportation Federal Highway Administration, Highway Construction Noise Handbook, Section 9.0 “Construction Equipment Noise Levels and Ranges,” August 2006.

11. Wyle Laboratories, Development of Ground Transportation Systems Noise Contours for the San Diego Region, December, 1973

FIGURES

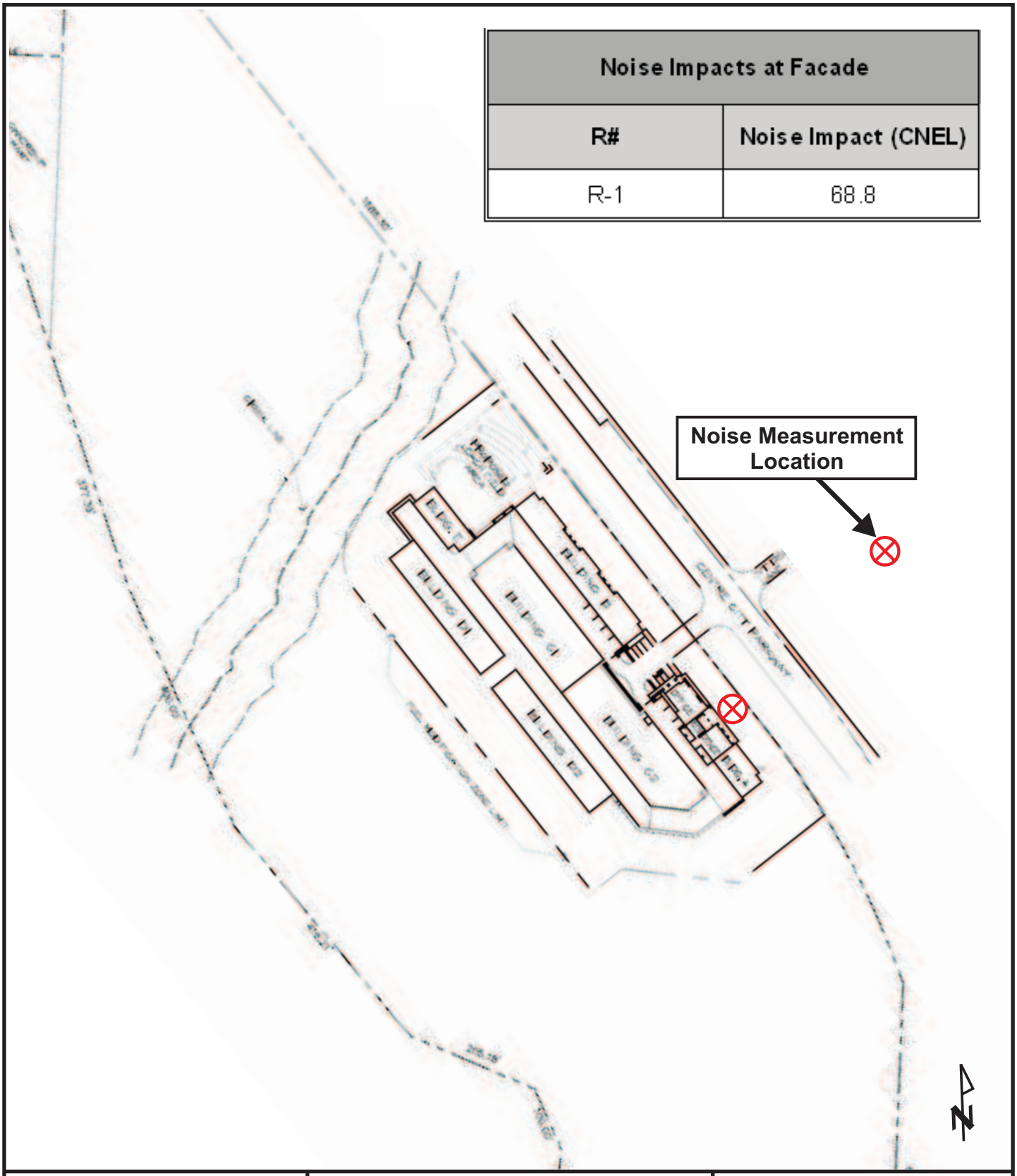


Eilar Associates, Inc. 321 Willowspring Drive North Encinitas, California 92024 760-738-5570	**Site Plan Showing Current Traffic CNEL Contours and Noise Measurement Location Job # B10306N3**	**Figure 1**



Eilar Associates, Inc. 321 Willowspring Drive North Encinitas, California 92024 760-738-5570	**Site Plan Showing Future Traffic CNEL Contours and Noise Measurement Location Job # B10306N3**	**Figure 2**

