



April 30, 2018

Ms. Danica Lee, Director
Denver Department of Environmental Health
Public Health Inspections Division
200 W. 14th Avenue, Suite 200
Denver, CO 80204

Request for Variance to Noise Ordinance
Central 70, I-70 from I-25 to Chambers Rd.

Dear Ms. Lee:

Kiewit Infrastructure Co. (KIC) hereby requests a variance to the City and County of Denver (CCD) Noise Ordinance DRMC, Chapter 36, Section 36-7(5) to be granted for the above referenced project, which is scheduled to begin by summer 2018. A check of \$25.00 payable to the Manager of Finance is enclosed to process this variance request. The reasons for needing the variance are outlined below.

The Central 70 Project will reconstruct a 10-mile stretch of I-70 between I-25 and Chambers Road, add one new Express Lane in each direction, remove the aging 54-year old viaduct, lower the interstate between Brighton and Colorado Boulevards, and place a 4-acre park over a portion of the lowered interstate.

When completed, it will reduce congestion, improve safety, and better accommodate future growth along this vital transportation corridor. The work of this project will facilitate greater access to the areas adjacent to the project for business and residents alike. Thus, while the work will have a short-term effect on those residents and businesses located adjacent to the project, the long-term effects of the project will positively enhance the area as a whole.

Type and Timing of Claim

The timing of the request for variance, if granted, will allow contractors to begin night work at the start of construction and plan this into their schedules and bids. Nighttime construction on the Central 70 Project is slated to begin in summer 2018 (immediately after the granted variance) and last 5 years until winter 2023. I-70 is a major east-west transportation corridor in the Denver Metropolitan area that experiences heavy traffic loads under normal circumstances. It is home to 1,200 businesses, provides regional connections to Denver International Airport, and carries upwards of 200,000 vehicles per day. Night work will be required (working 24 hours per day) primarily to reduce the overall project duration and minimize inconvenience to the local businesses, residents, and traveling public, and to maximize safety of workers and the traveling public. Work will be performed 24 hours a day when required. Furthermore, for major equipment and material deliveries, additional traffic impacts will be required, which could also be performed at night with a noise variance.

The project extends along Interstate 70 approximately from Interstate-25 on the west end to Chambers Road on the east end.

We have broken down the work into three areas. An overview of the project extent and work areas is shown in Figure 1.

Project Work Area Locations:

West: between I-25 and Colorado Boulevard

Central: between Colorado Boulevard and Quebec (Sand Creek Bridge)

East: between Quebec (Sand Creek Bridge) and Chambers Road

This application focuses on the impact of nighttime construction noise on adjacent properties.

Residential areas are concentrated in the West area between I-25 and Colorado Boulevard. There are also residences east of Colorado Boulevard and north of I-70 between Peoria Street and Chambers Road that were taken into account.

The nighttime construction noise limits also apply to commercial properties. We are evaluating the nighttime noise impact on hotels in the vicinity of I-70 from I-25 to Chambers Road, as well as a fire station on Brighton Boulevard. We have not identified any other noise or vibration sensitive commercial properties such as hospitals, medical clinics, laboratories.



Figure 1: Project Overview Map

The following work is proposed for nighttime hours:

1. MOT Lane Closures - Corridor Wide
2. MOT Concrete Barrier Set/Remove - Corridor Wide
3. MOT Temp Paving Detours – Corridor Wide
4. Asphalt Paving – Corridor Wide
5. Excavation/Embankment – Corridor Wide
6. MSE Walls – Center Section (Colorado to Quebec)
7. Surface Removals – Corridor Wide
8. Drilled Shafts – Corridor Wide
9. CIP Walls – Corridor Wide
10. Drainage/Utility Tie Ins – Corridor Wide
11. Bridge Work – Girder Set
12. Bridge Work – Deck Pour
13. Bridge Work – Form/Pour/Strip
14. Bridge Demolition

This variance request will focus on the construction between I-25 and Colorado Boulevard (approximately three miles long) because that is where the majority of residential areas are located.

