



LAWRENCE FIELD OPERATIONS FACILITY
Combined Facility for the Municipal Services and Operations
Organization (MSO)
Northeast of E 19th Street & O'Connell Road
CFS Project Number 191196

Traffic Study

July 2, 2020

Owner:

The City of Lawrence
6 East 6th Street, Lawrence, Kansas 66044

Architect / Prime Contract Holder:

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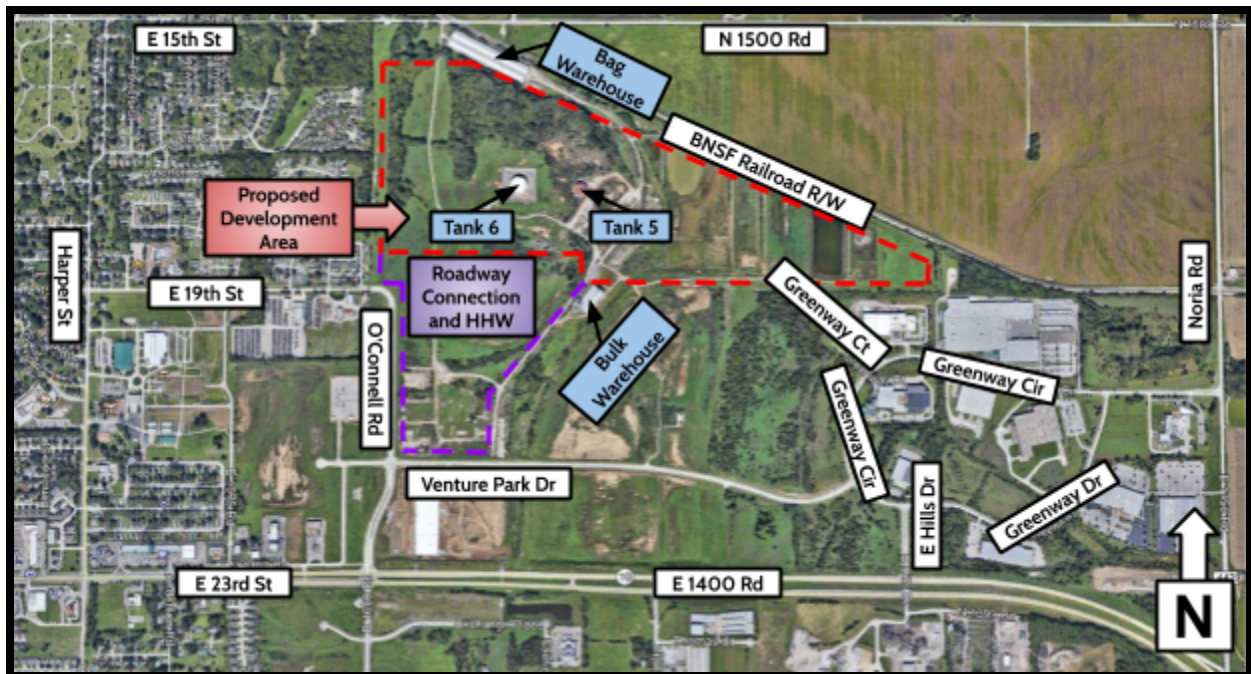
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Introduction

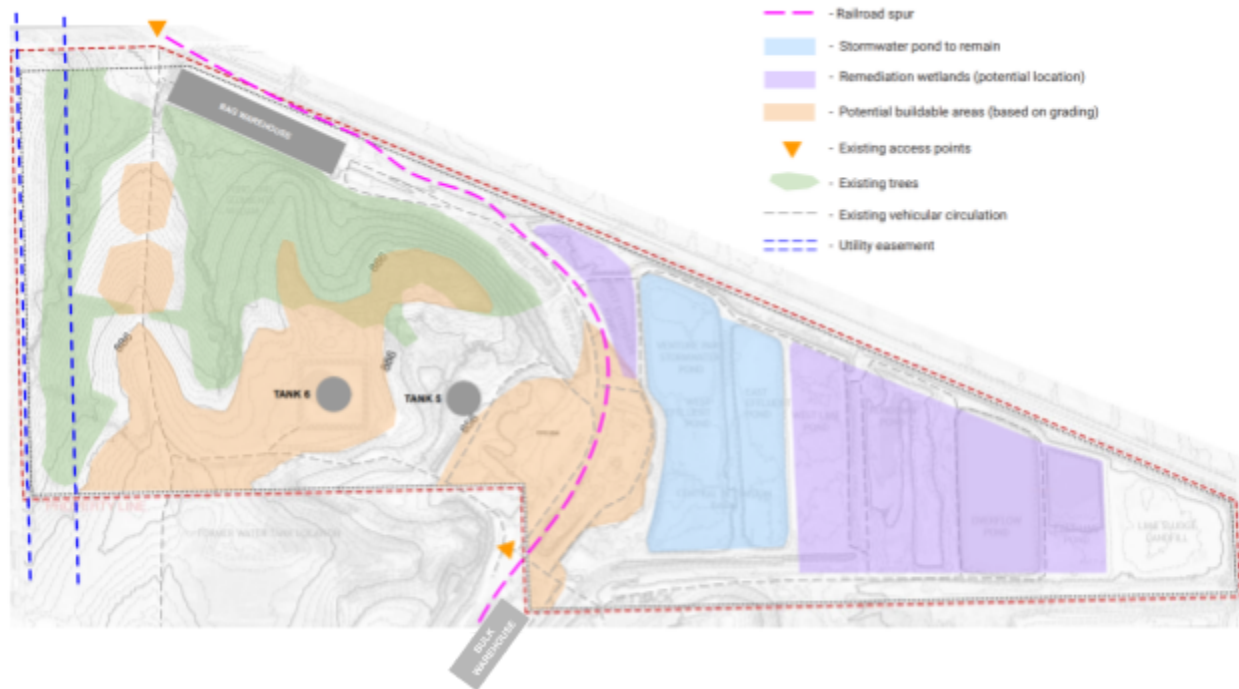
This traffic study for the field operations campus in the City of Lawrence, Kansas, has been prepared at the request of the City of Lawrence in accordance with the City’s Traffic Study Guidelines. The City of Lawrence is constructing a new field operations campus on the eastern side of the city which will consolidate several departments into one secure location. The 168 acre site will be northwest of the intersection of E 19th Street & O’Connell Road. Proposed staff includes 223 full-time and 13 part-time personnel with some individuals making multiple site trips to and from the facility throughout the day. The facility will be constructed to accommodate a growth in city staff to align with the growth of Lawrence over the next 50 years with an estimated 355 full-time and 21 part-time personnel.

There will be at least one new roadway connection to public streets with a major access point connecting to the intersection of E 19th Street & O’Connell Road. Although the current orientation of buildings and circulation roadway within the campus is still under development, an additional roadway access connection is being considered for either Greenway Circle and/or E 15th Street to meet emergency service access requirements. The intersection of E 19th Street & O’Connell Road will be reconfigured into a stop-controlled T-intersection with O’Connell Road extending to the north.



Site Location Map, Lawrence, Kansas

Many of the vacated improvements currently on site will be removed, including Tank 5 and Tank 6. The bulk warehouse and bag warehouse buildings are planned to remain unchanged due to this development but other options are being discussed at this time. Additional details for the existing site conditions are shown in the image below.



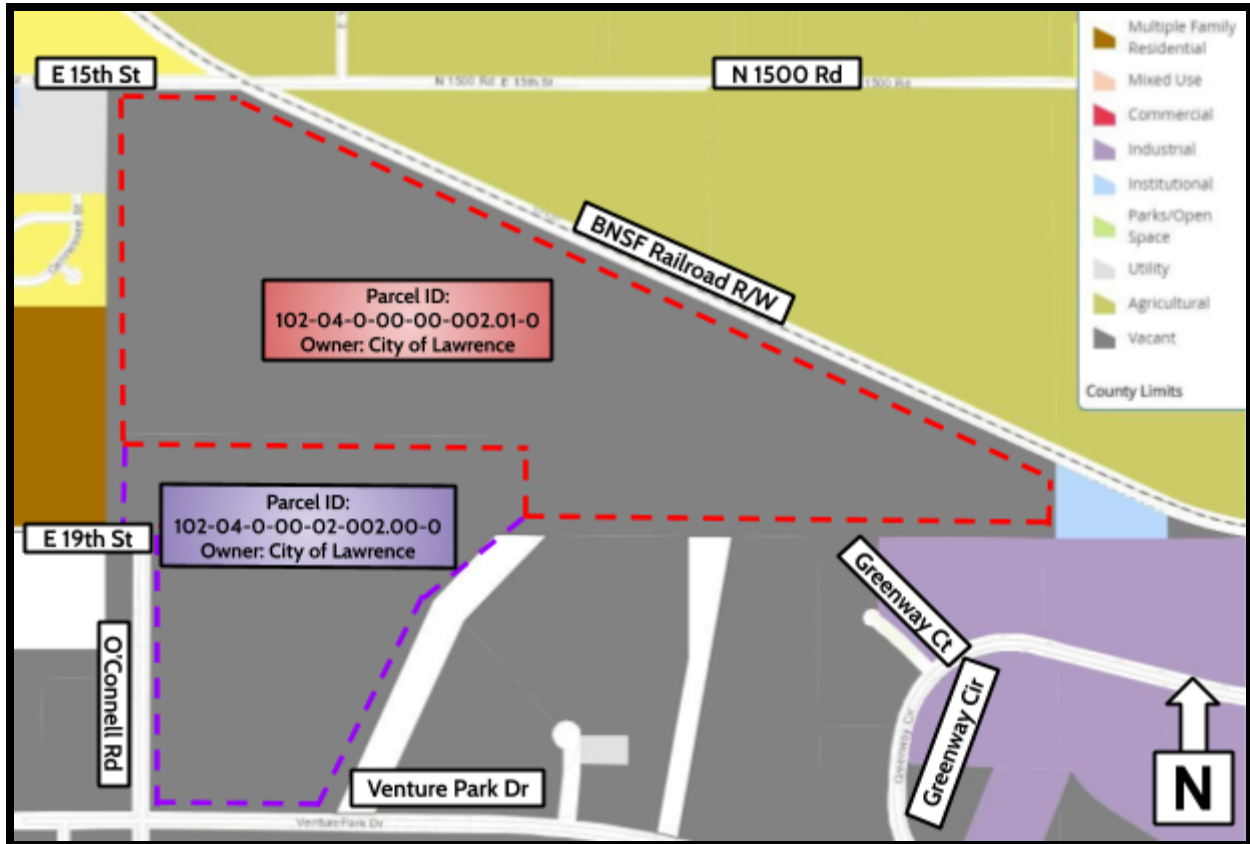
Existing Conditions Site Map, Lawrence, Kansas

The overall objective of the report is to look at proposed land uses and nearby intersections to determine if additional improvements are needed based on trip generation levels. The report will provide details on planned site improvements, provide traffic generation volumes, use available traffic data to distribute volumes for peak hour analysis, provide a Synchro analysis using performance measures, analyze multi-modal aspects of the facility, and provide details on the proposed roadways and access points.

Section 1: Specific Development Plan and Land Use

Land Use of Development: The land use for the site will be converted from the “Former Farmland/Vacant” category to “Institution” category. The site includes portions of two parcels currently owned by the City of Lawrence, Parcel ID 102-04-0-00-00-002.01-0 and Parcel ID

102-04-0-00-02-002.00-0. New improvements to Parcel ID 102-04-0-00-00-002.01-0 will include 3-6 combined-use buildings, bulk storage, fueling station, new roadways, and parking. New improvements to Parcel ID 102-04-0-00-02-002.00-0 will include a roadway connection or other improvements, such as the Household Hazardous Waste (HHW) building, depending on the final building footprint arrangement.



Land Use Map, Lawrence, Kansas

There will be 3 distinct land uses for the development which include the following:

- (1) Office and Maintenance Combined Campus
 - (a) This includes several related-use buildings, offices, conference rooms, workshops, garages, storage bays, a refueling pump, and other building elements needed for city operations. Divisions within the Office and Maintenance Campus include the central maintenance garage, construction management engineering division, facility maintenance, forestry, horticulture, inspections, stormwater, streets, traffic division, wastewater collections, and water distribution.
 - (b) For trip generation purposes, operating hours are Monday through Friday. It was estimated that 95% of the employees make at least one additional trip throughout the day if not two. Most employees will arrive around 6:30am, leave between

6:45am-7:00am to go to their scheduled field work, and return to the campus around 5:00pm-5:15pm. About 50% of staff will return for lunch around 11:30am-12:00pm. Inspectors leave for the field around 8:00am and return at 5:00pm. Some of the supervisory staff may make 3 or 4 trips throughout the day for meetings. Maintenance operations hours are 7:30am to 3:30pm with cart delivery trucks and maintenance trucks entering and exiting the shop area throughout the day.

(2) Solid Waste Division

(a) This includes trash truck operations.

(b) For trip generation purposes, operation hours are slightly different than Office and Maintenance operations since trash trucks operate Monday through Saturday. About 70% of the collection services operation starts at 6:00am with the other 30% at 7:00am. There is a single “late truck” that starts at 7:30am. Trucks leaving at 6:00am are expected to return back from their route at around 2:00-2:15pm to be clocked out by 2:30pm. Trucks leaving at 7:00am are expected to return back from their route at around 3:00-3:15pm to be clocked out by 3:30pm. The single “late truck” works until 4:00pm. Inclement weather slows down operations as well as when students move out meaning that, on occasion, the 6:00am trucks don’t return until 3:00-3:30pm. Only 3 trucks run on Saturdays with a start time of 6:00am and ending around 12:00pm.

(3) Household Hazardous Waste

(a) This includes household hazardous waste operations as well as a drop-off area for the public. This building will be outside of the fenced-in section of the campus.

(b) For trip generation purposes, the facility is open to the public 8:00am-1:00pm Tuesday, Wednesday, and Thursday. The number of public trips is expected to be 7 per hour.

Land Use of Surrounding Properties: To the north, across the BNSF Railroad rail line, the land use category is Agriculture. To the east, the land use category is Industrial. To the south of the site is vacant which is undeveloped/partially developed. To the west of the site, the land use categories are Vacant on the southside of E 19th Street and Multiple Family Residential on the northside of E 19th Street.

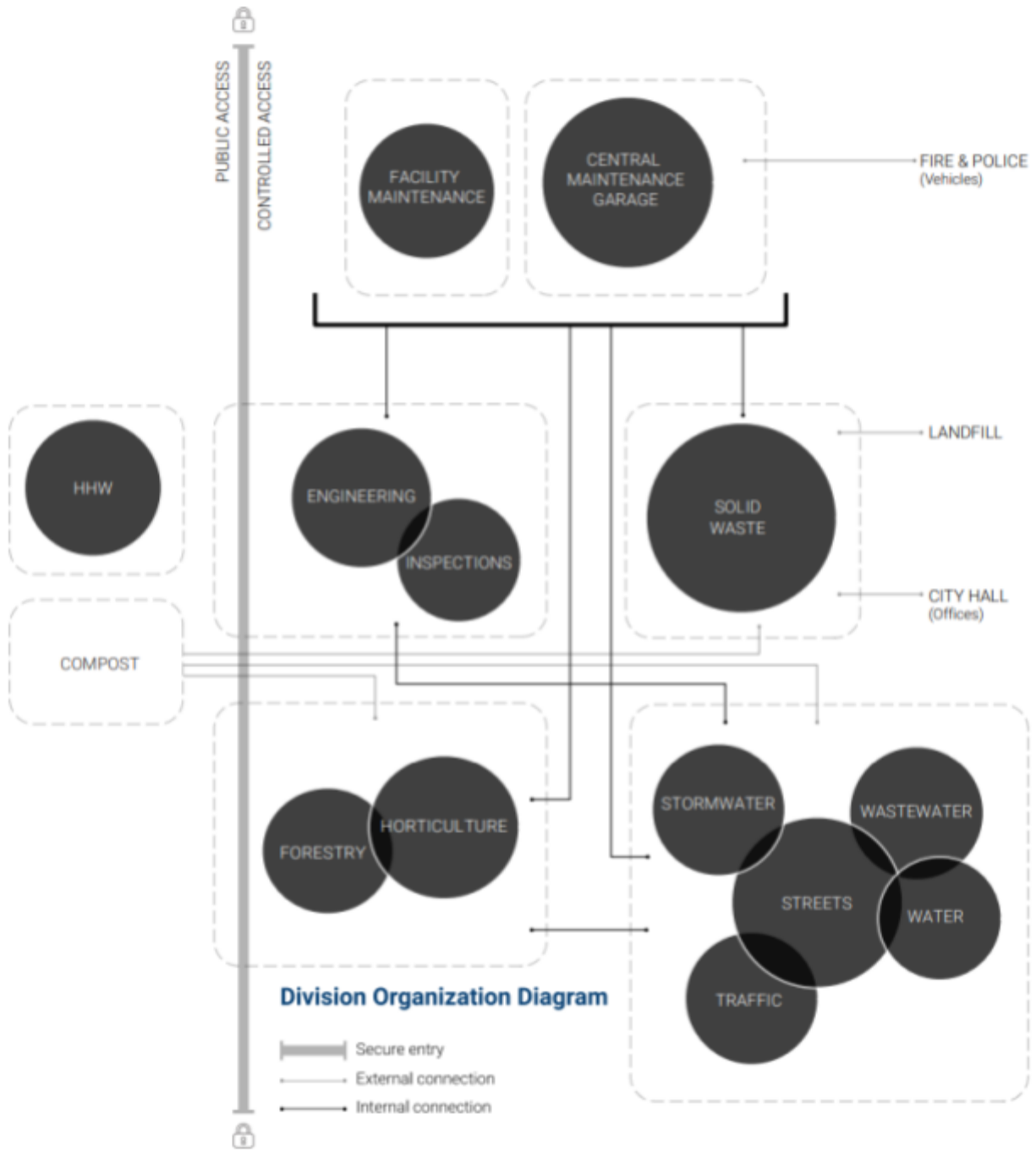
Development Plan: The following Facility Divisions will share space in the new campus:

- CMG – Central Maintenance Garage
 - Service and repair for all City-owned equipment
 - 73,770 sq ft for Main Building, 8.25 acres for total site requirements
 - 17 full-time employees
- CMED – Construction Management Engineering Division

- Engineering oversight and management for construction projects in the City
- 8,490 sq ft for Main Building, 2.71 acres for total site requirements
- 14 full-time employees
- FAC – Facility Maintenance Division
 - Maintenance and operations for 258 City-owned buildings/structures and grounds
 - 33,523 sq ft for Main Building, 4.60 acres for total site requirements
 - 10 full-time employees and 1 part-time employee
- FOR – Forestry Division
 - Protect and maintain street trees
 - 24,665 sq ft for Main Building, 2.70 acres for total site requirements
 - 5 full-time employees and 3 part-time employee
- HOR – Horticulture Division
 - Maintenance of landscaping and natural areas
 - 11,856 sq ft for Main Building, 10.52 acres for total site requirements
 - 5 full-time employees and 5 part-time employee
- HHW – Household Hazardous Waste Division
 - City and County drop off location for household hazardous waste
 - 12,181 sq ft for Main Building, 2.78 acres for total site requirements
 - 1 full-time employee and 4 part-time employees
- INS – Inspections Division
 - Inspection of construction and repair projects
 - 4,713 sq ft for Main Building, 1.93 acres for total site requirements
 - 9 full-time employees
- SWD – Solid Waste Division
 - Collection of trash, recycling, yard waste, bulky items and tires
 - 43,584 sq ft for Main Building, 14.48 acres for total site requirements
 - 80 full-time employees
- STWT – Stormwater Division
 - Stormwater system oversight and management
 - 51,623 sq ft for Main Building, 6.56 acres for total site requirements
 - 10 full-time employees
- STRT – Streets Division
 - Roadway oversight and management
 - 79,626 sq ft for Main Building, 11.93 acres for total site requirements
 - 24 full-time employees
- TRAF – Traffic Division
 - Street signage and intersection traffic signal oversight and management
 - 23,513 sq ft for Main Building, 3.16 acres for total site requirements
 - 6 full-time employees

- WSWT – Wastewater Collections Division
 - Sanitary sewer system oversight and management
 - 22,729 sq ft for Main Building, 2.53 acres for total site requirements
 - 10 full-time employees
- WTDT – Water Distribution Division
 - Water distribution system oversight and management
 - 58,583 sq ft for Main Building, 10.00 acres for total site requirements
 - 32 full-time employees

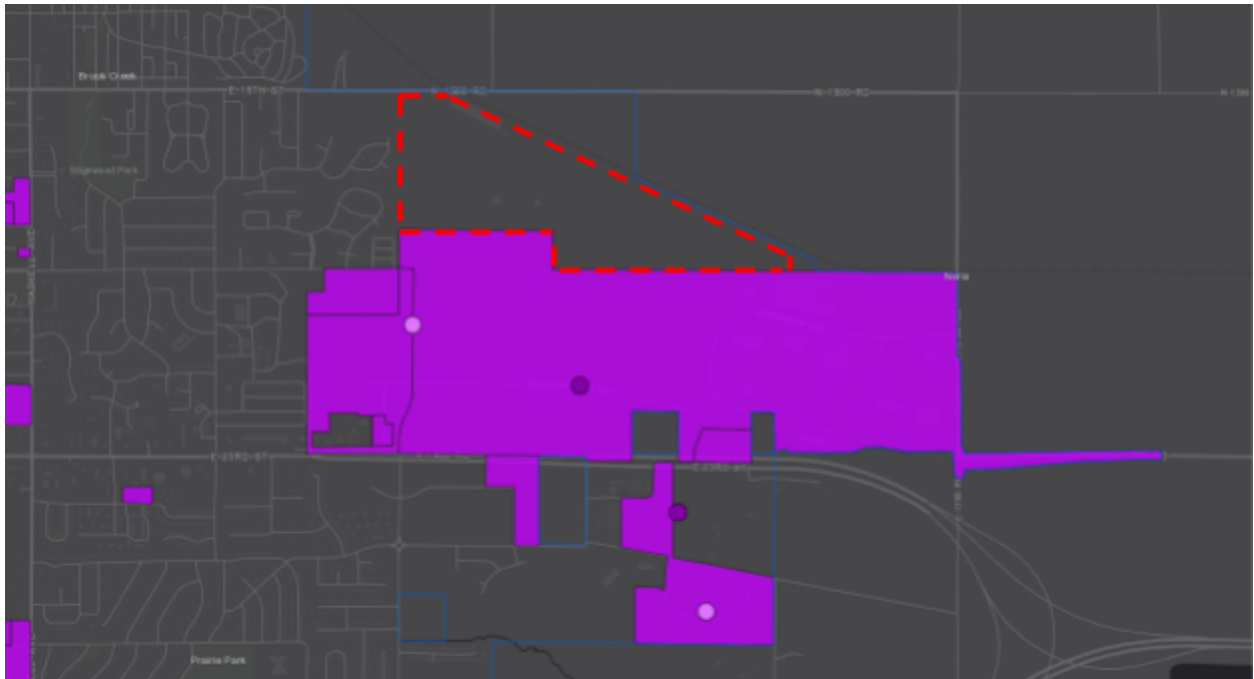
For the Office and Maintenance Combined Campus including the Household Hazardous Waste division, the total building square footage is 448,856 sq ft and the total acreage is 82.15 acres. The final building layout is being refined at the time of writing this report. The general concept of the buildings is shown in the image below.



Schematic Building Layout

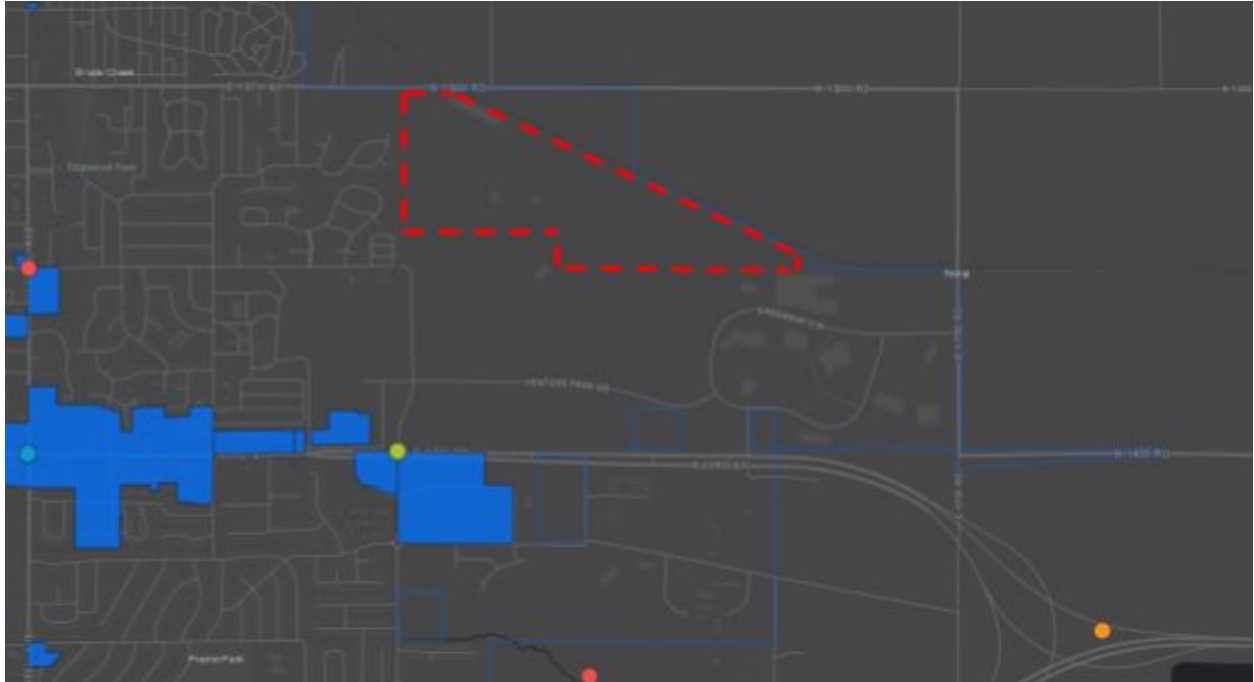
Section 2: Land Use Shown in the Lawrence/Douglas County Comprehensive Plan

Land Uses in the Lawrence/Douglas County Comprehensive Plan: The land use shown in the Plan 2040 GIS maps show that the site is partially vacant and partially industrial.



Plan 2040 Industrial Map (Purple)

Shown below are the nearby commercial areas and flood areas which will not be impacted by the new development.



Plan 2040 Commercial Map (Blue)

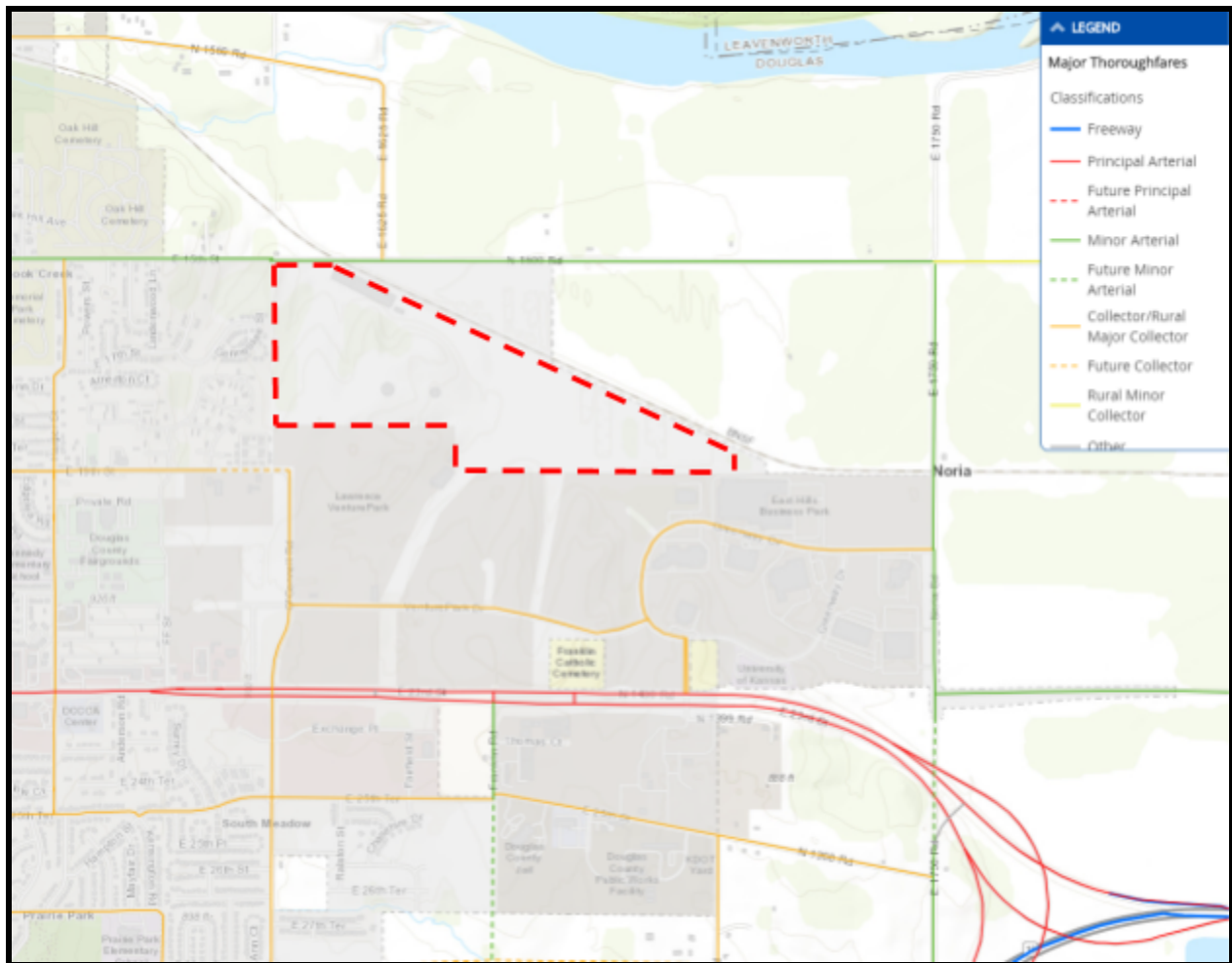


Plan 2040 Flood Zone Map (Red)

There is no conflict between the proposed land use for the new development and the Comprehensive Plan.

Section 3: Functional Classification of the Public Streets Bordering the Site

Surrounding Public Streets and Highway Network: As shown in the Transportation 2040 (T2040) report developed by the Metropolitan Transportation Plan of Lawrence and Douglas County, the functional classification of the surrounding streets is shown in the map below.



