

TECHNICAL MEMORANDUM

TO: Gretchen Bruner, Blumen Consulting Group

FROM: Shannon Khounnala

DATE: February 14, 2007

**RE: SUPPLEMENTAL NOISE ANALYSIS
PROPOSED WAL-MART RETAIL FACILITY, TUMWATER, WASHINGTON**

The following supplemental noise analysis has been prepared to address comments received from the Draft Environmental Impact Statement (DEIS), and the added alternatives included in the Final Environmental Impact Statement. The following memorandum expands on the discussion of the following key items:

- Description of the added alternatives
- Expanded discussion and clarification of the noise modeling methodology
- Discussion of background noise in the project area
- Expected noise levels under the added alternatives.

DESCRIPTION OF ALTERNATIVES

Two alternatives were originally proposed for the project in the DEIS, the Proposed Site Plan and the Alternate Site Plan. Following the issue of the DEIS, three additional alternatives (Alternatives 2, 3, and 4) are being considered. Alternatives 2 and 4 propose to realign Kingswood Drive at the southern end of the site, where the roadway will not divide the parking lot into two areas and create a crossing hazard. Several access points from the proposed retail store's parking lot will connect to Kingswood Drive to allow vehicles to enter and exit the lot. This arrangement is similar to the Alternate Site Plan discussed in the original Air Quality Memorandum (Landau Associates 2006), now referred to as Alternative 1. Under Alternative 3, Kingswood Drive will remain in its current location and will bisect the main parking area and a smaller southwest lot, similar to the proposed site plan. Although a lease lot is proposed for both the Proposed Site Plan and Alternative 1, a lease lot is not proposed for any of Alternatives 2 through 4.

Regardless of the selected alternative, a signalized intersection is planned to be installed to ease traffic congestion at the intersection of Costco/Albany Access and Littlerock Road. Additionally, a vehicle roundabout at the intersection of Kingswood Drive and Littlerock Road is included as part of the City's planned improvements to Littlerock Road and is included in the design of all site plans. The

purpose of this roundabout is to slow vehicle speeds in the project area and keep a constant flow of traffic along Littlerock Road.

Method of Analysis

Further clarification of the method of analysis has been included in this supplemental noise analysis in order to address many of the comments regarding how existing noise information was collected within the project area, and how noise modeling of the Proposed Action and Alternatives was conducted.

Noise measurements were collected in April 2005, on a mild day, with winds below 10 MPH. Conditions of dry pavement and low wind speeds are required in order to collect accurate traffic noise measurements, as directed by WAC 173-58-040. Therefore, the noise collection conditions were deemed to be adequate.

Field-measured values are typically only used for calibration of the noise model. Notes and observations in the field were used to construct the noise model of the site vicinity, which factored in the project area features. Initial estimates of the ground types (e.g., pavement, soft ground, field grass, and pavement) and shielding (e.g., building row density, vegetation, and terrain lines) were made while noise measurements were collected in the field. All measurements were conducted for 15-minute sampling periods during daytime off-peak hours, approximately 10 a.m. to 4 p.m. when traffic is moving freely. Traffic counts were also taken at the same time as the noise measurements in April 2005, documenting the number of vehicles, heavy trucks, medium trucks and light duty vehicles passing the measurement location during the period that each noise measurement was taken.

Traffic volumes that were counted during the noise measurement survey were modeled and the resulting sound levels were compared with the measured sound levels to calibrate the model. In order for the model to be considered accurate, the existing sound levels calculated by the model must be within 2 dBA of the field measured sound levels after adjustment factors, such as ground type and topography, have been applied and shielding objects have been included. Once the model was determined to be accurate, the afternoon peak hour traffic of the existing year was run to determine the actual baseline conditions for the worst hourly volume of traffic within the project area. These baseline conditions determine the current traffic-related noise without the proposed project.