Date of Payment:

A check was presented to CCD on April 30, 2018, with this application.

Objections to Manager's Determinations:

The Manager has not made a determination at this time.

Hardship if Variance is Not Granted:

- There will be substantially more people traveling through work areas during the day. It is safer for local residents, businesses, and the public to perform the proposed work at night.
- Due to the nature of the work involved, some bridge work must take place on or over I-70. For example, demolishing the bridges, building parts of the substructure, and building the superstructure. CDOT will not allow closures of I-70 during daytime hours and nighttime closures will be limited.
- Working at night will decrease the duration of the construction. If the nighttime work is eliminated or reduced, the work duration would be prolonged significantly which would extend the time that local residents, businesses, and the general public would be affected by the work.
- The nighttime work should reduce overall daytime traffic congestion and make it easier for local residents to perform everyday tasks, such as going to the grocery store, gym, or dropping their kids off at school.
- The financial impacts could be substantial for nearby businesses if the work is performed during the day. The increased daytime traffic and lane closures/changes would make access to local businesses much more difficult.

No Adverse Effects to Public Health:

To ensure minimal impacts on the community during the course of construction, KIC will plan its work schedule to quickly and efficiently perform work in areas adjacent to local businesses and residents. KIC hopes to complete the project work prior to the estimated 2023 completion date. KIC will monitor noise levels over the course of the project when needed and will mitigate noise levels where feasible. Furthermore, from a public relations and public information perspective, KIC will continue to engage in public outreach and information efforts aimed at reaching out to the community and keeping them up-to-date regarding the progress of the project work. Thus far, KIC holds monthly business and developer outreach meetings during preconstruction and positive relationships are being forged, which KIC will continue to strengthen throughout the entire project. As part of its public information plan, KIC will provide schedules regarding major project related events including the start of construction, major traffic switches, intersection closures, and pedestrian access, through social media, email, and a website. KIC will make available a public information website and telephone number for local residents to call and voice their project related concerns.

A preliminary noise analysis has been performed by Wave Engineering, Inc., to identify locations (and distances from the work) where noise level exceedances are likely to occur. The results of this study are outlined below.

Denver Noise Ordinance

The Denver Noise Ordinance Chapter 36 limits noise levels to 55 dBA during the day and to 50 dBA at night at a residential property line. Construction noise is allowed to exceed the daytime limit. If construction noise levels will exceed the nighttime limit, then a variance is required. On previous projects for which a nighttime noise variance was granted by the City and County of Denver, construction noise levels have been limited to an L_{EQ} of 75 dBA and an L_{MAX} of 86 dBA.

Construction Noise Level Predictions

Wave Engineering, Inc., used the Roadway Construction Noise Model (RCNM) developed by the Federal Highway Administration (FHA) to predict noise levels from nighttime construction activity.

There are many homes along the West work area. The nighttime construction noise levels at these homes will vary based on the type of work (see Figure 1 map) and the distance from the work.

Corridor Wide

Many of the construction operations will occur across the entire West work area. We will refer to these as “Corridor wide” operations. The noise levels for corridor wide work will be constantly shifting, consistent along the work route, and noise levels will be a function of distance from the edge of the lane of travel under construction.

Bridge Work

The nighttime construction for bridge work will occur in specific areas around each bridge. The work will be more stationary and noise levels will be a function of distance from the construction activity to the residences.

Predicting construction noise levels at each residence would be very difficult because the exact location of the construction activity will move around on a nightly basis, and the noise making equipment will move around each work area. Instead of predicting noise levels at every residence along the corridor or near each bridge, we determined the distances from each type of work where the L_{MAX} and L_{EQ} criteria may be exceeded and determined how many homes fall within this distance and may require additional mitigation or controls.

The following source levels for significant noise producing equipment were used in our analysis. The RCNM database of equipment noise levels and usage percentage were used.

