Rochester Public Works

Memo

To: Mayor and City Councilmembers

From: Richard W. Freese

CC: Stevan Kvenvold

Date: 1/22/2003

Re: Noise Standards Exemption Request for TH 52 Sound Walls

BACKGROUND:

MnDOT has requested that the Rochester City Council pass a Resolution in support of the recommendations found in the Noise Standards Exemption Request for TH 14/52 Reconstruction. The City staff has reviewed the Noise Standards Exemption Request for TH 14/52 Reconstruction dated May 2002 prepared by URS Corporation for MnDOT

As part of the TH 52 Final Environmental Impact Statement (FEIS) approved in 1996, a detailed noise mitigation plan was completed. The plan evaluated all "reasonably available noise mitigation measures." The Noise Standards Exemption Request is part of an Environmental Assessment being prepared by the Department to address the environmental impacts associated with the increase in the project scope from 4-lane highway to a 6-lane highway. The Environmental Assessment includes all mitigation measures included in the detailed noise mitigation plan that met the design criteria.

The Exemption Request states "future noise levels exceed both the Federal and State Noise Abatement Criteria and State Noise Standards at many sensitive receptors." Therefore, noise abatement measures are proposed and were analyzed in the study. The TH 52 Reconstruction Project must comply with both the State of Minnesota Noise Standards and the Federal Noise Abatement Criteria. The Study states, " all reasonable and feasible mitigation measures are planned as part of this project. Even with these noise mitigation measures, the Minnesota Noise Standards are exceeded at many locations. Therefore, a Noise Standards Exemption Request will be submitted to the Commissioners of the Minnesota Pollution Control, and the Minnesota Department of Transportation." MnDOT's Exemption Request is for areas along TH 52 were noise mitigation from proposed noise walls has been determined to be ineffective (a 5 dB reduction was not achieved) or not cost-effective (the cost of the noise wall was greater than $3,250 per decibel reduction per household).

The Study also identifies noise wall locations and heights that have been proposed for construction as a part of the TH 52 Reconstruction Project through Rochester. The Study states that "the standards for Noise Area Classification apply to residential areas and other

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uses intended for overnight sleeping (hotels, motels, mobile home parks, etc.). The standards also apply to schools, churches, medical services, and park areas."

Several commercial business owners along the TH 52 Frontage Roads have contacted the City where noise walls are proposed in the Study. These business owners have asked that portions of the noise walls be removed from in front of their property to maintain visibility of their business from TH 52.

The City Council held a meeting on this matter on August 19, 2002 at which time several business owners raised their concerns to the City Council about the locations of proposed noise walls in relationship to their businesses. The City Council asked that I meet with business owners along TH 52 affected by the proposed location of noise walls.
I discussed this matter with MnDOT staff and we agreed to meet with URS (MnDOT's consult that performed the updated TH 52 Air Quality and Noise Assessment) to discuss this matter after the TH 52 Design Build selection process had been completed (It was agreed to avoid any conflict of interest that neither the City or MnDOT would discuss this matter with URS since they were members on a team proposing on the TH 52 Design Build Project). We subsequently meet with URS staff on December 4, 2002. MnDOT requested that I write a letter to MnDOT formally requesting MnDOT concurrence with the City's retention of URS to utilize MnDOT's noise model developed for the TH 52 Reconstruction Project.

I have requested that URS conduct the following professional services under contract with the City:

1. Task 1: Meet with business property owners along TH 52 where visibility from TH 52 is affected by the proposed location of noise walls and;
    a. explain the process used in locating the proposed noise walls, and
    b. explain the scope of the review the City proposes to have conducted.

2. Task 2: Direct URS to evaluate whether or not the lengths of the proposed noise walls; East Wall 1, East Wall 3, East Wall 6, East Wall 12; East Wall 9, and West Wall 2, can be shortened in length and by how much without;
    a. increasing the dB of the identified Study receptors by more than 3 dB, and
    b. without decreasing the cost-effectiveness of the proposed walls below the criteria for cost-effectiveness.

3. Task 3: Direct URS staff to evaluate whether or not relocation of the proposed noise walls; East Wall 1, East Wall 3, East Wall 6, East Wall 12 and West Wall 2, behind the business parcels would achieve acceptable noise level reductions and meet the cost-effective criteria for noise wall placement.

