



21370 SW Langer Farms Pkwy  
Suite 142, Sherwood, OR 97140

## Technical Memorandum

**To:** Todd Boyce - Westwood Homes

**From:** Michael Ard, PE

**Date:** August 22, 2022

**Re:** Coburn Grand View Subdivision – Strong Road Access Analysis



RENEWS: 12/31/2023

This memorandum is written to provide information related to trip distribution and access considerations on the east side of the Coburn Grand View Subdivision project in Salem, Oregon. In particular, it focuses on impacts and proposed improvements surrounding the connection provided by Strong Road SE and 27<sup>th</sup> Avenue SE to Kuebler Boulevard.

### ***TRIP GENERATION AND DISTRIBUTION***

The prior *Coburn Apartments – Plan Modification Trip Generation and Distribution* memo dated February 11, 2022 contained detailed information regarding trip generation for the entire Coburn Grand View Subdivision project site, inclusive of the single-family homes and apartments within the proposed development. However, the “Site Trip Distribution Patterns and Added Traffic at Intersections” portion of the report was based on the travel patterns that would be expected upon completion of the full street network within the site. This street network provides connections to Reed Road SE, Battle Creek Road SE, and Strong Road SE.

Under the current phased development plan, 60 homes within “Segment C” of the proposed development would initially take access exclusively to Strong Road SE. Prior to completion of the remaining street network, this initial configuration is likely to result in increased traffic volumes on the east side of the development. Accordingly, a projection of interim traffic volumes at area intersections is appropriate.

For the 60 homes within “Segment C”, the daily and peak-hour trip volumes projected are provided in Table 1 below.

**Table 1 - "Segment C" Site Trips**

	AM Peak Hour			PM Peak Hour			Daily Total
	In	Out	Total	In	Out	Total	
60 Single-Family Homes	11	31	42	35	21	56	566

Assuming that the destinations of site trips are unchanged but that all trips must utilize an access location on Strong Road SE to reach their respective destinations, it is anticipated that all site trips destined for Kuebler Boulevard would be likely to use 27<sup>th</sup> Avenue SE rather than Reed Road SE and Battle Creek Road SE since this connection provides a more efficient travel path and avoids out-of-direction travel. Overall,



this is projected to result in 85% of site trips traveling to and from the south via Strong Road SE and 27<sup>th</sup> Avenue SE. The remaining 15% of site trips would be projected to use Strong Road to reach Reed Road SE. Based on these trip distribution patterns, we would expect 36 site trips to utilize 27<sup>th</sup> Avenue SE during the morning peak hour and 48 site trips to use 27<sup>th</sup> Avenue SE during the evening peak hour.

### ***EXISTING STREET AND INTERSECTION EXAMINATION***

In order to ensure that site trips can safely be added to the existing street network on the east side of the proposed development, the area streets and intersections were examined in detail. The primary focus of the investigation was to determine whether any existing deficiencies may require improvements in conjunction with the “Segment C” development.

#### **27<sup>th</sup> Avenue SE (Road Segment)**

The existing segment of 27<sup>th</sup> Avenue SE between Strong Road and the Morning Star Community Church / Roots Academy site is relatively narrow and lacks centerline striping and sidewalks. There is no posted speed limit on the roadway, but 85<sup>th</sup> percentile travel speeds in the vicinity of Marietta Street SE were measured to be 33 mph northbound and 38 mph southbound. The paved width of 27<sup>th</sup> Avenue SE near its intersection with Strong Road SE extends outside the public right-of-way onto private property on the west side.

#### **Strong Road at 27<sup>th</sup> Avenue SE (Intersection)**

The intersection of Strong Road SE at 27<sup>th</sup> Avenue SE is a T-intersection controlled by a stop sign on the northbound 27<sup>th</sup> Avenue approach. Through traffic traveling along Strong Road is free flowing.

Near its intersection with Strong Road SE, 27<sup>th</sup> Avenue SE has a sharp turn and descends a steep embankment to match the grade on Strong Road. The intersection is significantly skewed, with 27<sup>th</sup> Avenue running nearly parallel to Strong Road prior to connecting within a flared pavement section. Large trees and an embankment in the southeast corner of the intersection limit sight lines, which were measured to be less than 200 feet to the east from the northbound 28<sup>th</sup> Avenue SE approach to Strong Road SE. Since this is less than the required stopping sight distance for vehicles traveling northwest-bound along Strong Road, the limited sight distance may create a significant safety hazard at the intersection. Improving sight lines at the intersection would require removal of a row of large trees and regrading of the roadside embankment across private property, and is therefore not likely to be feasible.



### **Marietta Street SE (Road Segment)**

The existing segment of Marietta Street SE between 27<sup>th</sup> Avenue SE and Strong Road SE is also relatively narrow and lacks centerline striping and sidewalks. The paved width of Marietta Street SE is as narrow as 16 feet, although a gravel shoulder may functionally augment the road width when accommodating existing two-way traffic.

### **27<sup>th</sup> Avenue SE at Marietta Street SE (Intersection)**

The intersection of 27<sup>th</sup> Avenue SE at Marietta Street SE is also a T-intersection and is controlled by a stop sign on the westbound Marietta Street approach. Through traffic traveling along 27<sup>th</sup> Avenue is free flowing.