Noise Impacts at Facade	
R#	Noise Impact (CNEL)
R-1	68.8



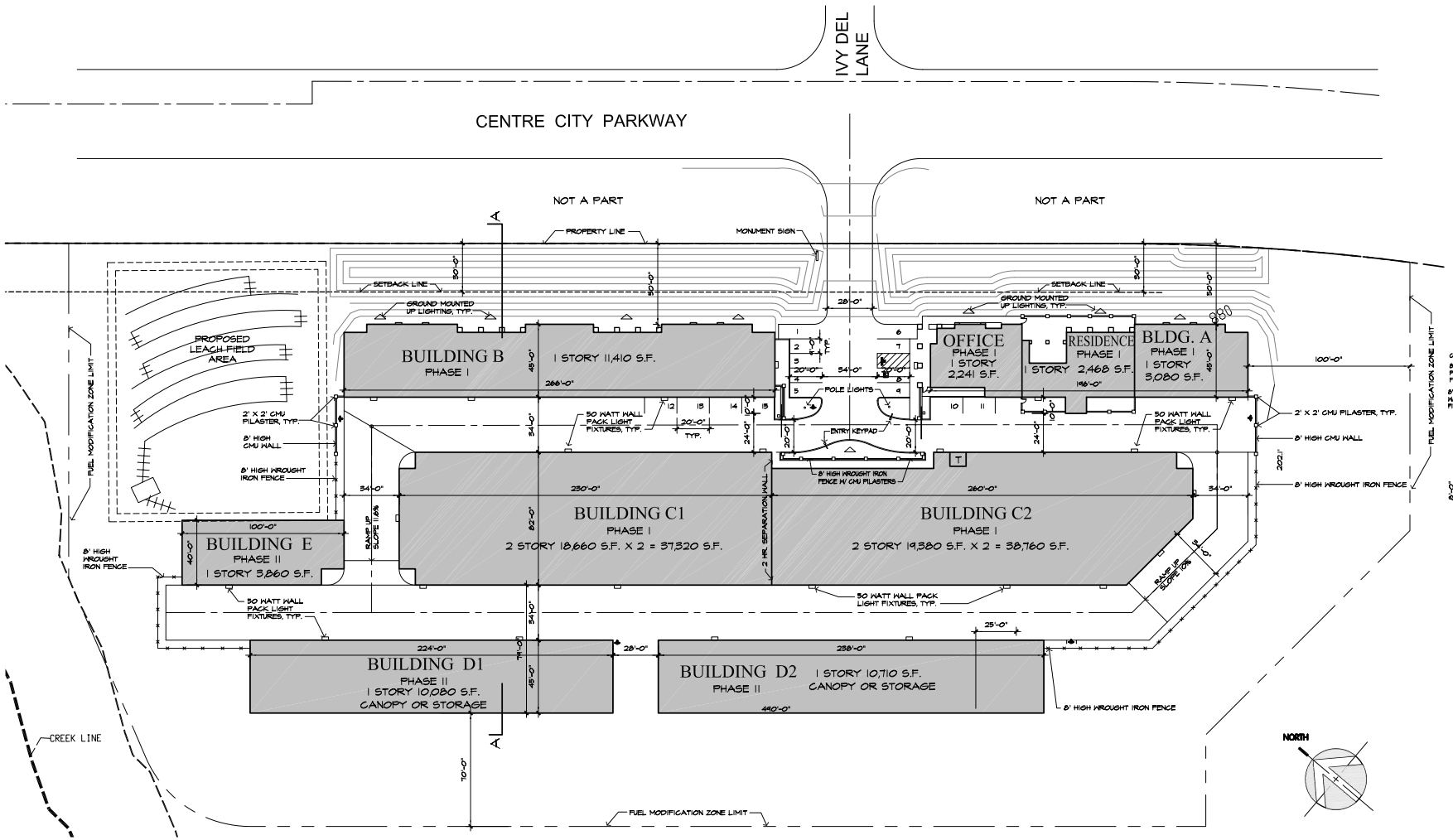
Eilar Associates, Inc.
321 Willowspring Drive North
Encinitas, California 92024
760-738-5570

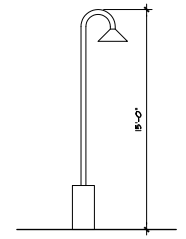
Site Plan Showing Impacts at Facade
Job # B10306N3

Figure 3

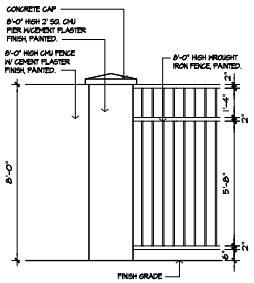
APPENDIX A

Project Plans





POLE LIGHT SCALE: 1/4"=1'-0"



FENCE DETAIL SCALE: 3/8"=1'-0"

VICINITY MAP	SITE DATA	PROJECT DATA	BUILDING DATA
	**SITE DATA:** ADDRESS: CENTRE CITY PARKWAY & IVY DEL LANE ESCONDIDO, CA APN: 167-370-48 & 49 167-100-36 TOTAL OVERALL SITE AREA: 31.7 ACRES DEVELOPED SITE AREA: 5.00 ACRES (217,800 SQ.FT.)	**OWNER / APPLICANT:** OWNER: T & R SELF STORAGE, LLC ADDRESS: 910 S. EL CAMINO REAL, SUITE A SAN CLEMENTE, CA 92672 TELEPHONE: (949) 546-0560 **APPLICANT'S AGENT:** COMPANY: LG CONSULTING & ENGINEERING ADDRESS: 3940 HORTENSIA ST. SAN DIEGO, CA 92110 CONTACT: JERRY GALIGHAN TELEPHONE: (619) 269-7451	**BUILDING AREAS:** **PHASE I** BLDG. A (ONE STORY): 5,080 SQ. FT. BLDG. B (ONE STORY): 11,410 SQ. FT. BLDG. C1 - FIRST LEVEL: 18,660 SQ. FT. BLDG. C1 - SECOND LEVEL: 18,660 SQ. FT. BLDG. C2 - FIRST LEVEL: 19,380 SQ. FT. BLDG. C2 - SECOND LEVEL: 19,380 SQ. FT. TOTAL STORAGE AREA PHASE I: 90,570 SQ. FT. OFFICE (ONE STORY): 2,241 SQ. FT. RESIDENCE (ONE STORY): 2,468 SQ. FT. TOTAL BUILDING AREA PHASE I: 95,279 SQ. FT. **PHASE II** BLDG. D 1 (ONE STORY): 10,080 SQ. FT. BLDG. D 2 (ONE STORY): 10,710 SQ. FT. BLDG. E (ONE STORY): 3,860 SQ. FT. TOTAL STORAGE AREA PHASE II: 24,650 SQ. FT. **PHASE I & II COMBINED** TOTAL STORAGE AREA: 115,220 SQ. FT. TOTAL BUILDING AREA: 119,929 SQ. FT.	**PARKING REQUIRED:** .075 PARKING SPACES / UNIT 0.075 X 1200 UNITS = 15 SPACES **PARKING PROVIDED:** REGULAR PARKING: 8 SPACES HANDICAP PARKING: 1 SPACE PARALLEL PARKING: 6 SPACES TOTAL PARKING PROVIDED: 15 SPACES