4. Task 4: Prepare an Addendum to the TH 52 Noise Wall Exemption Study that includes the results of Task #2.

5. Task 5: Present the results of the TH 52 Noise Wall Exemption Study and the Addendum to the City Council at a Committee of the Whole Meeting (1/27/03).

6. Task 6: Attend City Council Meeting to answer questions associated with request for Council passage of a Resolution in support of the TH 52 Noise Wall Exemption Study and the Addendum (if necessary).

A series of 4 different meetings were held on December 19, 2002 with the business owners impacted by the proposed location of the noise walls referenced above. We listened to the concerns of the business owners and asked what variations to the proposed noise wall locations they would like us to evaluate. We advised the business owners that we would meet with them again during the week of January 20, 2003 to review and discuss with them the results of the evaluation of the alternative noise wall configurations discussed on 12/19/02.

A meeting was held on January 22, 2003 with all of the business owners.

FINDINGS:

The evaluation of alternative noise wall configurations result in the following findings:

1. **EAST WALL 1 (Park Institute):** The proposed reduction of 185 feet from the south end of East Wall 1 has no impact except at receiver #9. At this location the proposed change in the length of the wall will result in an increase of 1 dB in the noise at this receiver over current conditions and an increase of 8 dB over the noise level that could be achieved if the wall were constructed as proposed in MnDOT's Noise Assessment Report.

2. **EAST WALL 3 (Park Place Motorcars):** The proposed reduction of 460 feet from the north end of Wall # 3 has no impact except at receiver #12. This receiver previously was a residential dwelling unit, but now serves an office for a used car sales business. The impact on this receiver can be disregarded. The proposed Alternative 1 moves the noise wall from the west side to the east side of the frontage road. This significantly reduces (69 to 61 dB) the noise levels at receiver #13 and only slightly increases (61 to 63 dB) the noise levels at receiver #14.

3. **EAST WALL 12 (Hillcrest Shopping Center to 14th Street NW):** The proposed elimination of all of Wall #12 (1,690 feet) has impacts on the noise levels of residential property to the south and east of the shopping center and businesses located on the frontage roads between 16th and 14th Streets NW.

   The noise impact on receivers #26 and #27 located north of 16th Street NW can be mitigated to comparable levels found in the Noise Assessment Report by relocating the proposed noise wall from west of the frontage road to the rear of the shopping center building and by connecting the east sides of the office buildings located along the frontage road between 16th and 14th Streets NW.

   The noise impact on receivers #28, #29, and #31 located south of 16th Street NW cannot be completely mitigated to comparable levels found in the Noise Assessment Report. Increases at these receivers ranged from 3 to 7 dB. Various alternatives were evaluated by relocating the proposed noises wall from west of the frontage road to the rear of the shopping center building and to the east edge of the office buildings located along the frontage road between 16th and 14th Streets NW.

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Alternative 4 was the most effective (increases of 2 to 4 dB) alternative, but requires the closure of 16th Street NW between 16 1/2 Avenue NW and the East Frontage Road.

4. **EAST WALL 6 (south of 14th Street NW):** The proposed reduction of 185 feet from the north end of Wall 6 has no impact except at receiver #31. The slight noise impact (3 dB increase) at receiver #31 is a result of the relocation of Wall #12 and a reduction in the length of Wall 6 south of 14th Street NW.

5. **EAST WALL 9 (14th Avenue SW):** The proposed reduction of 40 feet from the south end of Wall 9 has no impact except at receiver #54. The noticeable noise impact (5 dB increase) at receiver #54 is a result of the shortening of Wall 9.

6. **WEST WALL 2 (22nd to 26th Streets NW):** The proposed reduction of 710 feet from the south end of Wall 2 has impacts at receivers #11 and #12. The 6 dB noise increase impact at receiver #12 is a result of the elimination of Wall 2 south of 24th Street NW. The 14 dB noise increase impact at receiver #11 is a result of the elimination of Wall 2 from the south property line of Heritage Manor Apartments. This noise impact could be mitigated to some degree by extending a noise wall along the south property line of the Heritage Manor Apartment complex from the frontage road to northeast corner of the commercial building along the north side of 24th Street NW.