Roadway Functional Classification Map

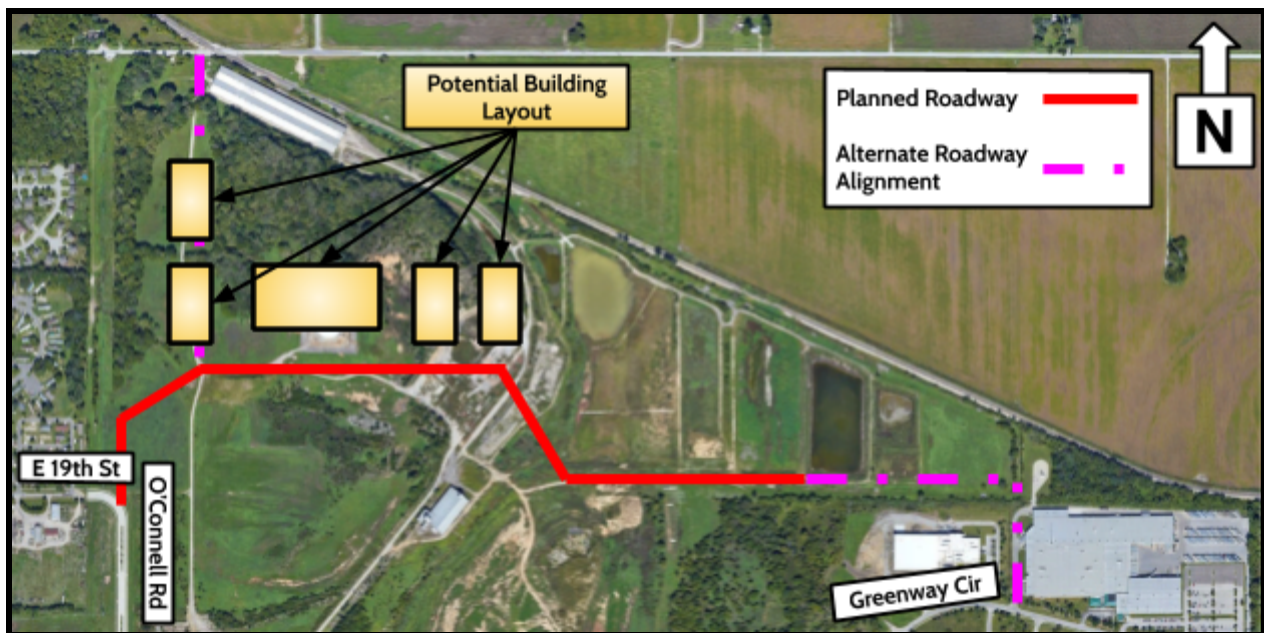
Surrounding Roadways include the following:

- E 23rd Street/N 1400 Road - Principal Arterial
- O’Connell Road/E 1600 Road - Collector/Rural Major Collector
- Venture Park Drive - Collector/Rural Major Collector

- Greenway Circle - Collector/Rural Major Collector
- Noria Road/E 1750 Road - Minor Arterial
- E 19th Street - Collector/Rural Major Collector
- Harper Street - Collector/Rural Major Collector

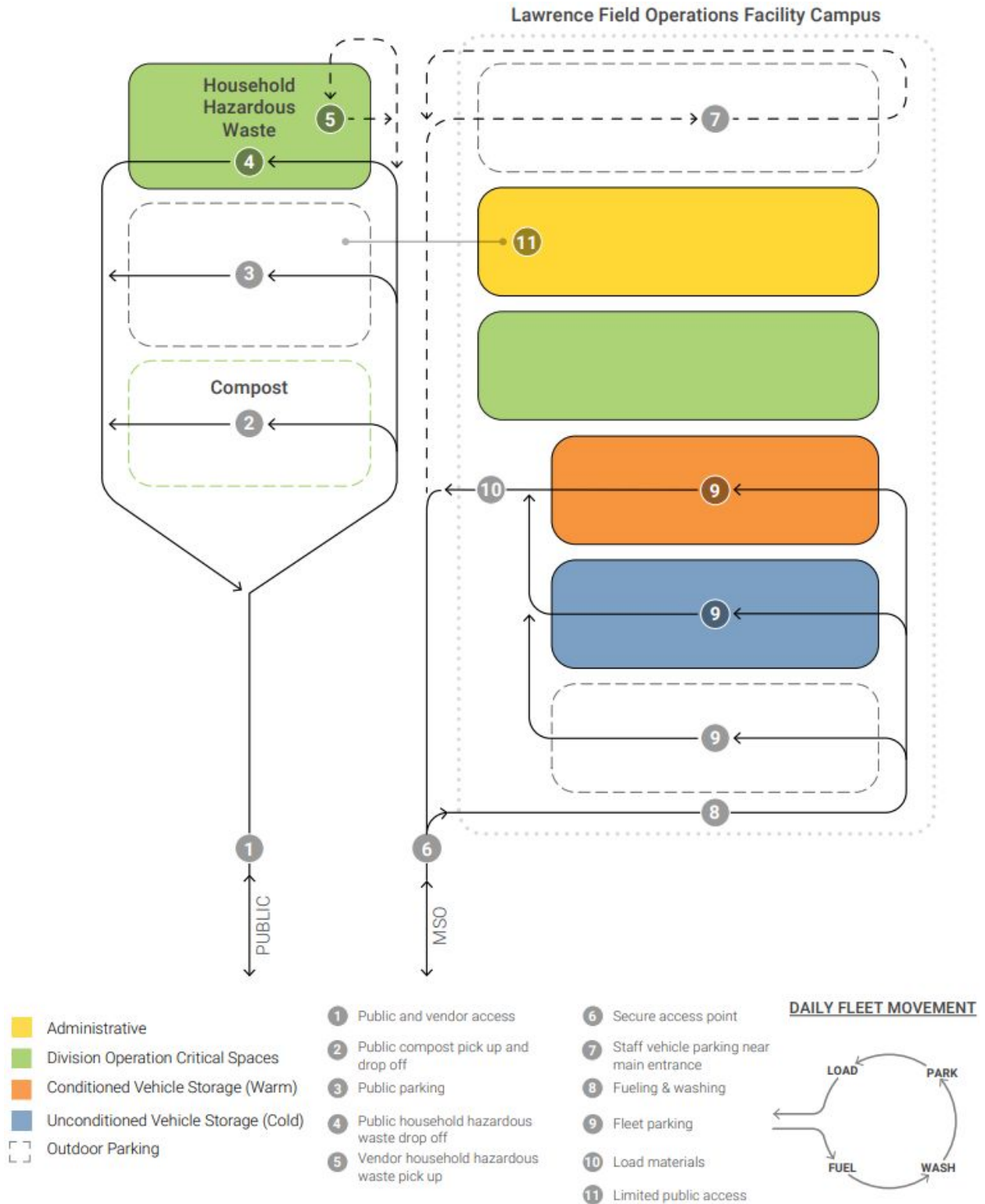
Section 4: Access to the Development, Internal Circulation, and Truck Turning Movements

Access to the Development: The main access to the development will be an extension of O’Connell Road to the north of 19th Street. North of O’Connell Road & 19th Street will be a security gate entrance. The roadway will provide internal circulation through the site and will be used by vehicles traveling between buildings, vehicle maintenance bays, and workshops. Several options for a back entrance are being considered as an alternative egress for emergency/fire access.



Potential Layout

Internal Circulation and Parking: The final parking lot layout and circulation plan is being refined at the time of writing this report. The general concept of vehicle flow is shown in the image below.



The Facility Divisions within the campus will share parking spaces although parking space requirements per division have been calculated separately to ensure parking needs are satisfied. The number of vehicle parking spaces is outlined below:

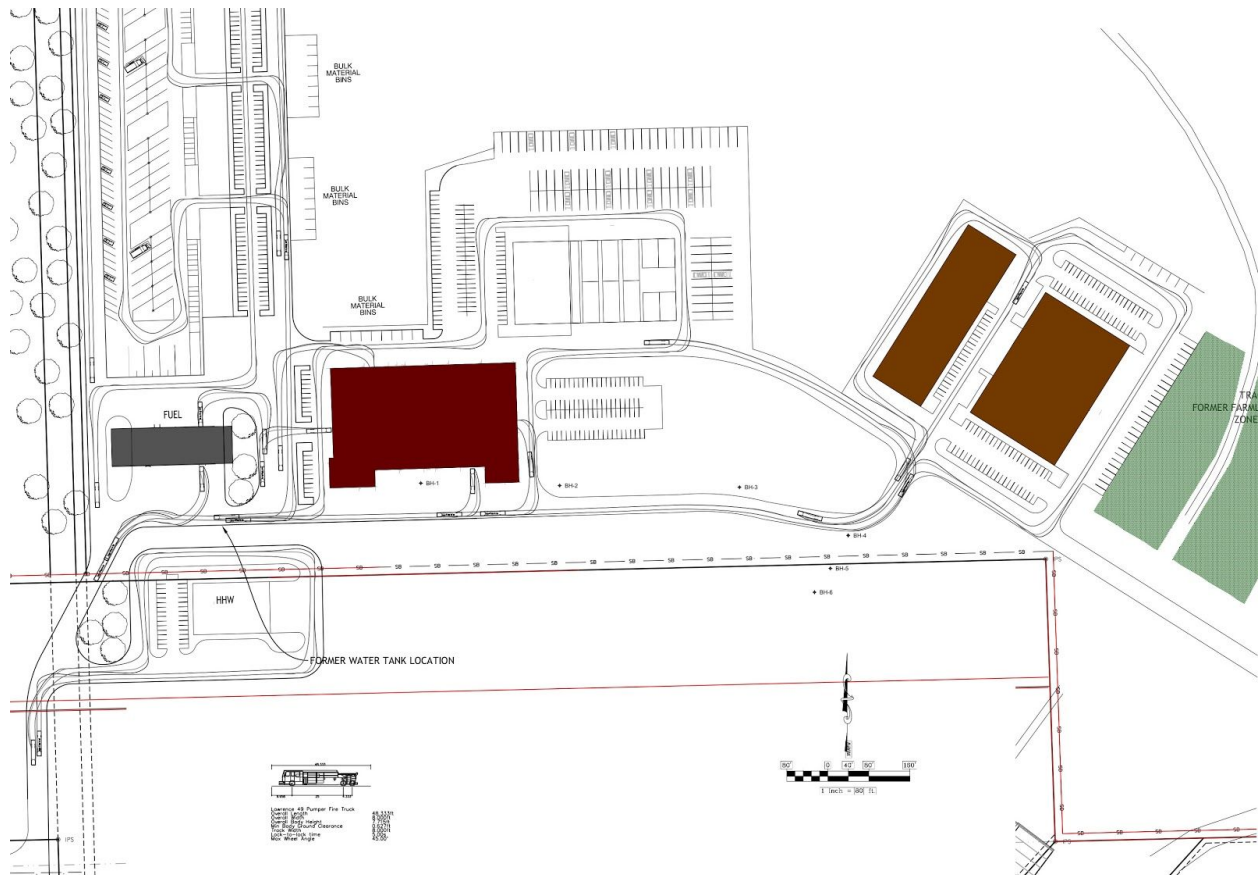
- CMG – Central Maintenance Garage
 - Staff Parking - 30 spaces
 - ADA Reserved Parking - 1 space
 - Conditioned Vehicle Storage (Warm) - 3,366 sq ft total
 - Pickup - 6 spaces at 10 ft x 20 ft
 - Large Service Bays - 18 spaces at 28 ft x 52 ft
 - Small Service Bays - 12 spaces at 22 ft x 32 ft
 - Tire Service Bay - 1 space at 28 ft x 52 ft
 - Fleet Staging Area - 6 spaces at 20 ft x 45 ft
 - Wash Bay - 1 space at 30 ft x 56 ft
 - Fuel Island - 1 space at 30 ft x 50 ft
 - Trash / Recycling Area - 1 space at 30 ft x 30 ft
- CMED – Construction Management Engineering Division
 - Staff Parking - 23 spaces
 - ADA Reserved Parking - 1 space
 - Exterior Equipment Parking - 10 spaces at 12 ft x 24 ft
- FAC – Facility Maintenance Division
 - Staff Parking - 18 spaces
 - ADA Reserved Parking - 1 space
 - Conditioned Vehicle Storage (Warm) - 26,668 sq ft total
 - Large - 5 spaces at 20 ft x 45 ft
 - Medium - 14 spaces at 12 ft x 24 ft
 - Pickup - 5 spaces at 10 ft x 20 ft
 - Unconditioned Vehicle Storage (Cold) - 8,976 sq ft total
 - Pickup - 16 spaces at 10 ft x 20 ft
 - Trash / Recycling Area - 1 space at 30 ft x 30 ft
- FOR – Forestry Division
 - Staff Parking - 8 spaces
 - ADA Reserved Parking - 1 space
 - Conditioned Vehicle Storage (Warm) - 19,191 sq ft total
 - Large - 5 spaces at 20 ft x 45 ft
 - Medium - 3 spaces at 12 ft x 24 ft
 - Pickup - 8 spaces at 10 ft x 20 ft
 - Unconditioned Vehicle Storage (Cold) - 1,795 sq ft total
 - Pickup - 3 spaces at 10 ft x 20 ft
 - Trash / Recycling Area - 1 space at 30 ft x 30 ft
- HOR – Horticulture Division
 - Staff Parking - 26 spaces
 - ADA Reserved Parking - 1 space

- Conditioned Vehicle Storage (Warm) - 4,825 sq ft total
 - Pickup - 9 spaces at 10 ft x 20 ft
- Unconditioned Vehicle Storage (Cold) - 8,976 sq ft total
 - Pickup - 16 spaces at 10 ft x 20 ft
- Exterior Equipment Parking - 14 spaces at 12 ft x 24 ft
- Trash / Recycling Area - 1 space at 30 ft x 30 ft
- HHW – Household Hazardous Waste Division
 - Staff Parking - 9 spaces
 - ADA Reserved Parking - 2 spaces
 - Visitor Parking - 17 spaces
 - Visitor Drive-thru - 1 space at 15 ft x 15 ft
 - Conditioned Vehicle Storage (Warm) - 561 sq ft total
 - Pickup - 1 spaces at 10 ft x 20 ft
 - Household Hazardous Waste Dumpster Containers - 3 spaces at 8 ft x 13 ft
- INS – Inspections Division
 - Staff Parking - 15 spaces
 - ADA Reserved Parking - 1 space
 - Exterior Equipment Parking - 14 spaces at 12 ft x 24 ft
- SWD – Solid Waste Division
 - Staff Parking - 109 spaces
 - ADA Reserved Parking - 4 spaces
 - Exterior Equipment Parking - 109 spaces at 12 ft x 24 ft
 - Wash Bay - 2 spaces at 30 ft x 56 ft
 - Fuel Island - 1 space at 30 ft x 50 ft
 - Dumpster and Cart Storage Area - 1 space at 160 ft x 300 ft
- STWT – Stormwater Division
 - Staff Parking - 16 spaces
 - ADA Reserved Parking - 1 space
 - Conditioned Vehicle Storage (Warm) - 39,898 sq ft total
 - Large - 13 spaces at 20 ft x 45 ft
 - Medium - 8 spaces at 12 ft x 24 ft
 - Pickup - 2 spaces at 10 ft x 20 ft
 - Unconditioned Vehicle Storage (Cold) - 12,629 sq ft total
 - Medium - 5 spaces at 12 ft x 24 ft
 - Pickup - 16 spaces at 10 ft x 20 ft
 - Exterior Equipment Parking - 13 spaces at 12 ft x 24 ft
 - Wash Bay - 1 space at 30 ft x 56 ft
- STRT – Streets Division
 - Staff Parking - 39 spaces

- ADA Reserved Parking - 2 spaces
- Conditioned Vehicle Storage (Warm) - 61,055 sq ft total
 - Large - 19 spaces at 20 ft x 45 ft
 - Medium - 13 spaces at 12 ft x 24 ft
 - Pickup - 4 spaces at 10 ft x 20 ft
- Unconditioned Vehicle Storage (Cold) - 11,561 sq ft total
 - Medium - 3 spaces at 12 ft x 24 ft
 - Pickup - 16 spaces at 10 ft x 20 ft
- Exterior Equipment Parking - 28 spaces at 12 ft x 24 ft
- Wash Bay - 1 space at 30 ft x 56 ft
- Fuel Island - 1 space at 30 ft x 50 ft
- Trash / Recycling Area - 1 space at 30 ft x 30 ft
- TRAF – Traffic Division
 - Staff Parking - 10 spaces
 - ADA Reserved Parking - 1 space
 - Conditioned Vehicle Storage (Warm) - 7,414 sq ft total
 - Medium - 6 spaces at 12 ft x 24 ft
 - Pickup - 4 spaces at 10 ft x 20 ft
 - Exterior Equipment Parking - 6 spaces at 12 ft x 24 ft
- WSWT – Wastewater Collections Division
 - Staff Parking - 16 spaces
 - ADA Reserved Parking - 1 space
 - Conditioned Vehicle Storage (Warm) - 17,126 sq ft total
 - Large - 3 spaces at 20 ft x 45 ft
 - Medium - 11 spaces at 12 ft x 24 ft
- WTDT – Water Distribution Division
 - Staff Parking - 52 spaces
 - ADA Reserved Parking - 2 spaces
 - Conditioned Vehicle Storage (Warm) - 37,443 sq ft total
 - Large - 6 spaces at 20 ft x 45 ft
 - Medium - 18 spaces at 12 ft x 24 ft
 - Pickup - 13 spaces at 10 ft x 20 ft
 - Unconditioned Vehicle Storage (Cold) - 12,118 sq ft total
 - Pickup - 22 spaces at 10 ft x 20 ft
 - Exterior Equipment Parking - 35 spaces at 12 ft x 24 ft

Truck Turning Movements: Internal circulation routes will provide sufficient space for truck turning maneuvers. Most large trucks are less than 45 ft although the combination of a truck and trailer could be longer. The following image is a draft layout that provides sufficient turning

space for a Lawrence 49 Pumper Fire Truck. A larger version of this illustration has been included in the appendix.



Potential Layout showing Lawrence 49 Pumper Fire Truck Turning Movements

Section 5: Current Public Street Characteristics Adjacent to the Site

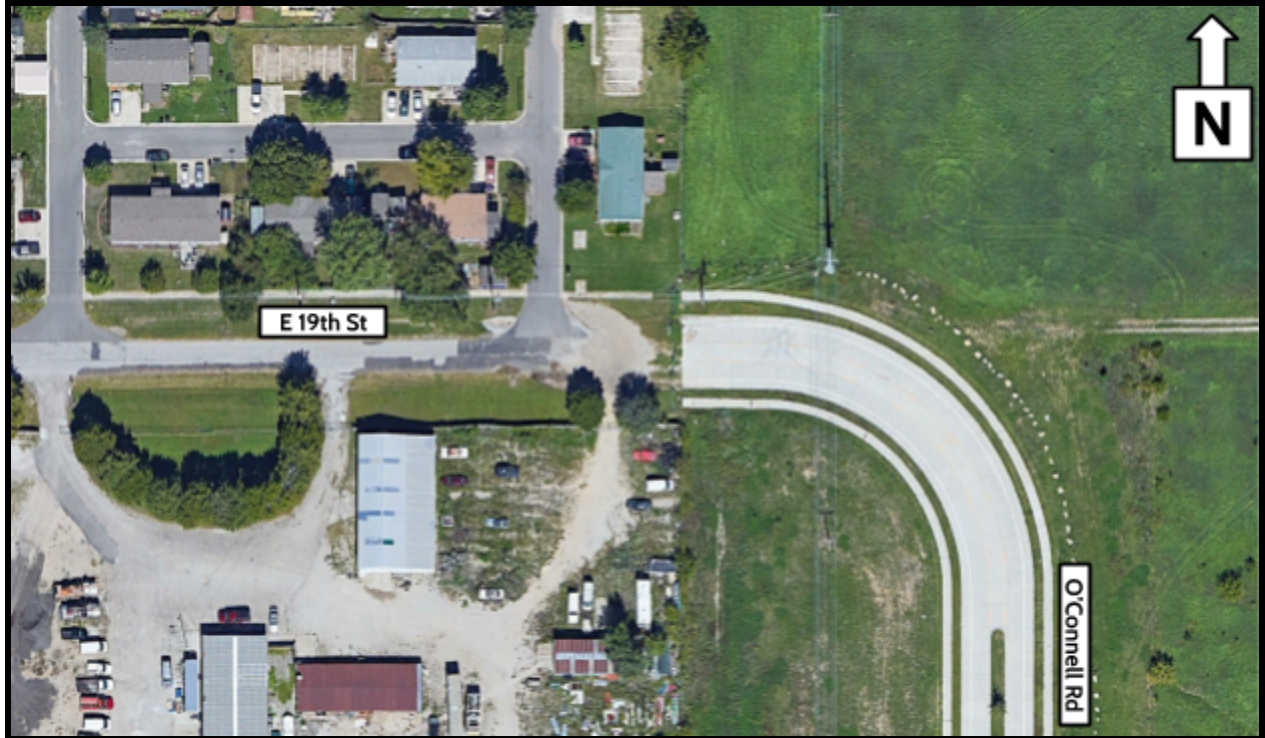
Surrounding Roadways: The following list provides a recap of roadways surrounding the MSO facility.

- E 23rd Street/N 1400 Road - Principal Arterial
 - East of O'Connell Road/E 1600 Road
 - 4 lane divided roadway with a speed limit of 55 mph
 - West of O'Connell Road/E 1600 Road
 - 4 lane divided roadway transition to a 5 lane undivided roadway with a speed limit of 45 mph

- O’Connell Road/E 1600 Road - Collector/Rural Major Collector
 - South of Venture Park Drive
 - 4 lane divided roadway with a speed limit of 35 mph and bike lanes
 - North of Venture Park Drive
 - 2 lane divided roadway with a speed limit of 35 mph and bike lanes
- Venture Park Drive - Collector/Rural Major Collector
 - 2 lane undivided roadway with a speed limit of 35 mph and bike lanes
- Greenway Circle - Collector/Rural Major Collector
 - 2 lane undivided roadway with a speed limit of 35 mph
- Noria Road/E 1750 Road - Minor Arterial
 - 2 lane undivided roadway with a speed limit of 45 mph
- E 19th Street - Collector/Rural Major Collector
 - 2 lane undivided roadway with a speed limit of 30 mph
- Harper Street - Collector/Rural Major Collector
 - 2 lane undivided roadway with a speed limit of 35 mph between 19th Street and 23rd Street, otherwise the speed limit is 30 mph

There are several proposed improvements to surrounding roadways as listed in the T2040 report. The report states that Harper Street, from 15th Street to 19th Street, is planned to be reconstructed. 19th Street, from Harper Street to O’Connell Road, is also planned to be reconstructed in 2021. The reconstruction is necessary due to pavement deterioration and would allow the continuation of bike lanes and sidewalks to match the rest of 19th Street. Future design plans would include curb & gutter, stormwater improvements, and address the current disconnection between O’Connell Road and 19th Street. T2040 lists the intersection of Harper Street & 19th Street as a candidate for a roundabout.

Public feedback from the T2040 report included several comments in regards to 19th Street improvements. Due to concerns that 19th Street will experience more traffic and will be treated like an arterial roadway rather than a collector roadway, many residents and representatives of the 19th Street Neighborhoods Coalition question whether connecting O’Connell Road to 19th Street is necessary. Since 19th Street is currently a “No Outlet” collector, the roadway does not experience thru traffic.

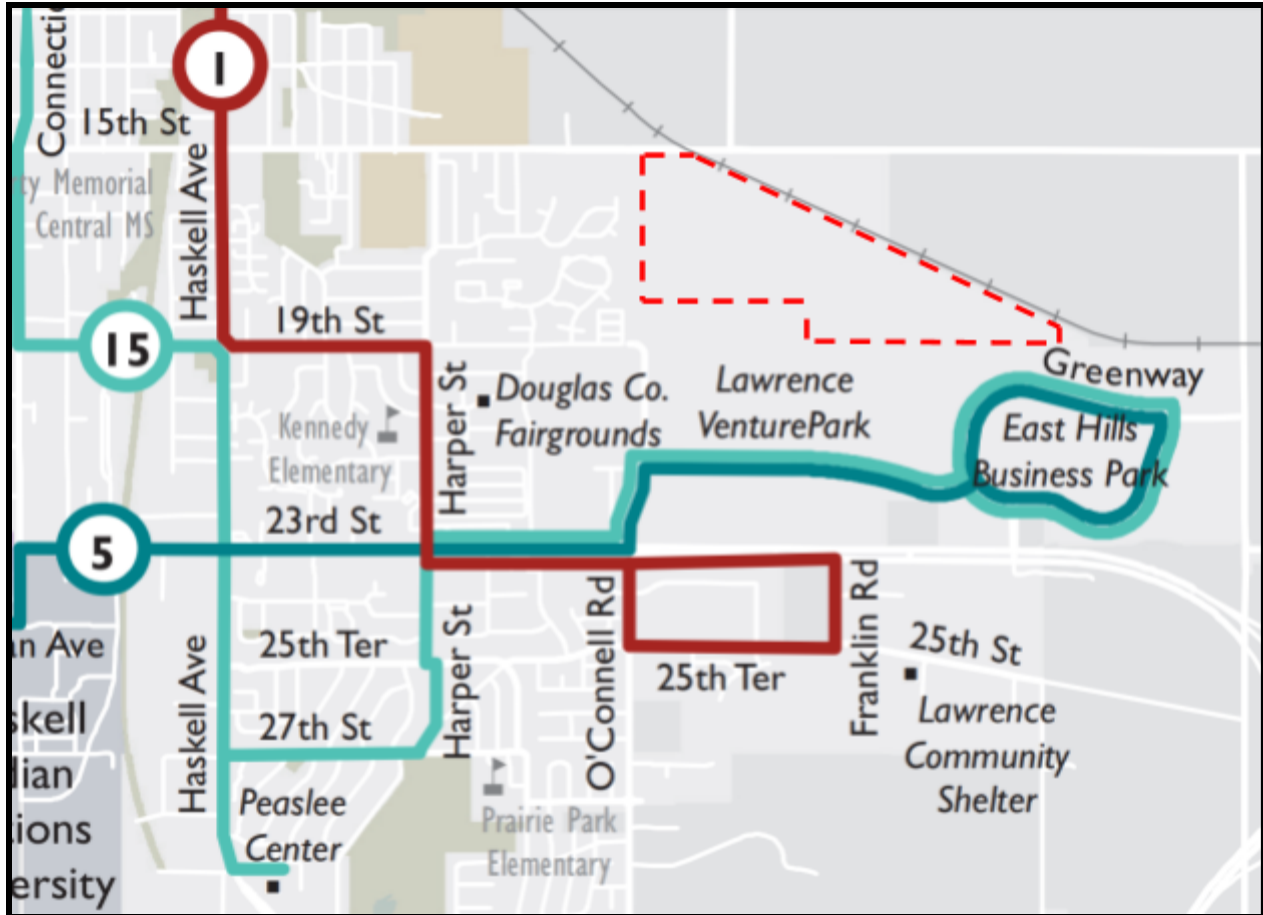


Current Condition of O'Connell Road & 19th Street

The public feedback centers on the potential level of traffic in conflict with walkability goals and neighborhood safety. This report does not cover any further detail of the future design of 19th Street improvements. If 19th Street is connected to O'Connell Road, some new trips generated by the MSO Facility might utilize 19th Street for emergency vehicle service, trash truck service, or other city vehicles in-service to the neighborhood; Most trips to and from the MSO facility will not utilize 19th Street because the layout of the MSO facility's main access drive will be an extension of O'Connell Road and vehicles that utilize O'Connell Road will have a quicker travel time to access a majority of Lawrence. Since 19th Street is not on the City's truck routing map, all trucks will be required to utilize O'Connell Road to get to E 23rd Street.

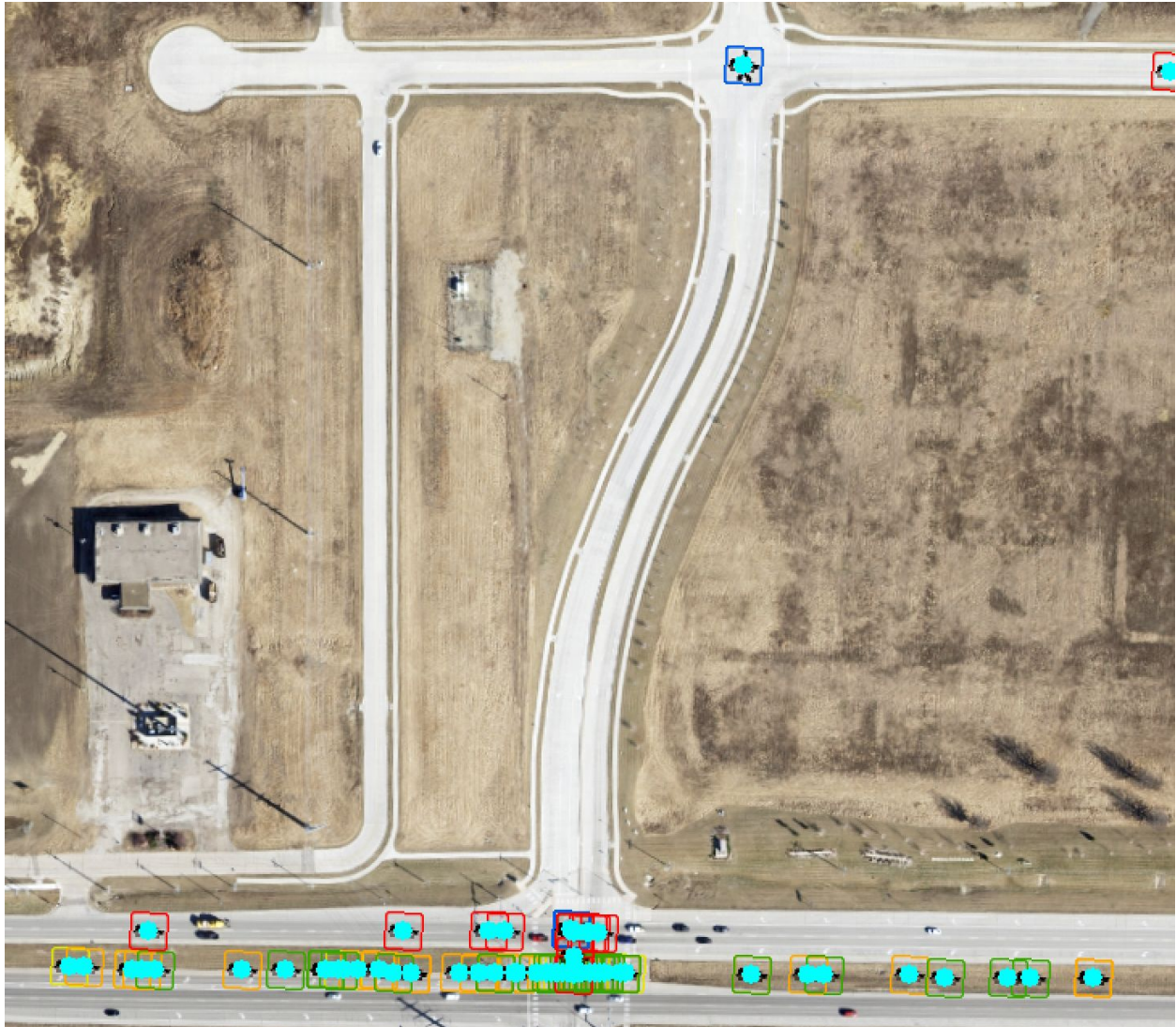
Water Conflicts: The flood map for the selected area is number 20045C0179E, effective on 09/02/2015, showed that the site was located outside of the 500 year flood zone.

Existing Alternative Transportation Mode Choices: Currently, there are sidewalks along both sides of O'Connell Road and Venture Park Drive. There is an existing sidewalk segment on the northside of E 19th Street. There are bicycle lanes on O'Connell Road and Venture Park Drive. Transit buses are routed along O'Connell Road and Venture Park Drive (Routes 5 and 15) and along Harper St and 19th Street (Route 1) which serve the area for the new development.