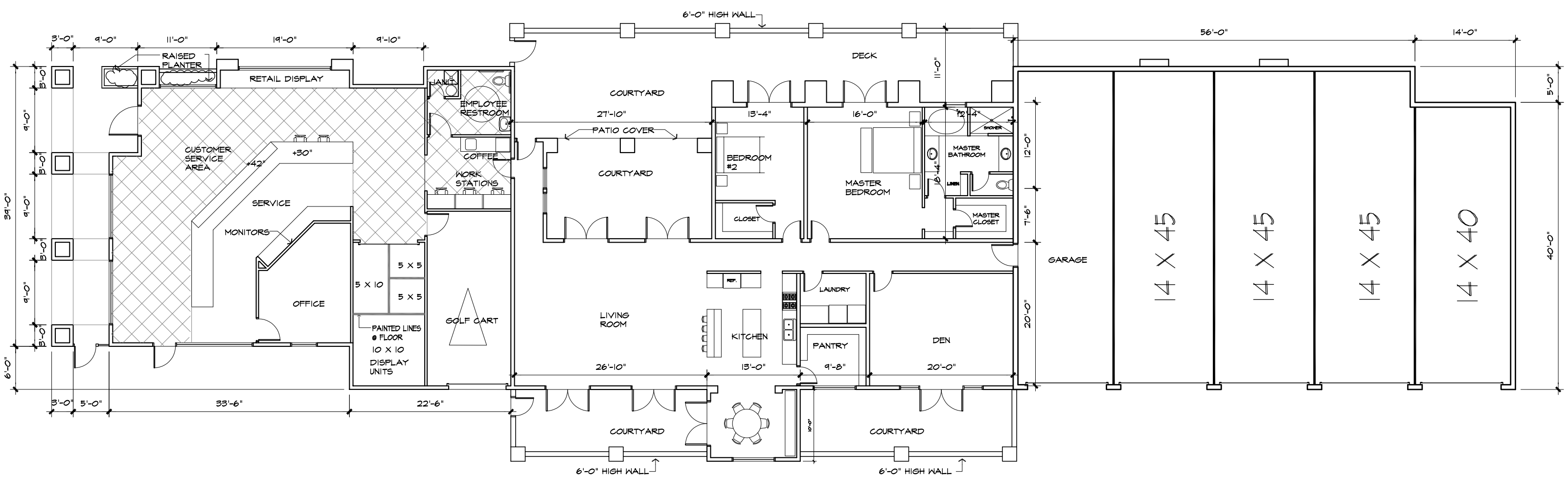
T & R SELF STORAGE

ESCONDIDO, CA 3300 05-052 (MUP)

PRELIMINARY SITE PLAN

JOB NUMBER: 12-540
SCALE: 1"=30'-0"
DATE: 03/19/13

jordan ARCHITECTS, INC.



T & R SELF STORAGE

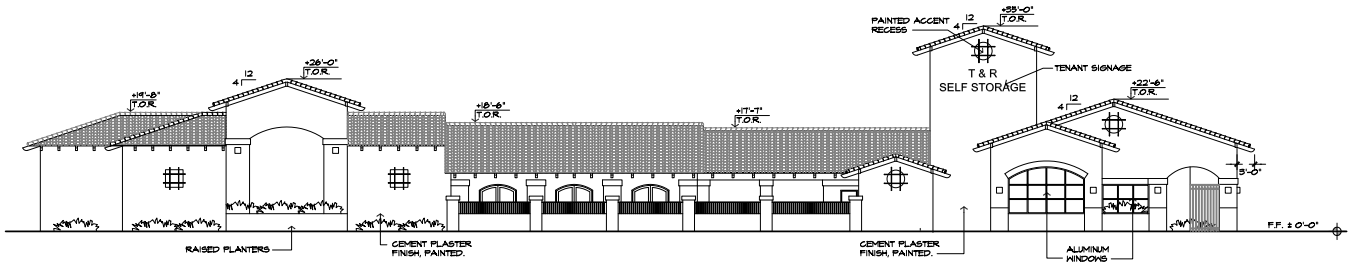
ESCONDIDO, CA

3300 05-052 (MUP)

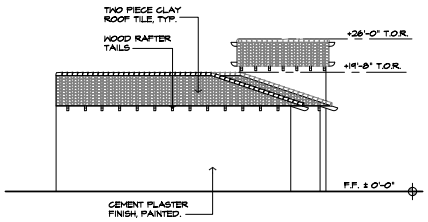
BLDG. A PRELIMINARY FLOOR PLAN

JOB NUMBER: 12-540
SCALE: 1/8"=1'-0"
DATE: 11/19/12

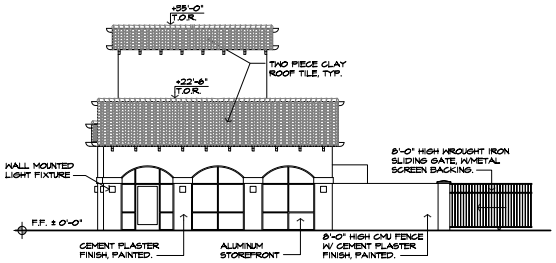
jordan
ARCHITECTS, INC.
131 CALLE IGLESIA, SUITE 100
SAN CLEMENTE,
CA 92672-7541
Telephone 949/388-8090
Facsimile 949/388-8290



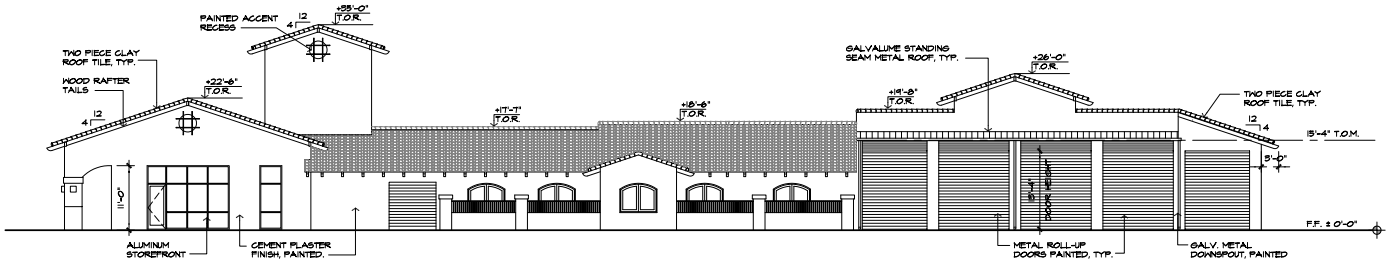
BUILDING A - OFFICE
NORTH ELEVATION



BUILDING A - OFFICE
EAST ELEVATION



BUILDING A - OFFICE
WEST ELEVATION



BUILDING A -OFFICE
SOUTH ELEVATION

T & R SELF STORAGE

ESCONDIDO, CA 3300 05-052 (MUP)

BLDG. A PRELIMINARY ELEVATIONS

JOB NUMBER: 12-540
SCALE: 1"=10'-0"
DATE: 11/19/12

jordan ARCHITECTS, INC.