The City Attorney will prepare a memo to the Council addressing the issue of possible "city liability" raised at the August 19, 2002 City Council Committee of the Whole Meeting if noise walls required by the State of Minnesota Noise Standards are recommended to be eliminated from the TH 52 Project by City Council Resolution. It's my understanding that the provisions of State Statute 116.07 Subd. 2a. (1) and (2) apply to our situation as well as Minnesota Rule 7030.0080. MPCA provides a Variance process (MN Rules 7030.0080) for individuals and the local unit of government. The Variance process allows for some level of discretion in determining what is an "undue hardship", "reasonable" or "impractical" when it comes to noise mitigation measures in that community.

The City Council also discussed the possibility of requiring that Noise Easements be granted by the businesses requesting that proposed noise walls be eliminated or shortened in length. The Council also discussed the likelihood that residential property owners may not be willing to grant a noise easement.

The proposed relocation of noise walls from public right-of-way to private property, as shown in all four East Wall 12 Alternatives, will require dedication of both temporary and permanent easements for the noise walls. Unless the property owners are willing to grant to MnDOT in a timely manner these easements at no cost, MnDOT will not be able to relocate the walls due the TH 52 Design Build schedule. There is also a concern about maintenance responsibility and costs for noise walls relocated out of public right-of-way onto private property. MnDOT has indicated that they will not responsible for maintenance costs attributable to the relocated noise walls that are constructed on private property. The City should not be expected to accept this additional cost. Therefore, the Council should consider assigning the cost of maintenance of these relocated walls to the respective property owners upon whose land the walls are located.

NEXT CONSIDERATIONS / ACTIONS BY THE CITY COUNCIL

1. **Committee of the Whole meeting on 1/27/03**

    a. The results of the analysis conducted by URS will be presented to the City Council. The Council will need to weigh the impacts on the businesses located along TH 52 that may result from the location of proposed noise walls in front of their businesses verses the noise impacts to residential properties if the noise walls are shortened in length or eliminated. The business owners want the Council to hear their concerns.
    b. The City Attorney will provide the City Council information on the actions they may choose to make or not make relative to MnDOT's Noise Standards Exemption Request.

2. **City Council Meeting on 2/03/03**

    a. Take no action either in support or opposition to MnDOT's Noise Standards Exemption Request, or
    b. Consider adoption of a Resolution in support of MnDOT's Noise Standards Exemption Request, or
    c. Consider adoption of a Resolution in support of an amendment to MnDOT's Noise Standards Exemption Request that includes reduction in length of certain noise walls deemed by the City Council to cause and undue hardship, are unreasonable or impractical, or
    d. Direct staff to prepare an application for a Variance to MN Rule 7030.0080 that finds by reason of exceptional circumstances strict conformity with any provisions of any noise rule would cause undue hardship, would be unreasonable or impractical.

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DRAFT
TH 52 Noise Wall Alternatives Analysis

For

TH 14/52 RECONSTRUCTION

Prepared for the City of Rochester
by
URS Corporation

January 2003

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TH 52 Noise Wall Alternatives Analysis

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INTRODUCTION

As a part of the TH 52 reconstruction by the Minnesota Department of Transportation (Mn/DOT), noise mitigation is proposed for much of the project corridor in the form of noise walls. A noise mitigation plan was prepared and presented for public review as part of the Final Environmental Impact Statement (FEIS) published in March of 1996. Since the publication of the FEIS, the project has been changed to include an additional lane in each direction. As a result, further environmental analysis has been conducted, which includes a detailed noise analysis. In addition to the change in the project alignment and configuration, the State of Minnesota's rules have been changed regarding noise mitigation for roadway projects. Through the changes and the updated noise analyses, noise walls have been proposed in some locations that were previously not proposed as part of the FEIS. These proposed walls are part of a Draft Noise Standards Exemption Request that is being prepared by Mn/DOT.

Part of the Noise Standards Exemption Request analysis includes consideration of whether noise walls are supported by the community. By means of a City Council Resolution, walls that have been found to be cost-effective can be declined and removed from the project. The goal of this document is to provide the details of several noise walls that have been identified as commercially undesirable to local businesses due to a reduction of visibility from the highway, and to assess the impacts of proposed alternatives.