Bus Routes

Crash Analysis: The analysis of crash data near the vicinity of the MSO Facility was limited to the previous 5 years, January 2014 to December 2018. During the 5 years, all observed crashes occurred along E 23rd Street/N 1400 Road or Venture Park Drive or at the intersections of K-10/E 23rd Street & O'Connell Road/E 1600 Road and O'Connell Road & Venture Park Drive.



Crash Locations near the vicinity of the MSO Facility, Jan 2014 to Dec 2018

Details of total crashes are summarized in the tables below:

Table 1. Number of Crashes in Each Year

Year	# of Crashes	Percentage
2014	14	12.5%
2015	33	29.5%
2016	34	30.4%
2017	18	16.1%
2018	13	11.6%
Grand Total	112	100%

Table 2. Number of Crashes per Category | Location Type

<i>Location Type</i>	<i># of Crashes</i>	<i>Percentage</i>	<i># of Vehicles</i>	<i>Percentage</i>
INTERSECTION-ON ROAD	11	9.8%	23	9.8%
INTERSECTION-RELATED-ON ROAD	66	58.9%	145	62.0%
MEDIAN-OFF ROAD	2	1.8%	3	1.3%
NON-INTERSECTION-ON ROAD	31	27.7%	61	26.1%
ROADSIDE-NO SHLDR-OFF ROAD	2	1.8%	2	0.9%
Grand Total	112	100.0%	234	100.0%

Of the 112 total crashes, 58.9% occurred on a roadway related to the presence of an intersection, 27.7% occurred on a roadway without being related to the presence of an intersection, 9.8% occurred within an intersection, 1.8% occurred off of a roadway within the median, and 1.8% occurred within the roadside.

Table 3. Number of Crashes per Category | Collision Type

<i>Collision Type</i>	<i># of Crashes</i>	<i>Percentage</i>	<i># of Vehicles</i>	<i>Percentage</i>
WITH ANIMAL	3	2.7%	3	1.3%
WITH FIXED OBJECT	8	7.1%	9	3.8%
WITH OTHER MOTOR VEHICLE	99	88.4%	220	94.0%
WITH PEDESTRIAN	2	1.8%	2	0.9%
Grand Total	112	100.0%	234	100.0%

Of the 112 total crashes, 88.4% occurred with at least one other motor vehicle, 7.1% occurred with fixed objects, 2.7% occurred with animals, and 1.8% occurred with pedestrians.

Table 4. Number of Vehicles | Location Type vs Collision Type

<i>Location Type vs Collision Type</i>	<i>WITH ANIMAL</i>	<i>WITH FIXED OBJECT</i>	<i>WITH OTHER MOTOR VEHICLE</i>	<i>WITH PEDESTRIAN</i>	<i>Grand Total</i>
INTERSECTION-ON ROAD		1	22		23
INTERSECTION-RELATED-ON ROAD		1	144		145
MEDIAN-OFF ROAD		3			3
NON-INTERSECTION-ON ROAD	3	2	54	2	61
ROADSIDE-NO SHLDR-OFF ROAD		2			2
Grand Total	3	9	220	2	234

The table above illustrates the total number of vehicles when considering location type and collision type. The two pedestrian crashes occurred on the roadway not at an intersection.

Table 5. Number of Crashes per Category | Lighting Conditions

<i>Lighting Conditions</i>	<i># of Crashes</i>	<i>Percentage</i>	<i># of Vehicles</i>	<i>Percentage</i>
DARK--NO STREET LIGHTS	3	2.7%	5	2.1%
DARK--STREET LIGHTS ON	18	16.1%	35	15.0%
DAWN	4	3.6%	9	3.8%
DAYLIGHT	84	75.0%	177	75.6%
DUSK	3	2.7%	8	3.4%
Grand Total	112	100%	234	100.0%

Of the 112 total crashes, 75% occurred during daylight hours, 16.1% occurred during dark with street lights turned on, 2.7% occurred during dark without street lights, 3.6% occurred during dawn, and 2.7% occurred during dusk.

Table 6. Number of Crashes per Category | Weather Conditions

<i>Weather Conditions</i>	<i># of Crashes</i>	<i>Percentage</i>	<i># of Vehicles</i>	<i>Percentage</i>
FOG	2	1.8%	4	1.7%
FREEZING RAIN	1	0.9%	3	1.3%
NO ADVERSE CONDITIONS	94	83.9%	196	83.8%
RAIN, MIST, OR DRIZZLE	14	12.5%	29	12.4%
SNOW	1	0.9%	2	0.9%
Grand Total	112	100%	234	100.0%

Of the 112 total crashes, 83.9% occurred during no adverse conditions, 12.5% occurred during rain, mist or drizzle, 1.8% occurred during fog, 0.9% occurred during snow, and 0.9% occurred during freezing rain.

Table 7. Number of Crashes per Category | Crash Type

<i>Crash Type</i>	<i># of Crashes</i>	<i>Percentage</i>	<i># of Vehicles</i>	<i>Percentage</i>
UNKNOWN	13	11.6%	14	6.0%
ANGLE - SIDE IMPACT	10	8.9%	20	8.5%
HEAD ON	1	0.9%	2	0.9%
REAR END	83	74.1%	186	79.5%
SIDESWIPE: SAME DIRECTION	5	4.5%	12	5.1%
Grand Total	112	100%	234	100.0%

Of the 112 total crashes, 74.1% involved a rear end, 8.9% involved an angle-side impact, 4.5% involved a sideswipe in the same direction, 0.9% involved a head on, and 11.6% were left unknown.

Table 8. Severity Distribution per Crash Type

<i>Crash Type</i>	<i># of Crashes</i>	<i># of Injury</i>	<i>Percentage</i>	<i># of PDO</i>	<i>Percentage</i>
UNKNOWN	13	3	23.1%	10	76.9%
ANGLE - SIDE IMPACT	10	4	40.0%	6	60.0%
HEAD ON	1	0	0.0%	1	100.0%
REAR END	83	17	20.5%	66	79.5%
SIDESWIPE: SAME DIRECTION	5	1	20.0%	4	80.0%
Grand Total	112	25	22.3%	87	77.7%

Most of the collisions are clustered around E 23rd Street/N 1400 Road & O’Connell Road with 74.1% rear end crashes. Of the 25 injury crashes, most were rear end crashes; however, if an angle/side impact crash occurred, the probability of an injury increased. Head on collisions are rare and the only recorded head-on was at a low enough speed so that there were no injuries. Based on the existing traffic crashes and new trips generated by the MSO facility, no improvements of the surrounding roadway network are recommended at this time.

Section 6: Proposed Access Compared with Design Criteria and Sight Distance Requirements

For the proposed access locations, the design speed is 35 mph resulting in a required stopping sight distance of 250 ft and an intersection sight distance of 390 ft. Although the layout of the access drives are currently under design consideration, the sight distance requirements given the current layout of the existing roadways is met. The new access drives will be laid out to meet these design constraints.

Section 7: Estimate of Trips Generated by Existing and Proposed Development

Existing Trip Generation: No trips are currently generated by the current land use.

Proposed Trip Generation: Since the City of Lawrence has defined how many employees will be working within each division and when they are expected to arrive and depart throughout the day, the number of trips can be estimated.

Trip Generation Summary						
	TOTAL DIVISIONS	BUILDING FLOOR AREA (sq ft)	TOTAL SITE (acres)	STAFF SUBCATEGORY	OPERATING DAYS OF THE WEEK	APPROX. OPERATING HOURS
Office and Maintenance Combined Campus (Staff)	11	393,091	65	Campus-only Staff	MON-FRI	7:00am - 5:00pm
				Site Visiting Staff	MON-FRI	6:30am - 5:00pm
				Inspectors	MON-FRI	8:00am - 5:00pm
				Maintenance Staff	MON-FRI	7:30am - 3:30pm
Solid Waste Division (Staff)	1	43,584	14	Fleet Round 1	MON-SAT	6:00am - 2:00pm
				Fleet Round 2	MON-SAT	7:00am - 3:00pm
				Fleet Round 3	MON-SAT	7:30am - 4:00pm
Household Hazardous Waste (Staff)	1	12,181	3	Campus-only Staff	MON-FRI	6:30am - 5:00pm
Household Hazardous Waste (Public Drop Off)				Public	TUES-THUR	8:00am - 1:00pm

Trip Generation Summary 2020								
	NUMBER OF EMPLOYEES		EXPECTED DAILY TRIPS PER STAFF SUBCATEGORY (Veh / Day / Employee)	ESTIMATED DAILY TRIPS (Veh / Day)	A.M. PEAK HOUR, 7-9am (Veh / Hour)		P.M. PEAK HOUR, 4-6pm (Veh / Hour)	
	(Full and Part Time)				IN	OUT	IN	OUT
Office and Maintenance Combined Campus (Staff)	8	Employees	2	16	8			8
	117	Employees	6	702	117	117	117	117
	9	Employees	8	72	9	9	9	9
	17	Employees	2	34	17			17
Solid Waste Division (Staff)	56	Employees	2	112				
	23	Employees	2	46	23	23		
	1	Employee	2	2	1	1	1	1
Household Hazardous Waste (Staff)	5	Employees	2	10	5			5
Household Hazardous Waste (Public Drop Off)				35	7	7		
Total	236	Employees		1029	187	157	127	157

Verification of Trip Generation Rates and Design Hour Volume Data: To verify the trips produced by the proposed development, trip generation volumes were compared utilizing the land use types categorized by the Institute of Transportation Engineer's Trip Generation Guidelines, 10th Edition. "Government Office Complex" (ITE Code 733) and "Utility" (ITE Code 170) were the ITE Land Use categories used to compare against the expected trips for the campus. The estimated number of trips were based on the number of employees. Copies of the applicable ITE Trip Generation Manual pages are included in the appendix. The following tables show the parameters for measurement units, total trip generation rates for peak hour traffic volumes, and corresponding total vehicles for peak hour traffic at the site.

ITE Traffic Generation Parameters Comparison Chart

ITE Category	Government Office Complex (ITE Code 733)	Utility (ITE Code 170)	Expected Trips (Based on City-Provided Data)
Weekday Total	13.29	4.11	4.36
Weekday In	50%	50%	50%
Weekday Out	50%	50%	50%
Peak Hour of Adjacent Street Traffic, One Hour			
AM Peak Total	0.83	0.70	0.70
AM Peak In	89%	81%	81%
AM Peak Out	11%	19%	19%
PM Peak Total	1.10	0.76	0.76
PM Peak In	31%	15%	15%
PM Peak Out	69%	85%	85%

ITE Traffic Generation Volumes Comparison Chart

ITE Category	Government Office Complex (ITE Code 733)	Utility (ITE Code 170)	Expected Trips (Based on City-Provided Data)
Units	<i>Employee</i>	<i>Employee</i>	<i>Employee</i>
Expected Units	236	236	236
Weekday Total	3,136	970	1,029
Weekday In	1,568	485	514.5
Weekday Out	1,568	485	514.5
AM Peak Total	196	165	344
AM Peak In	174	134	187
AM Peak Out	22	31	157
PM Peak Total	260	179	284
PM Peak In	80	27	127
PM Peak Out	179	152	157

The expected trips most closely resemble trip generation parameters for the Utility category with only a slight increase in volume (6% difference).

Reductions for Pass-By and Diverted-Link Trips: The land-use is not applicable to pass-by trip generation. No diverted-link analysis was done for this analysis.

Section 8: Traffic Data

Existing Traffic Volumes: Traffic count data was provided at the intersection of E 23rd Street/N 1400 Road & O'Connell Road/E 1600 Road on Tuesday, December 3, 2019. Although this study occurred during the COVID-19 pandemic, which caused a drastic change in traffic volumes, the data used for the analysis was taken December 3rd, 2019 well before the event. Counts were taken over a 24-hour period and were recorded in 15 minutes intervals. Recorded vehicle classifications included the following: light vehicles (motorcycles, cars, and light goods vehicles), buses and single-unit trucks, articulated trucks, bikes on the crosswalk, and pedestrians on the crosswalk. Inclement weather conditions or national holiday traffic did not impact the traffic counts.

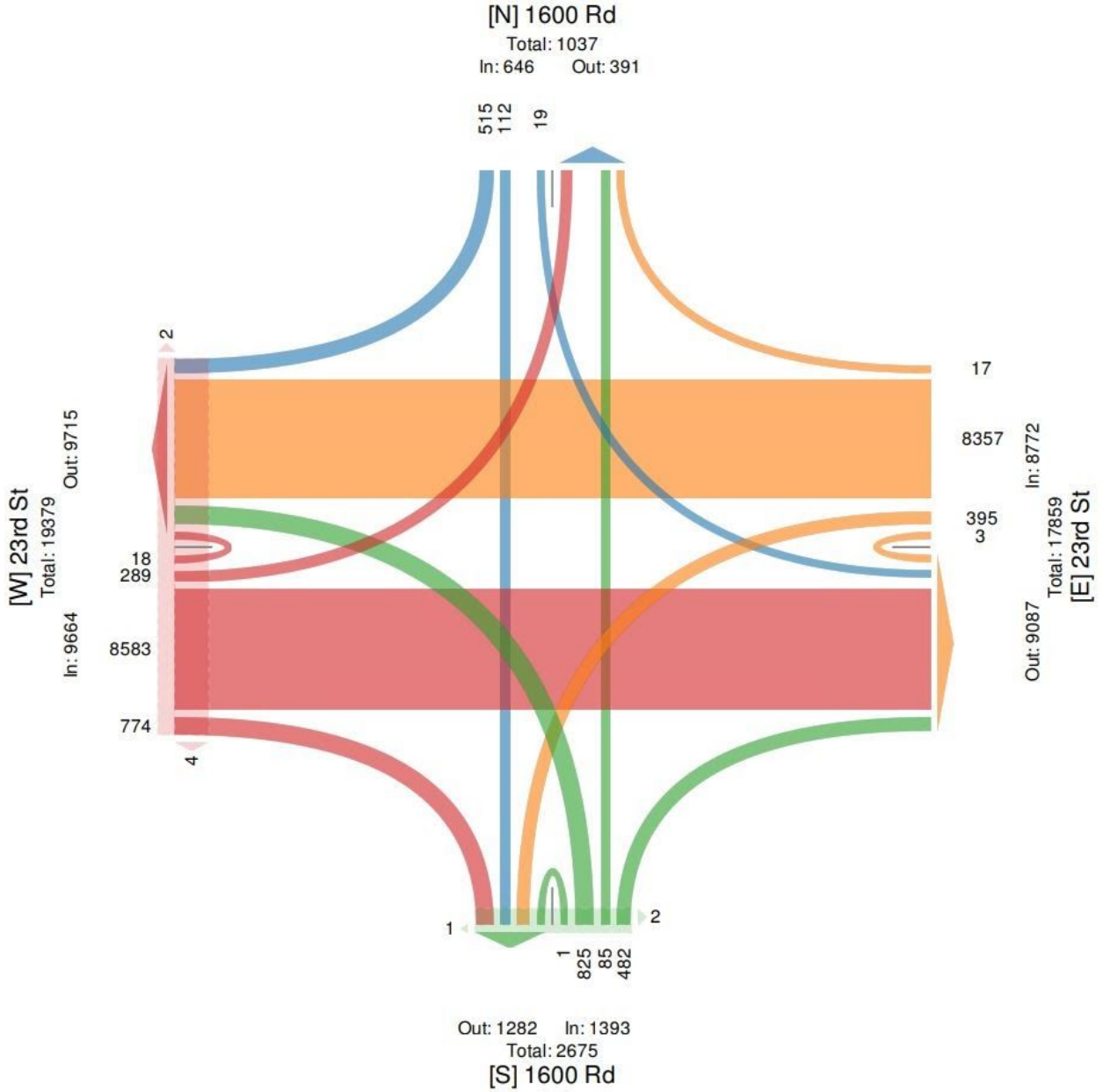
The combined daily traffic through the intersection was 20,475 vpd. There are 1,037 vpd currently using O'Connell Road/E 1600 Road to the north of E 23rd Street/N 1400 Road. With the new trips from the MSO facility, the daily trips are expected to grow to about 2,000 vpd.

For the AM Peak, between 7:45AM - 8:45 AM, all trips headed toward the new development came from the west or south meaning that existing commuters entering the Venture Park area from the east are not likely to use O'Connell Road. On O'Connell Road/E 1600 Road to the north of E 23rd Street/N 1400 Road, there were 45 trips headed northbound and 47 trips headed southbound. The AM peak hour factor was 0.938.

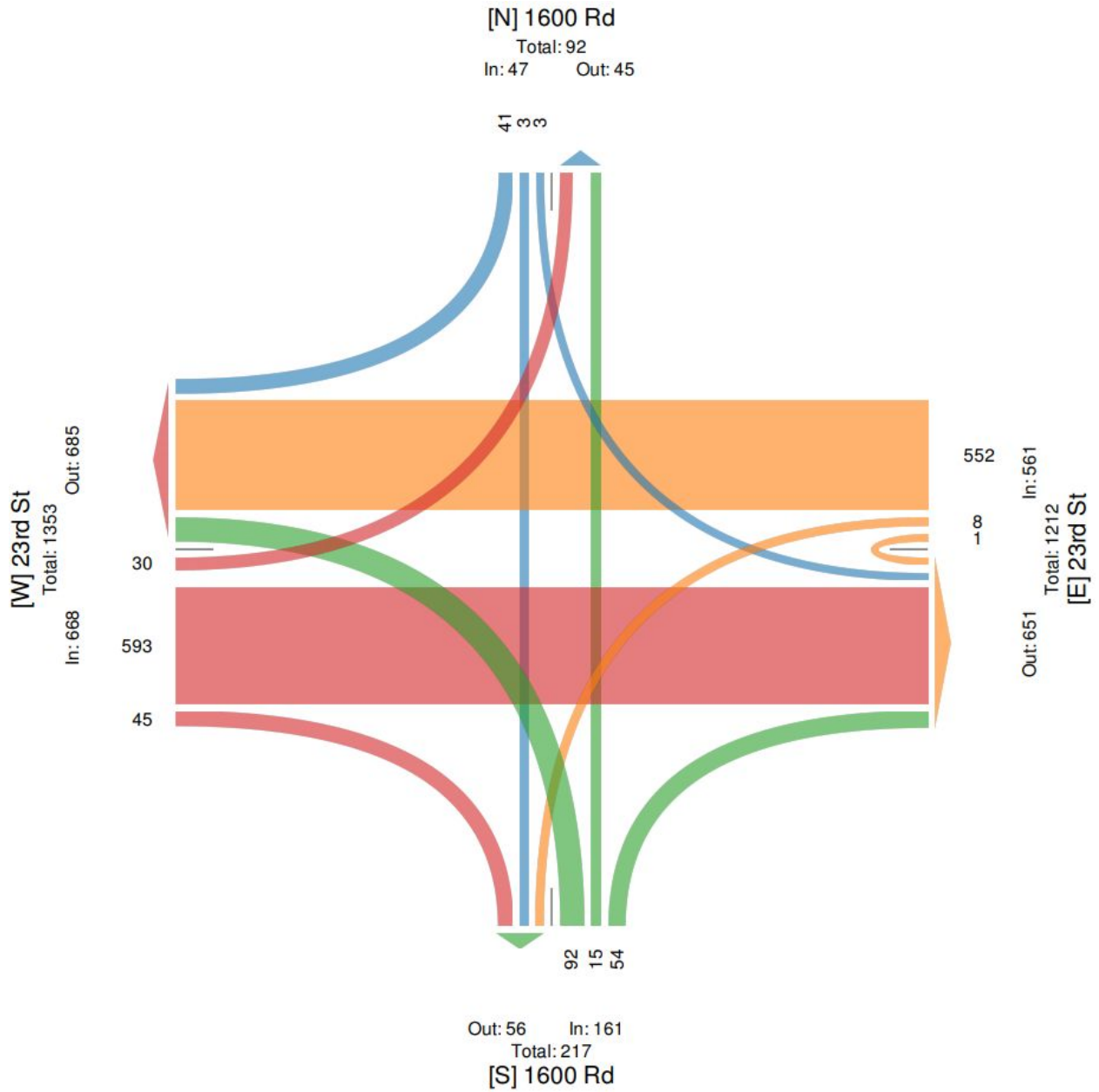
For the PM Peak, between 4:45PM - 5:45 PM, there were not many vehicles headed toward the new development using O'Connell Road. On O'Connell Road/E 1600 Road to the north of E 23rd Street/N 1400 Road, there were 18 trips headed northbound and 65 trips headed southbound. The PM peak hour factor was 0.953.

The following tables summarize the daily traffic volumes and AM and PM peak hour traffic volumes:

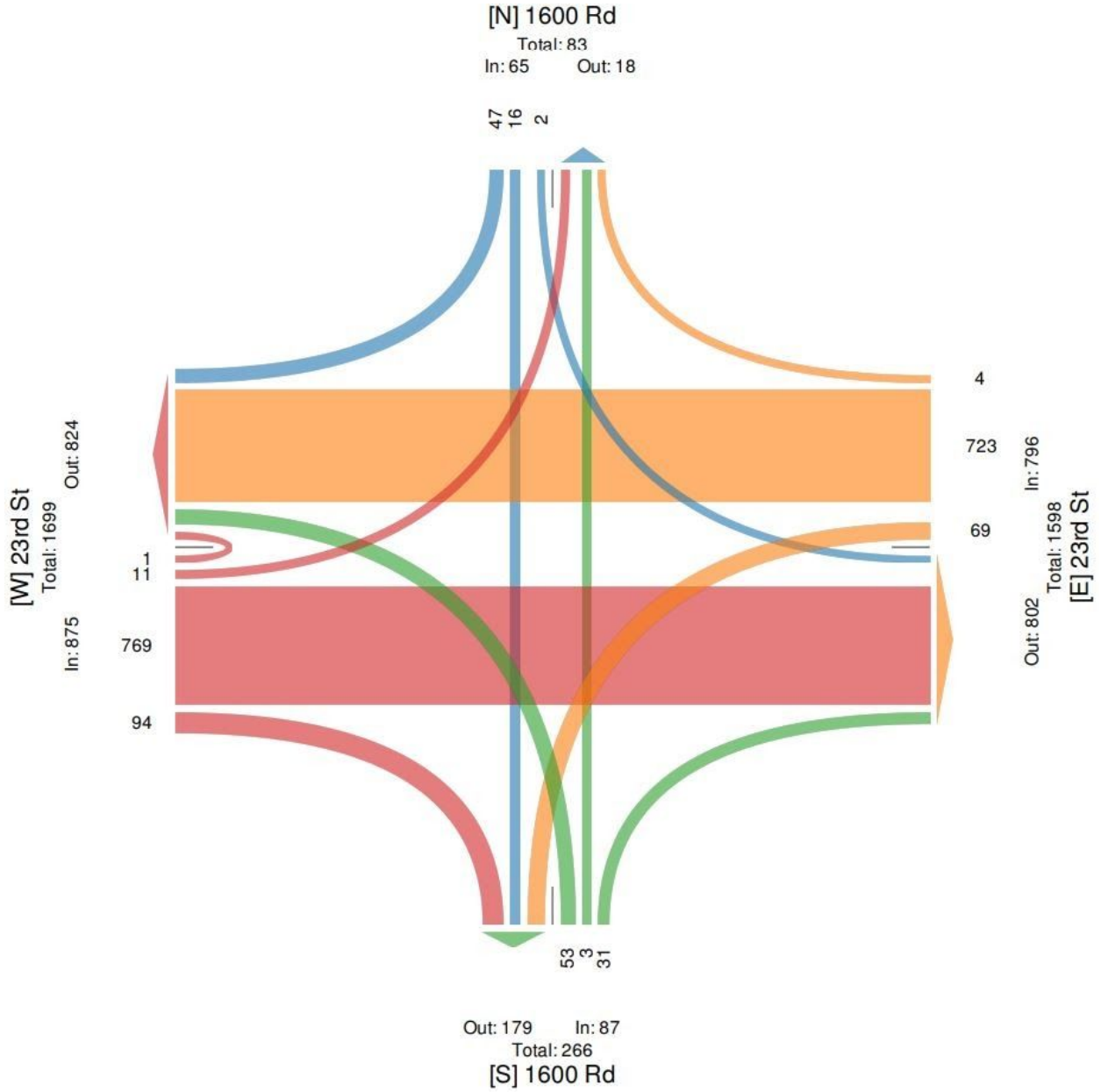
Daily Total, E 23rd Street & O'Connell Road Turning Movement Counts												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	307	8583	774	398	8357	17	826	85	482	19	112	515



AM Peak Hour, E 23rd Street & O'Connell Road Turning Movement Counts												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	30	593	45	9	552	0	92	15	54	3	3	41



PM Peak Hour, E 23rd Street & O'Connell Road Turning Movement Counts												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	12	769	94	69	723	4	53	3	31	2	16	47



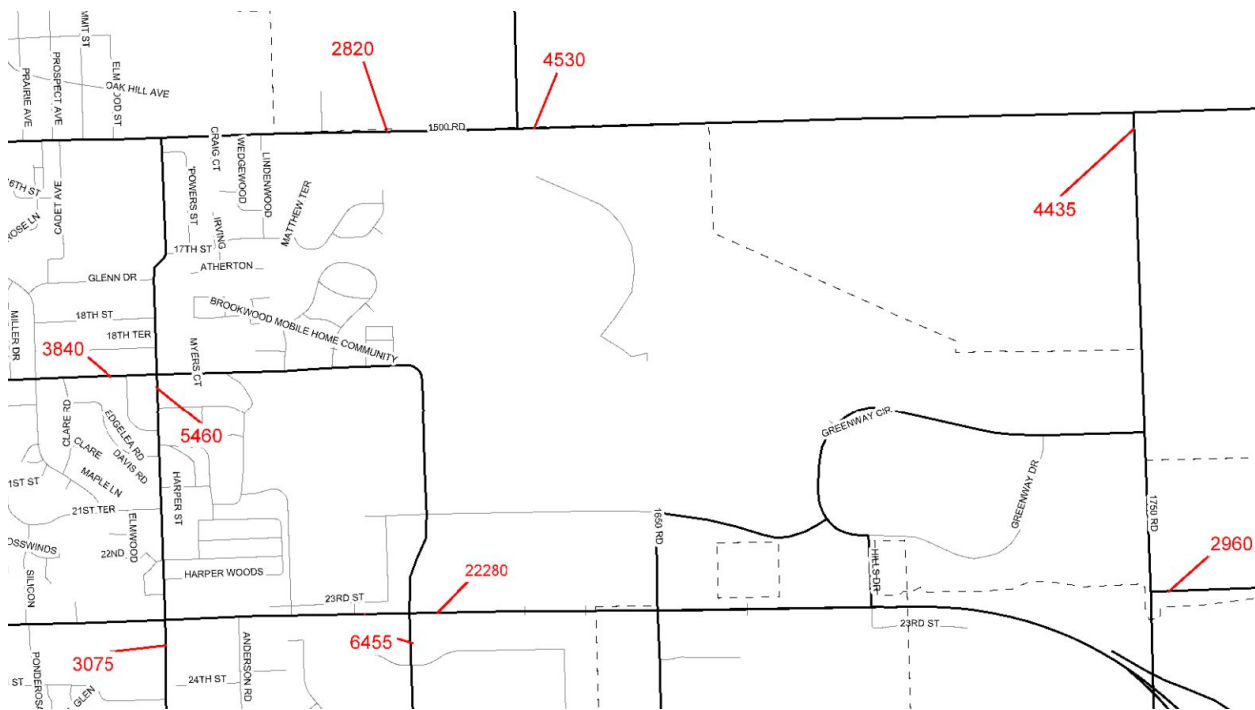
Average Daily Traffic Volumes: An estimate of the average daily traffic on the connecting roadway segments between each intersection is given below:

Based on Dec 3rd, 2019 traffic counts

1. E 23rd Street/N 1400 Road (East of O’Connell Road/E 1600 Road) ADT = 17,859 vpd
2. E 23rd Street/N 1400 Road (West of O’Connell Road/E 1600 Road) ADT = 19,409 vpd
3. O’Connell Road/E 1600 Road (South of E 23rd Street/N 1400 Road) ADT = 2,675 vpd
4. O’Connell Road/E 1600 Road (North of E 23rd Street/N 1400 Road) ADT = 1,037 vpd
 - a. Expected ADT post-development construction ADT = 2,000 vpd

Based on 2016 KDOT traffic counts

5. Harper Street (South of E 19th Street) ADT = 5,460 vpd
6. E 19th Street (West of Harper Street) ADT = 3,840 vpd
7. Noria Road/E 1750 Road (North of Greenway Circle) ADT = 4,435 vpd



2016 KDOT traffic counts

Buses and Single-unit Trucks: For Buses and Single-unit Trucks, there were a total of 646 vehicles for the 24 hour period making up 3.2% of total traffic. For the daily total, the highest percentage per movement were EBL and NBL. On O’Connell Road/E 1600 Road to the north of E 23rd Street/N 1400 Road, there were 114 Bus and Single-unit Truck trips making up 11% of the total traffic on the roadway. The tables below show the amount of Buses and Single-unit Trucks per movement:

	Daily Total, E 23rd Street & O’Connell Road Turning Movement Counts											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	50	200	47	4	163	0	113	1	6	1	5	56
Percentage %	17.3	2.3	6.1	1.0	2.0	0	13.7	1.2	1.2	5.3	4.5	10.9

	AM Peak Hour, E 23rd Street & O’Connell Road Turning Movement Counts											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	3	9	9	1	15	0	17	0	1	0	1	6
Percentage %	10.0	1.5	20.0	12.5	2.7	0	18.5	0	1.9	0	33.3	14.6

	PM Peak Hour, E 23rd Street & O’Connell Road Turning Movement Counts											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	3	8	0	0	10	0	4	1	1	0	0	2
Percentage %	27.3	1.0	0	0	1.4	0	7.5	33.3	3.2	0	0	4.3

Articulated Trucks: For Articulated Trucks, there were a total of 198 vehicles for the 24 hour period making up 1.0% of total traffic. For the daily total, the highest percentage per movement were SBL and EBL. On O’Connell Road/E 1600 Road to the north of E 23rd Street/N 1400 Road, there were 27 Articulated Truck trips making up 2.6% of the total traffic on the roadway. The tables below show the amount of Articulated Trucks per movement:

	Daily Total, E 23rd Street & O’Connell Road Turning Movement Counts											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	15	90	3	2	68	0	2	0	6	1	2	9
Percentage %	5.2	1.0	0.4	0.5	0.8	0	0.2	0	1.2	5.3	1.8	1.7