Table 1: Source Sound Levels

Construction Equipment	L_{MAX} at 50' (dBA)
Auger Drill Rig	84
Concrete Mixer Truck	79
Concrete Pump Truck	81
Concrete Saw	90
Compressor	78
Crane	81
Dozer	82
Dump Truck	77
Excavator	81
Flat Bed Truck	74
Front End Loader/Skid Steer	79
Generator/Light Plant	76
Grader	85
Man Lift	75
Mounted Impact Hammer	90
Paver	77
Pickup Truck	75
Pumps	81
Roller	80
Shears	96
Welder/Torch	74

*The Generator/Light Plant units that are going to be used during construction are the Allmand Night-Lite Pro 2. The L_{MAX} (at 50') of these units was measured at 76 dBA. This is quieter than the 81 dBA that is used in the RCNM database.

The noise level at each individual residence will depend on which equipment is operating, the distance of the equipment from the residence, and whether or not the residence is shielded from the equipment by other buildings, sound walls, etc. Due to the close proximity of most of the first row receiver buildings to the construction, we have not included shielding of the equipment from the buildings. There will often be shielding of second, third, etc., row homes, but it will vary on a home-by-home basis. Additionally, as the road work descends below grade (in specific sections), the receivers will receive shielding from the ground that is above the road. We have not accounted for shielding in order to provide worst case estimates.

The L_{EQ} values shown below were calculated with the RCNM program using the L_{MAX} values at 50' for equipment that is operating simultaneously and their associated usage. The L_{EQ} is the equivalent noise level which is similar to an average noise level over a one hour period. We

assumed that the equipment will be spread out around a typical work site. The L_{MAX} noise levels are calculated from the loudest piece of equipment.

The L_{EQ} calculations take into account the distance from the equipment and the usage factor of each piece of equipment. The usage factor is the percentage of time during a typical work hour when the equipment is operating at full power.

The L_{MAX} values shown below were calculated using the L_{MAX} values at 50'. The L_{MAX} is the maximum noise level at each receiver location from the loudest piece of equipment. The L_{MAX} calculations take into account the distance from the equipment to the receivers. The usage factor is *not* used in the L_{MAX} calculation as it is assumed that the loudest piece of equipment is at full power.

Corridor Wide Construction

The corridor wide construction will take place along on both sides of the roadway between Colorado Boulevard and I-25. We used the RCNM to determine the distances from each construction operation where the L_{EQ} noise level is equal to 75 dBA and where the L_{MAX} is equal to 86 dBA. These distances began at the construction area, generally near the curb or edge of the road. The distances were determined for both the existing location of the road and the future placement of the road. Beyond these distances, the L_{EQ} and L_{MAX} are less than 75 dBA and 86 dBA, respectively. *To ensure the L_{MAX} would be a worst-case scenario, in the calculations, the two loudest pieces of equipment were placed next to each other at the edge of the construction areas.* Furthermore, the second, third, etc., row of homes will receive some screening from closer rows of homes or commercial buildings, so the actual noise levels should be lower (to be conservative, the change in the noise level from building screening was not used in the calculations).

Below is a description of the corridor wide nighttime operations, the equipment that will be used during the operations, the distances for the L_{EQ} and L_{MAX} noise levels, and the number of homes that are within these distances. Keep in mind that all of the homes will not be affected on any given night, but the total number of homes that will be affected during the project from each type of nighttime construction operation is given. An example of the typical extent of construction noise is given in Figure 2. The shaded area in Figure 2 shows the extent of the area where the nighttime noise limits may be exceeded and mitigation measures would be implemented. Figure 2 shows the loudest corridor wide activity which is from the Excavation and Embankment work (as well as the Surface Removal work).



Figure 2: Construction Noise Extent for Excavation and Embankment Work

Maintenance of Traffic (MOT) Lane Closures - Corridor Wide

During this operation, pickup/flatbed trucks will operate along I-70 and associated frontage roads within the project limits to open/close specific lanes, which will be used to help control traffic during other phases of construction. This will take place and affect houses along the entire project area.

The equipment that will be used during this operation is listed in Table 2.