APPENDIX B

Pertinent Sections of the County of San Diego Noise Element to the General Plan

Policy 4b

Because exterior community noise equivalent levels (CNEL) above 60 decibels and/or interior CNEL above 45 decibels may have an adverse effect on public health and welfare, it is the policy of the County of San Diego that:

1. Whenever it appears that new *development* may result in any (existing or future) *noise sensitive land use* being subject to noise levels of CNEL equal to 60 *decibels (A)* or greater, an acoustical analysis shall be required.

2. If the acoustical analysis shows that noise levels at any *noise sensitive land use* will exceed CNEL equal to 60 decibels, modifications shall be made to the *development* which reduce the *exterior noise* level to less than CNEL of 60 *decibels (A)* and the *interior noise* level to less than CNEL of 45 *decibels (A)*.

3. If modifications are not made to the *development* in accordance with paragraph 2 above, the *development* shall not be approved unless a finding is made that there are specifically identified overriding social or economic considerations which warrant approval of the development without such modification; provided, however, if the acoustical study shows that sound levels for any noise sensitive land use will exceed a CNEL equal to 75 *decibels (A)* even with such modifications, the *development* shall not be approved irrespective of such social or economic considerations.

Definitions, Notes & Exceptions

"*Decibels (A)*" refers to A-weighted sound levels as noted on page VIII-2 of this Element.

"*Development*" means any physical development including but not limited to residences, commercial, or industrial facilities, roads, civic buildings, hospitals, schools, airports, or similar facilities.

"*Exterior noise*":

(a) For single family detached dwelling projects, "exterior noise" means noise measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum area:

(i) Net lot area up to 4,000 sq. ft.:	400 square feet
(ii) Net lot area 4,000 sq. ft. to 10 ac.:	10% of net lot area
(iii) Net lot area over 10 ac.:	1 ac.

(b) For all other projects, "exterior noise" means noise measured at all exterior areas which are provided for *group or private usable open space* purposes.

Table N-1 Noise Compatibility Guidelines

	Land Use Category	Exterior Noise Level (CNEL)						
			55	60	65	70	75	80
A	Residential—single family residences, mobile homes, senior housing, convalescent homes							
B	Residential—multi-family residences, mixed-use (commercial/residential)							
C	Transient lodging—motels, hotels, resorts							
D*	Schools, churches, hospitals, nursing homes, child care facilities							
E*	Passive recreational parks, nature preserves, contemplative spaces, cemeteries							
F*	Active parks, golf courses, athletic fields, outdoor spectator sports, water recreation							
G*	Office\professional, government, medical\dental, commercial, retail, laboratories							
H*	Industrial, manufacturing, utilities, agriculture, mining, stables, ranching, warehouse, maintenance/repair							

	ACCEPTABLE—Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal construction, without any special noise insulation requirements.
	CONDITIONALLY ACCEPTABLE—New construction or development should be undertaken only after a detailed noise analysis is conducted to determine if noise reduction measures are necessary to achieve acceptable levels for land use. Criteria for determining exterior and interior noise levels are listed in Table N-2, Noise Standards. If a project cannot mitigate noise to a level deemed Acceptable, the appropriate county decision-maker must determine that mitigation has been provided to the greatest extent practicable or that extraordinary circumstances exist.
	UNACCEPTABLE—New construction or development shall not be undertaken.

* Denotes facilities used for part of the day; therefore, an hourly standard would be used rather than CNEL (refer to Table N-2).

Note: For projects located within an Airport Influence Area of an adopted Airport Land Use Compatibility Plan (ALUCP), additional Noise Compatibility Criteria restrictions may apply as specified in the ALUCP.

APPENDIX C

Traffic Noise Model (TNM) Data and Results

Eilar Associates **7 April 2011**
JR **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B10306N1**
RUN: **Calibration**

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
I-15 N	point1	1	4331	65	215	65	272	65	0	0	0	0
	point2	2	4331	65	215	65	272	65	0	0	0	0
	point3	3	4331	65	215	65	272	65	0	0	0	0
	point4	4	4331	65	215	65	272	65	0	0	0	0
	point5	5										
I-15 S	point6	6	4266	65	212	65	268	65	0	0	0	0
	point7	7	4266	65	212	65	268	65	0	0	0	0
	point8	8	4266	65	212	65	268	65	0	0	0	0
	point9	9	4266	65	212	65	268	65	0	0	0	0
	point10	10	4266	65	212	65	268	65	0	0	0	0
	point11	11										
Centre City	point12	12	863	55	9	55	4	55	0	0	0	0
	point13	13	863	55	9	55	4	55	0	0	0	0
	point14	14	863	55	9	55	4	55	0	0	0	0
	point15	15	863	55	9	55	4	55	0	0	0	0
	point16	16	863	55	9	55	4	55	0	0	0	0
	point17	17	863	55	9	55	4	55	0	0	0	0
	point18	18	863	55	9	55	4	55	0	0	0	0
	point19	19	863	55	9	55	4	55	0	0	0	0
	point20	20	863	55	9	55	4	55	0	0	0	0
	point21	21										
Ivy Dell	point22	22	84	25	0	0	0	0	0	0	0	0
	point23	23	84	25	0	0	0	0	0	0	0	0

	point24	24	84	25	0	0	0	0	0	0	0	0
	point25	25	84	25	0	0	0	0	0	0	0	0
	point26	26	84	25	0	0	0	0	0	0	0	0
	point27	27	84	25	0	0	0	0	0	0	0	0
	point28	28	84	25	0	0	0	0	0	0	0	0
	point29	29	84	25	0	0	0	0	0	0	0	0
	point30	30	84	25	0	0	0	0	0	0	0	0
	point31	31										