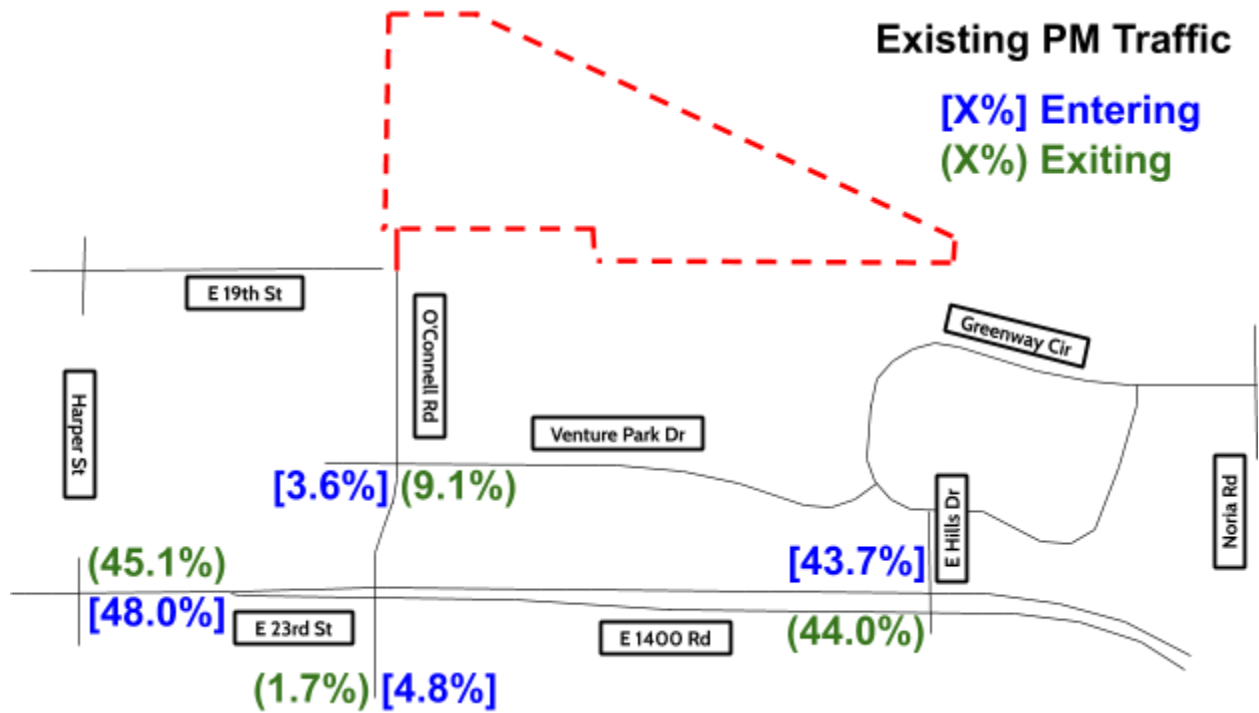
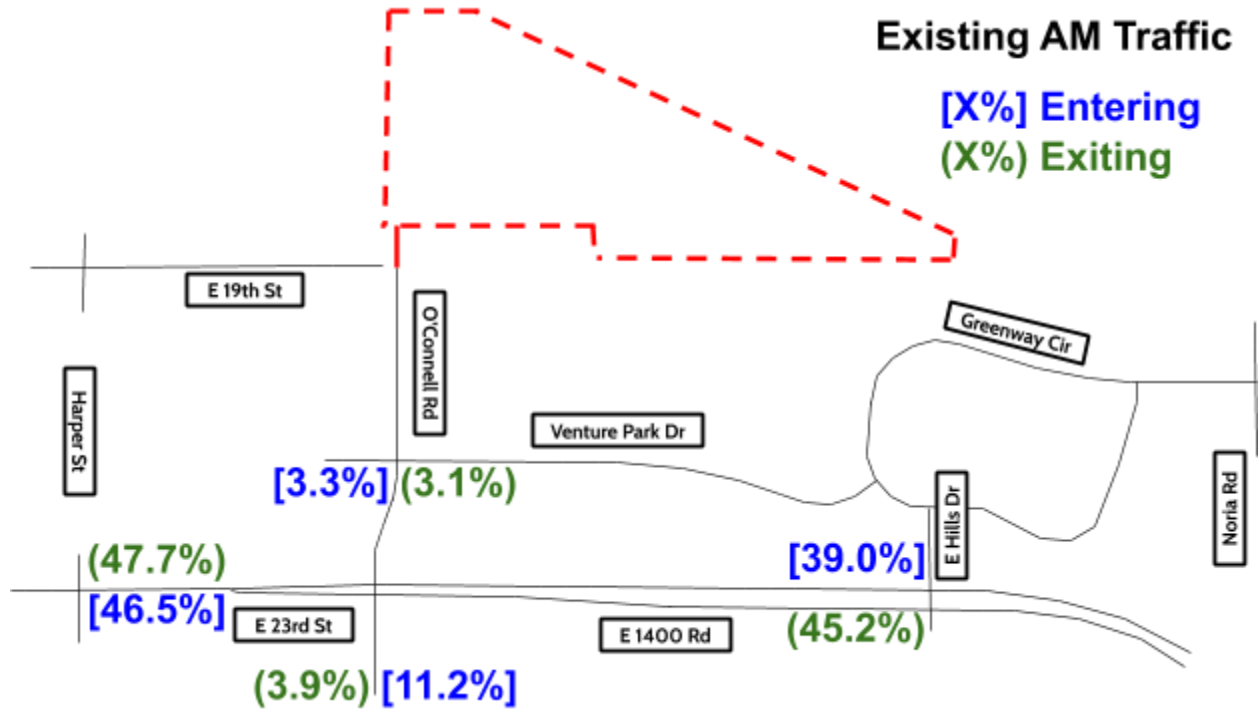
	AM Peak Hour, E 23rd Street & O’Connell Road Turning Movement Counts											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	0	5	0	0	4	0	0	0	0	0	0	0
Percentage %	0	0.8	0	0	0.7	0	0	0	0	0	0	0

	PM Peak Hour, E 23rd Street & O’Connell Road Turning Movement Counts											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	2	3	1	0	4	0	0	0	1	0	0	2
Percentage %	18.2	0.4	1.1	0	0.6	0	0	0	3.2	0	0	4.3

Bikes on the Crosswalk: There was only one bicyclist observed on December 3rd.

Pedestrians on the Crosswalk: 8 total pedestrians were observed on December 3rd with 5 crossing the east leg and 3 crossing the south leg of the intersection.

Trip Distribution: Trip distribution patterns were determined based on a gravity model using the peak hour counts around the development’s surrounding origins and destinations. Directional percentages were applied along entry and exit paths so that trips could be distributed proportionally and are shown in the following figures.



The trip distribution pattern also considered how many trips generated by the development would travel along 19th Street if 19th Street was connected to O'Connell Road. A previous Traffic Impact Study for Venture Park listed up to 30% of trips generated by the Venture Park

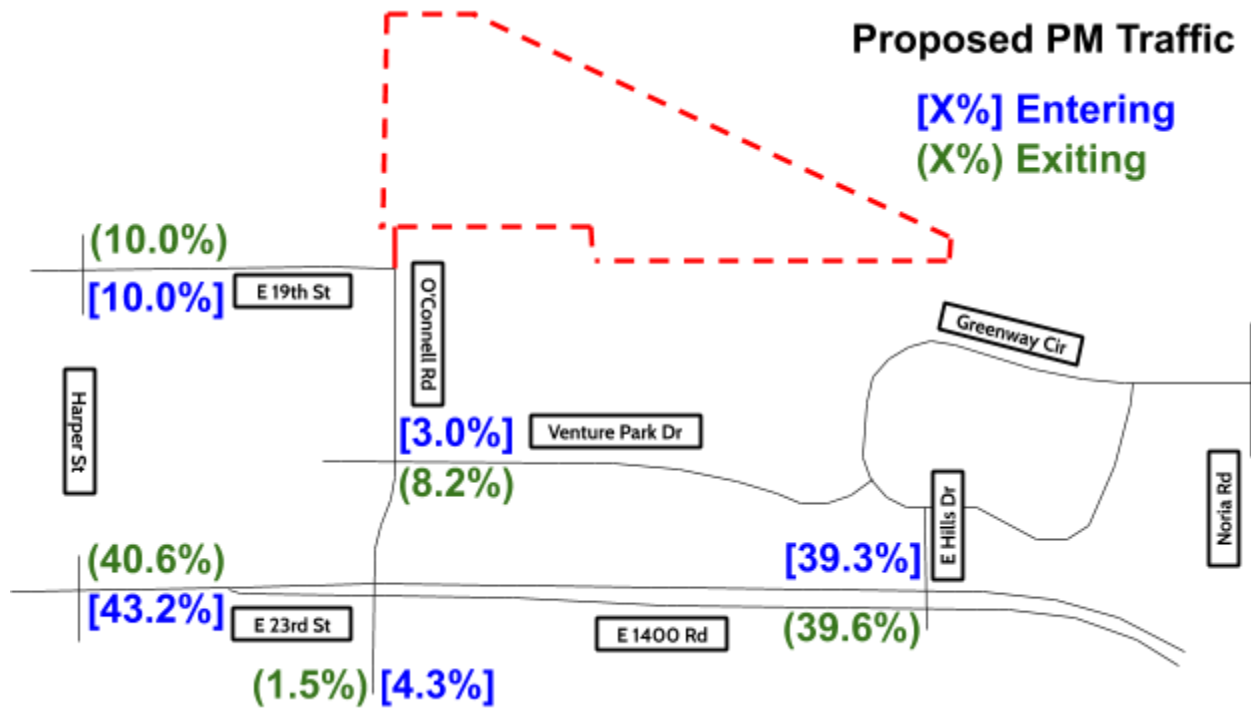
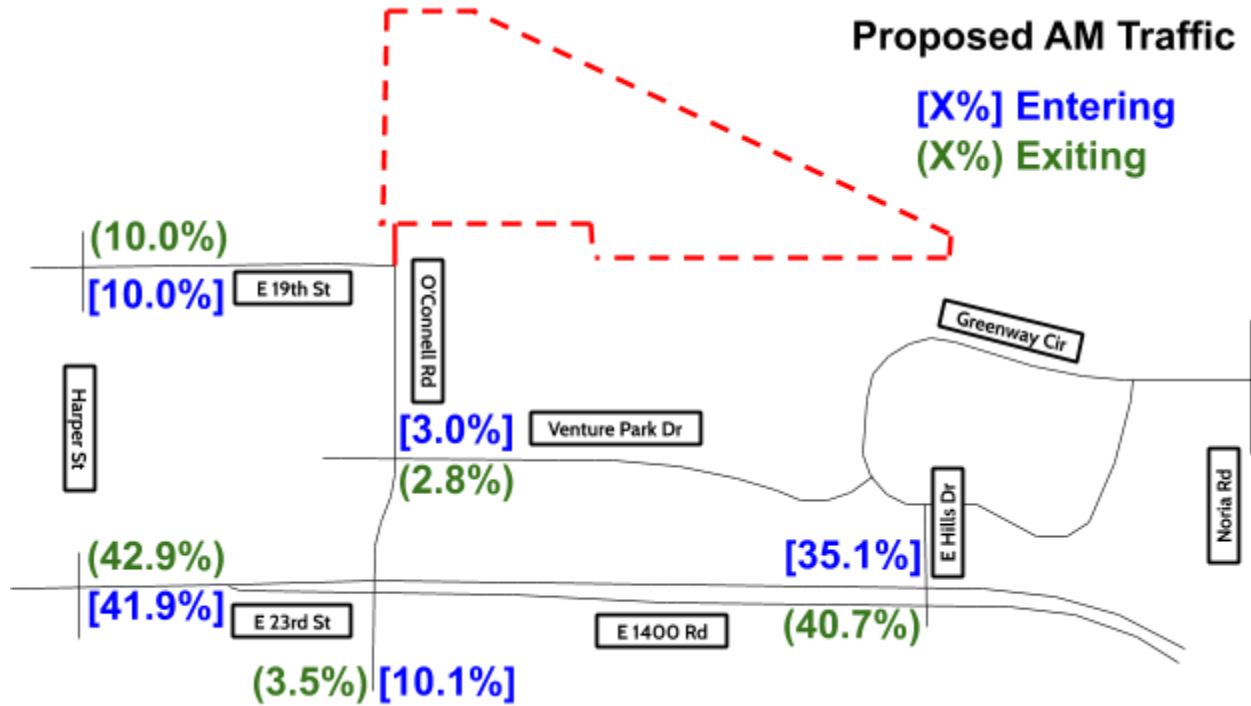
commercial zone to be routed along 19th Street; however, the trip distribution in that report included a lot of unknown assumptions for the area. Based on the MSO facility's land uses and 19th Street not being listed as a truck route, it was determined that a refined representation of potential trip distribution was needed.

The method used to refine the probable trip distribution pattern along 19th Street was the catchment area method. By identifying a catchment area that would likely use 19th Street compared to O'Connell Road, a general percentage of expected vehicles was estimated. The catchment area was evaluated using a shortest travel time method which is not necessarily aligned with the shortest path. Beyond this estimated catchment boundary, trips to and from the MSO facility will be more likely to be routed to and from the site with a strong preference for arterials due to higher speed limits. This means that, outside the boundary, a collector street such as 19th Street would not have a high probability of becoming a main thoroughfare for MSO facility generated trips. With an approximate catchment area of 2.4 sq miles out of the total 34.26 square miles in the City of Lawrence, this could mean about 7% of new vehicle trips would be likely to use 19th Street. To be conservative in the estimation, it was assumed that 10% of all new trips generated by the MSO facility would utilize 19th Street compared to O'Connell Road.

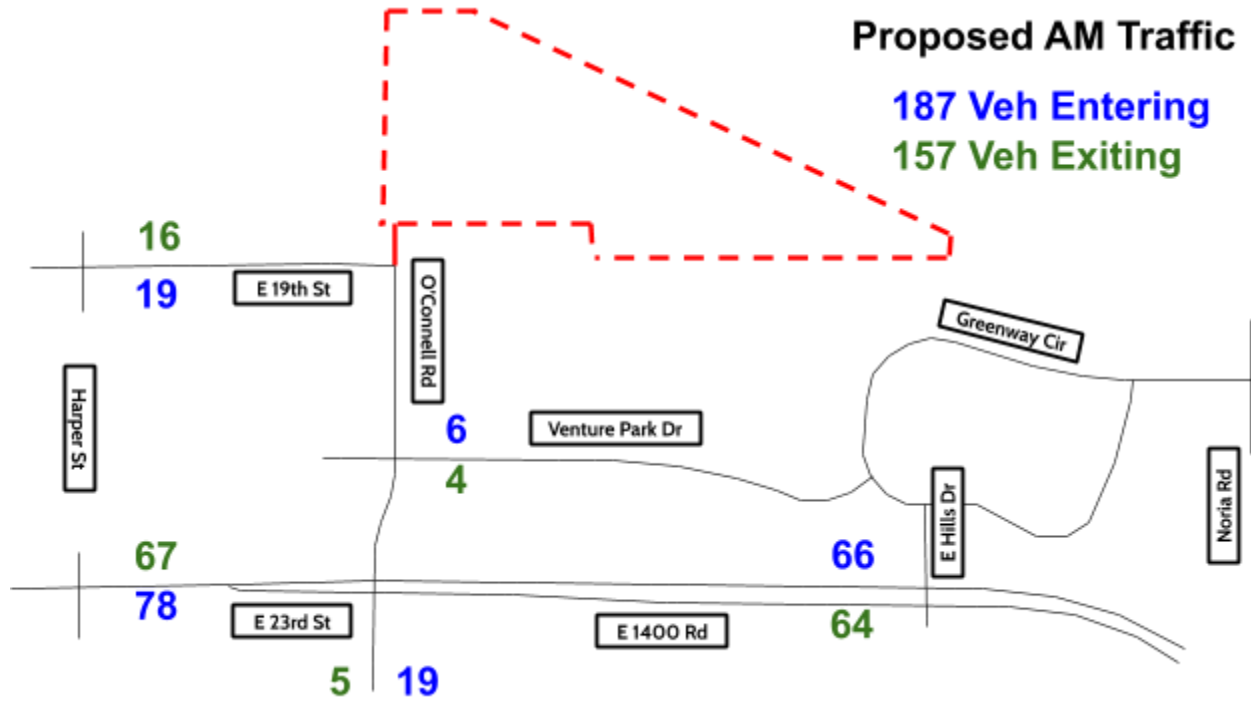


Estimated Catchment Area for Vehicles using 19th Street to Access the MSO Facility

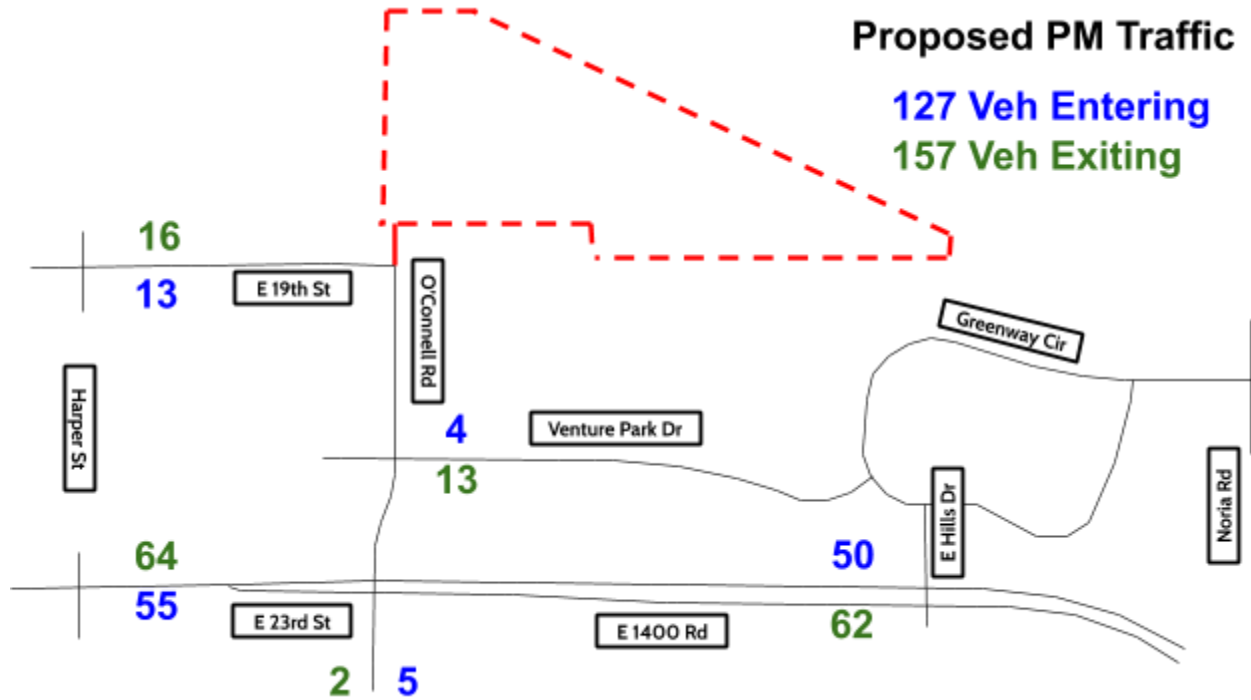
Using the conservative estimate that 10% of the newly generated trips would utilize 19th Street, the trip distribution patterns were adjusted as follows:



Using these trip distribution percentages, the number of vehicles during the peak hours were added to existing traffic volume patterns.



	AM Peak Hour, E 23rd Street & O'Connell Road Turning Movement Counts											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	30	593	45	9	552	0	92	15	54	3	3	41
Trip Generated	78					66		19		64	5	67
Total	108	593	45	9	552	66	92	34	54	67	8	108



	PM Peak Hour, E 23rd Street & O'Connell Road Turning Movement Counts											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	12	769	94	69	723	4	53	3	31	2	16	47
Trip Generated	55					50		5		62	2	64
Total	67	769	94	69	723	54	53	8	31	64	18	111

Determining the Growth Rate: The U.S. Census Bureau reported that the Lawrence population in 2000 was 80,098 while the population in 2015 was 94,104. This is an increase in growth of 17.5%. Based on the available census data, the average annual growth rate of Lawrence was calculated to be 1.08% which represented a constant linear growth derived from the following equation:

$$\begin{aligned}
 \text{Constant \% Growth (2000 to 2015)} &= (\text{End Year vpd} / \text{Beginning Year vpd})^{(1 / (\text{End Year} - \text{Beginning Year}))} - 1 \\
 &= (94,104 / 80,098)^{(1 / (2015 - 2000))} - 1 \\
 &= 1.08\% \text{ per year}
 \end{aligned}$$

Because the area is expected to grow slightly in traffic volume due to the proposed development and other possible developments, a 1.08% annual constant percent growth rate was used to project the increase in traffic volume twenty years into the future.

Growth Factor: The growth factor constant was determined as follows:

$$\begin{aligned}\text{Growth Factor Constant} &= (1 + \text{Constant \% Growth Rate}) ^ \text{Projected Years} \\ &= (1 + 0.0108) ^ 20 \\ &= 1.24, \text{ for 20 years growth at 1.1\%}\end{aligned}$$

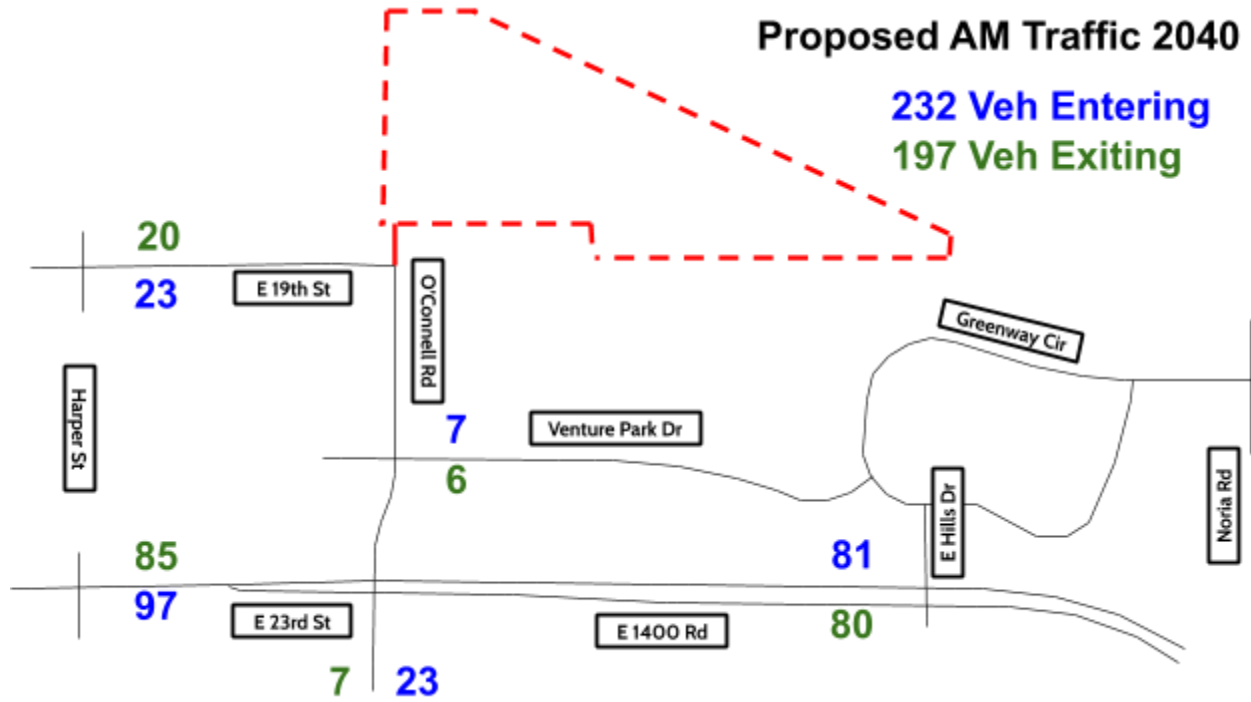
Projected Traffic Volumes: The 1.24 growth factor was applied to the existing traffic volumes but not the trips generated by the new development or existing developments. The number of trips attracted to the site will not increase or decrease with time, but would increase or decrease if the number of employees was altered.

In the case of the MSO facility, the campus will be constructed to accommodate a growth in city staff to align with the growth of Lawrence over the next 50 years; therefore, the increase of employees needs to be accounted for within the traffic volumes. Since traffic studies typically analyze traffic patterns projected by only two decades to remain relatively accurate, the number of employees at the facility at the 20 year mark post construction needs to be determined.

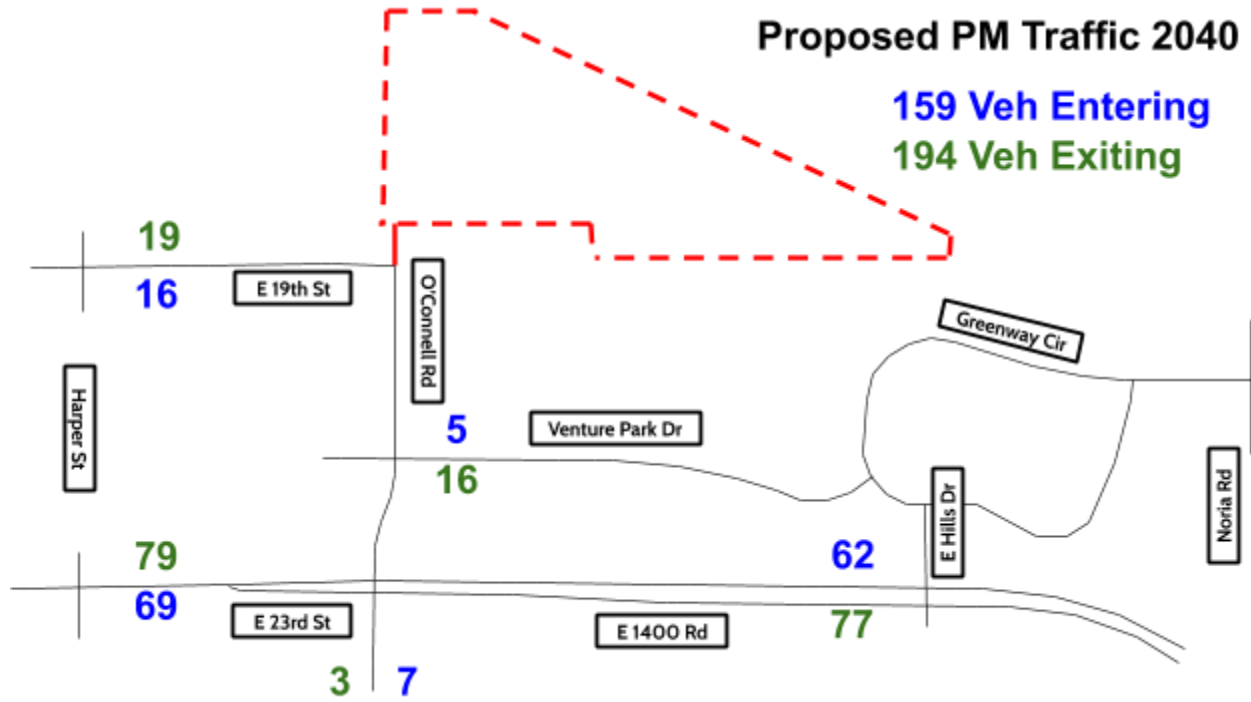
Based on data provided by city estimates, the future projected estimated staff includes 355 full-time and 21 part-time personnel at the 50 year mark. The increase in the number of employees at the 20 year mark would be about 40% of the expected increase in employees by the 50 year mark. Therefore, at the 20 year mark, there would be 276 full-time and 16 part-time personnel. Based on these new employee totals, the trip generation table has been updated for the future projected growth in 20 years.

Trip Generation Summary 2040								
	NUMBER OF EMPLOYEES		EXPECTED DAILY TRIPS PER STAFF SUBCATEGORY	ESTIMATED DAILY TRIPS (Veh / Day)	A.M. PEAK HOUR, 7-9am (Veh / Hour)		P.M. PEAK HOUR, 4-6pm (Veh / Hour)	
	(Full and Part Time)		(Veh / Day / Employee)		IN	OUT	IN	OUT
Office and Maintenance Combined Campus (Staff)	9	Employees	2	18	9			9
	147	Employees	6	882	147	147	147	147
	11	Employees	8	88	11	11	11	11
	20	Employees	2	40	20			20
Solid Waste Division (Staff)	69	Employees	2	138				
	29	Employees	2	58	29	29		
	1	Employee	2	2	1	1	1	1
Household Hazardous Waste (Staff)	6	Employees	2	12	6			6
Household Hazardous Waste (Public Drop Off)				35	9	9		
Total	292	Employees		1273	232	197	159	194

These trips were then distributed using the same distribution pattern.



	AM Peak Hour, E 23rd Street & O'Connell Road Turning Movement Counts											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	30	593	45	9	552	0	92	15	54	3	3	41
Trip Generated	78					66		19		64	5	67
Total	108	593	45	9	552	66	92	34	54	67	8	108
Future = Existing *1.24 Growth Factor	37	735	56	11	684	0	114	19	67	4	4	51
Future Trip Gen.	97					81		23		80	7	85
Future Total	134	735	56	11	684	81	114	42	67	84	11	136



	PM Peak Hour, E 23rd Street & O'Connell Road Turning Movement Counts											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	12	769	94	69	723	4	53	3	31	2	16	47
Trip Generated	55					50		5		62	2	64
Total	67	769	94	69	723	54	53	8	31	64	18	111
Future = Existing *1.24 Growth Factor	15	954	117	86	897	5	66	4	38	2	20	58
Future Trip Gen.	69					62		7		77	3	79
Future Total	84	954	117	86	897	67	66	11	38	79	23	137

Using these traffic volumes, a Synchro analysis was performed to identify any necessary changes to the intersection.

Section 9: Synchro Analysis of Performance Measures

Creating Synchro Scenarios: Using the traffic counts and the ITE trip generation volumes, six Synchro models were created for the traffic conditions surrounding the site.

- Scenario 1 - Existing street/pre-development conditions, Weekday AM Peak Traffic 2020
- Scenario 2 - Existing street/pre-development conditions, Weekday PM Peak Traffic 2020
- Scenario 3 - Proposed street/after-development conditions, Weekday AM Peak Traffic 2020
- Scenario 4 - Proposed street/after-development conditions, Weekday PM Peak Traffic 2020
- Scenario 5 - Proposed street/after-development conditions, Weekday AM Peak Traffic 2040
- Scenario 6 - Proposed street/after-development conditions, Weekday PM Peak Traffic 2040

Capacity and Level of Service Analysis: Three performance measures commonly used for Traffic Impact Studies are vehicle delay, level-of-service (LOS), and queue length. Vehicle delay is the average delay, in seconds, experienced by one vehicle passing through the intersection. The quality of traffic operation at an intersection is defined through level-of-service (LOS) which consists of assignments of ‘A’ for free-flowing conditions through ‘F’ for congested conditions. The procedures and methodology for determining the LOS are outlined in the Highway Capacity Manual (HCM 2010), produced by Transportation Research Board. LOS ‘A’ through ‘C’ is considered acceptable. For intersections, no individual lane should be below LOS D. The 95th percentile queue length is the overall length of a string of stopped vehicles. Note that the queue is reported in the left\thru\right order. The results of the Synchro models are in the tables below.

Scenarios 1 & 2 Synchro Results (Existing)

Performance Measures	AM 2020	PM 2020
E 23rd Street & O'Connell Road		
Delay, s	21.7	26.3
LOS	C	C
NB Delay, s L/T+R	10.6 12.7/7.8	12.1 14.6/8.3
NB LOS L/T+R	B B/A	B B/A
NB Queue, ft	56/35	37/22
EB Delay, s L/T/R	22.0 34.3/23.0/0.1	32.1 34.8/35.8/1.5
EB LOS L/T/R	C C/C/A	C C/D/A
EB Queue, ft	40/194/0	22/291/13
SB Delay, s L/T/R	2.2 12.7/20.3/0.2	6.0 13.5/21.6/0.3
SB LOS L/T/R	A B/C/A	A B/C/A
SB Queue, ft	6/7/0	4/21/0
WB Delay, s L/T/R	26.2 33.0/26.1/0	23.1 45.8/21.0/0.0
WB LOS L/T/R	C C/C/A	C D/C/A
WB Queue, ft	19/182/0	85/243/0

Existing traffic conditions were evaluated for the intersection of E 23rd Street & O'Connell Road. For AM peak hour traffic, the delay at the intersection was 21.7 sec on average with an overall LOS C. Each of the approaches and turning movements have a LOS C or better. EB and WB left-turns experienced the most delay compared to the other movements; however, this is likely due to the left-turns active before the other movements meaning a left-turning vehicle arriving just after the green phase for left-turns has to wait out nearly a whole cycle length. For PM peak hour traffic, the delay at the intersection was 26.3 sec on average with an overall LOS C. Each of the approaches have a LOS C or better while only EBT and WBL turning movements are at LOS D. Overall, the traffic signal is operating well under current demand and capacity levels. Queue lengths did not exceed the turn lane capacity for any movement.