Table 2: Lane Closure Equipment

Equipment Description	Quantity
Pickup Truck	2
Flat Bed Truck	4

$L_{EQ} = 75$ dBA at **75'** from I-70

$L_{MAX} = 86$ dBA at **15'** from I-70

Approximately **27** Denver homes along the corridor potentially fall within the 75 dBA L_{EQ} (within 75' distance)

Approximately **3** Denver homes along the corridor potentially fall within the 86 dBA L_{Max} (within 15' distance)

MOT Concrete Barrier Set/Remove - Corridor Wide

During this operation, pickup/flatbed trucks, an excavator, front end loaders, and generators will operate along I-70 and associated frontage roads within the project limits to set up and/or remove concrete barriers, which will be used to help control traffic during other phases of construction. This will take place and affect houses along the entire project area.

The equipment that will be used during this operation is listed in Table 3.

Table 3: Concrete Barrier Set/Remove equipment

Equipment Description	Quantity
Pickup Truck	2
Excavator	1
Front End Loader	2
Flat Bed Truck	6
Generator (Light Plant)	4

$L_{EQ} = 75$ dBA at **175'** from I-70

$L_{MAX} = 86$ dBA at **40'** from I-70

Approximately **126** Denver homes along the corridor potentially fall within the 75 dBA L_{EQ} (within 175' distance)

Approximately **29** Denver homes along the corridor potentially fall within the 86 dBA L_{Max} (within 40' distance)

MOT Temp Paving Detours – Corridor Wide

During this operation, pickup/dump trucks, a paver, a front end loader, rollers, and generators will operate along I-70 and associated frontage roads within the project limits to set up detours, which will be used to help redirect traffic during other phases of construction. This will take place and affect houses along the entire project area.

The equipment that will be used during this operation is listed in Table 4.

Table 4: MOT Temp Paving Detours equipment

Equipment Description	Quantity
Pickup Truck	2
Paver	1
Dump Truck	9
Front End Loader	1
Roller	3
Generator (Light Plant)	2

L_{EQ} = 75 dBA at **175'** from I-70

L_{MAX} = 86 dBA at **40'** from I-70

Approximately **126** Denver homes along the corridor potentially fall within the 75 dBA L_{EQ} (within 175' distance)

Approximately **29** Denver homes along the corridor potentially fall within the 86 dBA L_{MAX} (within 40' distance)

Asphalt Paving – Corridor Wide

During this operation, pickup/dump trucks, a paver, a front end loader, rollers, and generators will operate along I-70 and associated frontage roads within the project limits to lay asphalt for the new and existing roads. This will take place and affect houses along the entire project area.

The equipment that will be used during this operation is listed in Table 5.

Table 5: Asphalt Paving equipment

Equipment Description	Quantity
Pickup Truck	2
Paver	1
Dump Truck	9
Front End Loader	1
Roller	4
Generator (Light Plant)	2

$L_{EQ} = 75$ dBA at **175'** from I-70

$L_{MAX} = 86$ dBA at **40'** from I-70

Approximately **126** Denver homes along the corridor potentially fall within the 75 dBA L_{EQ} (within 175' distance)

Approximately **29** Denver homes along the corridor potentially fall within the 86 dBA L_{MAX} (within 40' distance)

Excavation/Embankment – Corridor Wide

During this operation, pickup/dump/flatbed trucks, an excavator, dozers, a roller, a grader, and generators will operate along I-70 and associated frontage roads within the project limits to create and/or remove embankments and excavations, which will be used in the creation of the new road way. This will take place and affect houses along the entire project area.

The equipment that will be used during this operation is listed in Table 6.

Table 6: Excavation/Embankment equipment

Equipment Description	Quantity
Pickup Truck	2
Excavator	1
Dozer	2
Roller	1
Grader	1
Dump Truck	10
Generator (Light Plant)	10
Flat Bed Truck	1

$L_{EQ} = 75$ dBA at **290'** from I-70

$L_{MAX} = 86$ dBA at **60'** from I-70

Approximately **274** Denver homes along the corridor potentially fall within the 75 dBA L_{EQ} (within 290' distance)

Approximately **50** Denver homes along the corridor potentially fall within the 86 dBA L_{MAX} (within 60' distance)

Mechanically Stabilized Earth (MSE) Walls – Center Section (Colorado to Quebec)

During this operation, pickup/dump/flatbed trucks, a compressor, a dozer, an excavator, a front end loader, a generator, a man lift, and a roller will operate along I-70 and associated frontage roads within the project limits to build MSE walls. This will take place between Colorado Boulevard and Quebec Street. The closest houses during this construction will not be affected by the construction noise.