State Noise Standards Exemption

The Noise Standards Exemption Request is a document prepared by Mn/DOT for presentation to the Commissioners of Mn/DOT and the MPCA. This document addresses the following information by providing documentation "that all reasonably available noise mitigation measures are employed to abate noise."

> *Exemption from State Noise Standards.* ***The Minnesota State Noise Standards do not apply to certain roadways provided that all reasonably available noise mitigation measures are employed to abate noise. The exemption criteria are found in Minnesota Statutes 2000, Section 116.07 Subdivision 2a. The text of the exemption is provided as follows, with the specific exemption shown in bold text:***
>
> Subd. 2a. Exemptions from standards. No standards adopted by any state agency for limiting levels of noise in terms of sound pressure which may occur in the outdoor atmosphere shall apply to (1) segments of trunk highways constructed with federal interstate substitution money, provided that all reasonably available noise mitigation measures are employed to abate noise, (2) **an existing or newly constructed segment of a highway, provided that all reasonably available noise mitigation measures, as approved by the commissioners of the department of transportation and pollution control agency, are employed to abate noise,** (3) except for the cities of Minneapolis and St. Paul, an existing or newly constructed segment of a road, street, or highway under the jurisdiction of a road authority of a town, statutory or home rule charter city, or county, except for roadways for which full control of access has been acquired, (4) skeet, trap or shooting sports clubs, or (5) motor vehicle race events conducted at a facility

specifically designed for that purpose that was in operation on or before July 1, 1983. Nothing herein shall prohibit a local unit of government or a public corporation with the power to make rules for the government of its real property from regulating the location and operation of skeet, trap or shooting sports clubs, or motor vehicle race events conducted at a facility specifically designed for that purpose that was in operation on or before July 1, 1983.

Source: http://www.revisor.leg.state.mn.us/stats/116/07.html and http://www.dot.state.mn.us/metro/tps/htms/noise/leg_stat.html

Subdivision 2a (2), highlighted in bold, is the exemption that applies to many state highway project when all reasonable and feasible noise mitigation measures are employed. This guidance is only intended for those projects that meet this exemption criterion.

Noise Exemption Process

Mn/DOT and the MPCA have created a process to determine that all reasonable and feasible noise mitigation measures are considered before issuing an Exemption from the State Noise Standards. The components of cost-effectiveness include the following:

- If a sensitive noise receiver exceeds the State Noise Standards, cost-effectiveness needs to be considered.
- Noise mitigation must provide a minimum of a 5-decibel reduction
- Cost/Effectiveness ratio must be less than $3,250 per decibel reduction per household

Differences from the FEIS Process

The Noise Exemption process is different from the analysis provided in the FEIS in several ways. The FEIS only addressed the Federal Noise Abatement Criteria, which are less stringent than the State Noise Standards. As a result, noise walls were considered in more locations for the current Draft Exemption Request. In addition, the FEIS used a cost-effectiveness ratio of $4,000 per decibel reduction per household, and the method of ensuring a minimum 5-decibel reduction had been applied differently than currently guided by the Noise Exemption process. For the FEIS, the wall, on average, needed a 5-decibel reduction to be considered reasonable. For the new Noise Exemption process, each individual receiver needs to obtain a 5-decibel reduction to be included in the cost-effectiveness calculation.

The result of all of these changes could result in walls that were previously considered to be cost-effective to be not cost-effective, or vice-versa.

Analysis Process

City Staff met with Local business owners on December 18th, 2002 to discuss potential alternatives to noise walls in six areas. With input from these business owners, alternative noise mitigation options were created. The figures in Appendix B show the details of the alternatives for each specific area. Each of the alternatives considered include some reduction in the noise wall length as proposed by Mn/DOT in the Draft State Noise Standards Exemption Request. Two of the areas include alternatives with the consideration of a relocated noise wall. The analysis provided shows how noise levels will change as a result of each alternative when compared to the noise walls proposed in the Mn/DOT Draft State Noise Standards Exemption Request.

Noise Description

A general description of noise and highway traffic noise is provided to help with interpretation of how noise level changes are perceived by humans, and whether these changes may be considered an impact.

Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithmic increase in sound energy relative to a reference energy level. A sound increase of 3 dB is barely perceptible to the human ear, a 5 dB increase is clearly noticeable, and a 10 dB increase is heard twice as loud. For example, if the sound energy is doubled (e.g. the amount of traffic doubles), there is a 3 dB increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases to where there is 10 times the sound energy level over a reference level, then there is a 10 dB increase and it is heard twice as loud.

For highway traffic noise, an adjustment, or weighting, of the high- and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sound levels are stated in units of " A-weighted decibels" (dBA). In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the traffic noise levels that are exceeded 10 % and 50% of the time during the hour of the day and/or night that has the heaviest traffic. These numbers are identified as the L10 and L50 levels. The L10 value is compared to FHWA noise abatement criteria.

The following chart provides a rough comparison of the noise levels of some common noise sources.

Sound Pressure Level (dBA)	Noise Source
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
120	Rock and Roll Concert
110	Pneumatic Chipper
100	Jointer/Planer
90	Chainsaw

80	---------- Heavy Truck Traffic
70	---------- Business Office
60	---------- Conversational Speech
50	---------- Library
40	---------- Bedroom
30	---------- Secluded Woods
20	---------- Whisper

Source: "A Guide to Noise Control in Minnesota," Minnesota Pollution Control Agency, http://www.pca.state.mn.us/programs/pubs/noise.pdf and "Highway Traffic Noise," FHWA, http://www.fhwa.dot.gov/environment/htnoise.htm

Noise Analysis Results

Noise mitigation alternatives and the associated noise level changes are described below for each area. Comparisons between the future year 2029 No Build (no highway or noise wall construction) and the proposed alternative are provided. In addition, comparisons between the future year 2029 Build noise walls as proposed in the Draft State Noise Standards Exemption Request and the proposed alternative are provided. Noise levels for all of these conditions are provided in tables in Appendix A.

East Wall 1

The southern end of East Wall 1 is reduced by approximately 185 feet for Alternative 1. This reduction would provide better visibility of the Park Institute. The impact to the noise levels would result in no impact except at receiver 9. At this location the proposed change in the length of the wall will result in a decrease of 2 decibels in the noise at this receiver over future No Build conditions. An increase of 8 decibels would result over the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request.

East Wall 3-4

Alternative 1

The northern end of East Wall 3-4 includes the removal of the entire 760 foot East Wall 3 (adjacent to the freeway), and a new 280 foot extension of the north end of East Wall 4 (east of the frontage road) for Alternative 1. This change would provide better visibility of a car dealer and a neighboring business north of 26th St NW. The impact to the noise levels would result in no impact except at receivers south of 26th Street. Note that receiver 12 is now a commercial property, and impacts are not discussed here. At receiver 13, alternative 1 will result in a decrease of 15 decibels in noise compared to future No Build conditions, and a decrease of 8 decibels compared to the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request. At receiver 14, alternative 1

will result in a decrease of 6 decibels in noise compared to future No Build conditions, and the proposed noise wall changes will result in an increase of 2 decibels compared to the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request.

Alternative 2
Alternative 2 includes the removal of approximately 460 feet of the north end of East Wall 3 (slightly more than half of East Wall 3), and all of East Wall 4 remains. This change would provide better visibility of a car dealer and a neighboring business north of 26th St NW. The impact to the noise levels would result in no impact except at receivers north of 26th Street, and a slight impact at two receivers south of 26th Street. Note that receiver 12 is no longer a residence, and impacts are not discussed here. At receiver 13, alternative 2 will result in a decrease of 6 decibels in noise compared to future No Build conditions, and an increase of 1 decibel compared to the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request. At receiver 14, alternative 2 will result in a decrease of 5 decibels in noise compared to future No Build conditions, and the proposed noise wall changes will result in an increase of 3 decibels compared to the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request. Receivers 16 and 18 also result in reductions of 6 and 7 decibels, respectively when compared to No Build. Receivers 16 and 18 result in a 1 decibel increase when compared to the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request.