Scenarios 3 & 4 Synchro Results (Proposed street/after-development conditions 2020)

Performance Measures	AM 2020	PM 2020
E 23rd Street & O'Connell Road		
Delay, s	21.8	28.9
LOS	C	C
NB Delay, s	13.6	13.0
L/T+R	15.3/11.8	14.8/10.6
NB LOS	B	B
L/T+R	B/B	B/B
NB Queue, ft	57/47	37/26
EB Delay, s	23.5	33.3
L/T/R	53.2/19.9/0.1	49.2/35.8/1.5
EB LOS	C	C
L/T/R	D/B/A	D/D/A
EB Queue, ft	135/192/0	87/291/13
SB Delay, s	6.7	7.4
L/T/R	14.8/21.2/0.6	15.0/21.7/0.7
SB LOS	A	A
L/T/R	B/C/A	B/C/A
SB Queue, ft	44/14/0	42/22/0
WB Delay, s	26.6	30.7
L/T/R	34.2/29.6/0.2	45.8/31.5/0.2
WB LOS	C	C
L/T/R	C/C/A	D/C/A
WB Queue, ft	19/183/1	85/247/0

Existing traffic conditions plus trips generated by the new development were evaluated for the intersection of E 23rd Street & O'Connell Road. For AM peak hour traffic, the delay at the intersection was 21.8 sec on average with an overall LOS C. This is 0.1 sec more than the existing traffic conditions without the new development trips. Each of the approaches and turning movements have a LOS C or better except EB left-turns. EB left-turns experienced the most delay compared to the other movements since there will be an influx of city employees coming from the east to head to the facility. For PM peak hour traffic, the delay at the intersection was 28.9 sec on average with an overall LOS C. This is 2.6 sec more than the existing traffic conditions without the new development trips. Each of the approaches have a LOS C or better while only EBL, EBT, and WBL turning movements are at LOS D. Given the additional traffic volumes, the traffic signal is operating well under expected demand and capacity levels. Based on the number of turning vehicles in the AM and PM, dual left-turn lanes are not justified. Queue lengths did not exceed the turn lane capacity for any movement.

Scenarios 5 & 6 Synchro Results (Proposed street/after-development conditions 2040)

Performance Measures	AM 2040	PM 2040
E 23rd Street & O'Connell Road		
Delay, s	25.6	32.6
LOS	C	C
NB Delay, s	14.6	14.8
L/T+R	16.9/12.2	17.3/11.4
NB LOS	B	B
L/T+R	B/B	B/B
NB Queue, ft	69/55	49/32
EB Delay, s	26.3	37.2
L/T/R	70.7/20.2/0.1	64.2/39.1/2.9
EB LOS	C	D
L/T/R	E/C/A	E/D/A
EB Queue, ft	166/252/0	122/395/25
SB Delay, s	7.6	9.3
L/T/R	15.9/21.7/1.4	17.7/24.1/2.0
SB LOS	A	A
L/T/R	B/C/A	B/C/A
SB Queue, ft	53/17/5	57/29/12
WB Delay, s	33.4	34.6
L/T/R	34.8/37.1/1.1	65.8/34.2/0.5
WB LOS	C	C
L/T/R	C/D/A	E/C/A
WB Queue, ft	21/257/8	125/358/4

Future traffic conditions plus trips generated by the new development were evaluated for the intersection of E 23rd Street & O'Connell Road. For AM peak hour traffic, the delay at the intersection was 25.6 sec on average with an overall LOS C. This is 3.8 sec more than the existing 2020 traffic conditions with the new development trips. Each of the approaches and turning movements have a LOS C or better except EBL and WBT. For PM peak hour traffic, the delay at the intersection was 32.6 sec on average with an overall LOS C. This is 3.7 sec more than the existing 2020 traffic conditions with the new development trips. Each of the approaches have a LOS C or better except the eastbound approach with a LOS D. The only turning movements with a LOS C or worse are EBL at LOS E, EBT at LOS D, and WBL at LOS E. The traffic signal is operating well under expected demand and capacity levels. Based on the number of turning vehicles in the AM and PM, dual left-turn lanes are still not justified. Queue lengths did not exceed the turn lane capacity for any movement.

Section 10: Near-term Impact of Development

The roadways surrounding the planned MSO Facility have the capacity to handle the newly generated trips. The intersection of E 23rd Street & O'Connell Road does not require improvements to handle the new trips since the traffic volumes do not justify dual left-turn lanes and the queue lengths do not exceed the turn lane capacity for any movement.

Since 19th Street is planned to be connected to O'Connell Road in 2021, some city vehicles would utilize 19th Street with an estimate of up to 10% of newly generated trips by the MSO facility. This means an additional 16 westbound vehicles and 19 eastbound vehicles during the AM peak hour and an additional 16 westbound vehicles and 13 eastbound vehicles during the PM peak hour between Harper Street and O'Connell Road. Although the neighborhood association has raised concerns about thru traffic utilizing 19th Street, the MSO Facility land-uses would not cause a high enough volume to cause congestion or walkability issues along 19th Street and 19th Street will not be utilized as a truck route.

Section 11: Impact of Development with Existing Traffic Projected 20 Years

For the projected traffic volumes, no changes are required to handle traffic volumes as a result of the MSO Facility. For 2040 traffic volumes, the intersection of E 23rd Street & O'Connell Road does not require dual left-turn lanes or extended turn lane capacity for any movement.

Section 12: Summary and Recommendations

Summary: This traffic study covered the impact of the field operations campus in the City of Lawrence, Kansas. The 168 acre site will include several large buildings and will host a staff of 223 people. The total daily trips for the facility is expected to be 1,029 with 187 entering and 157 leaving during the AM peak hour and with 127 entering and 157 leaving during the PM peak hour. These traffic volumes account for the personnel making multiple site trips to and from the facility throughout the day.

New roadway connections will be constructed connecting to public streets with the major access point connecting to the intersection of E 19th Street & O'Connell Road. Although the current orientation of buildings within the campus is still under development, the site will be contained within a secure fence with only the Household Hazardous Waste located on the outside as a public drop off location. The intersection of E 19th Street & O'Connell Road will be reconfigured into a stop-controlled T-intersection with O'Connell Road extended to the north. The intersection of E 23rd Street & O'Connell Road does not require improvements to handle the new trips. If 19th Street is connected to O'Connell Road, an estimated 10% of newly generated trips might utilize 19th Street. Between Harper Street and O'Connell Road, trip distribution results included an additional 16 westbound vehicles and 19 eastbound vehicles during the AM peak hour and an additional 16 westbound vehicles and 13 eastbound vehicles during the PM peak hour. In general, O'Connell Road and the surrounding roadway network was constructed with the capacity to handle development in the area. The trips generated by the MSO facility do not justify additional roadway improvements besides the necessary changes needed for access to the site.

Recommendations:

- Construct the access roadways for the development and ensure trucks can maneuver through the circulating parking areas and fuel areas without issues.
- Ensure sight distance requirements are consistent with AASHTO requirements during finalization of the facility layout.
- If 19th Street is connected to O'Connell Road, reconsider the routing for transit buses through the area.
- Install a street light at the intersection of 19th Street & O'Connell Road to aid in nighttime visibility.

Government Office Complex (733)

Vehicle Trip Ends vs: Employees
On a: Weekday

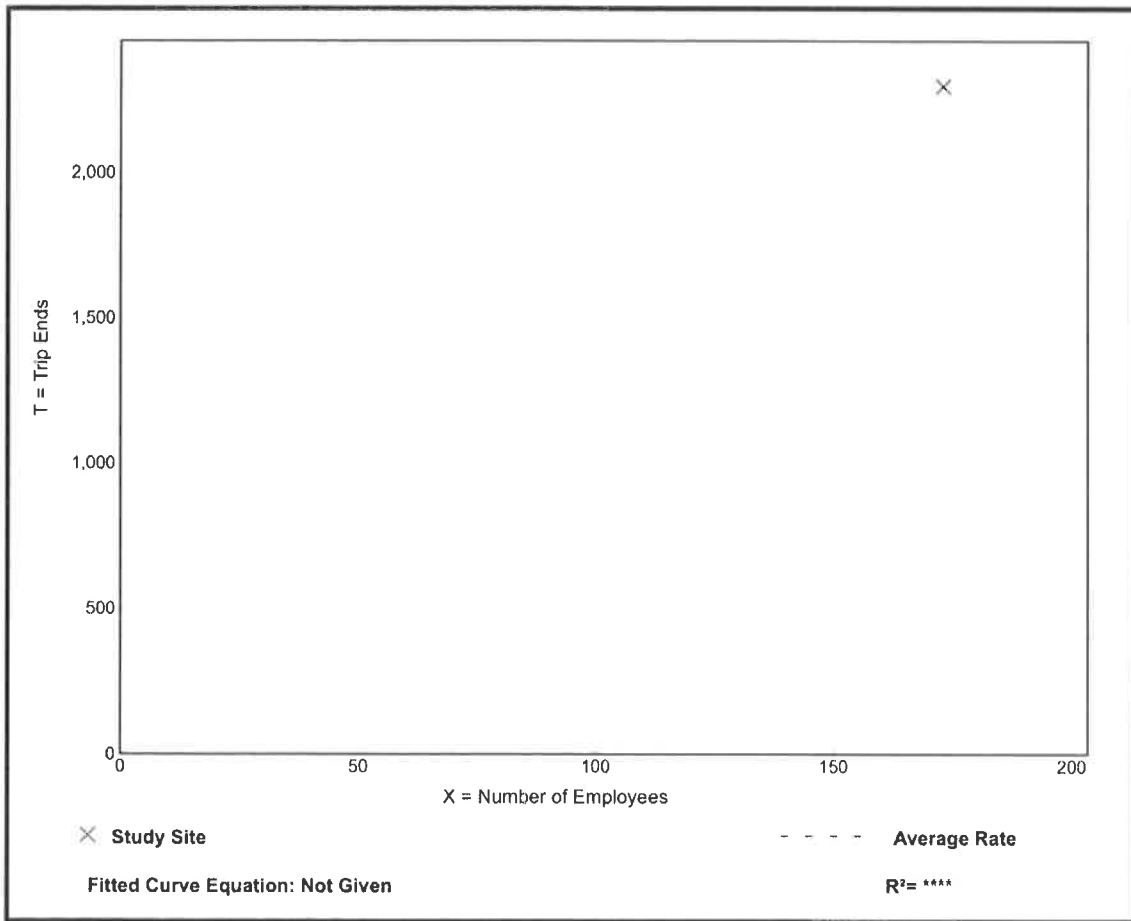
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Employees: 173
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
13.29	13.29 - 13.29	*

Data Plot and Equation

Caution - Small Sample Size



Government Office Complex (733)

Vehicle Trip Ends vs: Employees
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

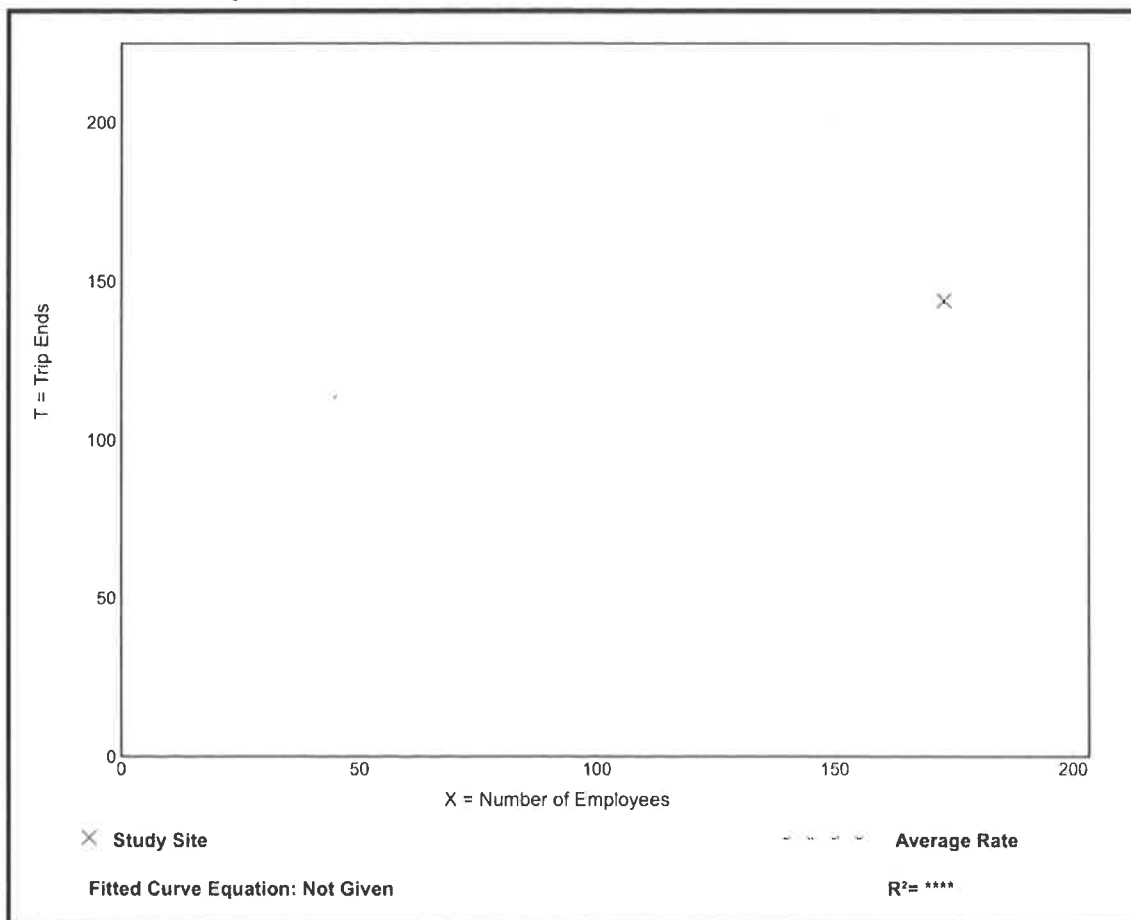
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Employees: 173
Directional Distribution: 89% entering, 11% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.83	0.83 - 0.83	*

Data Plot and Equation

Caution – Small Sample Size



Government Office Complex (733)

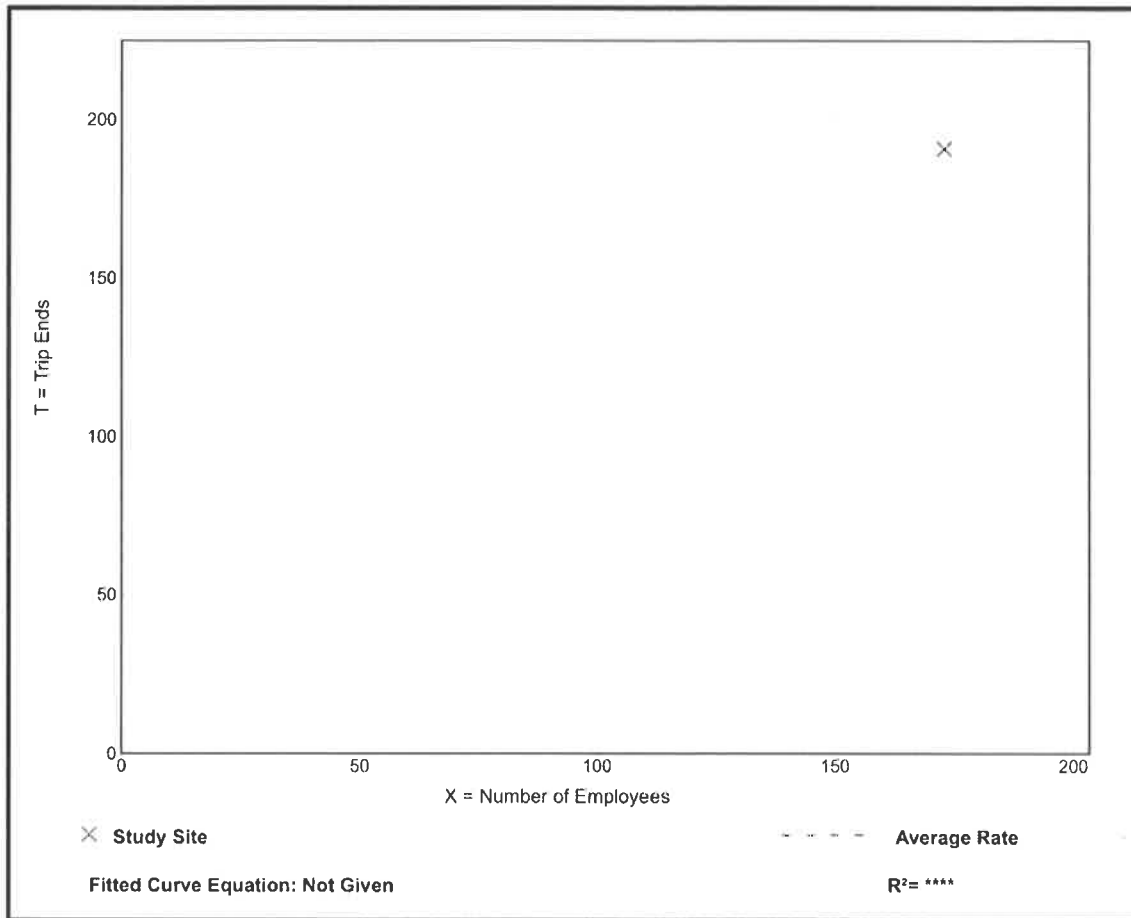
Vehicle Trip Ends vs: Employees
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Employees: 173
Directional Distribution: 31% entering, 69% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.10	1.10 - 1.10	*

Data Plot and Equation

Caution – Small Sample Size



Utility (170)

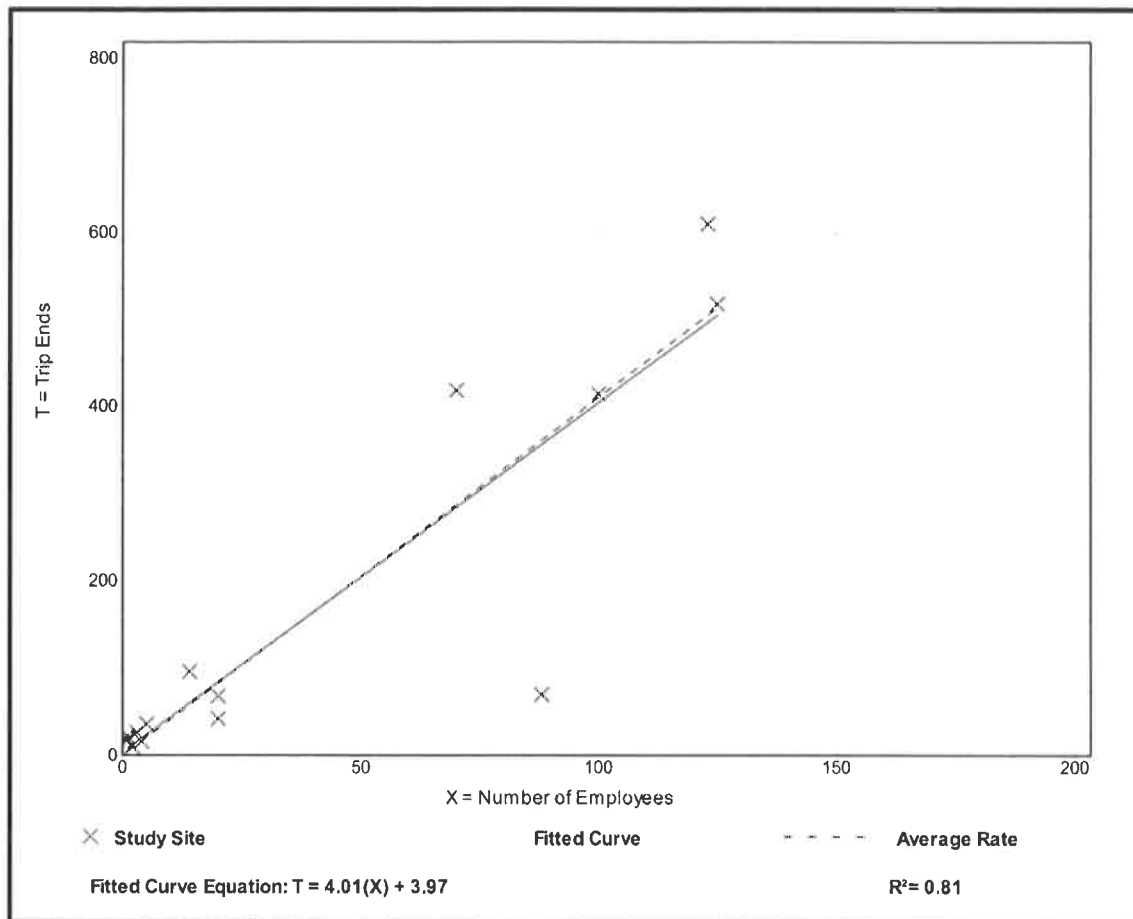
Vehicle Trip Ends vs: Employees
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 14
Avg. Num. of Employees: 41
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
4.11	0.80 - 22.00	1.99

Data Plot and Equation



Utility (170)

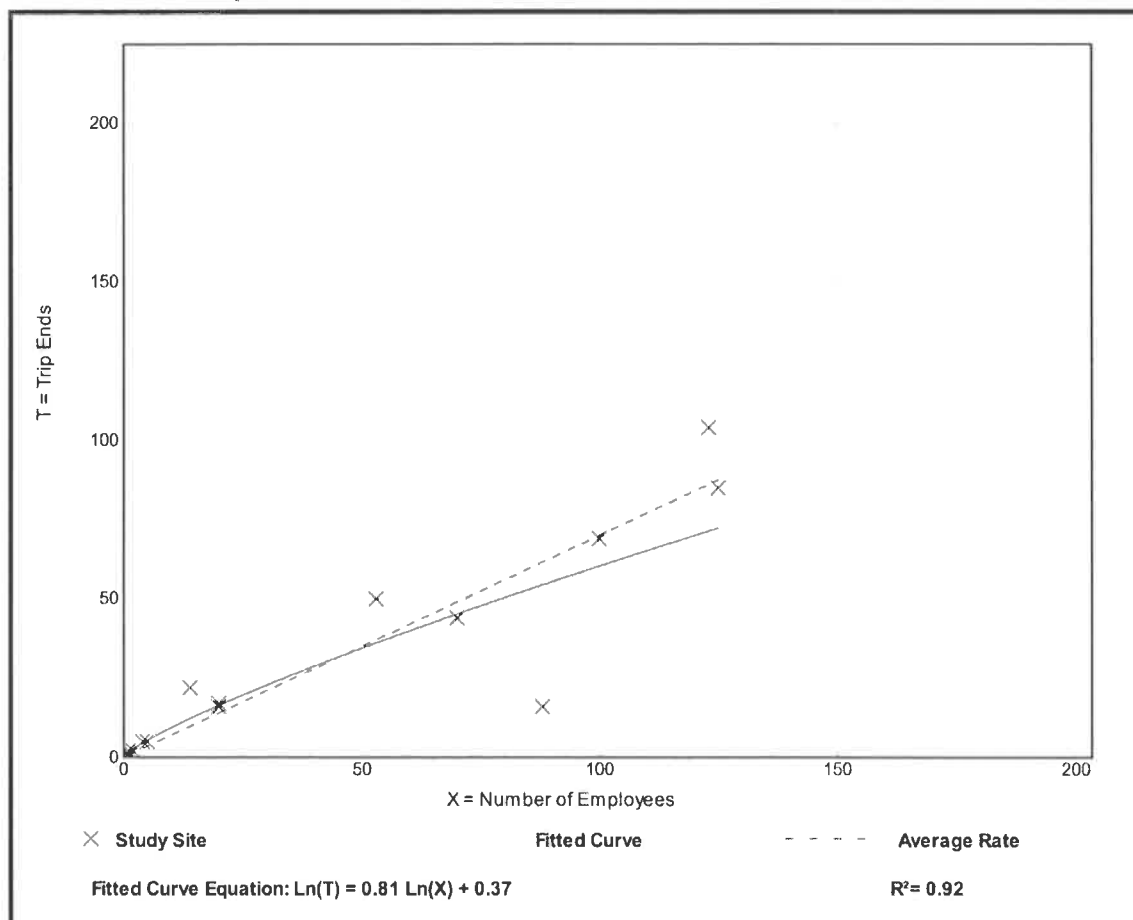
Vehicle Trip Ends vs: Employees
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban
Number of Studies: 14
Avg. Num. of Employees: 45
Directional Distribution: 81% entering, 19% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.70	0.18 - 2.00	0.28

Data Plot and Equation



Utility (170)

Vehicle Trip Ends vs: Employees

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 15

Avg. Num. of Employees: 83

Directional Distribution: 15% entering, 85% exiting

Vehicle Trip Generation per Employee

Average Rate

Range of Rates

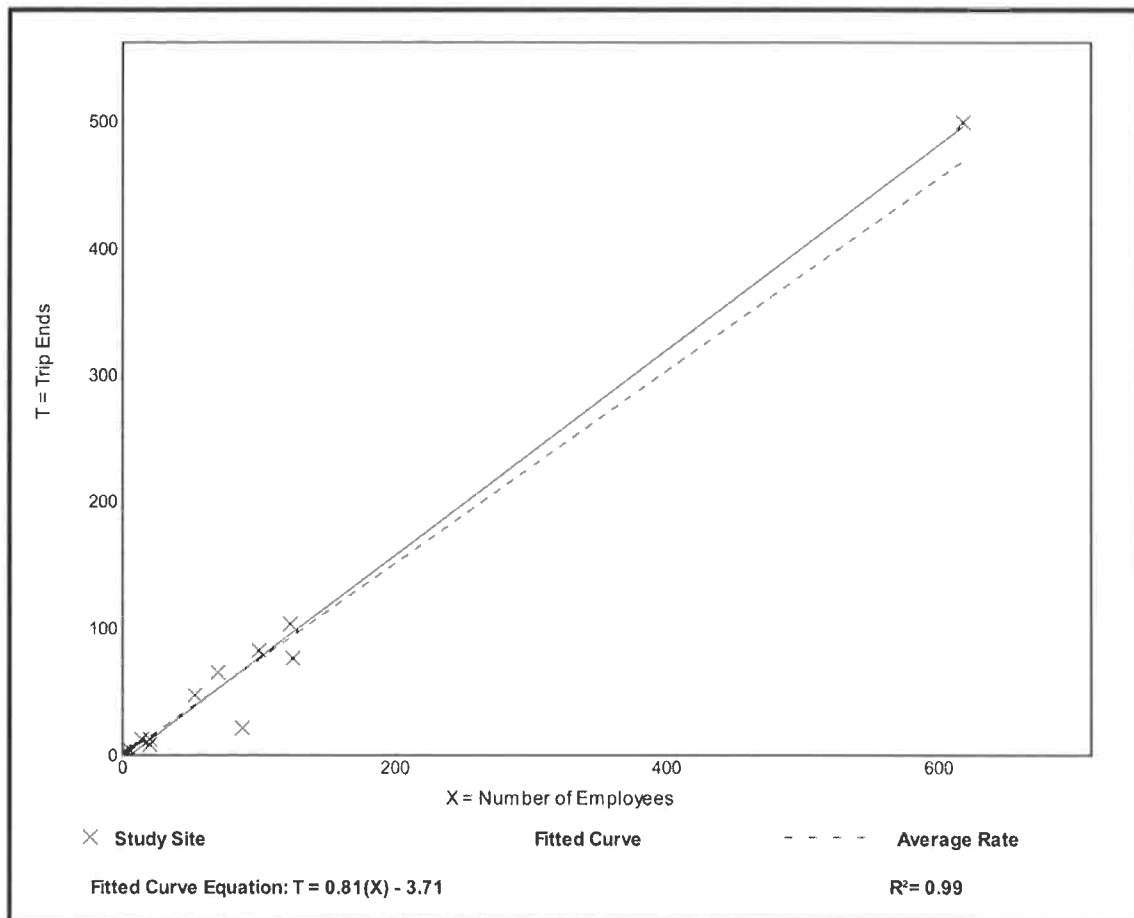
Standard Deviation

0.76

0.25 - 3.00

0.19

Data Plot and Equation



E 23rd Street & E 1600 Road - TMC

Tue Dec 3, 2019

Full Length (12 AM-12 AM (+1))

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 731785, Location: 38.942698, -95.204907