Although there are no skew angles, vertical topography breaks or horizontal curves in the vicinity of the intersection, sight distances are limited by vegetation within the southeast corner of the intersection. Intersection sight distance was measured to be 129 feet to the south and 395 feet to the north from 12 feet behind the edge of the traveled way under existing conditions. Based on the measured 85<sup>th</sup> percentile speeds the minimum sight distance required for safe operation was calculated to be 230 feet to the south and 280 feet to the north. Since the available sight distance to the south is less than the minimum required for safety, it would be appropriate to clear vegetation within the southeast corner of the intersection to meet or exceed the minimum safety requirements.

### **Strong Road at Marietta Street SE (Intersection)**

The intersection of Strong Road SE at Marietta Street SE is a T-intersection controlled by a stop sign on the eastbound Marietta Street approach. Through traffic traveling along Strong Road is free flowing.

The intersection is located on the outside of a horizontal curve in Strong Road. The intersection angle is also at a skew; however, vertical topography does not result in operational or safety concerns and vegetation does not restrict sight lines significantly. Intersection sight distance was measured to be 475 feet to the north and greater than 500 feet to the east from the eastbound Marietta approach. The available sight distances are well in excess of the minimum required for safe and efficient intersection operation.

Although the intersection is at a skew angle, the eastbound Marietta Street SE approach is flared in the vicinity of Strong Road SE. The paved width is sufficient to allow vehicles to intersect Strong Road at a near 90-degree angle. But without centerline striping most drivers would be hesitant to use the necessary portion of the flared approach for their turning movements. Accordingly, the intersection operates as a skewed intersection despite the presence of sufficient paved width to facilitate a more perpendicular approach.



## ***RECOMMENDATIONS***

Based on the impacts of the proposed Section C development and the detailed examination of the existing street and intersection infrastructure, the following recommendations are made:

- 1) Limited sight distances at the intersection of Strong Road SE and 27<sup>th</sup> Avenue SE present a significant hazard that vehicles may enter Strong Road from 27<sup>th</sup> Avenue while oncoming drivers have insufficient time and distance to allow them to stop to avoid a collision. Accordingly, it is recommended either that the intersection be closed, or that the intersection be converted to all-way stop control for safety. It should be noted that intersection volumes are not projected to meet all-way stop control warrants per the Manual on Uniform Traffic Control Devices; however, the warrants specifically allow consideration of “Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop.” As such, either option was determined to be feasible.
- 2) Limited sight distances at the intersection of 27<sup>th</sup> Avenue SE and Marietta Street SE also present a safety hazard under existing conditions. It is therefore recommended that vegetation be cleared from the southeast corner of the intersection to improve sight lines to the south. The minimum sight distance necessary for safety at this intersection was determined to be 230 feet to the south.
- 3) If the intersection of 27<sup>th</sup> Avenue SE at Strong Road SE is closed, traffic volumes will increase on Marietta Street SE, since this will provide the only connection between Strong Road SE and 27<sup>th</sup> Avenue SE. Accordingly, it may be appropriate to widen Marietta Street SE to meet the minimum requirements to accommodate fire vehicles as well as two-way traffic. If the roadway is widened, it is recommended that the cross-section include no less than 20 feet of paved width.
- 4) Additionally, if the intersection of 27<sup>th</sup> Avenue at Strong Road SE is closed it is recommended that centerline striping be provided on Marietta Street SE in the vicinity of Strong Road to allocate sufficient space for eastbound vehicles to approach Strong Road at a 90-degree angle. It should be noted that vehicles can safely execute the eastbound right-turn movement onto Strong Road by simply continuing straight while using the existing flared paved width near the intersection. This movement is not inherently problematic and with striping in place drivers can choose to approach Strong Road anywhere within the flared width allocated to the eastbound travel direction. Accordingly, it is not necessary to remove existing paving from the south side of the roadway to facilitate safe and efficient operation of the intersection. Further, since the intersection is likely to be re-built in the near future as further development occurs within the underdeveloped commercial property to the south, it is recommended that improvements at this intersection be limited to the widening necessary along Marietta Street and the striping necessary to allocate the appropriate space to eastbound vehicles to facilitate a perpendicular approach.

If you have any questions regarding this analysis, please feel free to contact me via email at [mike.ard@gmail.com](mailto:mike.ard@gmail.com) or via phone at 503-537-8511.

## Appendix

# Trip Generation Calculation Worksheet



Land Use Description: Single-Family Detached Housing

ITE Land Use Code: 210

Independent Variable: Dwelling Units

Quantity: 60 Dwelling Units

Setting: General Urban/Suburban and Rural

## Summary of ITE Trip Generation Data

### **AM Peak Hour of Adjacent Street Traffic**

Trip Rate: 0.70 trips per dwelling unit

Directional Distribution: 26% Entering 74% Exiting

### **PM Peak Hour of Adjacent Street Traffic**

Trip Rate: 0.94 trips per dwelling unit

Directional Distribution: 63% Entering 37% Exiting

### **Total Weekday Traffic**

Trip Rate: 9.43 trips per dwelling unit

Directional Distribution: 50% Entering 50% Exiting

## Site Trip Generation Calculations

60 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	11	31	42
PM Peak Hour	35	21	56
Weekday	283	283	566