The traffic noise analysis guidance provided is based largely on the regulatory material that is found in Title 23 Code of Federal Regulations Part 772 (23 CFR Part 772) entitled “Procedures for Abatement of Highway Traffic Noise and Construction Noise.” This policy provides the guidance for selection on noise measurement locations. Measurements are to be made at representative locations—residential neighborhoods, commercial and industrial areas, parks, churches, schools, hospitals, libraries,

etc. Measurements are normally restricted to exterior areas of frequent human use. Measurements are usually taken in one of three exterior locations: 1) at or near the roadway right-of-way line; 2) at or near buildings in residential or commercial areas; and 3) at an area between the right-of-way line and the building where frequent human activity occurs, such as a patio or the yard of a home. For comparison purposes, the future year (year of store opening) traffic noise levels with and without the proposed project were modeled for various representative receivers within the area. The number of representative receivers was based on the number of properties within 500 feet of the project site for the length of the project.

Numerous comments on the DEIS questioned noise levels at other receivers within the site vicinity. The original Noise Evaluation for Tumwater Retail Facility (Landau Associates 2006) completed for the DEIS evaluated noise impacts as a result of the traffic going to and from the proposed retail store with the various roadway improvements proposed, such as the added roundabout at Kingswood Drive, and other signal improvements in the area. The Noise Evaluation for Tumwater Retail Facility (Landau Associates 2006) provided a comparison of expected noise levels with the project to the existing noise levels and the year of store opening noise levels without the project. A variety of noise receivers were chosen in order to characterize and represent the majority of receivers in the project area. However, the noise analysis did not provide, nor was it intended to provide, an analysis of all potential noise impacts as a result of the proposed roadway and signal modifications to Littlerock Road. The City of Tumwater will be responsible for completing a full noise impact evaluation in accordance with state and federal guidelines before initiating any roadway or intersection improvements that alter the horizontal or vertical alignment of Littlerock Road. The City's noise impact study will predict noise levels through the roadway project design year (typically 25 to 30 years), and will include appropriate mitigation, if necessary.

Although various noise levels and noise sources are regulated by local, state and federal agencies, vibration is not. The original noise evaluation briefly discussed the vibration from delivery trucks during operation of the retail store, however, the noise analysis for the Tumwater Retail facility did not evaluate vibration from construction activities because typical construction activities, including earth compaction, have been found to fall well below the vibration threshold that would cause any structural damage to adjacent buildings, and would not be considered a significant impact.

CHARACTERISTICS OF NOISE WITHIN THE PROJECT AREA

Background noise

The identification of background noise from the dominant noise source is important to accurately predict noise level increases from a proposed project. For this reason, background noise from mobile sources (i.e., traffic) must be measured at receivers within 500 feet of the proposed project site. Outside of this study area, the traffic noise from the proposed project can often not be distinguished from other background noise sources, particularly a dominant noise source, such as another roadway.

The DEIS noise study considered Littlerock Road the dominant noise source within the immediate site vicinity because at any given receiver within 500 feet of the site boundary, when traffic is present along Littlerock Road, background noise sources are diminished and the noise levels at the receiver locations increase by more than 10 dBA. Because a 10 dBA increase is considered twice as “loud”, Littlerock Road was determined to be the dominant noise source within the site vicinity. When traffic along Littlerock Road diminishes, background noise, such as that from I-5 or other adjacent areas, becomes the loudest noise source.

Many residential and/or commercial receivers occur within the site vicinity at distances far greater than 500 feet from the proposed retail and roadway improvements. At these locations, Littlerock Road is not the dominant noise source and only contributes to the background noise, and is not readily distinguishable from other noise sources.