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	1600 Rd Southbound					23rd St Westbound					1600 Rd Northbound					23rd St Eastbound					Int				
	R	T	L	U	App Ped*	R	T	L	U	App Ped*	R	T	L	U	App Ped*	R	T	L	U	App Ped*					
2019-12-03 12:00AM	4	3	0	0	7	0	0	29	1	0	30	0	1	0	0	0	1	0	2	15	0	0	17	0	55
12:15AM	1	0	0	0	1	0	0	25	1	0	26	0	0	0	2	0	2	0	2	21	1	0	24	0	53
12:30AM	7	0	0	0	7	0	0	37	0	0	37	0	0	1	0	0	1	0	1	7	0	1	9	0	54
12:45AM	5	0	0	0	5	0	0	32	0	0	32	0	0	0	1	0	1	0	1	6	0	0	7	0	45
Hourly Total	17	3	0	0	20	0	0	123	2	0	125	0	1	1	3	0	5	0	6	49	1	1	57	0	207
1:00AM	9	1	0	0	10	0	0	30	1	0	31	0	0	0	0	0	0	0	2	10	0	0	12	0	53
1:15AM	3	1	0	0	4	0	0	12	0	0	12	0	0	0	0	0	0	0	1	10	1	0	12	0	28
1:30AM	1	0	0	0	1	0	0	12	0	0	12	0	0	0	1	0	1	0	0	2	1	1	4	0	18
1:45AM	1	0	0	0	1	0	0	14	0	0	14	0	1	0	0	0	1	0	0	9	0	0	9	0	25
Hourly Total	14	2	0	0	16	0	0	68	1	0	69	0	1	0	1	0	2	0	3	31	2	1	37	0	124
2:00AM	3	0	0	0	3	0	0	6	0	0	6	0	0	0	0	0	0	0	0	6	0	0	6	0	15
2:15AM	1	0	0	0	1	0	0	12	0	0	12	0	0	0	0	0	0	0	0	5	0	0	5	0	18
2:30AM	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	0	0	0	3	0	0	3	0	16
2:45AM	1	0	0	0	1	0	0	14	0	0	14	0	0	0	0	0	0	0	2	4	0	0	6	0	21
Hourly Total	5	0	0	0	5	0	0	45	0	0	45	0	0	0	0	0	0	0	2	18	0	0	20	0	70
3:00AM	1	0	0	0	1	0	0	9	0	0	9	0	0	0	0	0	0	0	0	13	0	0	13	0	23
3:15AM	0	0	0	0	0	0	0	7	0	0	7	0	1	0	0	0	1	0	0	6	0	0	6	0	14
3:30AM	1	0	0	0	1	0	0	2	0	0	2	0	0	0	0	0	0	0	0	6	0	0	6	0	9
3:45AM	0	0	0	0	0	0	0	2	0	0	2	0	2	1	0	0	3	0	0	10	0	0	10	0	15
Hourly Total	2	0	0	0	2	0	0	20	0	0	20	0	3	1	0	0	4	0	0	35	0	0	35	0	61
4:00AM	3	0	0	0	3	0	0	8	0	0	8	0	1	0	0	0	1	0	0	7	0	0	7	0	19
4:15AM	0	0	0	0	0	0	0	6	0	0	6	0	0	0	1	0	1	0	0	16	0	0	16	0	23
4:30AM	0	0	0	0	0	0	0	8	1	0	9	0	4	0	1	0	5	0	0	17	0	0	17	0	31
4:45AM	0	0	0	0	0	0	0	2	1	0	3	0	6	0	2	0	8	0	0	27	1	0	28	0	39
Hourly Total	3	0	0	0	3	0	0	24	2	0	26	0	11	0	4	0	15	0	0	67	1	0	68	0	112
5:00AM	1	0	0	0	1	0	0	4	1	0	5	0	5	1	0	0	6	0	0	32	0	0	32	0	44
5:15AM	0	0	0	0	0	0	0	5	1	0	6	0	3	0	2	0	5	0	0	44	0	0	44	0	55
5:30AM	0	0	0	0	0	0	0	10	0	0	10	0	13	0	1	0	14	0	0	67	1	0	68	0	92
5:45AM	1	0	0	0	1	0	0	11	0	0	11	0	9	2	4	0	15	0	0	104	1	0	105	0	132
Hourly Total	2	0	0	0	2	0	0	30	2	0	32	0	30	3	7	0	40	0	0	247	2	0	249	0	323
6:00AM	0	1	0	0	1	0	0	16	1	0	17	0	14	1	4	0	19	0	0	83	0	0	83	0	120
6:15AM	0	0	0	0	0	0	0	31	0	0	31	0	12	0	5	0	17	0	4	127	4	0	135	0	183
6:30AM	1	0	0	0	1	0	0	25	2	0	27	0	23	2	8	0	33	0	3	135	1	0	139	0	200
6:45AM	1	1	1	0	3	0	1	41	1	0	43	0	17	1	7	0	25	0	2	175	6	0	183	0	254
Hourly Total	2	2	1	0	5	0	1	113	4	0	118	0	66	4	24	0	94	0	9	520	11	0	540	0	757
7:00AM	4	3	1	0	8	0	0	55	1	0	56	0	18	3	14	0	35	0	4	178	3	0	185	0	284
7:15AM	4	0	0	0	4	0	0	60	6	0	66	0	15	1	27	0	43	0	4	174	7	0	185	0	298
7:30AM	6	1	2	0	9	0	0	96	6	0	102	0	28	3	23	0	54	0	8	160	16	0	184	0	349
7:45AM	6	1	1	0	8	0	0	111	3	0	114	0	15	8	36	0	59	0	7	173	13	0	193	0	374
Hourly Total	20	5	4	0	29	0	0	322	16	0	338	0	76	15	100	0	191	0	23	685	39	0	747	0	1305
8:00AM	16	1	0	0	17	0	0	112	2	0	114	0	16	0	24	0	40	0	15	146	1	0	162	0	333
8:15AM	10	0	2	0	12	0	0	140	2	0	142	0	11	1	15	0	27	0	13	142	11	0	166	0	347
8:30AM	9	1	0	0	10	0	0	189	1	1	191	0	12	6	17	0	35	0	10	132	5	0	147	0	383
8:45AM	7	0	0	0	7	0	0	169	2	0	171	0	6	6	6	0	18	0	8	118	9	0	135	0	331
Hourly Total	42	2	2	0	46	0	0	610	7	1	618	0	45	13	62	0	120	0	46	538	26	0	610	0	1394
9:00AM	4	0	0	0	4	0	0	159	2	0	161	0	4	2	11	0	17	0	11	106	6	0	123	0	305
9:15AM	1	0	3	0	4	0	0	133	2	0	135	0	5	5	12	0	22	0	10	129	6	0	145	1	306
9:30AM	3	0	0	0	3	0	0	149	4	0	153	0	8	0	15	0	23	0	10	100	1	0	111	0	290
9:45AM	3	0	0	0	3	0	0	202	3	0	205	0	5	0	7	0	12	0	7	106	4	0	117	0	337
Hourly Total	11	0	3	0	14	0	0	643	11	0	654	0	22	7	45	0	74	0	38	441	17	0	496	1	1238
10:00AM	4	0	0	0	4	0	1	152	2	0	155	0	5	0	13	0	18	0	13	113	0	0	126	0	303
10:15AM	1	1	0	0	2	0	0	123	2	0	125	0	8	1	20	0	29	0	15	118	8	0	141	0	297
10:30AM	5	2	0	0	7	0	0	117	2	0	119	0	1	0	11	0	12	0	12	117	3	0	132	0	270
10:45AM	4	1	0	0	5	0	0	118	4	0	122	0	7	0	19	0	26	0	11	109	3	0	123	0	276
Hourly Total	14	4	0	0	18	0	1	510	10	0	521	0	21	1	63	0	85	0	51	457	14	0	522	0	1146
11:00AM	1	4	0	0	5	0	0	100	4	0	104	0	2	0	16	0	18	0	14	105	1	0	120	0	247
11:15AM	4	1	0	0	5	0	0	103	3	0	106	0	2	1	19	0	22	0	13	109	1	0	123	0	256
11:30AM	5	2	0	0	7	0	0	115	3	0	118	0	6	1	16	0	23	0	10	112	3	0	125	0	273
11:45AM	2	2	0	0	4	0	0	110	1	1	112	0	8	0	15	0	23	0	16	128	2	0	146	0	285
Hourly Total	12	9	0	0	21	0	0	428	11	1	440	0	18	2	66	0	86	0	53	454	7	0	514	0	1061
12:00PM	9	6	0	0	15	0	0	97	4	0	101	0	6	0	18	0	24	0	14	122	2	0	138	0	278
12:15PM	6	3	0	0	9	0	0	104	2	0	106	0	6	0	10	0	16	0	10	130	5	1	146	0	277
12:30PM	8	3	1	0	12	0	1	112	2	0	115	0	4	2	12	0	18	0	18	123	3	0	144	0	289
12:45PM	14	2	0	0	16	0	0	114	5	0	119	0	4	0	15	0	19	0	12	112	8	0	132	0	286
Hourly Total																									

Leg Direction	1600 Rd Southbound					23rd St Westbound					1600 Rd Northbound					23rd St Eastbound					Int				
	R	T	L	U	App Ped*	R	T	L	U	App Ped*	R	T	L	U	App Ped*	R	T	L	U	App Ped*					
Time																									
2:45PM	3	1	0	0	4	0	0	95	4	0	99	0	7	2	15	0	24	1	15	154	9	0	178	1	305
Hourly Total	24	6	1	0	31	0	0	377	18	0	395	0	28	4	50	0	82	1	39	586	25	0	650	1	1158
3:00PM	11	3	0	0	14	0	0	87	5	0	92	0	6	1	12	0	19	0	17	136	5	0	158	0	283
3:15PM	3	1	0	0	4	0	0	108	6	0	114	0	4	2	12	0	18	0	14	138	9	0	161	0	297
3:30PM	8	13	0	0	21	0	1	134	11	0	146	0	9	2	16	0	27	0	21	129	3	0	153	0	347
3:45PM	4	0	0	0	4	0	0	110	16	0	126	0	3	3	13	0	19	0	17	157	7	1	182	0	331
Hourly Total	26	17	0	0	43	0	1	439	38	0	478	0	22	8	53	0	83	0	69	560	24	1	654	0	1258
4:00PM	14	5	0	0	19	0	0	121	15	0	136	0	3	2	15	0	20	0	19	162	8	1	190	0	365
4:15PM	5	0	1	0	6	0	0	118	17	0	135	0	7	0	10	0	17	0	15	203	5	1	224	0	382
4:30PM	31	8	1	0	40	0	0	181	21	0	202	0	5	0	16	0	21	0	12	162	1	0	175	0	438
4:45PM	12	2	1	0	15	0	1	175	13	0	189	0	8	0	12	0	20	0	25	182	3	0	210	0	434
Hourly Total	62	15	3	0	80	0	1	595	66	0	662	0	23	2	53	0	78	0	71	709	17	2	799	0	1619
5:00PM	9	10	1	0	20	0	2	157	20	0	179	0	9	2	16	0	27	0	24	182	3	1	210	0	436
5:15PM	9	2	0	0	11	0	1	158	17	0	176	0	6	1	11	0	18	0	28	243	2	0	273	0	478
5:30PM	17	2	0	0	19	0	0	233	19	0	252	0	8	0	14	0	22	0	17	162	3	0	182	0	475
5:45PM	11	4	0	0	15	0	2	194	12	0	208	0	7	0	17	1	25	0	19	137	3	0	159	0	407
Hourly Total	46	18	1	0	65	0	5	742	68	0	815	0	30	3	58	1	92	0	88	724	11	1	824	0	1796
6:00PM	24	2	0	0	26	0	0	188	12	0	200	0	4	1	21	0	26	1	6	141	1	0	148	1	400
6:15PM	12	1	1	0	14	0	1	186	11	0	198	0	5	0	16	0	21	0	18	114	4	0	136	1	369
6:30PM	8	1	0	0	9	0	0	192	4	0	196	0	7	2	11	0	20	0	15	111	4	0	130	0	355
6:45PM	5	0	0	0	5	0	0	181	7	0	188	0	4	1	13	0	18	0	6	110	2	1	119	0	330
Hourly Total	49	4	1	0	54	0	1	747	34	0	782	0	20	4	61	0	85	1	45	476	11	1	533	2	1454
7:00PM	14	0	0	0	14	0	1	185	7	0	193	0	4	0	14	0	18	0	15	67	4	0	86	0	311
7:15PM	6	0	0	0	6	0	2	177	6	0	185	0	2	0	4	0	6	0	18	107	4	0	129	0	326
7:30PM	8	4	1	0	13	0	0	159	5	0	164	0	1	0	6	0	7	0	8	80	2	1	91	0	275
7:45PM	4	0	1	0	5	0	0	106	4	0	110	0	0	0	7	0	7	0	14	78	3	0	95	0	217
Hourly Total	32	4	2	0	38	0	3	627	22	0	652	0	7	0	31	0	38	0	55	332	13	1	401	0	1129
8:00PM	14	1	0	0	15	0	0	101	4	0	105	0	6	0	5	0	11	0	11	69	1	0	81	2	212
8:15PM	7	0	0	0	7	0	0	93	8	0	101	0	3	2	6	0	11	0	14	70	2	0	86	0	205
8:30PM	7	0	0	0	7	0	0	85	2	0	87	0	1	0	7	0	8	0	10	74	2	0	86	0	188
8:45PM	2	1	0	0	3	0	0	73	6	0	79	0	0	0	1	0	1	0	8	53	1	2	64	0	147
Hourly Total	30	2	0	0	32	0	0	352	20	0	372	0	10	2	19	0	31	0	43	266	6	2	317	2	752
9:00PM	2	0	0	0	2	0	0	79	6	0	85	0	0	0	5	0	5	0	5	63	1	0	69	0	161
9:15PM	3	0	0	0	3	0	0	70	7	0	77	0	1	0	5	0	6	0	3	56	1	0	60	0	146
9:30PM	6	0	0	0	6	0	2	81	4	1	88	0	2	0	3	0	5	0	5	39	2	1	47	0	146
9:45PM	0	0	0	0	0	0	0	54	6	0	60	0	1	2	4	0	7	0	4	30	2	0	36	0	103
Hourly Total	11	0	0	0	11	0	2	284	23	1	310	0	4	2	17	0	23	0	17	188	6	1	212	0	556
10:00PM	2	0	0	0	2	0	0	71	3	0	74	0	0	0	1	0	1	0	4	43	0	1	48	0	125
10:15PM	0	0	0	0	0	0	1	60	3	0	64	0	0	1	1	0	2	0	4	24	0	0	28	0	94
10:30PM	3	0	0	0	3	0	0	52	0	0	52	0	1	1	1	0	3	0	2	29	0	0	31	0	89
10:45PM	0	0	0	0	0	0	0	59	2	0	61	0	1	0	0	0	1	0	3	19	0	0	22	0	84
Hourly Total	5	0	0	0	5	0	1	242	8	0	251	0	2	2	3	0	7	0	13	115	0	1	129	0	392
11:00PM	0	0	0	0	0	0	0	47	1	0	48	0	1	0	1	0	2	0	1	19	2	1	23	0	73
11:15PM	0	0	0	0	0	0	0	39	1	0	40	0	0	1	0	0	1	0	1	15	1	0	17	0	58
11:30PM	3	1	0	0	4	0	0	33	0	0	33	0	0	0	2	0	2	0	1	23	1	0	25	0	64
11:45PM	0	0	0	0	0	0	0	38	1	0	39	0	0	1	2	0	3	0	2	20	1	1	24	0	66
Hourly Total	3	1	0	0	4	0	0	157	3	0	160	0	1	2	5	0	8	0	5	77	5	2	89	0	261
Total	515	112	19	0	646	-	17	8357	395	3	8772	0	482	85	825	1	1393	3	774	8583	289	18	9664	6	20475
% Approach	79.7%	17.3%	2.9%	0%	-	-	0.2%	95.3%	4.5%	0%	-	-	34.6%	6.1%	59.2%	0.1%	-	-	8.0%	88.8%	3.0%	0.2%	-	-	-
% Total	2.5%	0.5%	0.1%	0%	3.2%	-	0.1%	40.8%	1.9%	0%	42.8%	-	2.4%	0.4%	4.0%	0%	6.8%	-	3.8%	41.9%	1.4%	0.1%	47.2%	-	-
Lights	450	105	17	0	572	-	17	8126	389	3	8535	-	470	84	710	1	1265	-	724	8293	224	18	9259	-	19631
% Lights	87.4%	93.8%	89.5%	0%	88.5%	-	100%	97.2%	98.5%	100%	97.3%	-	97.5%	98.8%	86.1%	100%	90.8%	-	93.5%	96.6%	77.5%	100%	95.8%	-	95.9%
Articulated Trucks	9	2	1	0	12	-	0	68	2	0	70	-	6	0	2	0	8	-	3	90	15	0	108	-	198
% Articulated Trucks	1.7%	1.8%	5.3%	0%	1.9%	-	0%	0.8%	0.5%	0%	0.8%	-	1.2%	0%	0.2%	0%	0.6%	-	0.4%	1.0%	5.2%	0%	1.1%	-	1.0%
Buses and Single-Unit Trucks	56	5	1	0	62	-	0	163																	

E 23rd Street & E 1600 Road - TMC

Tue Dec 3, 2019

Full Length (12 AM-12 AM (+1))

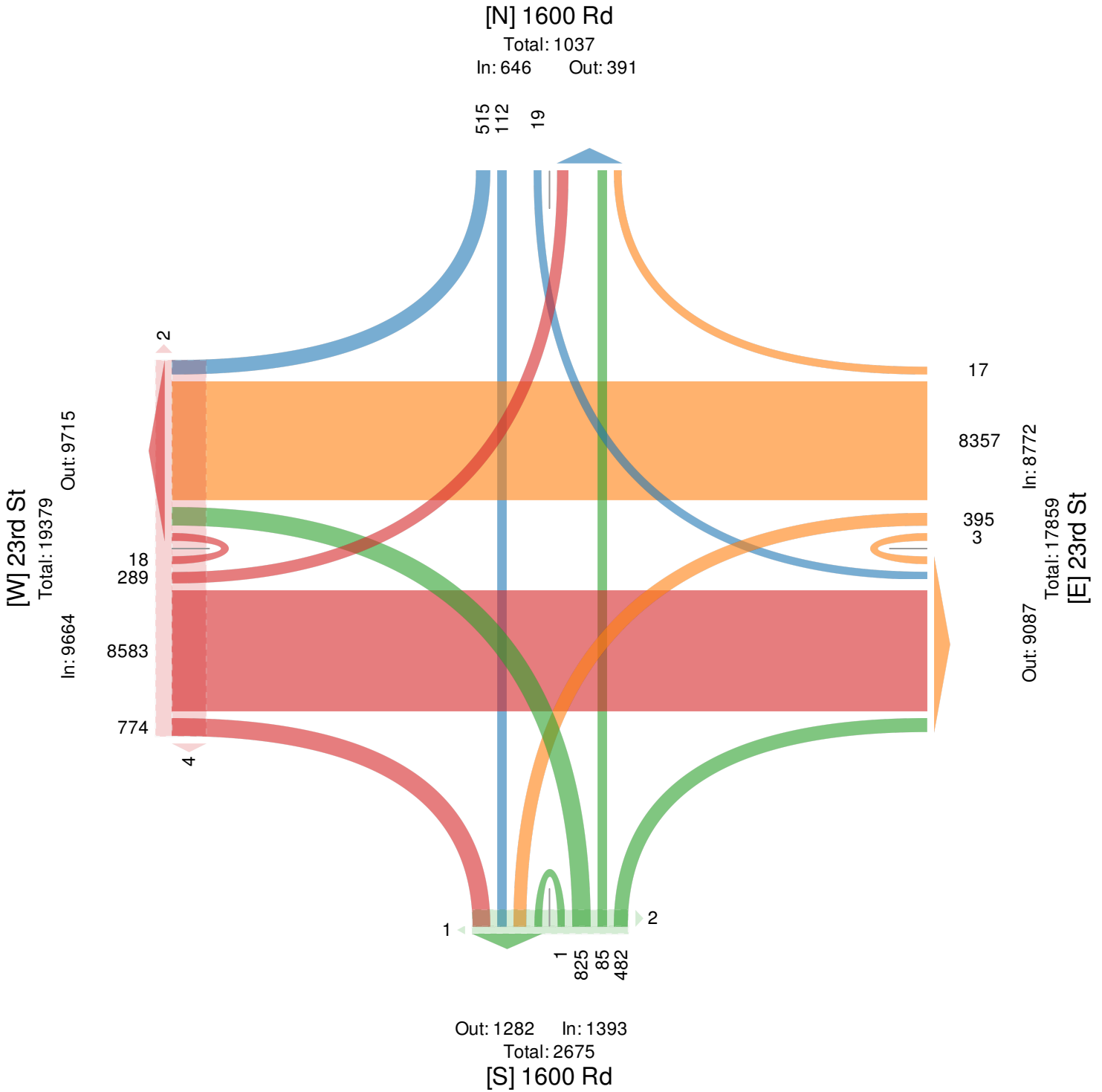
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 731785, Location: 38.942698, -95.204907



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



E 23rd Street & E 1600 Road - TMC

Tue Dec 3, 2019

AM Peak (Dec 03 2019 7:45AM - 8:45 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 731785, Location: 38.942698, -95.204907



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	1600 Rd Southbound						23rd St Westbound						1600 Rd Northbound						23rd St Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2019-12-03 7:45AM	6	1	1	0	8	0	0	111	3	0	114	0	15	8	36	0	59	0	7	173	13	0	193	0	374
8:00AM	16	1	0	0	17	0	0	112	2	0	114	0	16	0	24	0	40	0	15	146	1	0	162	0	333
8:15AM	10	0	2	0	12	0	0	140	2	0	142	0	11	1	15	0	27	0	13	142	11	0	166	0	347
8:30AM	9	1	0	0	10	0	0	189	1	1	191	0	12	6	17	0	35	0	10	132	5	0	147	0	383
Total	41	3	3	0	47	0	0	552	8	1	561	0	54	15	92	0	161	0	45	593	30	0	668	0	1437
% Approach	87.2%	6.4%	6.4%	0%	-	-	0%	98.4%	1.4%	0.2%	-	-	33.5%	9.3%	57.1%	0%	-	-	6.7%	88.8%	4.5%	0%	-	-	-
% Total	2.9%	0.2%	0.2%	0%	3.3%	-	0%	38.4%	0.6%	0.1%	39.0%	-	3.8%	1.0%	6.4%	0%	11.2%	-	3.1%	41.3%	2.1%	0%	46.5%	-	-
PHF	0.641	0.750	0.375	-	0.691	-	-	0.730	0.667	0.250	0.734	-	0.844	0.469	0.639	-	0.682	-	0.750	0.857	0.577	-	0.865	-	0.938
Lights	35	2	3	0	40	-	0	533	7	1	541	-	53	15	75	0	143	-	36	579	27	0	642	-	1366
% Lights	85.4%	66.7%	100%	0%	85.1%	-	0%	96.6%	87.5%	100%	96.4%	-	98.1%	100%	81.5%	0%	88.8%	-	80.0%	97.6%	90.0%	0%	96.1%	-	95.1%
Articulated Trucks	0	0	0	0	0	-	0	4	0	0	4	-	0	0	0	0	0	-	0	5	0	0	5	-	9
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0.7%	0%	0%	0.7%	-	0%	0%	0%	0%	0%	-	0%	0.8%	0%	0%	0.7%	-	0.6%
Buses and Single-Unit Trucks	6	1	0	0	7	-	0	15	1	0	16	-	1	0	17	0	18	-	9	9	3	0	21	-	62
% Buses and Single-Unit Trucks	14.6%	33.3%	0%	0%	14.9%	-	0%	2.7%	12.5%	0%	2.9%	-	1.9%	0%	18.5%	0%	11.2%	-	20.0%	1.5%	10.0%	0%	3.1%	-	4.3%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

E 23rd Street & E 1600 Road - TMC

Tue Dec 3, 2019

AM Peak (Dec 03 2019 7:45AM - 8:45 AM)

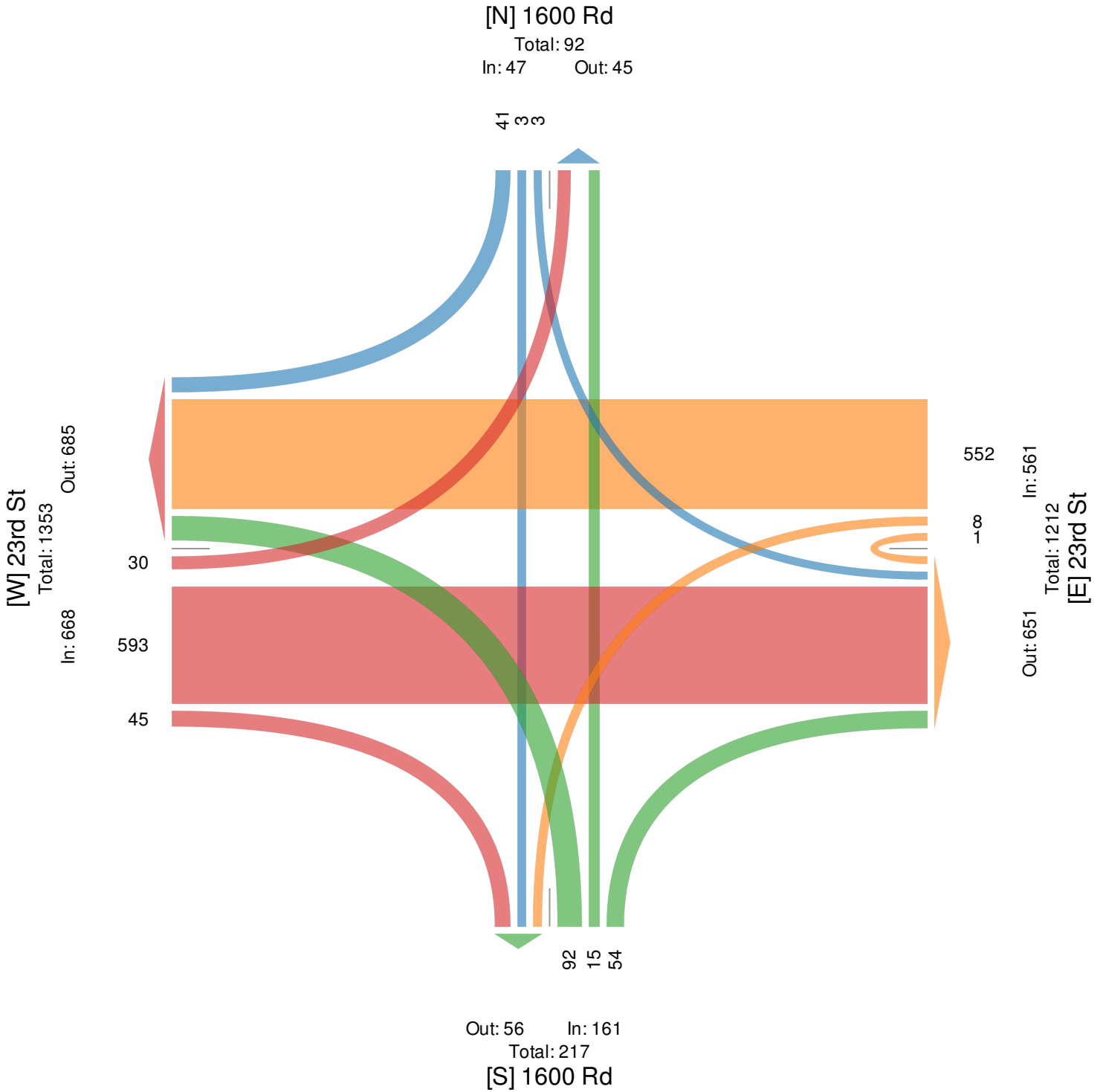
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 731785, Location: 38.942698, -95.204907



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



E 23rd Street & E 1600 Road - TMC

Tue Dec 3, 2019

Midday Peak (Dec 03 2019 12PM - 1 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 731785, Location: 38.942698, -95.204907



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction Time	1600 Rd Southbound						23rd St Westbound						1600 Rd Northbound						23rd St Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2019-12-03 12:00PM	9	6	0	0	15	0	0	97	4	0	101	0	6	0	18	0	24	0	14	122	2	0	138	0	278
12:15PM	6	3	0	0	9	0	0	104	2	0	106	0	6	0	10	0	16	0	10	130	5	1	146	0	277
12:30PM	8	3	1	0	12	0	1	112	2	0	115	0	4	2	12	0	18	0	18	123	3	0	144	0	289
12:45PM	14	2	0	0	16	0	0	114	5	0	119	0	4	0	15	0	19	0	12	112	8	0	132	0	286
Total	37	14	1	0	52	0	1	427	13	0	441	0	20	2	55	0	77	0	54	487	18	1	560	0	1130
% Approach	71.2%	26.9%	1.9%	0%	-	-	0.2%	96.8%	2.9%	0%	-	-	26.0%	2.6%	71.4%	0%	-	-	9.6%	87.0%	3.2%	0.2%	-	-	-
% Total	3.3%	1.2%	0.1%	0%	4.6%	-	0.1%	37.8%	1.2%	0%	39.0%	-	1.8%	0.2%	4.9%	0%	6.8%	-	4.8%	43.1%	1.6%	0.1%	49.6%	-	-
PHF	0.661	0.583	0.250	-	0.813	-	0.250	0.936	0.650	-	0.926	-	0.833	0.250	0.764	-	0.802	-	0.750	0.937	0.563	0.250	0.959	-	0.978
Lights	32	12	1	0	45	-	1	400	13	0	414	-	19	2	45	0	66	-	52	462	14	1	529	-	1054
% Lights	86.5%	85.7%	100%	0%	86.5%	-	100%	93.7%	100%	0%	93.9%	-	95.0%	100%	81.8%	0%	85.7%	-	96.3%	94.9%	77.8%	100%	94.5%	-	93.3%
Articulated Trucks	0	1	0	0	1	-	0	6	0	0	6	-	0	0	1	0	1	-	0	7	0	0	7	-	15
% Articulated Trucks	0%	7.1%	0%	0%	1.9%	-	0%	1.4%	0%	0%	1.4%	-	0%	0%	1.8%	0%	1.3%	-	0%	1.4%	0%	0%	1.3%	-	1.3%
Buses and Single-Unit Trucks	5	1	0	0	6	-	0	21	0	0	21	-	1	0	9	0	10	-	2	18	4	0	24	-	61
% Buses and Single-Unit Trucks	13.5%	7.1%	0%	0%	11.5%	-	0%	4.9%	0%	0%	4.8%	-	5.0%	0%	16.4%	0%	13.0%	-	3.7%	3.7%	22.2%	0%	4.3%	-	5.4%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

E 23rd Street & E 1600 Road - TMC

Tue Dec 3, 2019

Midday Peak (Dec 03 2019 12PM - 1 PM)

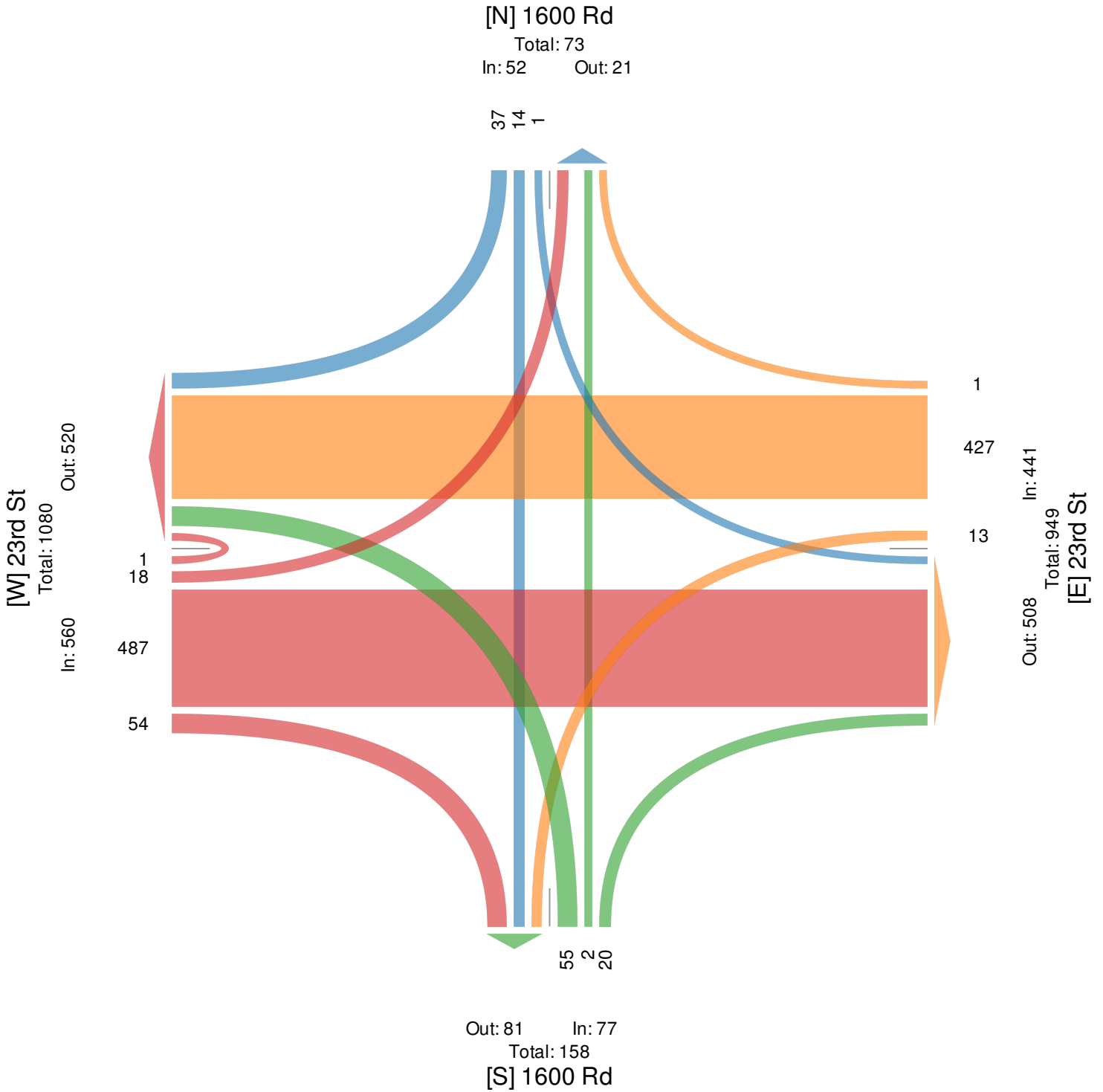
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 731785, Location: 38.942698, -95.204907