East Wall 6

The northern end of East Wall 6 is reduced by approximately 185 feet for Alternative 1. Note that the East Wall 12 has been completely removed for this alternative. This reduction would provide better visibility of a commercial property near 14th Street NW. The impact to the noise levels would result in no impact except at receiver 32. At this location the proposed change in the length of the wall will result in a decrease of 6 decibels in the noise at this receiver compared to future No Build conditions. An increase of 1 decibel would result over the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request.

East Wall 9

The southern end of East Wall 9 is reduced by approximately 40 feet for Alternative 1. This reduction would provide better visibility of a commercial property south of the noise wall. The impact to the noise levels would result in no impact except at receivers 54 and 55. At these locations, the proposed change in the length of the wall will result in a decrease of 4 - 5 decibels in the noise at this receiver compared to future No Build conditions. Receivers 54 and 55 would experience an increase of 5 decibels and 1 decibel, respectively over the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request.

East Wall 12

For each alternative to East Wall 12, the entire 1,690 feet of East Wall 12 is removed. Note that a small segment of the north end of East Wall 6 has been removed for these alternatives. This removal of East Wall 12 would provide better visibility of a shopping center and businesses east of the noise wall proposed in the Draft State Noise Standards Exemption Request.

Alternative 1
As a method to maintain mitigation for residences in the area, walls have been considered along the east side of the shopping center structure. These walls would be constructed to connect very close to the structure, and at the same height of the structure. At receivers near this wall, the proposed change of the wall will result in a range of noise level changes from a decrease of 7 decibels to an increase of 3 decibels when compared to future No Build conditions. These receivers would experience an increase of up to 10 decibels over the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request.

Alternative 2
As a method to maintain mitigation for residences in the area, walls have been considered along the east side of the businesses. These walls would be constructed to connect very close to the structures, and at the same height of the structures. At receivers near this wall, the proposed change of the wall will result in a range of noise level changes from a decrease of 8 decibels to no change when compared to future No Build conditions. These receivers would experience an increase of up to 8 decibels over the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request.

Alternative 3
Similar to Alternatives 1 and 2, as a method to maintain mitigation for residences in the area, walls have been considered along the east side of the shopping center and businesses. These walls would be constructed to connect very close to the structures, and at the same height of the structures. At receivers near this wall, the proposed change of the wall will result in a range of noise level changes from a decrease of 8 decibels to no change when compared to future No Build conditions. These receivers would experience an increase of up to 7 decibels over the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request.

Alternative 4
Similar to Alternatives 1., 2 and 3, as a method to maintain mitigation for residences in the area, walls have been considered along the east side of the shopping center and businesses. For Alternative 4, these walls are connected to close the local street between the shopping center and businesses. A small gap would need to be maintained for pedestrian access to the pedestrian bridge. These walls would be constructed to connect very close to the structures, and at the same height of the structures. At receivers near this wall, the proposed change in the walls will result in a range of noise level changes from a decrease of 9 to 3 decibels when compared to future No Build conditions. These receivers would experience an increase of up to 4 decibels over the

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noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request.

West Wall 2

The southern end of West Wall 2 is reduced by approximately 710 feet for Alternative 1. This reduction would provide better visibility of commercial properties on the south end of the noise wall, along with a residential property whose residents have stated a preference for no noise wall. The impact to the noise levels would result in no impact except at receivers 10, 11 and 12. The proposed change in the length of the wall will result in a decrease of 4 and 2 decibels at receivers 10 and 11, respectively in the noise at this receiver compared to future No Build conditions. The proposed change in the length of the wall will result in no change at receiver 12 in the noise at this receiver compared to future No Build conditions. Receivers 10, 11 and 12 would experience an increase of 3, 14 and 6 decibels, respectively over the noise level that could be achieved if the wall were constructed as proposed in the Draft State Noise Standards Exemption Request.