Eilar Associates						**7 April 2011**					
JR						**TNM 2.5**					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	**B10306N1**										
RUN:	**Calibration**										
Receiver											
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**				**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**	**Calc.**
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Calibration	1	1	3,068.6	2,426.6	865.00	4.92	0.00	66	10.0	8.0	Y

Eilar Associates			**7 April 2011**	
JR			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**B10306N1**			
RUN:	**Calibration**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line9	10	2,926.1	1,396.5	1,000.00
	11	2,715.5	1,621.8	1,039.00
	12	2,426.4	1,927.7	931.00
	13	2,279.7	2,086.9	900.00
	14	2,229.4	2,195.9	910.00

Eilar Associates
JR
7 April 2011
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: B10306N1
RUN: Calibration
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier		Increase over existing		Type	With Barrier			
			LAeq1h	LAeq1h					Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Calibration	1	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Eilar Associates **7 April 2011**
JR **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B10306N1**
RUN: **Current**

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
I-15 N	point1	1	3441	65	171	65	216	65	0	0	0	0
	point2	2	3441	65	171	65	216	65	0	0	0	0
	point3	3	3441	65	171	65	216	65	0	0	0	0
	point4	4	3441	65	171	65	216	65	0	0	0	0
	point5	5										
I-15 S	point6	6	6518	65	323	65	409	65	0	0	0	0
	point7	7	6518	65	323	65	409	65	0	0	0	0
	point8	8	6518	65	323	65	409	65	0	0	0	0
	point9	9	6518	65	323	65	409	65	0	0	0	0
	point10	10	6518	65	323	65	409	65	0	0	0	0
	point11	11										
Centre City	point12	12	686	55	7	55	3	55	0	0	0	0
	point13	13	686	55	7	55	3	55	0	0	0	0
	point14	14	686	55	7	55	3	55	0	0	0	0
	point15	15	686	55	7	55	3	55	0	0	0	0
	point16	16	686	55	7	55	3	55	0	0	0	0
	point17	17	686	55	7	55	3	55	0	0	0	0
	point18	18	686	55	7	55	3	55	0	0	0	0
	point19	19	686	55	7	55	3	55	0	0	0	0
	point20	20	686	55	7	55	3	55	0	0	0	0
	point21	21										
Ivy Dell	point22	22	84	25	0	0	0	0	0	0	0	0
	point23	23	84	25	0	0	0	0	0	0	0	0

	point24	24	84	25	0	0	0	0	0	0	0	0
	point25	25	84	25	0	0	0	0	0	0	0	0
	point26	26	84	25	0	0	0	0	0	0	0	0
	point27	27	84	25	0	0	0	0	0	0	0	0
	point28	28	84	25	0	0	0	0	0	0	0	0
	point29	29	84	25	0	0	0	0	0	0	0	0
	point30	30	84	25	0	0	0	0	0	0	0	0
	point31	31										

Eilar Associates				**7 April 2011**		
JR				**TNM 2.5**		
INPUT: CONTOUR ZONES						
PROJECT/CONTRACT:	**B10306N1**					
RUN:	**Current**					
Contour Zone				**Points**		
Name	**Grid**	**Minimum**	**Contour**	**No.**	**Coordinates**	
	Height	**Grid**	**Tolerance**		**X**	**Y**
		Spacing				
	ft	ft	dB		ft	ft
Contour Zone1	5.00	200.00	1	1	1,299.7	3,251.1
				2	4,357.9	3,122.0
				3	4,285.2	572.3
				4	1,340.1	846.6

Eilar Associates **11 June 2013**
JR **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B10306N1**
RUN: **Future**

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
I-15 N	point1	1	7221	65	322	65	407	65	0	0	0	0
	point2	2	7221	65	322	65	407	65	0	0	0	0
	point3	3	7221	65	322	65	407	65	0	0	0	0
	point4	4	7221	65	322	65	407	65	0	0	0	0
	point5	5										
I-15 S	point6	6	7221	65	322	65	407	65	0	0	0	0
	point7	7	7221	65	322	65	407	65	0	0	0	0
	point8	8	7221	65	322	65	407	65	0	0	0	0
	point9	9	7221	65	322	65	407	65	0	0	0	0
	point10	10	7221	65	322	65	407	65	0	0	0	0
	point11	11										
Centre City	point12	12	1415	55	28	55	14	55	0	0	0	0
	point13	13	1415	55	28	55	14	55	0	0	0	0
	point14	14	1415	55	28	55	14	55	0	0	0	0
	point15	15	1415	55	28	55	14	55	0	0	0	0
	point16	16	1415	55	28	55	14	55	0	0	0	0
	point17	17	1415	55	28	55	14	55	0	0	0	0
	point18	18	1415	55	28	55	14	55	0	0	0	0
	point19	19	1415	55	28	55	14	55	0	0	0	0
	point20	20	1415	55	28	55	14	55	0	0	0	0
	point21	21										
Ivy Dell	point22	22	209	30	4	30	2	30	0	0	0	0
	point23	23	209	30	4	30	2	30	0	0	0	0

	point24	24	209	30	4	30	2	30	0	0	0	0
	point25	25	209	30	4	30	2	30	0	0	0	0
	point26	26	209	30	4	30	2	30	0	0	0	0
	point27	27	209	30	4	30	2	30	0	0	0	0
	point28	28	209	30	4	30	2	30	0	0	0	0
	point29	29	209	30	4	30	2	30	0	0	0	0
	point30	30	209	30	4	30	2	30	0	0	0	0
	point31	31										

Eilar Associates						**11 June 2013**					
JR						**TNM 2.5**					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	**B10306N1**										
RUN:	**Future**										
Receiver											
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**				**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**	**Calc.**
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Residence	9	1	2,895.7	2,313.2	874.00	4.92	0.00	66	10.0	8.0	Y