The equipment that will be used during this operation is listed in Table 7.

Table 7: MSE Walls equipment

Equipment Description	Quantity
Pickup Truck	2
Compressor	1
Dozer	1
Dump Truck	4
Excavator	1
Front End Loader	1
Generator (Light Plant)	1
Flat Bed Truck	1
Man Lift	1
Roller	1

No residences are located within the vicinity of this operation.

Surface Removals – Corridor Wide

During this operation, pickup/dump/flatbed trucks, excavators, mounted impact hammers, a front end loader, generators, and a concrete saw will operate along I-70 and associated frontage roads within the project limits to remove the existing pavement in certain locations. This will take place and affect houses along the entire project area.

The equipment that will be used during this operation is listed in Table 8.

Table 8: Surface Removals equipment

Equipment Description	Quantity
Pickup Truck	2
Excavator	2
Mounted Impact Hammer	2
Front End Loader	1
Dump Truck	2
Generator (Light Plant)	4
Flat Bed Truck	1
Concrete Saw	1

L_{EQ} = 75 dBA at **290'** from I-70

L_{MAX} = 86 dBA at **120'** from I-70

Approximately **274** Denver homes along the corridor potentially fall within the 75 dBA **L_{EQ}** (within 290' distance).

Approximately **112** Denver homes along the corridor potentially fall within the 86 dBA **L_{Max}** (within 120' distance)

Drilled Shafts – Corridor Wide

During this operation, pickup trucks, an auger drill rig, a front end loader, generators, a concrete mixer truck, a crane, and pumps will operate along I-70 and associated frontage roads within the project limits to create drilled shaft supports for the roadway/bridges. This will take place and affect houses along the entire project area.

The equipment that will be used during this operation is listed in Table 9.

Table 9: Drilled Shafts equipment

Equipment Description	Quantity
Pickup Truck	2
Auger Drill Rig	1
Front End Loader	1
Generator (Light Plant)	4
Concrete Mixer Truck	1
Crane	1
Pumps	1

$L_{EQ} = 75$ dBA at **195'** from C-70

$L_{MAX} = 86$ dBA at **50'** from C-70

Approximately **141** Denver homes along the corridor potentially fall within the 75 dBA L_{EQ} (within 195' distance)

Approximately **38** Denver homes along the corridor potentially fall within the 86 dBA L_{Max} (within 50' distance)

CIP Walls – Corridor Wide

During this operation, pickup trucks, a front end loader, a compressor, generators, an excavator, a man lift, concrete mixer trucks, and a concrete pump truck will operate along I-70 and associated frontage roads within the project limits to create cast-in-place walls. This will take place and affect houses along the entire project area.

The equipment that will be used during this operation is listed in Table 10.

Table 10: CIP Walls equipment

Equipment Description	Quantity
Pickup Truck	2
Front End Loader	1
Compressor (Air)	1
Generator (Light Plant)	4
Excavator	1
Man Lift	1
Concrete Mixer Truck	4
Concrete Pump Truck	1

$L_{EQ} = 75$ dBA at **195'** from I-70

$L_{MAX} = 86$ dBA at **40'** from I-70

Approximately **141** Denver homes along the corridor potentially fall within the 75 dBA L_{EQ} (within 195' distance)

Approximately **29** Denver homes along the corridor potentially fall within the 86 dBA L_{MAX} (within 40' distance)

Drainage/Utility Tie Ins - Corridor Wide

During this operation, pickup/flatbed trucks, a front end loader, an excavator, a roller, generators, and pumps will operate along I-70 and associated frontage roads within the project limits to move, connect, replace, etc., the drainage pipes and utilities. This will take place and affect houses along the entire project area.