If vegetation within the site vicinity is high enough, wide enough, deep enough and dense enough (cannot be seen through), vegetation can decrease roadway traffic noise at a sensitive receiver. A 200-ft depth of effective dense vegetation can reduce noise by 10 dBA, which can cut the noise volume in half; a 100-ft depth of vegetation can reduce noise by 5 dBA. Vegetation less than 100 ft deep is not considered effective to discernibly reduce noise. It is often impractical to plant enough dense vegetation along a road to achieve such reductions. Vegetation planted as part of proposed landscaping can visually block the line of site to a noise source from a noise receiver. This landscaping can provide a psychological reduction in noise; however, it does not provide any actual audible decrease in noise.

FEDERAL, STATE, AND LOCAL REGULATIONS AND POLICIES

State and Local Regulations

As stated in the original Noise Evaluation for Tumwater Retail Facility (Landau Associates 2006), both the City and Thurston County do not have a specific noise ordinance that provides jurisdictional direction for the evaluation of traffic noise. The City and County have adopted the

Washington State Department of Ecology (Ecology) noise regulations as defined in Washington Administrative Code (WAC) 173-60; however, these regulations do not apply to traffic-related noise.

Because the proposed retail store would not be completed with any federal or state funds, and does not fall within the jurisdiction of the Washington State Department of Transportation (WSDOT) or federal programs, a traffic-related noise impact evaluation would not be required for the project. However, the WSDOT noise criteria were used in the original noise analysis to provide a technical framework for comparison purposes to state-approved criteria in an effort to evaluate potential noise impacts associated with the additional traffic traveling to and from the proposed retail facility.

Although the development of the retail store would not fall under any traffic-related noise regulations, the installation of any intersections or expansion to Littlerock Road must meet all state regulations. Before the City of Tumwater can move forward with the improvements to the surrounding roadways, modifications to the signals, or installation of the roundabout, a full noise analysis will need to be prepared by the City. This analysis will evaluate potential noise impacts at all surrounding sensitive receivers and estimate the noise impacts for the roadway project design year (assumed 2030).

TRAFFIC NOISE LEVELS

Added Alternatives

Compared with the Preferred Action Alternative and Alternative 1 modeled in the original Noise Evaluation for Tumwater Retail Facility (Landau Associates 2006), the predicted traffic volumes for the new Alternatives 2 through 4 (Transpo 2006) would be reduced by nearly 20 percent under each of the three alternatives. This reduction in traffic associated with Alternatives 2 through 4 provides for a small reduction in predicted noise within some areas of the proposed project. Overall, however, many representative receivers would either remain at the predicted noise measured for the original Preferred Alternatives and the original Alternative 1, or estimated noise levels would increase or decrease by 1 dBA at certain noise receivers under the new Alternatives 2 through 4 (Table 1). The largest decreases in noise relative to the Proposed Action (3 dBA) would occur at the cemetery in the central site vicinity on the west side of Littlerock Road under Alternatives 2 and 4. A slight increase in noise levels relative to the Proposed Action (1 dBA) would occur in the residential area on the eastern side of Littlerock Road, south of the proposed retail store under Alternatives 2 and 4. All receivers evaluated within this study, however, are expected to remain below the FHWA and WSDOT traffic noise criteria.

CONSTRUCTION NOISE

Added Alternatives

Construction noise impacts under the added alternatives would be similar to those described for Preferred Action Alternative and Alternative 1 discussed in the original Noise Evaluation. As discussed for the original Alternative 1, construction associated with the relocation of Kingswood Drive would be closer to residential receivers to the south under Alternatives 2 and 4. As originally presented, construction noise would generally be short-term and would occur during the daylight hours, as specified by the City of Tumwater Municipal Code.