Eilar Associates
JR
11 June 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: B10306N1
RUN: Future
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Residence	9	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

APPENDIX D

Exterior-to-Interior Noise Analysis

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: T&R Storage
Project # : B10306N3
Room Name: Living Room

Wall 1 of 1

Room Type : Medium Soft

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.8	0.8	0.8	0.8	0.7	0.7	: Fairly Absorptive Room
Room Absorption (Sabins) :	421	421	421	421	527	527	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	Traffic	68.8	CNEL	52.1	57.6	60.1	64.1	64.1	58.1	: Traffic Spectrum
Source 2:	<N/A>	0.0	CNEL	0.0	0.0	0.0	0.0	0.0	0.0	
Source 3:	<N/A>	0.0	CNEL	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	<N/A>	0.0	CNEL	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		68.8	CNEL	52.1	57.6	60.1	64.1	64.1	58.1	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
STC 44 Typical Exterior Wall	N	39	9	1	255.0	29	39	44	43	42	49
Window, Single Pane	Y	6	8	2	96.0	12	19	21	19	27	26
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: 20 ft   **Overall Area:** 351 ft²
Volume: 7020 ft³
Number of Impacted Walls: 1

Windows Open		
Interior Noise Level:	**59.0**	**CNEL**
Windows Closed		
Interior Noise Level:	**41.7**	**CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.1	57.6	60.1	64.1	64.1	58.1	: Exterior Wall Noise Exposure
8.3	8.6	8.6	8.6	8.6	8.6	: Transmission Loss
25.5	25.5	25.5	25.5	25.5	25.5	: Wall Surface Area Factor
26.2	26.2	26.2	26.2	27.2	27.2	: Absorption
43.0	48.2	50.7	54.7	53.7	47.7	: Noise Level
59.0	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.1	57.6	60.1	64.1	64.1	58.1	: Exterior Wall Noise Exposure
17.4	24.5	26.6	24.6	32.3	31.6	: Transmission Loss
25.5	25.5	25.5	25.5	25.5	25.5	: Wall Surface Area Factor
26.2	26.2	26.2	26.2	27.2	27.2	: Absorption
33.9	32.3	32.7	38.7	30.1	24.8	: Noise Level
41.7	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: T&R Storage
Project # : B10306N3
Room Name: Den

Wall 1 of 1

Room Type : Medium Soft

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.8	0.8	0.8	0.8	0.7	0.7	: Fairly Absorptive Room
Room Absorption (Sabins) :	162	162	162	162	203	203	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	Traffic	**68.8**	**CNEL**	52.1	57.6	60.1	64.1	64.1	58.1	: Traffic Spectrum
Source 2:	<N/A>	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 3:	<N/A>	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	<N/A>	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**68.8**	**CNEL**	52.1	57.6	60.1	64.1	64.1	58.1	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
STC 44 Typical Exterior Wall	N	20	9	1	132.0	29	39	44	43	42	49
Window, Single Pane	Y	6	8	1	48.0	12	19	21	19	27	26
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: 15 ft **Overall Area:** 180 ft²
Volume: 2700 ft³

Number of Impacted Walls: 1

Windows Open Interior Noise Level:	**60.1**	**CNEL**
Windows Closed Interior Noise Level:	**42.9**	**CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.1	57.6	60.1	64.1	64.1	58.1	: Exterior Wall Noise Exposure
8.5	8.7	8.7	8.7	8.7	8.7	: Transmission Loss
22.6	22.6	22.6	22.6	22.6	22.6	: Wall Surface Area Factor
22.1	22.1	22.1	22.1	23.1	23.1	: Absorption
44.1	49.4	51.8	55.9	54.9	48.9	: Noise Level
60.1	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.1	57.6	60.1	64.1	64.1	58.1	: Exterior Wall Noise Exposure
17.5	24.6	26.7	24.7	32.4	31.7	: Transmission Loss
22.6	22.6	22.6	22.6	22.6	22.6	: Wall Surface Area Factor
22.1	22.1	22.1	22.1	23.1	23.1	: Absorption
35.1	33.4	33.9	39.9	31.2	25.9	: Noise Level
42.9	**CNEL**	WINDOWS CLOSED				

APPENDIX E

Recommended Products

TECHNICAL DATA

DRAFT & ACOUSTICAL
SOUND SEALANT

OSI® Greenseries™ Draft & Acoustical Sound Sealant is a non-flammable, latex-based sealant specially designed to reduce sound transmissions and drafts in all types of wall systems where a sound-rated assembly is required. Its primary function is to achieve and maintain the specific STC (Sound Transmission Class) value of the system designed.

The paintable sealant remains flexible and adheres firmly to wood, metal studs, concrete, gypsum board and most other building materials. The easy-to-use sealant cleans up easily with soap and water.

FEATURES
- Permanently flexible
- Easy application and cleanup
- UL Classification – R9732; UL 723
- Easy water cleanup
- Low VOC, compliant formula
- Will not harden, crack or separate
- Non-staining & non-migrating
- High degree of adhesive and cohesive strength.

USES
Greenseries™ Draft & Acoustical was developed primarily for commercial construction utilizing light weight cavity walls and floor systems. Draft & Acoustical Sealant is used successfully in office buildings, hotels, apartment complexes, and other types of commercial & residential construction.

PHYSICAL PROPERTIES

Type	Synthetic Latex Rubber
Color	White
Solids by weight	75%
Toxicity	Toxic only if swallowed. Refer to MSDS.
Flammability	Nonflammable
Flash Point	200°F. TCC (minimum amount of solvent present)
Tooling/Open Time	15 minutes
Tack Free Time	30 minutes
Cure Time	2-7 days
Application Temperature	40°F minimum
Service Temperature	-5°F - 170°F
Freeze-Thaw Stability	3 cycles. Unaffected by freezing after curing
Shelf Life	1 year from date made at 75°F
Sag or Slump	Nil (ASTM D2202)
VOC Level	22g/l or <1% by wt.
Shore "A" Hardness	45 +/-5 (Cured 30 days @ room temp.)
Clean-up	Water and soap before curing
Accelerated Weathering	No cracks, discoloration or chalking: 1000 hrs. in Xenon Arc Weatherometer

The sealant is used for exposed and unexposed applications at perimeter joints, floor and ceiling runners, cut outs in gypsum board, veneer plaster systems and other areas where a sound rated assembly is required. The sealant can also be applied or buttered around all electrical boxes and outlets, cold air returns, heating and air conditioning ducts, and other utility equipment penetrating wall surfaces for increased acoustical performance. Also works well for sealing sill and and base plates in residential construction.