The equipment that will be used during this operation is listed in Table 11.

Table 11: Drainage/Utility Tie Ins equipment

Equipment Description	Quantity
Pickup Truck	2
Front End Loader	1
Excavator	2
Roller	1
Flat Bed Truck	1
Generator (Light Plant)	4
Pumps	1

$L_{EQ} = 75$ dBA at **195'** from I-70

$L_{MAX} = 86$ dBA at **40'** from I-70

Approximately **141** Denver homes along the corridor potentially fall within the 75 dBA L_{EQ} (within 195' distance)

Approximately **29** Denver homes along the corridor potentially fall within the 86 dBA L_{MAX} (within 40' distance)

Bridge Construction

The bridge construction will take place at multiple bridges along I-70 and will occur on both sides of I-70. Similar to the corridor wide calculations, we used the RCNM to determine the distances from each bridge construction operation to where the L_{EQ} noise level is equal to 75 dBA and where the L_{MAX} is equal to 86 dBA. The distances were taken from both the edge of the construction areas and the center of the construction areas. *To ensure the L_{MAX} would be a worst-case scenario, in the calculations, the two loudest pieces of equipment were placed next to each other at the edge of the construction areas.* The construction areas were determined by finding the bridge construction locations with the highest density of nearby residences. Beyond these distances, the L_{EQ} and L_{MAX} are less than 75 dBA and 86 dBA, respectively. Again, these distances are a worst-case scenario. Furthermore, the second, third, etc., row of homes will receive some screening from the previous row of homes or commercial buildings, so the actual noise levels should be lower (to be conservative, the change in the noise level from building screening was not used in the calculations).

Below is a description of the bridge nighttime construction and demolition, the equipment that will be used during the construction, the distances for the L_{EQ} and L_{MAX} noise levels and the number of homes within these distances. The L_{EQ} distance/radius is shown in Figure 3.

Bridge Work – Girder Set

During this operation, pickup/flatbed trucks, cranes, generators, man lifts, and a front end loader will operate at a bridge to set up girders for the bridge construction. The bridge locations are at Brighton Boulevard, UPRR, York Street, Josephine Street, Columbine Street, Clayton Street, Fillmore Street, Steele Street, Cook Street, Monroe Street, BNSF, and Colorado Boulevard

The equipment that will be used during this operation is listed in Table 12.

Table 12: Bridge Work - Girder Set equipment

Equipment Description	Quantity
Pickup Truck	4
Crane	2
Flat Bed Truck	6
Generator (Light Plant)	10
Man Lift	2
Front End Loader	1

L_{EQ} = 75 dBA at **200'** from edge of equipment (260' radius from center of equipment)

L_{MAX} = 86 dBA at **40'** from edge of equipment (100' radius from center of equipment)

Approximately **171** Denver homes (total for all bridges combined) fall within the 75 dBA L_{EQ} (within 200' distance)

Approximately **72** Denver homes (total for all bridges combined) fall within the 86 dBA L_{MAX} (within 40' distance)



Figure 3: Girder Set Noise LEQ Distance/Radius

Bridge Work – Deck Pour

During this operation, Pickup trucks, Concrete Pump Trucks, Concrete Mixer Trucks, a compressor, a man lift, and generators will operate at a bridge to pour the bridge deck. The bridge locations are Brighton Boulevard, UPRR, York Street, Josephine Street, Columbine Street, Clayton Street, Fillmore Street, Steele Street, Cook Street, Monroe Street, BNSF, and Colorado Boulevard

The equipment that will be used during this operation is listed in Table 13.

Table 13: Bridge Work – Deck Pour equipment

Equipment Description	Quantity
Pickup Truck	4
Concrete Pump Truck	2
Concrete Mixer Truck	8
Compressor (Air)	1
Man Lift	1
Generator (Light Plant)	11

L_{EQ} = 75 dBA at **275'** from edge of equipment (335' radius from center of equipment)

L_{MAX} = 86 dBA at **40'** from edge of equipment (100' radius from center of equipment)

Approximately **209** Denver homes fall (total for all bridges combined) within the 75 dBA **L_{EQ}** (within 275' distance).