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



E 23rd Street & E 1600 Road - TMC

Tue Dec 3, 2019

PM Peak (Dec 03 2019 4:45PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 731785, Location: 38.942698, -95.204907



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	1600 Rd Southbound						23rd St Westbound						1600 Rd Northbound						23rd St Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2019-12-03 4:45PM	12	2	1	0	15	0	1	175	13	0	189	0	8	0	12	0	20	0	25	182	3	0	210	0	434
5:00PM	9	10	1	0	20	0	2	157	20	0	179	0	9	2	16	0	27	0	24	182	3	1	210	0	436
5:15PM	9	2	0	0	11	0	1	158	17	0	176	0	6	1	11	0	18	0	28	243	2	0	273	0	478
5:30PM	17	2	0	0	19	0	0	233	19	0	252	0	8	0	14	0	22	0	17	162	3	0	182	0	475
Total	47	16	2	0	65	0	4	723	69	0	796	0	31	3	53	0	87	0	94	769	11	1	875	0	1823
% Approach	72.3%	24.6%	3.1%	0%	-	-	0.5%	90.8%	8.7%	0%	-	-	35.6%	3.4%	60.9%	0%	-	-	10.7%	87.9%	1.3%	0.1%	-	-	-
% Total	2.6%	0.9%	0.1%	0%	3.6%	-	0.2%	39.7%	3.8%	0%	43.7%	-	1.7%	0.2%	2.9%	0%	4.8%	-	5.2%	42.2%	0.6%	0.1%	48.0%	-	-
PHF	0.691	0.400	0.500	-	0.813	-	0.500	0.776	0.863	-	0.790	-	0.861	0.375	0.828	-	0.806	-	0.839	0.791	0.917	0.250	0.801	-	0.953
Lights	43	16	2	0	61	-	4	709	69	0	782	-	29	2	49	0	80	-	93	758	6	1	858	-	1781
% Lights	91.5%	100%	100%	0%	93.8%	-	100%	98.1%	100%	0%	98.2%	-	93.5%	66.7%	92.5%	0%	92.0%	-	98.9%	98.6%	54.5%	100%	98.1%	-	97.7%
Articulated Trucks	2	0	0	0	2	-	0	4	0	0	4	-	1	0	0	0	1	-	1	3	2	0	6	-	13
% Articulated Trucks	4.3%	0%	0%	0%	3.1%	-	0%	0.6%	0%	0%	0.5%	-	3.2%	0%	0%	0%	1.1%	-	1.1%	0.4%	18.2%	0%	0.7%	-	0.7%
Buses and Single-Unit Trucks	2	0	0	0	2	-	0	10	0	0	10	-	1	1	4	0	6	-	0	8	3	0	11	-	29
% Buses and Single-Unit Trucks	4.3%	0%	0%	0%	3.1%	-	0%	1.4%	0%	0%	1.3%	-	3.2%	33.3%	7.5%	0%	6.9%	-	0%	1.0%	27.3%	0%	1.3%	-	1.6%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

E 23rd Street & E 1600 Road - TMC

Tue Dec 3, 2019

PM Peak (Dec 03 2019 4:45PM - 5:45 PM) - Overall Peak Hour

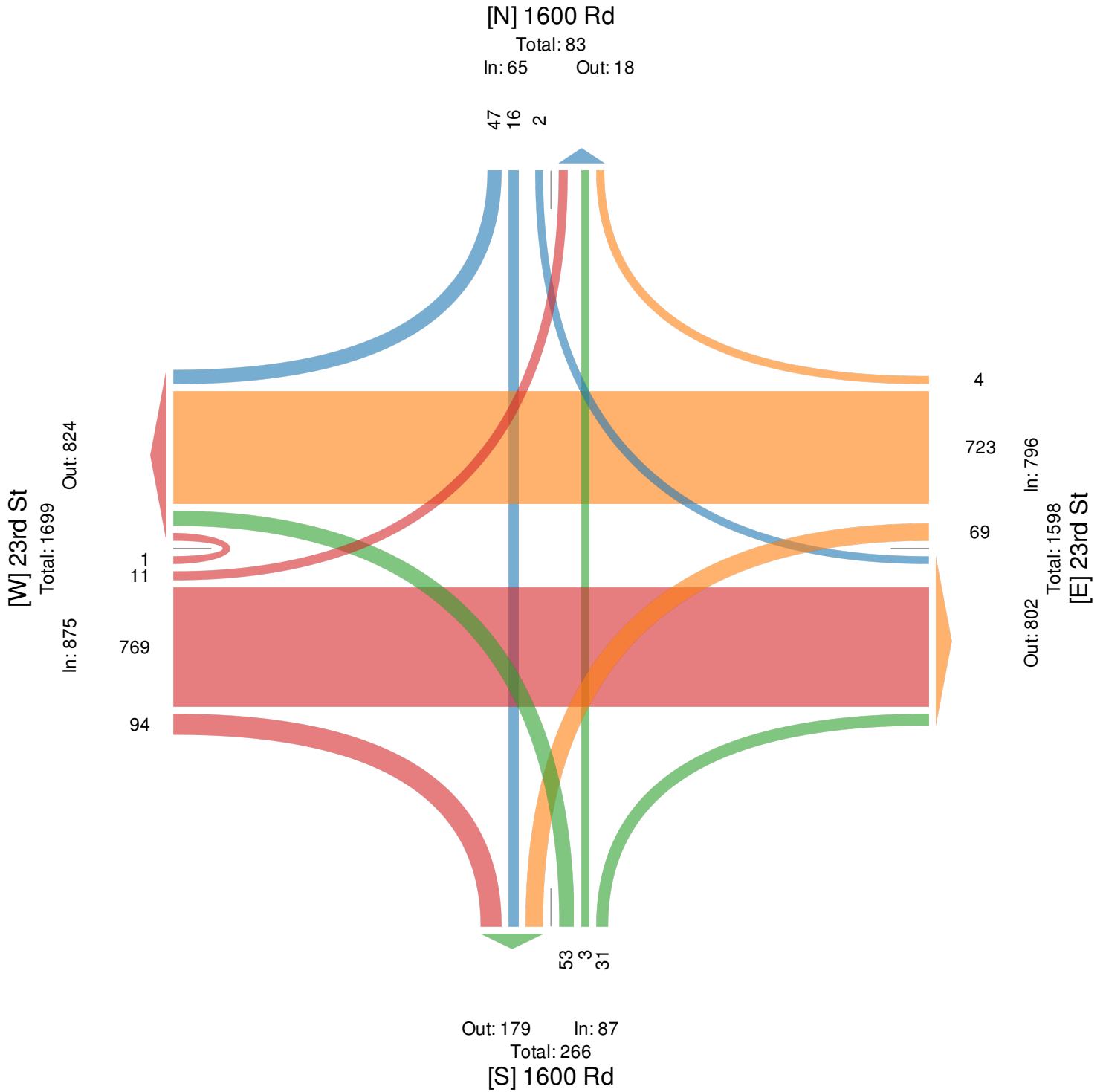
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 731785, Location: 38.942698, -95.204907



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Accident_K	Date	On_Road	Dist	UOM	Dir	Accident_C	CWOV	Fixed_Obj	Accident_L	F_of_Vehs	Total_Accs	Fatal_Accs	Injury_Acc	PDO_Accs	F_of_Deat	F_of_Inju	Time	Weather_Co	Light_Cond	KDOT_Latit	KDOT_Longi
20140101562	1/27/2014	K010	1	F	N	COLL W FIXED OBJECT			INTRSECTION-RELATED-ON ROADWAY	1	1	0	0	1	0	0	1203	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20481
20140107615	4/17/2014	K010	0			COLL W OTHER MOTOR VEHICLE	ANGLE - SIDE IMPACT		INTERSECTION-ON ROADWAY	2	1	0	1	0	0	3	2256	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	38.94266	-95.20481
20140108155	5/2/2014	K010	0			COLL W OTHER MOTOR VEHICLE	REAR END		INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	2240	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	38.94266	-95.20481
20140108161	4/30/2014	K010	20	F	W	COLL W OTHER MOTOR VEHICLE	SIDESWIPE: SAME DIRECTION		INTRSECTION-RELATED-ON ROADWAY	3	1	0	0	1	0	0	1605	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20489
20140108248	5/2/2014	K010	30	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	1	0	0	1	2230	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	38.94266	-95.2047
20140109535	5/13/2014	K010	0			COLL W OTHER MOTOR VEHICLE	REAR END		INTERSECTION-ON ROADWAY	2	1	0	1	0	0	1	1405	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20481
20140111174	6/11/2014	K010	300	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1805	NO ADVERSE CONDITIONS	DAYLIGHT	38.94267	-95.20587
20140111696	6/18/2014	K010	100	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	843	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20516
20140113218	7/10/2014	K010	50	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1819	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20498
20140116797	8/23/2014	K010	20	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	1	0	0	1	1210	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20496
20140124649	11/14/2014	K010	0.1	M	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	1	0	0	1	1555	NO ADVERSE CONDITIONS	DAYLIGHT	38.94267	-95.20674
20140124894	11/17/2014	K010	10	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	0	1	0	0	1920	NO ADVERSE CONDITIONS	DARK--NO STREET LIGHTS	38.94266	-95.20485
20140125445	11/22/2014	K010	600	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	0	1	0	0	1510	NO ADVERSE CONDITIONS	DAYLIGHT	38.94268	-95.207
20140128003	12/16/2014	K010	10	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1520	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20492

Accident_K	Date	On_Road	Dist	UOM	Dir	Accident_C	CWOV	Fixed_Obj	Accident_L	F_of_Vehs	Total_Accs	Fatal_Accs	Injury_Acc	PDO_Accs	F_of_Deat	F_of_Inju	Time	Weather_Co	Light_Cond	KDOT_Latit	KDOT_Longi
20150102664	2/11/2015	K010	15	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1440	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20494
20150103290	2/21/2015	K010	15	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	725	FOG	DAYLIGHT	38.94266	-95.20494
20150103887	2/27/2015	K010	15	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1400	NO ADVERSE CONDITIONS	DAYLIGHT	38.94265	-95.20353
20150106047	3/24/2015	K010	45	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1625	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20472
20150106665	4/3/2015	K010	75	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1547	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20515
20150106830	4/7/2015	K010	80	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1123	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20516
20150108338	4/24/2015	K010	0			COLL W OTHER MOTOR VEHICLE	REAR END		INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	1150	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20489
20150108815	5/2/2015	K010	25	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1040	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20479
20150109132	5/4/2015	K010	200	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	710	RAIN, MIST OR DRIZZLE	DAYLIGHT	38.94266	-95.20559
20150109447	5/10/2015	K010	145	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1200	RAIN, MIST OR DRIZZLE	DAYLIGHT	38.94266	-95.20539
20150109470	4/30/2015	K010	0.1	M	W	COLL W OTHER MOTOR VEHICLE	ANGLE - SIDE IMPACT		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	900	NO ADVERSE CONDITIONS	DAYLIGHT	38.94267	-95.20674
20150111882	5/28/2015	K010	100	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	550	RAIN, MIST OR DRIZZLE	DAWN	38.94266	-95.20524
20150113339	6/22/2015	K010	239	F	W	COLL W OTHER MOTOR VEHICLE	SIDESWIPE: SAME DIRECTION		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1159	NO ADVERSE CONDITIONS	DAYLIGHT	38.94267	-95.20572
20150114881	7/8/2015	K010	100	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	810	RAIN, MIST OR DRIZZLE	DAYLIGHT	38.94266	-95.20524
20150116216	7/24/2015	K010	0			COLL W OTHER MOTOR VEHICLE	ANGLE - SIDE IMPACT		INTERSECTION-ON ROADWAY	2	1	0	1	0	0	2	1514	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20488
20150116988	8/3/2015	K010	200	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	753	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20559
20150117066	8/4/2015	K010	264	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1640	RAIN, MIST OR DRIZZLE	DAYLIGHT	38.94265	-95.20395
20150118184	8/18/2015	K010	100	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	0	1	0	0	1644	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20524
20150118551	8/15/2015	K010	600	F	E	COLL W FIXED OBJECT			MEDIAN-OFF ROADWAY	2	1	0	0	1	0	0	338	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	38.94264	-95.20277
20150120255	9/3/2015	K010	263	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1548	NO ADVERSE CONDITIONS	DAYLIGHT	38.94267	-95.20581
20150122772	10/1/2015	K010	200	F	W	COLL W OTHER MOTOR VEHICLE	SIDESWIPE: SAME DIRECTION		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	940	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20559
20150124600	10/27/2015	K010	120	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	0	1	0	0	654	RAIN, MIST OR DRIZZLE	DAWN	38.94266	-95.20531
20150125513	10/15/2015	K010	5	F	W	COLL W FIXED OBJECT			MEDIAN-OFF ROADWAY	1	1	0	0	1	0	0	215	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	38.94266	-95.2049
20150125735	10/27/2015	K010	400	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1650	RAIN, MIST OR DRIZZLE	DAYLIGHT	38.94267	-95.20629
20150126876	11/18/2015	K010	600	F	E	COLL W OTHER MOTOR VEHICLE	SIDESWIPE: SAME DIRECTION		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	1703	NO ADVERSE CONDITIONS	DAYLIGHT	38.94264	-95.20277
20150127431	11/27/2015	K010	587	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	1	0	0	1	1435	FREEZING RAIN	DAYLIGHT	38.94268	-95.20694
20150128325	12/1/2015	K010	40	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1550	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20503
20150128809	12/9/2015	K010	20	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	1	0	0	1	2035	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	38.94266	-95.20481
20150129924	12/21/2015	K010	200	F	E	COLL W ANIMAL			NON-INTERSECTION-ON ROADWAY	1	1	0	0	1	0	0	840	NO ADVERSE CONDITIONS	DAYLIGHT	38.94265	-95.20418
20150130261	12/22/2015	K010	520	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	4	1	0	0	1	0	0	1725	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	38.94267	-95.2067
20150131523	1/6/2015	K010	50	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	0	1	0	0	1640	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20472
20150132140	12/18/2015	K010	600	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	1705	NO ADVERSE CONDITIONS	DUSK	38.94264	-95.20277
20150132624	3/21/2015	K010	300	F	W	COLL W OTHER MOTOR VEHICLE	ANGLE - SIDE IMPACT		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	1157	NO ADVERSE CONDITIONS	DAYLIGHT	38.94267	-95.20594

Accident_K	Date	On_Road	Dist	UOM	Dir	Accident_C	CWOV	Fixed_Obj	Accident_L	F_of_Vehs	Total_Accs	Fatal_Accs	Injury_Acc	PDO_Accs	F_of_Deat	F_of_Inju	Time	Weather_Co	Light_Cond	KDOT_Latit	KDOT_Longi
20160033260	1/6/2016	K010	50	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	0	1	0	0	1640	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20472
20160101811	1/30/2016	K010	1	F	W	COLL W FIXED OBJECT		CURB	ROADSIDE-NO SHLDR-OFF RDWY	1	1	0	0	1	0	0	1248	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.2049
20160102739	2/13/2016	K010	5	F	W	COLL W FIXED OBJECT		OTHER POST-POLE	ROADSIDE-NO SHLDR-OFF RDWY	1	1	0	0	1	0	0		NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	38.94266	-95.2049
20160102820	2/11/2016	K010	500	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	3	1	0	1	0	0	1	800	NO ADVERSE CONDITIONS	DAYLIGHT	38.94264	-95.20312
20160103755	2/27/2016	K010	300	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1304	NO ADVERSE CONDITIONS	DAYLIGHT	38.94267	-95.20594
20160104193	3/3/2016	K010	0			COLL W OTHER MOTOR VEHICLE	ANGLE - SIDE IMPACT		INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	1115	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20488
20160104206	2/26/2016	K010	286	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1701	NO ADVERSE CONDITIONS	DAYLIGHT	38.94267	-95.20589
20160104706	3/3/2016	K010	20	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	755	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20481
20160107779	4/10/2016	K010	200	F	E	COLL W ANIMAL			NON-INTERSECTION-ON ROADWAY	1	1	0	0	1	0	0	38	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	38.94265	-95.20418
20160108048	4/10/2016	K010	100	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	3	1	0	0	1	0	0	1018	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20524
20160108541	4/18/2016	K010	35	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	720	RAIN, MIST OR DRIZZLE	DAYLIGHT	38.94266	-95.20488
20160109186	4/29/2016	K010	25	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	1	0	0	1	1609	RAIN, MIST OR DRIZZLE	DAYLIGHT	38.94266	-95.20479
20160110216	5/13/2016	K010	300	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1722	RAIN, MIST OR DRIZZLE	DAYLIGHT	38.94267	-95.20594
20160110217	5/13/2016	K010	16	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1712	RAIN, MIST OR DRIZZLE	DAYLIGHT	38.94266	-95.20494
20160111386	5/16/2016	K010	12	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1243	RAIN, MIST OR DRIZZLE	DAYLIGHT	38.94266	-95.20492
20160112225	6/3/2016	K010	15	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	1	0	0	2	1955	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20483
20160113092	6/14/2016	K010	500	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	700	NO ADVERSE CONDITIONS	DAYLIGHT	38.94267	-95.20665
20160113289	6/18/2016	K010	0			COLL W OTHER MOTOR VEHICLE	REAR END		INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	600	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20488
20160114790	6/29/2016	K010	300	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	0	1	0	0	1555	NO ADVERSE CONDITIONS	DAYLIGHT	38.94267	-95.20594
20160117241	7/30/2016	K010	285	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	0	1	0	0	1630	NO ADVERSE CONDITIONS	DAYLIGHT	38.94265	-95.20388
20160117273	8/2/2016	K010	20	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	645	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20481
20160117529	7/15/2016	K010	15	F	E	COLL W OTHER MOTOR VEHICLE	SIDESWIPE: SAME DIRECTION		NON-INTERSECTION-ON ROADWAY	3	1	0	1	0	0	2	2213	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	38.94266	-95.20483
20160118807	8/16/2016	K010	45	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	0	1	0	0	1700	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20472
20160119237	8/22/2016	K010	100	F	W	COLL W OTHER MOTOR VEHICLE	ANGLE - SIDE IMPACT		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	719	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20524
20160120083	9/4/2016	K010	426	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	0	1	0	0	1515	NO ADVERSE CONDITIONS	DAYLIGHT	38.94264	-95.20338
20160120600	9/12/2016	K010	0.01	M	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1618	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20507
20160120609	9/12/2016	K010	0.1	M	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	3	1	0	1	0	0	1	1530	NO ADVERSE CONDITIONS	DAYLIGHT	38.94264	-95.20303
20160122979	10/7/2016	K010	350	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	1640	NO ADVERSE CONDITIONS	DAYLIGHT	38.94267	-95.20611
20160124464	10/21/2016	K010	30	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	1	0	0	1	643	NO ADVERSE CONDITIONS	DAWN	38.94266	-95.20499
20160124977	10/27/2016	K010	25	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	1	0	0	1	1549	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20479
20160125521	10/25/2016	K010	220	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	1	0	0	2	1636	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20566
20160126611	11/3/2016	K010	35	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1520	NO ADVERSE CONDITIONS	DAYLIGHT	38.94266	-95.20501
20160101774	2/2/2016	23RD	150	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	1	0	0	1	1733	NO ADVERSE CONDITIONS	DUSK	0	0
20160131860	12/17/2016	23RD	15	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	640	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	0	0
























Accident_K	Date	On_Road	Dist	UOM	Dir	Accident_C	CWOV	Fixed_Obj	Accident_L	F_of_Vehs	Total_Accs	Fatal_Accs	Injury_Accs	PDO_Accs	F_of_Deat	F_of_Inju	Time	Weather_Co	Light_Cond	KDOT_Latit	KDOT_Longi
20170100115	1/3/2017	23RD	145	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	2307	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	0	0
20170100620	1/12/2017	23RD	158	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1555	NO ADVERSE CONDITIONS	DAYLIGHT	0	0
20170104381	3/2/2017	23RD	0.1	M	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	1731	NO ADVERSE CONDITIONS	DAYLIGHT	0	0
20170104931	3/10/2017	23RD	100	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	3	1	0	0	1	0	0	1710	NO ADVERSE CONDITIONS	DAYLIGHT	0	0
20170109106	4/27/2017	23RD	40	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1630	NO ADVERSE CONDITIONS	DAYLIGHT	0	0
20170111523	5/15/2017	23RD	100	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		INTRSECTION-RELATED-ON ROADWAY	2	1	0	0	1	0	0	1545	NO ADVERSE CONDITIONS	DAYLIGHT	0	0
20170113397	6/13/2017	23RD	300	F	E	COLL W ANIMAL			NON-INTERSECTION-ON ROADWAY	1	1	0	1	0	0	1	1915	NO ADVERSE CONDITIONS	DAYLIGHT	0	0
20170113446	6/16/2017	23RD	50	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	1744	NO ADVERSE CONDITIONS	DAYLIGHT	0	0
20170116983	8/10/2017	23RD	150	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	736	FOG	DAYLIGHT	0	0
20170117595	8/16/2017	23RD	200	F	E	COLL W OTHER MOTOR VEHICLE	ANGLE - SIDE IMPACT		INTRSECTION-RELATED-ON ROADWAY	2	1	0	1	0	0	1	1141	RAIN, MIST OR DRIZZLE	DAYLIGHT	0	0
20170120486	9/27/2017	23RD	300	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	744	NO ADVERSE CONDITIONS	DAYLIGHT	0	0
20170121411	10/5/2017	23RD	30	F	W	COLL W FIXED OBJECT			NON-INTERSECTION-ON ROADWAY	1	1	0	0	1	0	0	1000	NO ADVERSE CONDITIONS	DAYLIGHT	0	0
20170126597	11/4/2017	23RD	30	F	E	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	815	NO ADVERSE CONDITIONS	DAWN	0	0
20170126617	10/27/2017	23RD	0			COLL W OTHER MOTOR VEHICLE	HEAD ON		INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	1700	NO ADVERSE CONDITIONS	DAYLIGHT	0	0
20170127098	11/5/2017	VENTUREPARK	0.5	M	E	COLL W PEDESTRIAN			NON-INTERSECTION-ON ROADWAY	1	1	0	1	0	0	1	2346	NO ADVERSE CONDITIONS	DARK--NO STREET LIGHTS	0	0
20170128611	11/21/2017	23RD	200	F	W	COLL W OTHER MOTOR VEHICLE	REAR END		NON-INTERSECTION-ON ROADWAY	2	1	0	0	1	0	0	1734	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	0	0
20170118065	8/25/2017	VENTURE PARK	0			COLL W FIXED OBJECT			INTERSECTION-ON ROADWAY	1	1	0	0	1	0	0	145	NO ADVERSE CONDITIONS	DARK--STREET LIGHTS ON	38.945577	-95.204202
20170127098	11/5/2017	VENTUREPARK	0.5	M	E	COLL W PEDESTRIAN			NON-INTERSECTION-ON ROADWAY	1	1	0	1	0	0	1	2346	NO ADVERSE CONDITIONS	DARK--NO STREET LIGHTS	0	0

Accident Key	Date	On Road	Dist	UOM	Dir	Accident Class	CWOV	Fixed Object	Accident Location	# of Vehs	Total Accs	Fatal Accs	Injury Accs	PDO Accs	# of Deaths	# of Injuries	Time	Weather	Light Conditions	DOT Latitude	DOT Longitude
20180101182	1/22/2018	23RD	<Null>			Other Motor Vehicle	Angle - Side Impact		Intersection	2	1	0	0	1	0	0	1135	Rain, mist, or drizzle	Daylight	38.942791	-95.204919
20180121662	9/15/2018	23RD	<Null>			Other Motor Vehicle	Rear End		Intersection	4	1	0	1	0	0	1	1917	No adverse conditions	Dusk	38.942791	-95.204919
20180103846	2/21/2018	23RD	15	F	E	Other Motor Vehicle	Rear End		Intersection-related	2	1	0	0	1	0	0	1831	No adverse conditions	Dark: Street Lights On	38.942791	-95.204866
20180120363	8/28/2018	23RD	20	F	E	Other Motor Vehicle	Rear End		Intersection-related	2	1	0	1	0	0	2	632	No adverse conditions	Daylight	38.94279	-95.204848
20180104620	2/7/2018	23RD	30	F	E	Other Motor Vehicle	Rear End		Intersection-related	2	1	0	0	1	0	0	1237	No adverse conditions	Daylight	38.94279	-95.204813
20180117730	7/30/2018	23RD	80	F	W	Other Motor Vehicle	Rear End		Non-Intersection	2	1	0	0	1	0	0	925	No adverse conditions	Daylight	38.942792	-95.2052
20180100509	1/14/2018	23RD	100	F	W	Other Motor Vehicle	Rear End		Intersection-related	2	1	0	0	1	0	0	1050	Snow	Daylight	38.942792	-95.20527
20180101251	1/23/2018	23RD	200	F	W	Other Motor Vehicle	Rear End		Intersection-related	2	1	0	0	1	0	0	1756	No adverse conditions	Dark: Street Lights On	38.942794	-95.205622
20180100995	1/20/2018	23RD	500	F	W	Other Motor Vehicle	Rear End		Intersection-related	3	1	0	1	0	0	2	1947	No adverse conditions	Dark: Street Lights On	38.942797	-95.206677
20180117736	7/31/2018	O'CONNELL	30	F	S	Other Motor Vehicle	Rear End		Intersection-related	2	1	0	0	1	0	0	740	No adverse conditions	Daylight	38.942709	-95.204916
20180115999	7/9/2018	O'CONNELL	30	F	S	Other Motor Vehicle	Angle - Side Impact		Intersection-related	2	1	0	1	0	0	1	1300	No adverse conditions	Daylight	38.942709	-95.204916
20180131350	12/5/2018	O'CONNELL	50	F	S	Other Motor Vehicle	Angle - Side Impact		Non-Intersection	2	1	0	0	1	0	0	1227	No adverse conditions	Daylight	38.942654	-95.204914
20180116491	5/24/2018	VENTUREPARK	500	F	E	Fixed Object		Curb	Non-Intersection	1	1	0	0	1	0	0	304	No adverse conditions	Dark: Street Lights On	38.945562	-95.202444

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	593	45	9	552	0	92	15	54	3	3	41
Future Volume (vph)	30	593	45	9	552	0	92	15	54	3	3	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	750		550	700		1000	145		0	270		0
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	220			220			25			65		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850						0.883			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1863	1770	1645	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.664			0.709		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1863	1237	1645	0	1321	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145						57			240
Link Speed (mph)		45			55			35				35
Link Distance (ft)		1944			5046			911				1100
Travel Time (s)		29.5			62.6			17.7				21.4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	631	48	10	587	0	98	16	57	3	3	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	631	48	10	587	0	98	73	0	3	3	44
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		30			36			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA	pt+ov	Prot	NA	pt+ov	pm+pt	NA		pm+pt	NA	Prot
Protected Phases	7	4	4 5	3	8	8 1	5	2		1	6	6
Permitted Phases							2			6		

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4 5	3	8	8 1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.5	25.0		11.5	25.0		11.5	25.0		11.5	25.0	25.0
Total Split (s)	12.0	26.0		11.5	25.5		12.0	26.0		11.5	25.5	25.5
Total Split (%)	16.0%	34.7%		15.3%	34.0%		16.0%	34.7%		15.3%	34.0%	34.0%
Maximum Green (s)	5.5	19.5		5.0	19.0		5.5	19.5		5.0	19.0	19.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5		6.5	6.5		6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	5.7	17.9	30.4	5.2	15.8		28.0	27.1		23.8	20.0	20.0
Actuated g/C Ratio	0.09	0.29	0.49	0.08	0.25		0.45	0.43		0.38	0.32	0.32
v/c Ratio	0.20	0.62	0.06	0.07	0.66		0.16	0.10		0.01	0.01	0.07
Control Delay	34.3	23.0	0.1	33.0	26.1		12.7	7.8		12.7	20.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	34.3	23.0	0.1	33.0	26.1		12.7	7.8		12.7	20.3	0.2
LOS	C	C	A	C	C		B	A		B	C	A
Approach Delay		22.0			26.2			10.6			2.2	
Approach LOS		C			C			B			A	
90th %ile Green (s)	5.5	19.5		5.0	19.0		5.5	19.5		5.0	19.0	19.0
90th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
70th %ile Green (s)	5.5	31.0		0.0	19.0		5.5	31.0		0.0	19.0	19.0
70th %ile Term Code	Max	Hold		Skip	Max		Max	Hold		Skip	MaxR	MaxR
50th %ile Green (s)	0.0	16.5		0.0	16.5		5.5	31.0		0.0	19.0	19.0
50th %ile Term Code	Skip	Gap		Skip	Hold		Max	Hold		Skip	MaxR	MaxR
30th %ile Green (s)	0.0	14.8		0.0	14.8		5.5	31.0		0.0	19.0	19.0
30th %ile Term Code	Skip	Gap		Skip	Hold		Max	Hold		Skip	MaxR	MaxR
10th %ile Green (s)	0.0	10.0		0.0	10.0		0.0	19.5		0.0	19.5	19.5
10th %ile Term Code	Skip	Gap		Skip	Hold		Skip	MaxR		Skip	Hold	Hold
Stops (vph)	31	470	0	12	459		52	19		3	4	0
Fuel Used(gal)	1	16	1	1	29		1	1		0	0	0
CO Emissions (g/hr)	68	1126	40	40	2034		86	49		4	5	23
NOx Emissions (g/hr)	13	219	8	8	396		17	10		1	1	4
VOC Emissions (g/hr)	16	261	9	9	471		20	11		1	1	5
Dilemma Vehicles (#)	0	40	0	0	40		0	4		0	0	0
Queue Length 50th (ft)	11	106	0	4	97		17	3		1	1	0
Queue Length 95th (ft)	40	194	0	19	182		56	35		6	7	0
Internal Link Dist (ft)		1864			4966			831			1020	
Turn Bay Length (ft)	750		550	700			145			270		
Base Capacity (vph)	162	1264	820	148	1126		604	746		540	596	670
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020

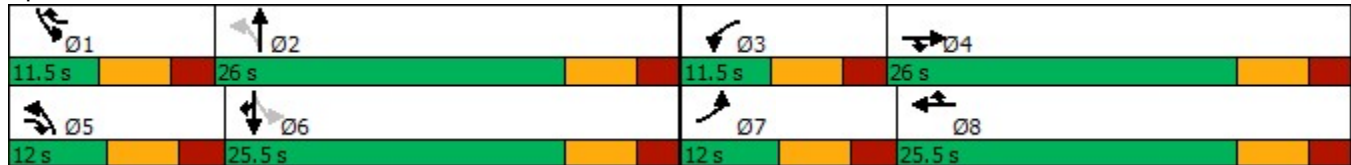


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.20	0.50	0.06	0.07	0.52		0.16	0.10		0.01	0.01	0.07