SPECIFICATIONS
- UL Classified – 48S9 (R9732). Tested in accordance with and conforms to UL 723: U.B.C. Standard No. 42-1 Class I.
- ASTM E84: Surface Burning Characteristics of Building Materials.
- ASTM E90-85: Laboratory Measurement of Airborne-Sound Transmission Loss of Building Materials.
- ASTM D217: Testing Standard for Consistency.
- ASTM C919-79: Standard Practice for Use of Sealants in Acoustical Applications.
- SCAQMD Rule 1168 V.O.C.; CARB; and BAAQMD compliant
- GREENGUARD Certified
- Meets LEEDS requirements

LIMITATIONS
- Keep from freezing
- Do not use below 40°F. (5°C.).
- Not recommended for use on mirrors or underwater applications.
- Not recommended for exterior use.

PACKAGING
28 oz. cartridges – 12 per case (Item No. GS79928)

STORAGE
Store at 70°F. +/- 5° (21°C) for long shelf life and easy application. Do not store below 40°F. (5°C.).

COVERAGE
3/8" round bead size: approx. 40 lin. ft. per 28 oz. cartridge.
¼" round bead size: Approx. 89 lin. ft. / 28oz cartridge.

PERFORMANCE CHARACTERISTICS

1. Underwriters Laboratories Inc. Classified 48S9 (R9732) UL 723: Sealant tested for surface burning characteristics

	Applied to organic Reinforced Cement Board*
Flame Spread	5
Smoke Development	5

*Tested as applied in two 1/2in. beads, 8in. on center. The sealant covered 5.6 percent of the exposed sample area.

2. ASTM E90-85: STC Value – Effect of sealing the opening on a test wall partition.

APPLICATION PROCEEDURES

All surfaces must be clean and free of dust, dirt, oil, moisture and other foreign substances which could interfere with the bond of the sealant.

DIRECTIONS

1. Cut spout on tube to desired bead size (3/8" round bead recommended) and puncture seal inside spout.
2. Sealant should be applied as specified in the sound-rated system being installed (either wood or metal studs)

A. Bottom & Top Runners: Apply a continuous 3/8" round bead of sealant on runners before setting gypsum board. Gypsum board shall be set into sealant to form complete contact with adjacent materials. Fill joint on top runners to complete seal. Repeat procedure for double layer applications.

B. Cut-Outs and Perimeter Joints. Backs of electrical boxes, pipes, duct systems and other types of utility equipment penetrating wall surfaces shall be buttered with sealant. Seal all joints at perimeter edges including abutting surfaces and corner joints.

3. Maximum joint size should not exceed ⅝" x ½".
4. Clean tools and excess sealant immediately after application with soap and water.
5. If necessary, sealant can be painted as applicable to meet project requirements after 24 hours.

CAUTION! CONTAINS ETHYLENE GLYCOL , MINERAL SPIRITS and crystalline silica. Avoid eye contact. Do not take internally. If swallowed, may cause abdominal discomfort. Use with adequate ventilation. Refer to MSDS.

WARNING: This product contains a chemical known to the State of California to cause cancer.

KEEP OUT OF REACH OF CHILDREN

FIRST AID

Eye Contact: In case of eye contact, flush with clean water for at least 15 minutes. Skin Contact: Wash skin thoroughly with soap and water. Ingestion: DO NOT induce vomiting. Seek medical attention. If dizziness occurs, remove to fresh air.

NOTICE TO PURCHASER

Henkel Corporation warrants this product when used according to directions. If not satisfied with the product's performance when used as directed, return sales receipt and used container to Henkel Corporation, 32150 Just Imagine Drive, Avon OH, 44011 for product replacement or refund. User shall determine suitability of product for use and assumes all risk.

QUESTIONS?

For commercial use or other questions pertaining to this product, call Henkel Technical Service at 800-321-0253 M-F, 9am – 4pm. or visit our website at www.greenseries.com.

Test partition consisted of metal studs 24" O.C. with double layer gypsum board, Fire code "C" and attached with screws on both sides. Inside of partition was filled with sound insulation. Partition system was erected and shimmed out 4.75 mm (0.1875in.) at top, bottom and edges.

Results: Sound Transmission Class Value

1. Un-sealed partition – Arrows show sound travel around or through partitions.
   a. STC=15
2. Single bead of sealant used at top and bottom runners only – both sides of partition system.
   a. STC=24

Metal Stud Partition Door/Window frame in a hollow partition

3. Single bead of sealant used at top, bottom and perimeter joints – both sides of system.
   a. STC=45
4. Double bead of sealant used at top, bottom and perimeter joints – both sides of system.
   a. STC=55

OSI® GreenSeries™ Draft & Acoustical Sound Sealant is currently under going tested by GREENGUARD.
The GREENGUARD INDOOR AIR QUALITY CERTIFIED Mark is a registered certification mark used under license through the GREENGUARD Environmental Institute.

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AC-20 FTR®

(Fire & Temperature Rated) Acoustical & Insulation Sealant

Specification Data Sheet

PECORA CORPORATION

BASIC USES

• AC-20 FTR® fire-rated systems are suitable for applications in schools, hospitals, churches, high-rise office buildings and hotels, prisons, sports arenas, and other public-use buildings to ensure a safe and orderly evacuation in the event of a fire.