Approximately **72** Denver homes (total for all bridges combined) fall within the 86 dBA **L_{MAX}** (within 40' distance)

The **L_{EQ}** distance/radius is shown in Figure 4. (Please note that the **L_{MAX}** limits are not shown here as they are the same limits shown in Figure 3)



Figure 4: Deck Pour Noise LEQ Distance/Radius

Bridge Work – Form/Pour/Strip

During this operation, pickup trucks, a front end loader, a compressor, a man lift, a crane, and generators will operate at a bridge to form, pour, and strip the bridges/road. The bridge locations are Brighton Boulevard, UPRR, York Street, Josephine Street, Columbine Street, Clayton Street, Fillmore Street, Steele Street, Cook Street, Monroe Street, BNSF, and Colorado Boulevard

The equipment that will be used during this operation is listed in Table 14.

Table 14: Bridge Work – Form/Pour/Strip equipment

Equipment Description	Quantity
Pickup Truck	2
Front End Loader	1
Compressor (Air)	1
Man Lift	1
Crane	1
Generator (Light Plant)	4

L_{EQ} = 75 dBA at **160'** from edge of equipment (195' radius from center of equipment)

L_{MAX} = 86 dBA at **40'** from edge of equipment (75' radius from center of equipment)

Approximately **114** Denver homes fall (total for all bridges combined) within the 75 dBA **L_{EQ}** (within 160' distance).

Approximately **72** Denver homes (total for all bridges combined) fall within the 86 dBA **L_{MAX}** (within 40' distance)

The **L_{EQ}** distance/radius is shown in Figure 5. (Please note that the **L_{MAX}** limits are not shown here as they are the same limits shown in Figure 3)



Figure 5: Form/Pour/Strip Noise L_{EQ} Distance/Radius

Bridge Demolition

During this operation, pickup/dump/flatbed trucks, excavators, shears, mounted impact hammers, front end loaders, a compressor, generators, a welder/torch, and a concrete saw will operate at existing bridges to demolish them. The bridge locations are Brighton Boulevard bridge, UPRR Bridge, and the bridges at the I-70 viaduct.

The equipment that will be used during this operation is listed in Table 15.

Table 15: Bridge Demolition equipment

Equipment Description	Quantity
Pickup Truck	4
Excavator	8
Shears (on backhoe)	2
Mounted Impact Hammer	6
Front End Loader	3
Dump Truck	3
Compressor	1
Generator (Light Plant)	10
Welder/Torch	1
Flat Bed Truck	2
Concrete Saw	2

$L_{EQ} = 75$ dBA at **700'** from edge of equipment (750' radius from center of equipment)

$L_{MAX} = 86$ dBA at **225'** from edge of equipment (275' radius from center of equipment)

Approximately **324** Denver homes fall (total for all bridges combined) within the 75 dBA L_{EQ} (within 700' distance).

Approximately **68** Denver homes (total for all bridges combined) fall within the 86 dBA L_{MAX} (within 225' distance)

The L_{EQ} distance/radius is shown in Figure 6.



Figure 6: Bridge Demolition Noise L_{EQ} Distance/Radius

The home counts are based on construction in the closest lanes to the homes.

Hotels

The following hotels will be affected by the MOT concrete barrier set/removal work, MOT temporary paving detours work, and asphalt paving work:

- Denver's Best Inn & Suites – 4590 Quebec St, Denver, CO
- Western Motor Inn – 4757 Vasquez Blvd. E, Denver, CO

The following hotels, as well as the hotels mentioned above, will be affected by the surface removal work:

- The Timbers Hotel – 4411 Peoria St, Denver, CO
- Courtyard by Marriot Denver Stapleton – 7415 E 41st Ave, Denver, CO

The following hotels, as well as the hotels mentioned above (except for the Western Motor Inn), will be affected by bridge demolition work:

- Comfort Inn Denver East – 4380 Peoria St, Denver, CO
- Rodeway Inn – 3975 Peoria Way, Denver, CO
- Motel 6 Denver - Airport – 12020 E 39th Ave, Denver, CO

Fire Departments

The Denver Fire Department Fire Station 9 will be affected by the bridge work conducted along Brighton Boulevard.