**TABLE 1
PREDICTED TRAFFIC NOISE LEVELS (IN DBA)**

Receiver Number	Description of Location	FHWA / WSDOT Traffic Noise Criteria	2005 Existing Conditions	2007 No Action	2007 Preferred Action	2007 Alt 1	2007 Alt 2	2007 Alt 3	2007 Alt 4
1	Retail store at north end of project area	72	58	59	65	66	64	64	64
2	Located within mobile home park community in the northern project area	67	61	62	65	65	64	64	64
3	Commercial strip mall	72	62	62	65	65	64	64	64
4	Located at the cemetery, central project area, on the west side of Littlerock Road	67	60	61	64	61	61	63	61
5	Located in a residential area on the eastern side of Littlerock Road, south of the proposed retail store; near proposed realignment of Kingswood Drive	67	63	64	63	64	64	63	64
6	Located in front of Tumwater Middle School courtyard	67	62	63	63	63	63	63	63
7	Located in a residential area along Littlerock Road south of the project area	67	61	62	62	62	62	62	62

Based on the noise modeling results for the Preferred Alternative, Alternative 1 and the new Alternatives 2 through 4, it is expected that the noise resulting from the proposed retail store would not be audibly different under any of the alternatives. With or without the project, the overall growth anticipated

in the site vicinity, will result in an increase in traffic along Littlerock Road. Therefore, many noise receivers in the site vicinity are expected to experience noise increases of the same magnitude with or without the project.

ENVIRONMENTAL NOISE LEVELS

There are numerous noise sources that would be located at the site of the proposed retail facility under the Proposed Action and all of the alternatives. These noise sources would include: loading and unloading of trucks and associated merchandise, vehicles within the parking lot facilities, an auto service station associated with the retail facility, a potential garden center, and a potential gas station (under the Proposed Action and Alternative 1 only). All of these noise sources are regulated by the Ecology noise regulations, as defined in Washington Administrative Code (WAC) 173-60-040.

In order to meet these noise regulations, certain noise generating features of the proposed retail store would be located such that maximum noise reduction would be achieved. This would include locating the loading and unloading facilities along the eastern wall of the store facing I-5. Although the location of these features alone may not eliminate potential noise from reaching sensitive receivers, it provides for the best mitigation possible to reduce the noise. Under Alternatives 2, 3 and 4, the auto service center and garden center would be located at the south end of the store, which could generate additional noise closer to residential receivers to the south. The amount and type of noise from the proposed retail store that would be heard at various receivers within the site vicinity would vary widely. The transmission of noise would depend on the amount of background noise, the amount of traffic along Littlerock Road, the number of cars parked within the parking lot (providing noise shielding properties), and weather conditions. Given the close proximity of I-5 to the east and the distance of the nearest residential sensitive receiver (over 600 feet in any direction), significant impacts to residential receivers would not result, even during nighttime hours.

The WAC 173-60-40 also provides for the following exemptions:

- (a) Sounds created by motor vehicles when regulated by chapter 173-62 WAC.
- (d) Sounds created by warning devices not operating continuously for more than five minutes, or bells, chimes, and carillons.
- (e) Sounds created by safety and protective devices where noise suppression would defeat the intent of the device or is not economically feasible.

Operational equipment, such as back up beepers, while loud and can transmit a distance greater than 500 feet, are a required safety feature and are exempt from WAC 173-60.

Other environmentally-related noise, such as parking lot noise, would range from 60-63 dBA at 50 feet during certain activities, such as starting a car and opening and closing doors. These noise levels would be at or below the existing noise levels along Littlerock Road, however. In addition, any parking lot noise of this level would need to occur at the spaces closest to Littlerock Road for this level of noise to transmit to the nearest receiver, the cemetery. Even at this distance, noise on Littlerock Road and any parking lot noise occurring at the cemetery will be “louder” than parking lot activities from the proposed retail store.

Overall, the operational noise under Alternatives 2, 3 and 4 would be within Ecology’s noise limitations for daytime noise, would be below background noise levels and would occur for periods that would be less than Ecology’s provision during the nighttime hours.

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REFERENCES

Landau Associates. 2006. *Noise Analysis Report, Tumwater Retail, Tumwater, Washington*. January 6.
The Transpo Group. 2006 *Tumwater Retail: Supplemental Traffic Analysis*.