2. MANUFACTURER

Pecora Corporation
165 Wambold Road
Harleysville, PA 19438
Phone: 215-723-6051
800-523-6688
Fax: 215-721-0286
Website: www.pecora.com

3. PRODUCT DESCRIPTION

AC-20 FTR® is a unique acrylic latex sealant that is UL® Classified in firestopping systems for expansion joints and through penetrations. When properly installed, these systems effectively contain fire, smoke, toxic fumes, and water within a given area surrounded by firewalls for a two, three, or four hour period, depending on the design specifications.

Other Uses: Excellent adhesive, flexibility and durability qualities make AC-20 FTR® ideal for insulating and weatherproofing around windows, doors, panels, siding, duct work, base plates, etc. It is compatible with all common building materials including specialties such as polystyrene, polyurethane, cork, vinyl, foamed and fibrous glass.

Used as an acoustical sealant, AC-20 FTR® reduces sound transmission in partition systems to achieve specific STC values by sealing spaces around cut-outs and at perimeters of partitions. The sealant cures to a tough rubber to form a long-lasting acoustical seal.

PACKAGING

• 30 fl. oz. (.887 liter) fiber cartridges
• 5-gallon (18.9 liter) pails

COLOR

• White, Beige-Gray
Special colors available in 250-gallon (946 liter) batches.

4. TECHNICAL DATA

Applicable Standards: ASTM C-834-86 specification for latex sealing compounds.

Fire Rated System: Two-hour Fire and Temperature Rated wall and floor joint systems up to 7" (178mm) wide and four-hour systems up to 4" wide can be designed with AC-20 FTR® in conjunction with Ultra Block fire blocking material in fire-rated walls and floors. Reference: ANSI/UL 263, ASTM E-119, NFPA No. 251.

UL CLASSIFIED

UNDERWRITERS LABORATORIES INC.® CLASSIFIED JOINT TREATMENT MATERIALS FIRE RESISTANCE CLASSIFICATION

DESIGNS J900H (FFS 0006) &U900 "O" (WWS 0010), J900Z (FFS 2002), U900Z-009 (WWS 2008), J900Z-007 (FFS 1010), U900Z-015 (WWS 1012)

AC-20 FTR® in conjunction with Ultra Block® achieves a 2-hour fire rating when sealing around steel or copper pipe and electrical metallic tubing or steel conduit in through penetration systems. Reference: ANSI/UL 1479, ASTM E-814.

FILL, VOID OR CAVITY MATERIALS CLASSIFIED BY UNDERWRITERS LABORATORIES INC. FOR USE IN THROUGH-PENETRATION FIRESTOP SYSTEM NO. CAJ 1093

In addition to its fire-blocking value, Ultra Block® is very efficient acoustically, having a noise reduction coefficient of .75 and sound transmission coefficient of .5 (Ultra Block® is a registered trademark of Backer Rod Mfg. and Supply Co., Denver, CO, USA.)

5. INSTALLATION

Surface Preparation: Surfaces must be free of all contamination. Sealant may be applied to damp, porous surfaces. No priming is required.

Application: Refer to Pecora Firestopping Manual 07270 and UL Fire Resistance Directory for installation details on fire-rated joint and through penetration systems. For insulating and weatherproofing purposes, fill all window, door, and panel perimeter joints using a resilient backer rod to control sealant depth to 1/2" (13mm) maximum. For best results, protect sealant from excessive low temperatures and apply above 40°F (4°C). For acoustical purposes, apply continuous

TYPICAL PHYSICAL PROPERTIES

Test Property	Value	Procedure
Modulus @ 100% (psi)	15-20	ASTM D412
Ultimate Tensile (psi)	30-40	ASTM D412
Ultimate Elongation (%)	400-500	ASTM D412
Movement Capability (%)	±7 1/2	ASTM D412
VOC Content	31 g/L	

beads of sealant to seal perimeters of all sound-rated partitions. Apply sealant in the angles formed by metal components or base-layer panels and abutting surfaces. Apply sealant around all openings formed for outlets; electrical, telephone, light fixtures, etc.

Tooling: Tool material flush with surfaces to allow for expected shrinkage and insure good contact and adhesion to the substrate.

Cleaning: Remove excess material with water or a damp cloth before it cures. Sealant may be painted within 30 minutes after application with a good grade of latex paint.

Shelf Life: AC-20 FTR® has a shelf life well in excess of one year when stored in unopened containers below 80° F (27°C).

Precautions: AC-20 FTR® is non-flammable, non-toxic, non-irritating and environmentally safe. However, do not take internally. Refer to Material Safety Data Sheet for additional information.

Ultra Block® is a non-carcinogenic processed continuous filament textile glass fiber that may cause skin, eye and respiratory irritation. When applying, wear long sleeves, gloves, cap, goggles or safety glasses and NIOSH/MSHA-approved dust respirator. After use bathe with soap and warm water. Wash clothes separately and rinse after use. Refer to Material Safety Data Sheet for additional information.

FOR PROFESSIONAL USE ONLY.
KEEP OUT OF THE REACH OF CHILDREN.

6. AVAILABILITY AND COST

Pecora products are available from our stocking distributors in all major cities. For the name and telephone number of your nearest representative call one of our locations listed below or visit our website at www.pecora.com.

7. WARRANTY

Pecora Corporation warrants its products to be free of defects. Under this warranty, we will provide, at no charge, replacement materials for, or refund the purchase price of, any product proven to be defective when installed in accordance with our published recommendations and in applications considered by us as suitable from this product. This warranty in lieu of any and all other warranties expressed or implied, and in no case will Pecora be liable for incidental or consequential damages.

8. MAINTENANCE

If the sealant is damaged and the bond is intact, cut out the damaged area and recaulk. No primer is required. If the bond has been affected, remove the sealant, clean and prepare the joint in accordance with instructions under "Installation".

9. TECHNICAL SERVICES

Pecora representatives are available to assist you in selecting an appropriate product and to provide on-site application instructions or to conduct jobsite inspections. For further assistance call our Technical Service Department at 800-523-6688.

ISO 9001:2000
KEMA CERTIFICATE
Accredited by ANSI-RAB NAP

PECORA CORPORATION
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PEOPLE • PRODUCTS • PERFORMANCE

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