Maintain Harmony with the Spirit and Purpose of the Ordinance:

The daytime alternative for completing the required demolition and construction activities would be a great hardship for the surrounding community; it would generate greater negative impacts to the local community and highway system when compared to the short-term increase in nighttime noise levels that are projected for the nighttime alternative. CDOT will not allow certain work to be performed during daytime hours. In addition, certain work cannot be done safely during the daytime hours.

The nighttime alternative effectively minimizes traffic congestion, safety hazards, and financial impacts to nearby businesses and user costs of the traveling public.

KIC is prepared to pro-actively address nighttime construction noise concerns. KIC will retain an acoustical engineering firm to assist with noise issues during the project. Noise levels will be measured pro-actively and KIC will investigate any complaints that are received. KIC staff will be trained in the use of a sound level meter to provide an immediate response to any complaints.

An acoustical firm will be on-call to address any noise issues that cannot be resolved by the KIC staff.

The following best management practices will be used for nighttime construction to reduce the noise impact of the project on residences.

- Pre-set up of equipment before night shift begins
- Turn 2-way radio volumes down when possible
- Avoid slamming of truck beds, truck tailgates, and equipment buckets
- Idle equipment motors down when the equipment is not in immediate use
- All equipment will be maintained to meet manufacturer's specifications
- Schedule trucks properly to minimize long queue lines
- Minimize backup distances for trucks and other equipment
- Truck traffic will travel on established truck routes
- Locate light plants and compressors away from residences and businesses when in close proximity to residences and install localized noise shielding when possible
- Utilize portable sound barriers if feasible near jackhammer, mounted impact hammer, shears, and concrete saw work.

In addition to adhering to these best management practices, we will implement the following practices to manage the impact on the community.

- Provide an I-70 hot line for questions and concerns
- Contact all complainants and attempt to resolve any problems or issues
- Implement a noise-monitoring plan to verify noise levels within the 86 dBA L_{Max} and 75 dBA L_{EQ} noise level contours
- If other mitigation efforts cannot be achieved, KIC will provide vouchers for hotel rooms to residents within an “eligibility zone” on nights where exterior noise levels are expected to exceed the noise levels allowed for Construction Activities at their residences
- Provide weekly schedules through social media, email, and a website.
- CDOT has committed to provide residents close to the highway construction—between 45th Avenue and 47th Avenue from Brighton Boulevard to Colorado Boulevard—two free portable or window-mounted air conditioning units with air filtration and assistance for the potential additional utility costs during construction.
- CDOT has committed to provide residents close to the highway construction—between 45th Avenue and 47th Avenue from Brighton Boulevard to Colorado Boulevard—interior storm windows

Project Location and Haul Routes

The project is located on the I-70 Corridor from I-25 to Chambers Road in Denver.

Haul routes will be a combination of utilizing I-70 and adjacent frontage roads and will be routed to minimize impact to the community wherever possible.

Petitioner’s Information:

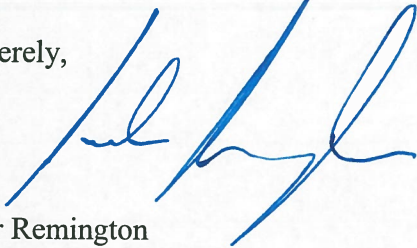
Peter Remington
Kiewit Infrastructure Co.
160 Inverness Drive West, Suite 110
Englewood, CO 80112
office: 303-649-6800

Ms. Danica Lee
April 30, 2018
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Petitioner's Signature:

Should you have any future concerns, please do not hesitate to contact me at 303-649-6800 and thank you for your attention to this matter.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Peter Remington', written over a horizontal line.

Peter Remington
Kiewit Infrastructure Co.
Construction Manager