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	62.4
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	21.7
Intersection LOS:	C
Intersection Capacity Utilization	47.5%
ICU Level of Service	A
Analysis Period (min)	15
90th %ile Actuated Cycle:	75
70th %ile Actuated Cycle:	75
50th %ile Actuated Cycle:	60.5
30th %ile Actuated Cycle:	58.8
10th %ile Actuated Cycle:	42.5
























Splits and Phases: 3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road



Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	769	94	69	723	4	53	3	31	2	16	47
Future Volume (vph)	12	769	94	69	723	4	53	3	31	2	16	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	750		550	700		1000	145		0	270		0
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	220			220			25			65		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.862				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1606	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.666			0.734		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1241	1606	0	1367	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145			145		33				240
Link Speed (mph)		45			55			35				35
Link Distance (ft)		1944			5046			911				1100
Travel Time (s)		29.5			62.6			17.7				21.4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	809	99	73	761	4	56	3	33	2	17	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	809	99	73	761	4	56	36	0	2	17	49
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		30			36			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA	pt+ov	Prot	NA	pt+ov	pm+pt	NA		pm+pt	NA	Prot
Protected Phases	7	4	4 5	3	8	8 1	5	2		1	6	6
Permitted Phases							2			6		

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4 5	3	8	8 1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.5	25.0		11.5	25.0		11.5	25.0		11.5	25.0	25.0
Total Split (s)	11.5	26.0		12.2	26.7		11.5	25.3		11.5	25.3	25.3
Total Split (%)	15.3%	34.7%		16.3%	35.6%		15.3%	33.7%		15.3%	33.7%	33.7%
Maximum Green (s)	5.0	19.5		5.7	20.2		5.0	18.8		5.0	18.8	18.8
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5		6.5	6.5		6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	5.2	18.6	30.6	5.9	25.5	37.5	26.8	25.9		23.2	19.6	19.6
Actuated g/C Ratio	0.08	0.27	0.44	0.09	0.37	0.54	0.39	0.37		0.34	0.28	0.28
v/c Ratio	0.10	0.85	0.13	0.49	0.58	0.00	0.11	0.06		0.00	0.03	0.08
Control Delay	34.8	35.8	1.5	45.8	21.0	0.0	14.6	8.3		13.5	21.6	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	34.8	35.8	1.5	45.8	21.0	0.0	14.6	8.3		13.5	21.6	0.3
LOS	C	D	A	D	C	A	B	A		B	C	A
Approach Delay		32.1			23.1			12.1			6.0	
Approach LOS		C			C			B			A	
90th %ile Green (s)	5.0	19.5		5.7	20.2		5.0	18.8		5.0	18.8	18.8
90th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
70th %ile Green (s)	0.0	19.5		5.7	31.7		5.0	30.3		0.0	18.8	18.8
70th %ile Term Code	Skip	Max		Max	Hold		Max	Hold		Skip	MaxR	MaxR
50th %ile Green (s)	0.0	19.5		5.7	31.7		5.0	30.3		0.0	18.8	18.8
50th %ile Term Code	Skip	Max		Max	Hold		Max	Hold		Skip	MaxR	MaxR
30th %ile Green (s)	0.0	19.5		5.7	31.7		5.0	30.3		0.0	18.8	18.8
30th %ile Term Code	Skip	Max		Max	Hold		Max	Hold		Skip	MaxR	MaxR
10th %ile Green (s)	0.0	14.0		0.0	14.0		0.0	18.8		0.0	18.8	18.8
10th %ile Term Code	Skip	Gap		Skip	Hold		Skip	MaxR		Skip	MaxR	MaxR
Stops (vph)	14	660	5	64	532	0	33	10		3	14	0
Fuel Used(gal)	0	24	1	4	36	0	1	0		0	0	0
CO Emissions (g/hr)	29	1644	89	282	2523	9	53	25		3	21	26
NOx Emissions (g/hr)	6	320	17	55	491	2	10	5		1	4	5
VOC Emissions (g/hr)	7	381	21	65	585	2	12	6		1	5	6
Dilemma Vehicles (#)	0	51	0	0	46	0	0	2		0	1	0
Queue Length 50th (ft)	6	190	0	34	132	0	16	1		1	6	0
Queue Length 95th (ft)	22	#291	13	#85	#243	0	37	22		4	21	0
Internal Link Dist (ft)		1864			4966			831			1020	
Turn Bay Length (ft)	750		550	700		1000	145			270		
Base Capacity (vph)	133	1037	774	151	1400	921	521	622		489	526	619
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.10	0.78	0.13	0.48	0.54	0.00	0.11	0.06		0.00	0.03	0.08

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	69.2
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	26.3
Intersection LOS:	C
Intersection Capacity Utilization	51.3%
ICU Level of Service	A
Analysis Period (min)	15
90th %ile Actuated Cycle:	75
70th %ile Actuated Cycle:	75
50th %ile Actuated Cycle:	75
30th %ile Actuated Cycle:	75
10th %ile Actuated Cycle:	45.8
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

























Splits and Phases: 3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

Ø1	Ø2	Ø3	Ø4
11.5 s	25.3 s	12.2 s	26 s
Ø5	Ø6	Ø7	Ø8
11.5 s	25.3 s	11.5 s	26.7 s

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	593	45	9	552	66	92	34	54	67	8	108
Future Volume (vph)	108	593	45	9	552	66	92	34	54	67	8	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	750		550	700		1000	145		0	270		0
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	220			220			25			65		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.908				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1691	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.752			0.697		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1401	1691	0	1298	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145			145		57				240
Link Speed (mph)		45			55			35				35
Link Distance (ft)		1944			5046			911				1100
Travel Time (s)		29.5			62.6			17.7				21.4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	115	631	48	10	587	70	98	36	57	71	9	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	115	631	48	10	587	70	98	93	0	71	9	115
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		30			36			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA	pt+ov	Prot	NA	pt+ov	pm+pt	NA		pm+pt	NA	Prot
Protected Phases	7	4	4 5	3	8	8 1	5	2		1	6	6
Permitted Phases							2			6		

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020

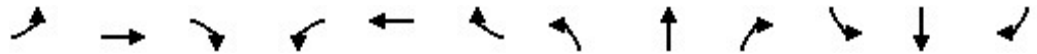


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4 5	3	8	8 1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.5	25.0		11.5	25.0		11.5	25.0		11.5	25.0	25.0
Total Split (s)	13.0	26.5		11.5	25.0		11.5	25.5		11.5	25.5	25.5
Total Split (%)	17.3%	35.3%		15.3%	33.3%		15.3%	34.0%		15.3%	34.0%	34.0%
Maximum Green (s)	6.5	20.0		5.0	18.5		5.0	19.0		5.0	19.0	19.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5		6.5	6.5		6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	6.8	23.8	35.9	5.2	16.3	28.4	23.6	19.9		23.6	19.9	19.9
Actuated g/C Ratio	0.10	0.35	0.53	0.08	0.24	0.42	0.35	0.29		0.35	0.29	0.29
v/c Ratio	0.65	0.51	0.05	0.07	0.69	0.09	0.19	0.17		0.15	0.02	0.18
Control Delay	53.2	19.9	0.1	34.2	29.6	0.2	15.3	11.8		14.8	21.2	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	53.2	19.9	0.1	34.2	29.6	0.2	15.3	11.8		14.8	21.2	0.6
LOS	D	B	A	C	C	A	B	B		B	C	A
Approach Delay		23.5			26.6			13.6			6.7	
Approach LOS		C			C			B			A	
90th %ile Green (s)	6.5	20.0		5.0	18.5		5.0	19.0		5.0	19.0	19.0
90th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
70th %ile Green (s)	6.5	31.5		0.0	18.5		5.0	19.0		5.0	19.0	19.0
70th %ile Term Code	Max	Hold		Skip	Max		Max	MaxR		Max	MaxR	MaxR
50th %ile Green (s)	6.5	31.2		0.0	18.2		5.0	19.0		5.0	19.0	19.0
50th %ile Term Code	Max	Hold		Skip	Gap		Max	MaxR		Max	MaxR	MaxR
30th %ile Green (s)	6.5	28.1		0.0	15.1		5.0	19.0		5.0	19.0	19.0
30th %ile Term Code	Max	Hold		Skip	Gap		Max	MaxR		Max	MaxR	MaxR
10th %ile Green (s)	0.0	11.0		0.0	11.0		0.0	19.0		0.0	19.0	19.0
10th %ile Term Code	Skip	Hold		Skip	Gap		Skip	MaxR		Skip	MaxR	MaxR
Stops (vph)	88	432	0	12	472	0	59	33		43	8	0
Fuel Used(gal)	4	15	1	1	30	2	1	1		1	0	1
CO Emissions (g/hr)	253	1066	40	40	2079	148	93	72		74	11	61
NOx Emissions (g/hr)	49	207	8	8	404	29	18	14		14	2	12
VOC Emissions (g/hr)	59	247	9	9	482	34	22	17		17	3	14
Dilemma Vehicles (#)	0	37	0	0	37	0	0	6		0	0	0
Queue Length 50th (ft)	53	105	0	5	130	0	28	13		20	3	0
Queue Length 95th (ft)	#135	192	0	19	183	1	57	47		44	14	0
Internal Link Dist (ft)		1864			4966			831			1020	
Turn Bay Length (ft)	750		550	700		1000	145			270		
Base Capacity (vph)	177	1388	904	136	1011	710	515	536		487	546	634
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020

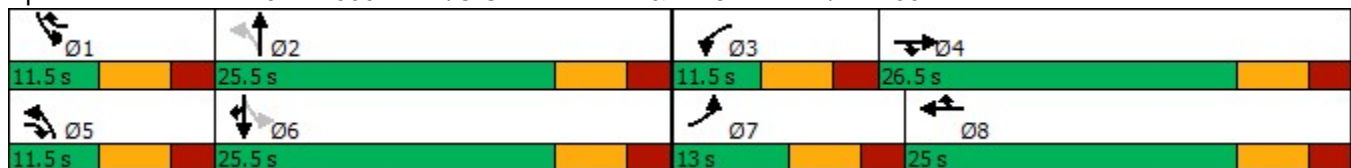


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.65	0.45	0.05	0.07	0.58	0.10	0.19	0.17		0.15	0.02	0.18

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	67.9
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	21.8
Intersection LOS:	C
Intersection Capacity Utilization	49.3%
ICU Level of Service	A
Analysis Period (min)	15
90th %ile Actuated Cycle:	75
70th %ile Actuated Cycle:	75
50th %ile Actuated Cycle:	74.7
30th %ile Actuated Cycle:	71.6
10th %ile Actuated Cycle:	43
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
























Splits and Phases: 3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road



Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	769	94	69	723	54	53	8	31	64	18	111
Future Volume (vph)	67	769	94	69	723	54	53	8	31	64	18	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	750		550	700		1000	145		0	270		0
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	220			220			25			65		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.879				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1637	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.745			0.730		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1388	1637	0	1360	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145			145		33				240
Link Speed (mph)		45			55			35				35
Link Distance (ft)		1944			5046			911				1100
Travel Time (s)		29.5			62.6			17.7				21.4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	809	99	73	761	57	56	8	33	67	19	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	809	99	73	761	57	56	41	0	67	19	117
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		30			36			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA	pt+ov	Prot	NA	pt+ov	pm+pt	NA		pm+pt	NA	Prot
Protected Phases	7	4	4 5	3	8	8 1	5	2		1	6	6
Permitted Phases							2			6		

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4 5	3	8	8 1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.5	25.0		11.5	25.0		11.5	25.0		11.5	25.0	25.0
Total Split (s)	11.7	26.0		12.2	26.5		11.5	25.3		11.5	25.3	25.3
Total Split (%)	15.6%	34.7%		16.3%	35.3%		15.3%	33.7%		15.3%	33.7%	33.7%
Maximum Green (s)	5.2	19.5		5.7	20.0		5.0	18.8		5.0	18.8	18.8
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5		6.5	6.5		6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	5.4	18.6	30.6	5.9	19.0	31.0	23.2	19.6		23.2	19.6	19.6
Actuated g/C Ratio	0.08	0.27	0.44	0.09	0.27	0.45	0.34	0.28		0.34	0.28	0.28
v/c Ratio	0.51	0.85	0.13	0.49	0.78	0.07	0.11	0.08		0.14	0.04	0.19
Control Delay	49.2	35.8	1.5	45.8	31.5	0.2	14.8	10.6		15.0	21.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	49.2	35.8	1.5	45.8	31.5	0.2	14.8	10.6		15.0	21.7	0.7
LOS	D	D	A	D	C	A	B	B		B	C	A
Approach Delay		33.3			30.7			13.0			7.4	
Approach LOS		C			C			B			A	
90th %ile Green (s)	5.2	19.5		5.7	20.0		5.0	18.8		5.0	18.8	18.8
90th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
70th %ile Green (s)	5.2	19.5		5.7	20.0		5.0	18.8		5.0	18.8	18.8
70th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
50th %ile Green (s)	5.2	19.5		5.7	20.0		5.0	18.8		5.0	18.8	18.8
50th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
30th %ile Green (s)	5.2	19.5		5.7	20.0		5.0	18.8		5.0	18.8	18.8
30th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
10th %ile Green (s)	0.0	14.0		0.0	14.0		0.0	18.8		0.0	18.8	18.8
10th %ile Term Code	Skip	Gap		Skip	Hold		Skip	MaxR		Skip	MaxR	MaxR
Stops (vph)	59	660	5	64	619	0	36	15		41	16	0
Fuel Used(gal)	2	24	1	4	39	2	1	0		1	0	1
CO Emissions (g/hr)	157	1644	89	282	2744	121	54	32		71	24	63
NOx Emissions (g/hr)	31	320	17	55	534	24	11	6		14	5	12
VOC Emissions (g/hr)	36	381	21	65	636	28	13	7		16	6	15
Dilemma Vehicles (#)	0	51	0	0	50	0	0	3		0	1	0
Queue Length 50th (ft)	33	190	0	34	173	0	16	3		19	7	0
Queue Length 95th (ft)	#87	#291	13	#85	#247	0	37	26		42	22	0
Internal Link Dist (ft)		1864			4966			831			1020	
Turn Bay Length (ft)	750		550	700		1000	145			270		
Base Capacity (vph)	138	1037	774	151	1063	784	494	486		487	526	619
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.51	0.78	0.13	0.48	0.72	0.07	0.11	0.08		0.14	0.04	0.19

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	69.2
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	28.9
Intersection LOS:	C
Intersection Capacity Utilization	51.9%
ICU Level of Service	A
Analysis Period (min)	15
90th %ile Actuated Cycle:	75
70th %ile Actuated Cycle:	75
50th %ile Actuated Cycle:	75
30th %ile Actuated Cycle:	75
10th %ile Actuated Cycle:	45.8
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
























Splits and Phases: 3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

Ø1	Ø2	Ø3	Ø4
11.5 s	25.3 s	12.2 s	26 s
Ø5	Ø6	Ø7	Ø8
11.5 s	25.3 s	11.7 s	26.5 s

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	735	56	11	684	81	114	42	67	84	11	136
Future Volume (vph)	134	735	56	11	684	81	114	42	67	84	11	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	750		550	700		1000	145		0	270		0
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	220			220			25			65		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.908				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1691	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.750			0.682		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1397	1691	0	1270	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145			145		71				240
Link Speed (mph)		45			55			35				35
Link Distance (ft)		1944			5046			911				1100
Travel Time (s)		29.5			62.6			17.7				21.4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	143	782	60	12	728	86	121	45	71	89	12	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	143	782	60	12	728	86	121	116	0	89	12	145
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		30			36			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA	pt+ov	Prot	NA	pt+ov	pm+pt	NA		pm+pt	NA	Prot
Protected Phases	7	4	4 5	3	8	8 1	5	2		1	6	6
Permitted Phases							2			6		

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4 5	3	8	8 1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.5	25.0		11.5	25.0		11.5	25.0		11.5	25.0	25.0
Total Split (s)	13.5	27.0		11.5	25.0		11.5	25.0		11.5	25.0	25.0
Total Split (%)	18.0%	36.0%		15.3%	33.3%		15.3%	33.3%		15.3%	33.3%	33.3%
Maximum Green (s)	7.0	20.5		5.0	18.5		5.0	18.5		5.0	18.5	18.5
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5		6.5	6.5		6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	7.1	28.9	40.5	5.0	17.5	29.1	22.5	18.7		22.5	18.7	18.7
Actuated g/C Ratio	0.10	0.40	0.56	0.07	0.24	0.41	0.31	0.26		0.31	0.26	0.26
v/c Ratio	0.82	0.55	0.06	0.10	0.84	0.12	0.26	0.24		0.21	0.02	0.25
Control Delay	70.7	20.2	0.1	34.8	37.1	1.1	16.9	12.2		15.9	21.7	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	70.7	20.2	0.1	34.8	37.1	1.1	16.9	12.2		15.9	21.7	1.4
LOS	E	C	A	C	D	A	B	B		B	C	A
Approach Delay		26.3			33.4			14.6			7.6	
Approach LOS		C			C			B			A	
90th %ile Green (s)	7.0	20.5		5.0	18.5		5.0	18.5		5.0	18.5	18.5
90th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
70th %ile Green (s)	7.0	32.0		0.0	18.5		5.0	18.5		5.0	18.5	18.5
70th %ile Term Code	Max	Hold		Skip	Max		Max	MaxR		Max	MaxR	MaxR
50th %ile Green (s)	7.0	32.0		0.0	18.5		5.0	18.5		5.0	18.5	18.5
50th %ile Term Code	Max	Hold		Skip	Max		Max	MaxR		Max	MaxR	MaxR
30th %ile Green (s)	7.0	32.0		0.0	18.5		5.0	18.5		5.0	18.5	18.5
30th %ile Term Code	Max	Hold		Skip	Max		Max	MaxR		Max	MaxR	MaxR
10th %ile Green (s)	7.0	27.1		0.0	13.6		0.0	18.5		0.0	18.5	18.5
10th %ile Term Code	Max	Hold		Skip	Gap		Skip	MaxR		Skip	MaxR	MaxR
Stops (vph)	109	530	0	14	602	3	78	40		54	11	2
Fuel Used(gal)	5	19	1	1	38	3	2	1		1	0	1
CO Emissions (g/hr)	348	1320	50	48	2672	186	121	90		94	15	79
NOx Emissions (g/hr)	68	257	10	9	520	36	24	18		18	3	15
VOC Emissions (g/hr)	81	306	11	11	619	43	28	21		22	4	18
Dilemma Vehicles (#)	0	42	0	0	45	0	0	7		0	1	0
Queue Length 50th (ft)	67	135	0	5	169	0	35	16		25	4	0
Queue Length 95th (ft)	#166	#252	0	21	#257	8	69	55		53	17	5
Internal Link Dist (ft)		1864			4966			831			1020	
Turn Bay Length (ft)	750		550	700		1000	145			270		
Base Capacity (vph)	174	1426	957	125	921	720	464	492		433	485	589
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020

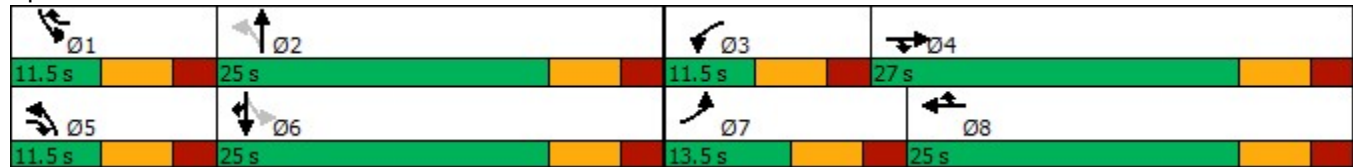


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.82	0.55	0.06	0.10	0.79	0.12	0.26	0.24		0.21	0.02	0.25

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	71.7
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	25.6
Intersection LOS:	C
Intersection Capacity Utilization	55.6%
ICU Level of Service	B
Analysis Period (min)	15
90th %ile Actuated Cycle:	75
70th %ile Actuated Cycle:	75
50th %ile Actuated Cycle:	75
30th %ile Actuated Cycle:	75
10th %ile Actuated Cycle:	58.6
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
























Splits and Phases: 3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road



Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	954	117	86	897	67	66	11	38	79	23	137
Future Volume (vph)	84	954	117	86	897	67	66	11	38	79	23	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	750		550	700		1000	145		0	270		0
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	220			220			25			65		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.884				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1647	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.741			0.722		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1380	1647	0	1345	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136		41				225
Link Speed (mph)		45			55			35				35
Link Distance (ft)		1944			5046			911			1100	
Travel Time (s)		29.5			62.6			17.7			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	1037	127	93	975	73	72	12	41	86	25	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	1037	127	93	975	73	72	53	0	86	25	149
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		30			36			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pt+ov	Prot	NA	pt+ov	pm+pt	NA		pm+pt	NA	Prot
Protected Phases	7	4	4 5	3	8	8 1	5	2		1	6	6
Permitted Phases							2			6		

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020

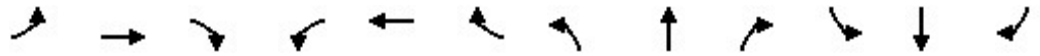


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4 5	3	8	8 1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.5	25.0		11.5	25.0		11.5	25.0		11.5	25.0	25.0
Total Split (s)	12.0	31.0		12.0	31.0		11.5	25.5		11.5	25.5	25.5
Total Split (%)	15.0%	38.8%		15.0%	38.8%		14.4%	31.9%		14.4%	31.9%	31.9%
Maximum Green (s)	5.5	24.5		5.5	24.5		5.0	19.0		5.0	19.0	19.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5		6.5	6.5		6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	5.7	24.1	35.9	5.7	24.1	35.9	23.3	19.5		23.3	19.5	19.5
Actuated g/C Ratio	0.08	0.32	0.48	0.08	0.32	0.48	0.31	0.26		0.31	0.26	0.26
v/c Ratio	0.68	0.91	0.15	0.69	0.85	0.09	0.16	0.11		0.19	0.05	0.26
Control Delay	64.2	39.1	2.9	65.8	34.2	0.5	17.3	11.4		17.7	24.1	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	64.2	39.1	2.9	65.8	34.2	0.5	17.3	11.4		17.7	24.1	2.0
LOS	E	D	A	E	C	A	B	B		B	C	A
Approach Delay		37.2			34.6			14.8			9.3	
Approach LOS		D			C			B			A	
90th %ile Green (s)	5.5	24.5		5.5	24.5		5.0	19.0		5.0	19.0	19.0
90th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
70th %ile Green (s)	5.5	24.5		5.5	24.5		5.0	19.0		5.0	19.0	19.0
70th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
50th %ile Green (s)	5.5	24.5		5.5	24.5		5.0	19.0		5.0	19.0	19.0
50th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
30th %ile Green (s)	5.5	24.5		5.5	24.5		5.0	19.0		5.0	19.0	19.0
30th %ile Term Code	Max	Max		Max	Max		Max	MaxR		Max	MaxR	MaxR
10th %ile Green (s)	0.0	20.5		0.0	20.5		0.0	19.0		0.0	19.0	19.0
10th %ile Term Code	Skip	Gap		Skip	Hold		Skip	MaxR		Skip	MaxR	MaxR
Stops (vph)	69	802	12	70	763	1	44	18		52	19	4
Fuel Used(gal)	3	30	2	5	49	2	1	1		1	0	1
CO Emissions (g/hr)	211	2069	118	364	3432	152	70	40		91	31	82
NOx Emissions (g/hr)	41	403	23	71	668	29	14	8		18	6	16
VOC Emissions (g/hr)	49	480	27	84	795	35	16	9		21	7	19
Dilemma Vehicles (#)	0	58	0	0	57	0	0	3		0	1	0
Queue Length 50th (ft)	46	265	0	47	243	0	23	5		27	10	0
Queue Length 95th (ft)	#122	#395	25	#125	#358	4	49	32		57	29	12
Internal Link Dist (ft)		1864			4966			831			1020	
Turn Bay Length (ft)	750		550	700		1000	145			270		
Base Capacity (vph)	134	1197	819	134	1197	819	458	462		449	488	581
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0

Lanes, Volumes, Timings

3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

05/22/2020



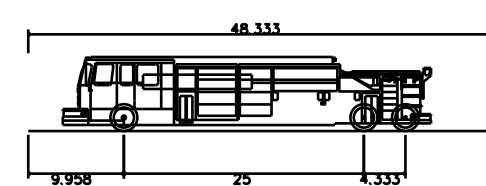
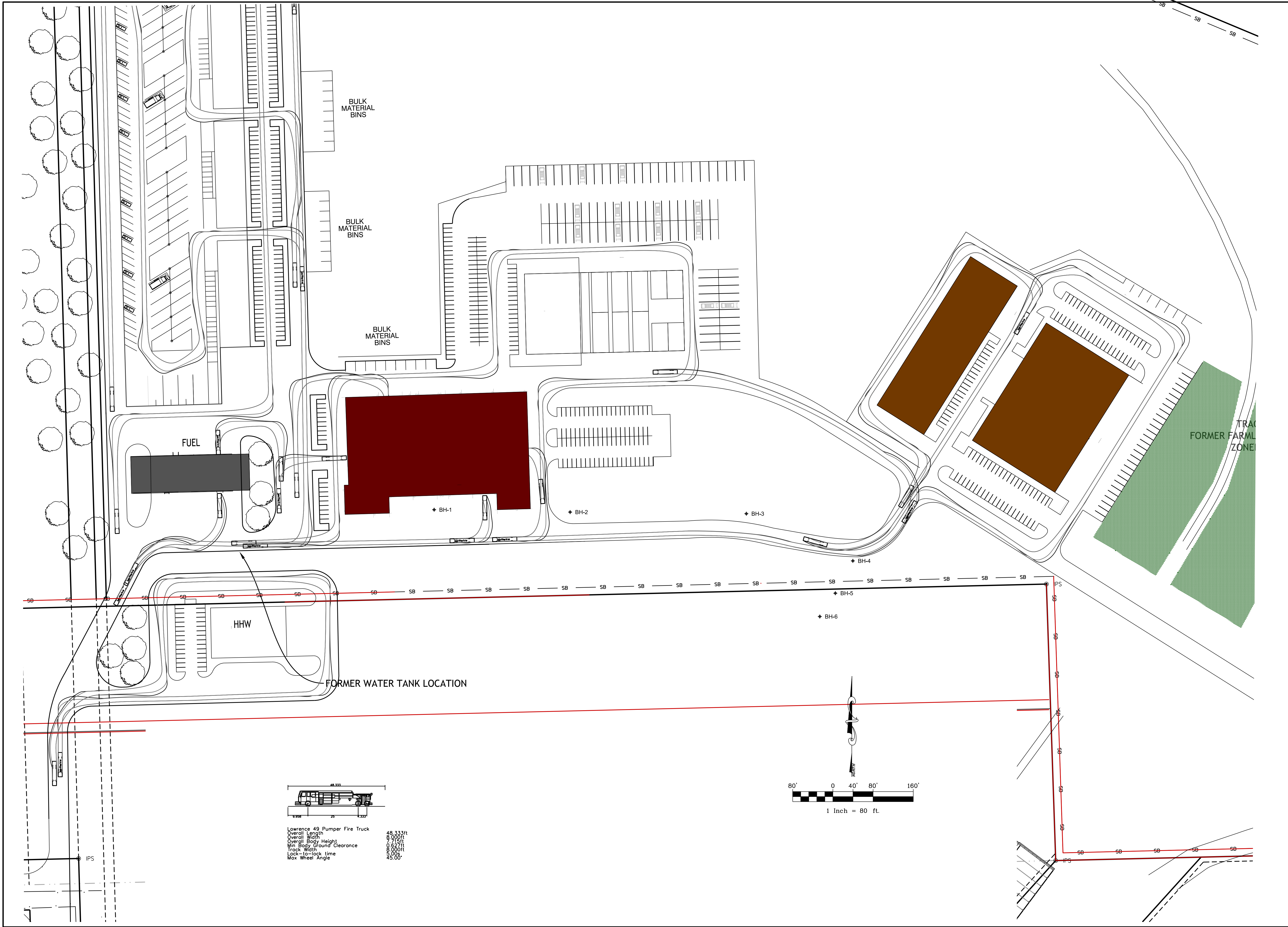
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.68	0.87	0.16	0.69	0.81	0.09	0.16	0.11		0.19	0.05	0.26

Intersection Summary

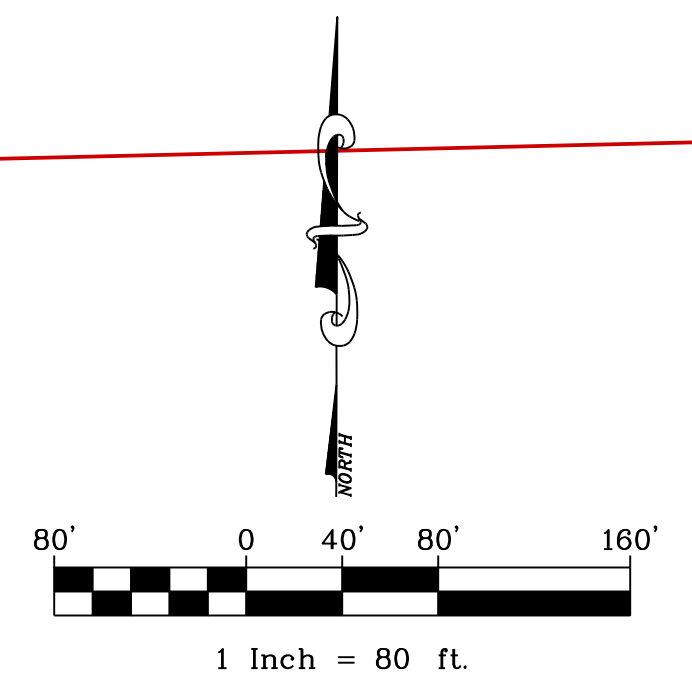
Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	74.5
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.91
Intersection Signal Delay:	32.6
Intersection LOS:	C
Intersection Capacity Utilization	58.4%
ICU Level of Service	B
Analysis Period (min)	15
90th %ile Actuated Cycle:	80
70th %ile Actuated Cycle:	80
50th %ile Actuated Cycle:	80
30th %ile Actuated Cycle:	80
10th %ile Actuated Cycle:	52.5
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 3: E 1600 Road/O'Connell Road & E 23rd Street/N 1400 Road

Ø1	Ø2	Ø3	Ø4
11.5 s	25.5 s	12 s	31 s
Ø5	Ø6	Ø7	Ø8
11.5 s	25.5 s	12 s	31 s



Lawrence 49 Pumper Fire Truck
 Overall Length 48.33ft
 Overall Width 8.00ft
 Overall Body Height 7.15ft
 Min Body Ground Clearance 0.62ft
 Track Width 8.00ft
 Lock-to-lock time 5.00s
 Max Wheel Angle 45.00°



Mark	Description	Date

Mark	Description	Date

Designed by:	Drawn by:	Checked by:	Reviewed by:	Date:
R.W.	R.W.	A.G.	A.G.	06-08-20
Submitted by:				Plot scale:
A.G.				1"=70'
File name: 091095_Turning-Fire_Truck.dwg				
Plot date: 07/01/20				

VEHICLE TURNING MOVEMENTS

49' LAWRENCE FIRE TRUCK