Appendix A

Noise Wall Alternatives Analysis Results

East Wall 1

TH 14/52 – 29th Place NW to beginning of 37th Street NB exit ramp

			OP	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
			Year 2029 Build With								
	Year 2029, No Build	No Walls	Originally Proposed Walls	Alt 1 Walls	Alt 2 Walls	Alt 3 Walls	Alt 4 Walls	Change from Originally Proposed Walls to Alternative			
Receiver		L10	L10	L10	L10	L10	L10	**1 – OP**	**2 – OP**	**3 – OP**	**4 – OP**
E-4	69	69	64	64				0			
E-5	66	66	63	63				0			
E-6	76	75	61	61				0			
E-7	70	70	62	62				0			
E-8	76	76	63	63				0			
E-9	77	77	67	75				8			

East Wall 3-4

TH 14/52 – South and North of 26th St NW

			OP	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
			Year 2029 Build With								
	Year 2029, No Build	No Walls	Originally Proposed Walls	Alt 1 Walls	Alt 2 Walls	Alt 3 Walls	Alt 4 Walls	Change from Originally Proposed Walls to Alternative			
Receiver		L10	L10	L10	L10	L10	L10	**1 – OP**	**2 – OP**	**3 – OP**	**4 – OP**
E-12	76	76	69	76	76			7	7		
E-13	76	76	69	61	70			-8	1		
E-14	69	69	61	63	64			2	3		
E-15	76	76	61	61	61			0	0		
E-16	70	70	63	63	64			0	1		
E-17	76	76	63	63	63			0	0		
E-18	70	70	62	62	63			0	1		

Note: Receiver #12 is no longer a residential dwelling unit, and
Therefore should not be used for determining the impacts on residential receivers.

East Wall 6

TH 14/52 – 7th St NW to 14th St NW (north of Civic Center Drive on east side)

			OP	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
			Year 2029 Build With								
	Year 2029, No Build	No Walls	Originally Proposed Walls	Alt 1 Walls	Alt 2 Walls	Alt 3 Walls	Alt 4 Walls	Change from Originally Proposed Walls to Alternative			
Receiver		L10	L10	L10	L10	L10	L10	**1 – OP**	**2 – OP**	**3 – OP**	**4 – OP**
E-32	72	71	65	66				1			
E-33	72	75	64	64				0			
E-34	76	67	62	62				0			
E-35	68	74	64	64				0			
E-36	75	70	65	65				0			
E-37	70	73	72	72				0			

East Wall 9

TH 14/52 – South of 6th St SW on east side

			OP	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
			Year 2029 Build With								
	Year 2029, No Build	No Walls	Originally Proposed Walls	Alt 1 Walls	Alt 2 Walls	Alt 3 Walls	Alt 4 Walls	Change from Originally Proposed Walls to Alternative			
Receiver		L10	L10	L10	L10	L10	L10	**1 – OP**	**2 – OP**	**3 – OP**	**4 – OP**
E-49	71	72	60	60				0			
E-50	76	76	61	61				0			
E-51	72	72	63	63				0			
E-52	72	72	65	65				0			
E-53	76	76	65	65				0			
E-54	77	76	67	72				5			
E-55	72	72	67	68				1			

East Wall 12

TH 14/52 – South of 19th St SW on east side to 14th St

			OP	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
			Year 2029 Build With								
	Year 2029, No Build	No Walls	Originally Proposed Walls	Alt 1 Walls	Alt 2 Walls	Alt 3 Walls	Alt 4 Walls	Change from Originally Proposed Walls to Alternative			
Receiver		L10	L10	L10	L10	L10	L10	**1 – OP**	**2 – OP**	**3 – OP**	**4 – OP**
E-26	69	68	63	62	68	61	61	-1	5	-2	-2
E-27	69	69	60	68	68	62	62	8	8	2	2
E-28	69	72	62	72	69	69	66	10	7	7	4
E-29	72	69	60	69	64	64	63	9	4	4	3
E-30	69	72	62	72	64	64	64	10	2	2	2
E-31	72	71	64	71	68	68	67	7	4	4	3

West Wall 2

TH 52 – North of 19th St NW

			OP	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
			Year 2029 Build With								
	Year 2029, No Build	No Walls	Originally Proposed Walls	Alt 1 Walls	Alt 2 Walls	Alt 3 Walls	Alt 4 Walls	Change from Originally Proposed Walls to Alternative			
Receiver		L10	L10	L10	L10	L10	L10	**1 – OP**	**2 – OP**	**3 – OP**	**4 – OP**
W-6	68	68	63	63				0			
W-7	76	76	66	66				0			
W-8	78	78	64	64				0			
W-9	72	72	63	63				0			
W-10	67	67	60	63				3			
W-11	79	78	63	77				14			
W-12	70	70	64	70				6			